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RCM&E

VOL.63 NO.5 MAY 2020

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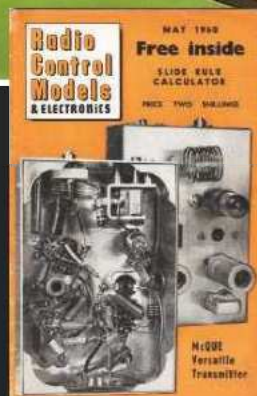
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WELCOME

Editor: Kevin Crozier. MyTimeMedia Ltd. Suite 25S, Eden House,
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After a long wait my DMARES Operator ID finally arrived, so at the end of February I decamped to my shed to turn the letters and number into something that I could fit inside my models. I've gone down the internal label route, rather than scribbling my ID on the outside of my models. For all but the smallest of my models (which don't need an ID anyway) there's usually plenty of room for the necessary details in either the fuel tank or battery bays.

I have opted for removeable labels using cut down lolly sticks, Velcro'd in easy to access areas. This means that I can remove the sticks for use in other models in case I forget to label up any hangar queens as they emerge from their winter slumbers. I've also knocked up a few spare lolly labels too, fitted with matching paper backed Velcro strips, which I'll be keeping in a small tin in my flight box, ready to fit at a moment's notice to any aircraft that may have slipped through the net.

To apply the letters, I delved into my old technical drawing collection for an alphabetical stencil, not used since my days as an engineering apprentice back in the 70s. My ID was swiftly inked on courtesy of a fine, black Sharpie pen.

I very much doubt if anyone in authority will ever want to delve inside my models but if they do at least I'll be ready for them!

Chatting to a clubmate about the aforementioned labels, conversation turned to 'If Found' labels, which were pretty much de rigueur when I first started flying, with radio failure (or more likely batteries running flat!) being an all too present danger. All my models were fitted with address labels, headlined with REWARD in big, bold capital letters - although quite what the reward would have been from a cash-strapped teenager, I cannot recall!

Despite the reliability of modern radios and batteries (if fully and properly charged) fly-aways can still happen, as Dave related to me concerning his large-scale sailplane, which was never seen again.

Although I do still affix 'If Found' labels to my largest (read most expensive!) models, I have to admit that many smaller craft do without, especially those in my foam fleet.

Thankfully it has been many decades, since training, when I last felt that dreaded feeling of not being in full control of a model. But as I get closer to my next big birthday (the one with a six and an 'oh' in it) I do

have to admit recently to applying one or two commands which have left me pondering in which direction the model was actually travelling. So, I'm now thinking of going the 'full lolly stick' and adding my phone number to my Operator ID, just in case...

Can you believe it? With this issue Radio Control Models & Electronics turns 60! Whilst I consider myself to be a fairly long-time reader of the magazine, having started by flicking through school model club copies in the mid-70s, I have to take my hat off to those stalwarts who have been collecting every issue since day one.

As I say, I started my own journey into R/C aeromodelling in the age of flares and zip up cardigans, thanks largely to regular doses of RCM&E and fuelled by monthly copies ordered at the newsagent just across the road. That, plus a well-thumbed copy of a Keil Kraft Handbook and a rather less weather beaten Ripmax catalogue, both of which were read cover to cover numerous times!

My collection of back issues continued to grow, piling up in my parents' back room, alongside Aeromodellers, Radio Modellers and newcomers like RC Model World. Back then, if a new mag came out, I was soon back at the shop counter asking for it to be added to my reading list. (Quite how I managed to pay for them all, I don't know? But I did have quite a good Saturday job...)

By the mid-80s my dear Mum had managed to hand me over to a young, misguided lass who was soon to become Mrs.C, although to be fair she did warn her to watch out for those darned models and that growing pile of magazines!

Little did I know that just a few short years later I would be starting out on a new career as Assistant Editor on RCM&E and Aeromodeller, and then rapidly be promoted to Editor of RCM&E - my dream job, which I'm glad to say it still is!

So please join me in saying a heartfelt 'Happy Birthday' to the old girl and wish her many more years of success as the UK's best-selling R/C magazine. I guess some of that is down to me, so I hope that I won't disappoint.

Happy Flying!

Kevin Crozier

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Andrew Hinton built his beautiful Blackburn Monoplane from scratch, based on the David Boddington plans. She is built to 1/4 scale and spans 96", powered by a Laser 150. Andrew's model is a faithful version of the example based at the Shuttleworth Collection, Old Warden.

Photo: Alex Whittaker



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MODEL FLYING AND COVID-19

In just the few short weeks that this issue of RCM&E has been in preparation we, across the countries of the UK, have gone from isolating a relatively small number of returning holidaymakers to now, at the time of writing, of shielding vulnerable people, with the rest of us being urged to practice social distancing - and with more extreme measures appearing highly likely quite soon.

With such a fast-changing situation it is impossible to keep our readers fully informed with the latest information on whether they should continue to fly their models.

The situation with model shows and other model flying related events is also in a state of flux, as you will see from the notices we are posting in this edition of Switch On, with some later events still hoping to go ahead whilst others are being postponed or cancelled.

Besides monitoring the websites of any show or events that you may be thinking of visiting, you'll also no doubt be keeping a close eye on the websites and social media of any clubs and associations that you may belong to for the latest information relating to your local model flying sites.

But if in doubt please stay at home.

The national model flying association websites are well worth looking at on a regular basis too:

- bmfa.org
- www.largemodelassociation.com
- www.saaweb.uk
- www.fpvuk.org

Finally, please do keep yourself and your family up to date on current government and NHS advice via the following links:

- www.gov.uk/coronavirus
- www.nhs.uk/conditions/coronavirus-covid-19/

WOODSPRING CANCELLATION

The Woodspring 2020 Model Air Show was due to take place on July 11th and 12th 2020. Sadly, this popular West Country event has become the latest show to be cancelled due to the Covid-19 restrictions:

"It is with great regret we have to announce the cancellation of this year's Woodspring Show. Updates on the progress and likely duration of the Coronavirus, with the government guidelines, has led the club to the conclusion it would be unwise for all involved to go ahead."

We are supported by a great group of traders, pilots and loyal enthusiasts, and believe it's the fairest thing to do to give as much notice as possible.

We will now focus on Woodspring 2021 to bring you the best ever show on our 30th anniversary.

Thank You, The Woodspring Show team"

MODELAIR 2020 AT OLD WARDEN

Following a constructive meeting with the management team at The Shuttleworth Collection of vintage aircraft based at Old Warden Aerodrome, near Biggleswade in Bedfordshire, ModelAir, who run a series of model aircraft events at the venue, were given confirmation that Shuttleworth is committed to supporting model flying at Old Warden. Ken and Sheila Sheppard, who organise the ModelAir events, told us:

"We are pleased to announce the following revised prices.

All visitors to ModelAir events will be welcome to visit the Museum Collection and the Swiss Garden, which are included in the ticket price.

- Adults (Spectators/Public) - £13.00 (No concessions)
- BMFA - £8.50 (with valid membership card)
- SVAS - £8.50 (with valid membership card)
- Children free

We hope that the addition of free entry to the Museum Collection and Swiss Garden will be appreciated. Shuttleworth have pointed out that the 2020 gate prices are significantly lower than the standard everyday ticket to the Collection, which is usually £21 for a combined ticket to the Collection and Garden."

Campers can book either by phone or by completing a form downloaded from www.shuttleworth.org/camping. Please ignore the prices on this website! To reserve your place please email: camping@shuttleworth.org or contact David or Pam Johansen on 07538 485843. Prices are £12 per unit per night reserved in advance by phone or £15 on the day if not advised before arrival. Traders and car-booters should contact Sheila: modelair.oldwarden@gmail.com or 07799 132999.

The list of model flying events at Old Warden are:

ModelAir Mayfly, 9 - 10 May: CANCELLED

www.shuttleworth.org/events/modelair-mayfly

ModelAir Scale Weekend, 25 - 26 July:

www.shuttleworth.org/events/modelair-scale-model

ModelAir Festival of Flight, 19 - 20 Sept:

www.shuttleworth.org/events/modelair-festival-of-flight

Please note that as the Government has implemented stronger measures to tackle Covid-19, The Shuttleworth Collection have decided to cancel all public events, including air shows, to the end of June. This means that the MayFly event will not take place. From June onwards, Shuttleworth will apply a rolling cancellation one month before each event and are hoping to get back on track come July. Please check before travelling:

www.modelair.info

www.facebook.com/ModelairAtOldWarden

PROWING INTERNATIONAL POSTPONED

The organisers of the highly regarded ProWing show in Germany have decided to postpone their popular event due to the Covid-19 virus:

"Due to the Coronavirus problems ProWing is postponed to 9 - 11th October 2020. We had to cancel ProWing [originally scheduled for May] so early because we are responsible for our visitors and exhibitors health. We also are bound to keep down costs for exhibitors and organisers as low as possible. Therefore, the early decision of moving ProWing to October was mandatory."

We hope you understand our decision and we are looking forward to seeing you at ProWing from October 9th to 11th 2020 in Soest/Bad Sassendorf."

For the latest information please visit the ProWing website: www.prowing.de



NEXT GENERATION!

With such sombre news permeating even our wonderful hobby, we are grateful to Pete Barnes for lightening the mood a little bit!

"New edition day means that my little wingman finally gets his hands-on last month's copy. Although it seems the excitement was too much! I may have inflicted his interests with aeroplanes from an early age, but this is how we will keep the hobby alive and well."

Many thanks for sending us your pictures, Peter - we hope it wasn't anything we wrote that caused such a reaction!



MACGREGOR TOOLEY UP

Next up is some sponsorship news from MacGregor Industries, who are the UK official distributor for Pilot RC and Dualsky products:

"We are glad to have Rory Tooley joining our team of sponsored pilots."

Over the past few years we have noticed how he has progressed at competition level, with great skill and at such a young age. Rory will be demonstrating the latest products from all three suppliers, including MacGregor Servos and we wish him every success for 2020."



PONTEFRACT SINGLE CHANNEL & RETRO FLY IN

The Pontefract Single Channel & Retro Fly In, scheduled for the 13th and 14th June, joins the growing list of model flying events that have now been cancelled. Shaun Garrity reports:

"The event is held in a public park and requires a licence from the local council, who have taken the only sensible course of action, suspending all current permissions until government advice gives the all-clear. The event organisers (who had already made a decision to cancel), hope to reschedule later in the year, if possible, and hope to see all the usual suspects there."

Keep safe, Shaun & Phil"



MISTAKEN IDENTITY

Our regular contributor and popular model designer, Peter Miller writes: *"Just been browsing through the latest RCM&E, which arrived a few minutes ago. Looking at Alec Whittaker's report on Woodvale, I saw a picture of a tiny Shrike Commander, claimed to be 28" span. I designed a 26" span Shrike Commander, which was published in Radio Modeller back in the 90s. It was powered by two Cox TD 020s and was a hairy little beast. I can't help wondering..."*

Sorry, Peter, but the diminutive Rockwell, owned by Leon Rosen and shown on page 54 of the April issue, is a foam model and so wasn't built from your plan.

However, it would certainly make an interesting project for any of our readers who may be confined to their homes and looking for a small model to build - and a nimble one to fly, by the sounds of it! If so, plans are still available from Sarik Hobbies (www.sarikhobbies.com) as plan number: **MAG182 – Rockwell Shrike Commander**, RRP £12.50

COUNTERPOINT

VQ TIGER MOTH

£196.95 | www.macgregor.co.uk

Resplendent in a striking yellow livery, VQ Model's Tiger Moth opens the door to owning a fine example of De Havilland's iconic 1930s biplane without spending too much building time. Presented in ARTF form, the pre-built balsa and liteply airframe is complemented by a fibreglass cowl, painted pilot (pre-installed), pre-hinged and installed control surfaces, wheels and covers, engine mounts, fuel tank, spinner, aluminium wing joiners, decals, hardware and illustrated assembly instructions. For 5-channel (minimum) R/C and 4–5 servos, this 55.1" (1400mm) span DH.82 requires either a .46 two-stroke, .70 four-stroke or electric equivalent (Electrospeed 3548/05 900kV outrunner, 60A ESC, 3S 4500mAh recommended). Check out MacGregor Industries website for more info.



EINDECKER

£149.99 | www.4-max.co.uk

If you're harbouring the desire to build a scale-like WWI warbird but are put off by cutting out all the ribs, formers etc. usually associated with such a model then help is at hand in the form of this lovely 59.8" (1520mm) span Fokker E1 Eindecker from 4-Max, the kit of which includes a host of interlocking CNC-cut balsa and ply parts, plus fibreglass cowl, wheels, guns, dummy radial engine and a comprehensive high quality hardware pack. Complemented by full-size plans, a colour assembly manual and the inclusion of two rolls of covering film (4m in total), this evocative model requires 4 to 5-channel R/C, a 2820-3250kV brushless motor, 40A–60A ESC and 3S or 4S 2200–4000mAh LiPo or .40–.56 IC power.



ARROWS HUSKY

£256.99 | www.jperkins.com

Spanning 70.9" (1800mm) and modelled on the hugely popular light utility high-winger, this latest semi-scale PNP foamie from Arrows Hobby looks resplendent in its authentic bush-inspired colour scheme. Complete with tundra tyres, authentic graphics and a wealth of detail that includes scale wing and jury struts, working landing and navigation lights, aials, panel and exhaust detail, this striking model flies beautifully, ably assisted by the flap-equipped wing's versatile semi-symmetrical section and efficient, high-lift drooping tips. A carefully selected 4S power system (suitable for upwards of 3200mAh) provides an abundance of power, which, combined with a full complement of STOL-enhancing aerodynamic features, conspire to make this an all-round sportster that excels at both ends of the speed range and delivers a satisfying aerobatic repertoire. Perfect for intermediate pilots and competent beginners. Check it out at your nearest J. Perkins stockist.





VQ SPITFIRE

£199.95 | www.macgregor.co.uk

With summer fast approaching what better model to carve across those inviting blue skies than a Spitfire? Featuring a laser-cut, jig-built balsa and liteply airframe, factory-installed control surfaces, fibreglass cowl, hand-painted pilot, detailed cockpit and good level of scale detail, this 60.6" (1539mm) VQ Models ARTF from MacGregor Industries is a faithful representation of this revered warbird. Recommended for a .55 two-stroke, .72 - .82 four-stroke or electric equivalent (Electrospeed 5045/10 720kV outrunner, 80A ESC, 4S 4500 - 5000mAh LiPo recommended), the kit includes a fixed undercarriage (retracts are available separately), wheels (inc. tailwheel), engine mounts, fuel tank, servo trays, spinner, decals and hardware. For 6-channel R/C and 6 to 7 servos.



AIR TRACTOR 1.5M

£299.99 (BNF); £279.99 (PNP) | www.horizonhobby.co.uk

Quick to build and easy to fly, E-flite's Piper Pawnee lookalike from Horizon Hobby looks every inch the crop duster and is ideal as a first scale model or low-winger. AS3X and SAFE technologies (BNF version only) provide enhanced flyability across the Air Tractor's remit of scale, sport and aerobatic performance, with slotted flaps providing excellent low-speed and STOL capability that makes short-field operation of this composite-reinforced EPO model a breeze. Optional floats and skis are available, adding levels of 'fly anywhere' potential. Moulded panel lines, rivets and factory-installed LED landing, navigation and strobe lights add to the scale aesthetics, with a pre-fitted brushless motor and 50A ESC providing plenty of power fuelled by your choice of a 3S 2200 - 3200mAh LiPo. For unlimited vertical performance you can go 4S without any modifications or upgrades. Six servos are also factory-fitted. Requires a 5 - 6 plus channel DSMX/DSM2 Tx (Rx also required for the PNP version).



SEAGULL B-25

£879.99 | www.jperkins.com

Famed for its role in the heroic Doolittle Raid, North American's B-25 Mitchell (named in honour of US military aviation pioneer, William 'Billy' Mitchell) first took to the air in August 1940. Safe and forgiving to fly, the B-25 quickly found favour with its pilots and crew, not least for the fact that with an engine out 60° banking turns were possible in the direction of the dead engine. The aircraft's popularity, coupled with its large wing area, stable flight characteristics and practical layout (tricycle U/C, twin fins and inboard engine arrangement) hasn't been lost on Seagull. The result is this gorgeous 95" (2413mm) span ARTF that comes wrapped in authentic matt finish Oracover, complete with all the regular hardware including fuel tanks, engine mounts, horns, linkages, pilots and an electric conversion kit. High intensity LED landing lights and a plethora of scale details (bomb doors, detailed cockpit, guns, turrets, dummy engines and a brace of beautifully moulded cowls) really do set this model off, which lends itself perfectly to super-detailing and authentic weathering. If you're a B-25 fan, you'll just have to have one - visit the J. Perkins website and see for yourself.





BLACKBURN MONOPLANE

Alex Whittaker examines Andrew Hilton's highly characterful '1912'. words & photos » Alex Whittaker



Andrew's Blackburn 1912 Monoplane has a wingspan of 86 inches.

The Blackburn Monoplane was a design years ahead of its time. In an age where biplanes and triplanes were considered the correct way forward a thoughtful and visionary Yorkshireman had other ideas. Robert Blackburn's Type D of 1912 was essentially a modern aircraft. First of all, it was a monoplane, and a mid-wing design at that. Perhaps, most significantly, the general arrangement of its key elements presaged the now accepted layout for most modern aircraft.

The Type D 1912 was a fabric covered wooden aircraft powered by a 50hp Gnome rotary engine. Originally built for Cyril Foggin, it was soon sold on to Montague Francis Glew, who promptly crashed it. The Great War intervened, so it was not repaired. Much later, Richard Ormonde Shuttleworth bought the remains in 1938. He had it rebuilt for the Shuttleworth Collection, where it remains as the oldest airworthy British aircraft.

It is a little-known fact of aviation history that Robert Blackburn introduced the first Air Service in Great Britain, too. This offered half-hourly



Andrew Hilton's 1/4 scale '1912' is built to the David Boddington plan.



She flies on three channels. The rigging is based on M2 hardware.

flights between Leeds and Bradford. Of course, it is never explained why anybody would wish to travel between Bradford and Leeds.

THE MODEL

Noted scale modeller Andrew Hinton built this beautifully observed model from scratch, based on the David Boddington plans. She is built to 1/4 scale and spans 96", so she is a decent size. She weighs 15lbs 8ozs and required 7ozs of nose weight. She is powered by a Laser 150 driving a 16" x 8" Master Airscrew.

Naturally, Andrew's model is a faithful version of the only extant example at the Shuttleworth Collection, Old Warden.

The whole of the model is covered in linen Solartex.

DOCUMENTATION

The 1912 Blackburn Monoplane is the oldest original airworthy British aeroplane. The only documentation used in the build by Andrew was to take about 60 photos (from every possible angle) of the museum exhibit at Shuttleworth and then faithfully try to replicate exactly what had been photographed!



Rib stitches were made by tacking 5mm bits of cotton across the ribs, then ironing 15mm wide rib tape on top.

WINGS

Construction is fully traditional, with balsa ribs and spars. The wings are under-cambered as per the original. The top spars, front and rear, sit below the top edge of the ribs, so they don't show through the covering. The bottom spars sit flush with the ribs. This provides more balsa for the covering to adhere to on the under-camber. Adhesion is further assisted by the use of Balsaloc on all the balsa before covering.

The rib stitches are achieved by tack-cyanoing 5mm bits of cotton across the ribs, and then 15mm wide rib tape was ironed on top.

The wing panels plug into the fuselage using 3/16" piano wire as dihedral braces. These are affixed permanently into the wing. They slide into brass tubes, which are set in beech wood blocks in the fuselage at the wing roots. There are one-inch stand-off blocks at the wing roots because there is a scale gap between the wing and fuselage.

TAIL SECTION

The tail section is all built-up balsa using strip cut from quarter inch sheet. The fin and rudder also require a scale gap where they meet the fuselage, so stand-off blocks are used again.



The Blackburn has large tail surfaces

Kingpost and pulley are nicely observed.



The Blackburn flies well on Laser 150 power.



KING POST, PULLEY & RIGGING

The wings are held in place by multiple rigging wires from the king post. The king post is made up from piano wire clad in wood and then stained. On top of the king post is a rigging pulley. Rigging wires pass over this pulley to give the appearance of wing warping. However, the model actually flies on three channels: rudder, elevator and throttle.

All rigging is replicated using standard M2 clevises, threaded rods (with eyelets) and nylon coated trace wire. Rigging points are all made from brass strip and secured to the pre-positioned hardwood blocks in the wing.

ENGINE, TANK & PROPELLER

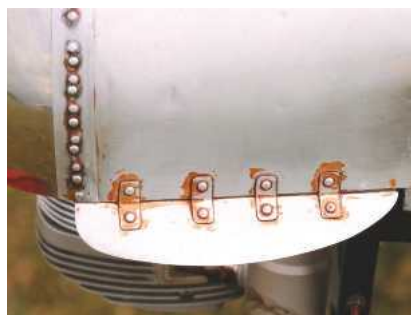
The 1912 is powered by an ultra-reliable Laser 150. The engine is mounted on a Dural plate bolted to beech bearers, which are built into the fuselage. Due to the V shape of the fuselage the 14 oz SLEC tank lies high, just on the top decking. So, with an inverted engine there is no problem with fuel feed. She has more than ample power, but a smaller engine would have required more than seven ounces of nose lead.

The Laser 150 turns a 16" x 8" Master Aircrow, which Andrew reports is an ideal combination. However, for static display, he feels that she looks better with a 20-inch wooden propeller.

The silencer is the standard Laser item with an additional straight extension piece, also available from Laser.



She oozes Edwardian style and decorousness.



An authentic cowl baffle is fitted.

COWL

The commercially available cowl was cut half-round by using a Dremel cutting disc. It was then reduced again around its circumference to a depth of only 1.5 inches. The remaining characteristic nose shape was achieved with litho plate over built-up formers.

The model is clad entirely in litho plate, from the cowl to the rear of the pilot seat. An 11-inch section of top decking is removable to allow access to the tank and flight pack etc. Rivets are added to various panels, stuck on with cyano after drilling a 1.5 mm hole into the litho plate to fit.

The dummy engine fuel filler caps were fashioned from brass using a needle file. These are similar in appearance to the caps on Pratts 2-gallon petrol cans.



Laser 150 has a standard silencer, plus factory extension.



Andrew's woodwork and metalwork are superb.

JIG

it is worth noting that the fuselage V shape is incredibly awkward to work with, so Andrew made up a special cradle to hold the whole fuselage upright on the bench.



Far left: The wheels have been weathered with pencil lead, enamel - and cold tea. Left: The cockpit is a faithful replica.

UNDERCARRIAGE

The undercarriage is primarily built from 3/16" and 1/8" piano wire, silver soldered up to make the frame. This is then clad with bass wood, cut into strips. These were routed out with a burr in the Dremel, by hand, to make a slot just deep enough to take the piano wire. The wire is epoxied into this slot, then capped with 1/16" ply, sanded and carved to shape and then stained.

The axle is bungee sprung, like the original. It allows about half an inch up and down movement upon landing. Small fish plates made from litho have been added to the undercarriage for scale effect.

The wheels are Williams Brothers 6-5/8" diameter vintage. The undercarriage is removable. It plugs into brass tubing in the fuselage, the same as the wings.

COCKPIT DETAILS

The pilot is from Roger Hawkins. His sheepskin collar and cuffs and moustache are real hair, carefully trimmed from paintbrush bristles.

The steering wheel is a curtain pole ring, with spokes hand filed from aluminium sheet. Pulleys, bell cranks and the like are replicated and functional, and on full show in the cockpit. The cockpit coaming is made from beading from old leather cushions salvaged from a disintegrating chair.

CONTROLS

Operating the controls are standard close loop set-ups. Servos are metal geared types due to the large surface areas and long throws on the rudder and elevator. No gyros are employed. The model has to be flown!



Left: Characteristic gap at the wing root. Below: Closed loop (pull-pull) control wires operate the controls. Note the wooden undercarriage 'horns'.





DATAFILE

Model Name:	Blackburn 1912 Monoplane
Manufacturer:	DB Sport and Scale plan
Builder:	Andrew Hilton
Scale:	1/4
Span:	96"
Weight:	15lbs 8ozs
Engine:	Laser 150
Prop:	16" x 8" Master
Exhaust:	Standard, with Laser extension

Top: The 1912 presaged the now accepted layout for most modern aircraft. This model is based on the full-size example in The Shuttleworth Collection. Left: The Monoplane requires a bit of 'opposite lock' to keep the turns flat. It's the Full Flambarbs!

SCALE DETAILING

Andy decided from the outset that the whole aircraft needs to display a grubby appearance. He reports that the wings and tail are were sprinkled with strong tea to replicate castor stains. Crushed pencil lead was rubbed along edges and rib tapes to emphasise a one hundred-year-old appearance. Castor oil staining around the front cowl rivet heads was replicated with wood stain.

Matt enamel paint was applied to the wheel hub, then the wheel was gently spun in a drill to throw the paint into a typical stain pattern. Andrew says you have to put a few gentle knocks and dents in the litho plate for authenticity.

Also, when the covering on the original Blackburn was replaced a few years ago, Andrew got hold of a 12-inch square piece of the discarded original. He used this as a swatch to match the wings on the model.

FLYING NOTES

The first flights seemed rather peculiar. Andy said they took a lot of getting used to. David Boddington suggested on his plan that wing warping was not necessary, so "being a lazy savage" Andrew opted for three channel control.

First, Andy reports that she doesn't like flying in winds much more than 3 or 4 mph, because she tends to weathercock all the time. He notes that the full-size does not fly at Old Warden unless it is flat calm.

Second, and most importantly, Andy states that all turns must be kept as gentle and as wide as possible. The wings should not be banked over much more than 5° before each turn is even half completed. Applying surprisingly large amounts of opposite rudder is needed to level her up out of the turn. The rudder has an 8-inch chord and moves three inches each way. Perhaps more

dihedral would make her a bit easier to manage, but that would compromise her scale appearance.

Once you are familiar with these peculiar traits, Andrew says she flies very well. "Overall, she's a delightful slow flying scale model, with take offs and landings being a pleasure."

Andrew also told me, "She always seems to be a crowd pleaser. With the light glinting off the polished cowl as the sun sets on a summer evening, and with the pilot's scarf flapping on a slow fly past, I am a happy bunny!"

POSTSCRIPT

Interestingly, Andrew's model first flew on the Centenary of the original. Furthermore, Andrew was awarded the Shuttleworth Scale Trophy for the best representation of an aircraft in the Shuttleworth Collection. Andrew's name joined those of Bryant, McDermott and Boddington on the Trophy, no less. ✈️



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YAK-9

Designed for the adrenaline fuelled rush of Aircombat, Timo Starkloff's compact and rugged Yak brings the promise of streamer cutting fun!

words & photos » Timo Starkloff

Small, fast and quick to build, this is no model for beginners, but it does make an ideal introduction into the world of Aircombat. If you're unfamiliar with this competitive discipline, I'll explain...

Aircombat is all about quick reactions and fun. Building and flying high performance models at speeds of around 93mph (150kmh) where the risk is much higher than with normal R/C flying, but so is the thrill and excitement. 1/8 scale WWI models are flown, but the main class is 1/12 scale WWII fighters of 31.5" (800mm) - 51.2" (1300mm) span, powered by .15 - .25 IC engines or electric equivalent with AUWs of 24.7oz (700g) to 49.4oz (1400g). Twin-engine fighters or unusual prototypes are also sometimes flown.

Up to seven models fly in each seven-minute heat, with a 12m paper streamer attached to each model. Thrilling dogfights ensue in the pursuit of cutting the streamers of fellow competitors. Between three and five heats are flown, with the seven best pilots flying against each other in the final.

The Swedish founded Aircombat in 1996, along with ACES (Air Combat Elementary Support), the body for implementing the discipline's rule set and organising contests. Aircombat has continued to grow since then

and eighteen countries currently participate, at the hands of a wide age range of pilots, from 12 to 75 years old. Yearly domestic championships are held in each country, culminating in the World Aircombat Scale Games, held every second year in different countries with some 80 - 130 participants.

There used to be a representation from England, with the likes of the Fen Fighters and Bulldog Squad flying the flag. But these were relatively small groups and due to a decline in participants there are currently no contests being held in the UK. If you're interested in Aircombat you're more than welcome to visit a contest on the continent, but it would be great if there was sufficient interest to see a UK contingent garner enough support for their own contests!

For those who are interested the Yak-9 is the perfect start – it's a low-cost model for Aircombat beginners that can be built over one or two rainy weekends. Grab a couple of like-minded clubmates, build a few models, make some test flights and get used to your Yaks. And then you can begin contest flying!

My Yak is based on the P-39 Airacobra designed in 1995 by Sweden's Martin Elmberg, one of the founders of Aircombat. The plan was published in magazines all over Europe

as a promotion for this (then) new sport class and as a result many pilots and countries started flying Aircombat contests with this little model. I developed the Yak-9 in 2006 as an improved version of the Airacobra, with a more detailed construction and improved top speed, and it's proved to be a great success, attracting many new pilots, mainly from Germany and neighbouring countries, but also in Eastern Europe.

BUILD

Before cutting any wood, be selective about its weight - an important consideration with this model. It needs to be as light as possible, especially if you're aiming to fly in the contest arena. Poplar plywood and soft, low weight balsa is recommended, as is PVA adhesive, which is easy to handle and is strong, cheap and has a low dry weight.

The woods used are 0.8mm and 3mm ply, and 1.5mm, 3mm and 5mm balsa. Some parts are made from a combination of different thicknesses to prevent buying a whole sheet of wood just for one or two parts. Transferring part outlines onto ply is easy; copy the parts of the plan onto ordinary paper and then transfer these onto the ply with a hot iron.

Okay, let's get this Yak built.



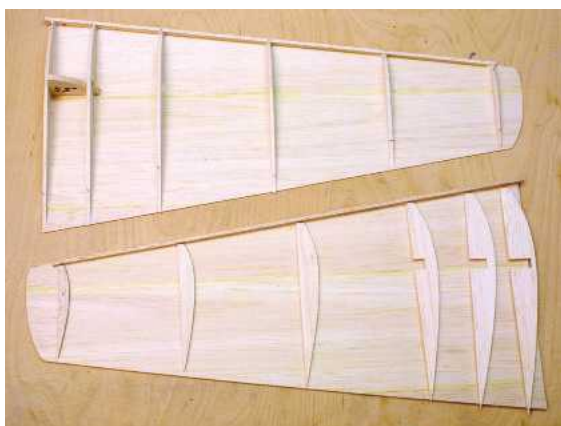
*Above: With transmitters holding down their streamers, a pair of Yaks await the call to arms.
Left: Pascal from Caen, France with his Yak-9 in the colours of the Normandy/Niemen squadron.*

WING

Start the build of the first wing panel by gluing L.E. F2 onto the front edge of the lower wing skin F1, followed by ribs F3 - F8, noting that F3 is angled to give 5.5° dihedral with the help of the template shown on the plan. When dry, sand F2 and the rear edge of F1 to shape as shown to gain more area for attaching the top skin. Test-fit the wing joiner F10 into the ribs F3 - F5 to check for a good fit and rework the ribs if necessary.

The most important aspect of the wing build is the 2.5° washout, without which it will be impossible to launch or land the Yak. To achieve said washout the wing T.E. must be jigged accordingly whilst sheeting the top side. For that you'll need a triangular balsa jig, made from 5mm balsa that's 420mm long and 4mm high at one end, tapering to 0mm at the other end. Secure the jig below the rear edge of F1 (4mm end at the tip, 0mm end at the root) then apply the 1.5mm top wing sheeting, pinning everything in place so the wing panel keeps its shape (and washout) whilst the glue dries. Add the L.E. F11 and wing tip F9.

Build the second panel in similar fashion, sand both to a smooth finish and join them together using F10, sealing the joint with a



Wing panels are simple affairs.



Port wing after sheeting.



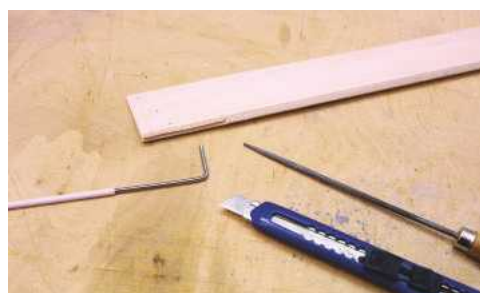
This simple jig sets the dihedral angle at the root rib.



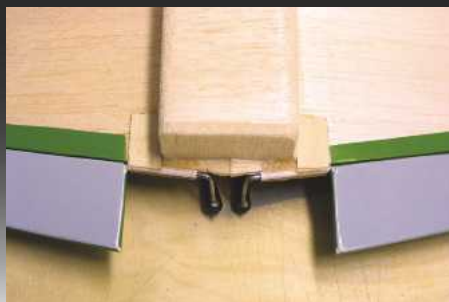
Fitting the wing joiner.



The dummy radiator provides a convenient hand hold for launching.



Making the aileron torque rods. Note the soldered-on balls for connecting the ball-links.



Torque rods are sandwiched between ply plates at the trailing edges, which makes it's easier to stop glue from gumming up the works!



Preparing the fuselage sides with formers and reinforcements.

good helping of PVA. Additional reinforcement with glass fibre isn't necessary.

The radiator is made from 5mm balsa and locates below the wing as shown. When used as a grip for hand launching, its sides should be covered with sandpaper to provide a good grip.

Made from 3mm balsa the ailerons are controlled by either one or two servos - your choice. F13 holds the tube for the torsion control of the aileron in place and strengthens the wing against the rubber bands used for retaining the wing to the fuselage.

FUSELAGE

Glue the reinforcement F2 and the 3mm square and 5mm square spars to the fuselage sides F1 as per the plan. When dry join the sides together over formers R3 to R8, holding the assembly together with rubber bands and pins, and ensuring that the structure remains straight and true whilst the glue dries. Glue the elevator snake outers into the frames as shown using cyano, then add the top and bottom fuselage sheeting, along with the servo mounting plate R9.

The simple indication of a cowl, by having one longer fuselage side, doesn't distract in the air and helps to simplify the build. But if you want a superior appearance then you can make a facsimile of the cowl from foam, cover it with two sheets of 163 g/dm² glass fibre, spray a thick layer of filler and sand it smooth with wet and dry sandpaper, used wet. From this you can then make a mould for making glass fibre cowlings. A mould for the canopy can be made the same way, the canopy being duly vac-formed using 0.5mm Vivak (PETG).



When fitting the wire pushrods try to get nice straight runs.



Sheeting the top of the fuselage. Extending one side panel helps give the appearance of a cowl. Simple but effective.



Above: Sheeting the nearly finished fuselage. Right: A full cowl is available from the author, as well as a vac-formed canopy.



DESIGNED BY TIMO STARKLOFF

DESIGNED BY TIMO STARKLOFF

A 1/12 SCALE MODEL FOR AIRCOMBAT CONTESTS

The open cowl gives easy access to the engine.



Finding a different colour scheme for your own Yak-9 should be easy!



Concentrating hard on a firm, straight hand launch.



Another Yak gets airborne.

TAIL FEATHERS

The rudder is made from two parts, placed on the fuselage and the joint reinforced with strips of 3mm square balsa. The elevators are separate and controlled by two snakes, which give a better safety margin in the event of a collision.

FINISH

Attaching the wing with rubber bands may look outdated but it's the ideal arrangement for Aircombat models as the fuselage and wing are better protected during hard landings compared with a bolt-on attachment, as in the event of a collision the wing can move a little instead of shearing off.

The control runs need to be accurate and slop-free because of the small control movements involved. And don't scrimp on servos, which should be reliable with robust gears. 15g metal gear units are best - Hitec HS82MGs, for example.

For securing the control surfaces I use Kavan polyester hinges, which are cheap and easy to install; there's virtually no space left between the control surface and its corresponding flying surface. Simply make a cut with a sharp knife, place the hinges and surfaces in place, then add thin cyano - job done.

Internal combustion engines are best mounted at 45° to the left side. Cooling is easy

with the Yak's open design and the shape of the model isn't too affected. An inverted installation often leads to a rich setting and dirt in the carburettor so is best avoided.

As far as covering is concerned an iron-on film is the way to go. It's not that heavy and improves the model's robustness. A paper finish is lighter but also weaker, whilst glass fibre weighs much more and shouldn't be used - remember, light weight is key to the Yak's performance.

FLYING

Just a few mm of elevator and aileron deflection may sound small, but it's the norm for fast, agile Aircombat models such as this. Too much deflection will only lead to high speed stalls or uncontrollable flying.

A bit of headwind is helpful for the first few launches but is not necessary once you've got used to the model.

Once your Yak's safely away on its inaugural flight remember that a small model flying at high speed gets very small, very quickly, so be prepared to reduce power and lower the speed before it gets too distant.

Performance wise the Yak will happily fly with the engine at idle; open the throttle and simple aerobatics are possible, as is inverted flight. In a stall the Yak does drop a wing but recovers fast. Provided the C of G is correct

this will happen only at very low speed.

A nose-heavy model isn't so agile, will land much faster and lose a lot of height in tight turns if there's no engine power. Compared to other air combat models the Yak's landing glide is relatively steep due to the drag of the Spica airfoil, however this makes it easier to land on small fields, especially handy for inexperienced pilots.

The true qualities of the Yak-9 come to the fore in Aircombat contests, where its flying characteristics make dogfights easy for beginners and the Spica airfoil affords a very tight turning radius. There's a speed reduction in such tight turns due to the airfoil, but the model's low weight means it will accelerate quickly.

In experienced hands the Yak can compete against any other model in Aircombat, as proven by two guys from the Austrian 'Carinthian Knights' squadron who flew it to victory in several contests and topped the yearly ranking.

Just because the Yak is light doesn't mean it's fragile. Far from it - this is a very tough aircraft. In my experience, after a crash a broken propeller is often the only damage. She flies further than many after collisions and will fly with just one elevator intact should the other one be lost in the heat of battle! She has also floated in a lake, and her simplicity means that quick repairs are possible between heats.

DATAFILE

Model Name:	Yak 9
Model type:	Aircombat
Designed by:	Timo Starkloff
Wingspan:	33.9" (860mm)
Fuselage length:	29.1" (740mm)
Wing area:	1.56sq. ft. (0.145sq. m)
All-up weight:	26.5oz (750g)+
Wing loading:	170z / sq. ft. (5.2kg / sq. m)+
Rec'd IC setup:	ASP 15 or O.S. 15 LA two-stroke, Rossi R3 glowplug, 7 x 5" APC or 8 x 4" Master Airscrew prop, 67% methanol/18% castor oil/15% nitromethane fuel, 100ml fuel tank
Rec'd electric setup:	3530-1400 or 3536-1250 brushless motor, 40A ESC (w/3A BEC), APC 8 x 6" E or Aeronaut CAMCarbon 9 x 5" prop, 3S 1700 – 3500mAh LiPo
Functions (servos):	Aileron (1 or 2); elevator (1); throttle (1, or via ESC)
Control deflections:	Aileron $\pm 0.2^\circ$ (5mm); elevator $+0.24^\circ$ (6mm), -0.2° (5mm)

CONTACTS

ACES website: www.aircombat.eu

MOULDINGS

Vac-formed canopies and glass fibre cowlings for the Yak-9 are available from the author. Please contact Timo for his latest prices and an estimate of postage costs:

timo.starkloff@t-online.de ✈



It looks bad but this airframe was designed to be easy to repair.



Young Aircombat pilots from Germany pose with their colourful Yaks.



Pascal's Yakovlev turns in readiness for a low pass.

“In experienced hands the Yak can compete against any other model in Aircombat...”





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B-25 produced by Seagull. Detail hasn't been ignored.

TWINS & THINGS

In a typically eclectic mix, David Ashby admires some fine warbird twins, talks crow and finds a new wind meter

words & photos » David Ashby

Warbird fanciers love the B-25 Mitchell, so let's start with a big one this month. ARTF versions are very rare. Go back 10 years and Hangar 9's now discontinued 80" span facsimile was popular, but Seagull's larger 95" version arrived last year and that's the one you see here.

With a street price of around £790 the ARTF kit isn't an impulse buy, but it is an impressive model none-the-less and well featured. There are flaps of course, hinged bomb bay doors, pre-fitted landing lights and the sort of sport-scale detail that helps create the right impression. The wing is two-piece and the matt-finish Oracover not only looks authentic but reminds you how annoying glossy Hangar 9's model was.

Seagull suggest two 15cc engines (or electric equivalent) for power and, as is the Seagull way, electric conversion accessories are bundled along with all the IC hardware needed, such as tanks and engine mounts.

This one was built by Geoff Wallace and I happened to be around to see the first flight

at the beginning of February. He'd fitted two Multiplex outrunners - Roxxy 5065-08 size 330kV units (ref 314665) - spinning three-blade 15" x 7" props. Power was routed through two 85A ZTW Gekko ESCs from two 6S 5000mAh 50C LiPos wired in parallel under the very large fuselage hatch. Retracts aren't included so Geoff fitted electric items from the J.Perkins catalogue. All-up the model came in at 10.4kg (22.92lbs).

The first flight was uneventful, although the model sat on its tail a little, so it was obvious the C of G needed to come forward. Power, while adequate, was no more than that, so it flew with the throttle stick pushed further forward than you'd expect.

One flight is enough for now and Geoff will move the Rx battery forward to tweak the C of G and intends to swap out the three-bladers for two-blade 15" x 8" props. Hopefully, these should endow the power system with a little more urge. The second flight awaits.

TIGER TWIN

Staying with twins, a personal favourite, Grumman's Tigercat, is the subject for Scott McKie's latest project.

He drew up the plans from scale drawings, although he's lucky enough to have one nearby where - in his words - *"a lucky dude has his own, personal, totally rebuilt and refurbished F-7F hangared. I've been all over that plane like dust and it is an unbelievably beautiful aircraft."*

It is. I've flown a couple of 'cats over the years - ASM's 2m span version (converted to electric) some ten years ago, and FMS' superb 1.7m example more recently. Both appeared in these pages and flew very well. I recall being paranoid about the torque effect from the two motors on ASM's model - both props were moving in the same direction - but I needn't have been. In both cases the models had a feeling of locked-in stability without any bad habits. The speed range was wide and flap deployment had no discernible effect on pitch. The FMS model is still here



A little tail heaviness was apparent during the first flight, but nothing that can't be easily fixed.



Seconds after the take-off roll. You can see a little flap was used.

and although it only comes out in fine weather, only a bad crash will separate us.

Back with Scott's model, as you can see on page 29, he has used 3mm Depron as the prime material, and construction uses a tongue and slot method throughout. It's very elaborate and each fuselage wrap-around skin piece has been sized so that when placed butt-to-butt with associated pieces, each new seam can be sanded and tapered toward the centre of each piece to make up a smooth, multi-curved skin. The wings have a 3mm profile sheet in the middle and the ribs are split horizontally and thus allow for some washout to be added.

The nacelles are made-up with outer rings slid over horizontal and vertical 3mm Depron pieces, although he concedes that the gear doors need to be added, probably of another material, in order to conform to the multi-curved nacelle.

Plenty of challenges remain; how to brace the two wings effectively because of the 6-degree dihedral, replicating the forward

sweep of the thickest part of each wing from root to the tip and how to fabricate a connecting piece (or pieces) inside the top of the fuselage so the wings will stay put when the model flies. Then there's the question of retracts, covering and finishing...

There's some way to go but it looks impressive and, hopefully, he'll keep us posted.

SHK UPDATE

Just a brief update on my Schempp-Hirth SHK glider, this year's winter project that I've described in recent issues. It's now practically finished but I'll round things up in a month or two when, all being well, it will have flown, and I can stand back to provide my overall impression.

In the meantime, some exciting slope soaring trips are planned for the Spring and I've just returned from a spending spree road trip when three pre-loved airframes joined the fleet. It's strange how these things happen at the same time - flyers selling up or having a clear out - but good opportunities

can't be ignored, and you have to move quickly when they do.

It's just as well the SHK is done as moving around the workshop isn't as easy as it was!

CAMBER WAYS

I'm no soaring evangelist but I always encourage my valley-bound flying friends to sample the slope's delights. I've yet to find a power flyer who doesn't enjoy silent flight, especially when they realise that a good moulded sport glider can fly much like a turbine jet but without the need for a fire extinguisher. Or a turbine...

But first-things-first. Most pilots - even those with some flat field power flying experience - will normally work their way up to a mouldie by way of things less expensive; foamy models, Foss Phases and the like. It's a bit of an apprenticeship and serves to embed the particular skills and experience required to manage the exciting (expensive) stuff; models that can make those hairs stand on end as they whistle and shriek on a fast pass.





Plenty of room for a couple of 6S packs under the hatch.



Geoff with the Mitchell, post maiden. I think that's a look of relief.

The Phase 5e ARTF, the latest product from the collaboration between Ripmax and Chris Foss, has sold well and deservedly so. I've counted several among the slope newbies who've recently joined our hill group. The wing has flaps, so is home to four servos and, for some, has been the first model where Crow/Butterfly braking has become an option. And every soaring newbie I've met (especially those transferring from the power flying field) has mucked things up. In other words, misunderstood the function, got the transmitter programming all wrong and made life very difficult for themselves.

CROW?

Crow, or Butterfly, are the terms commonly used to describe 'ailerons up and flaps down' all at the same time. Some say Crow is just 'ailerons up' while others call the same effect 'flapperons', but I'll use the word Crow from hereon in.

Crow comes into its own when you're trying to bring a model down to land in a small space. Typically, on a hill, you'll have far less room than the flat flying field - sometimes just a small patch of grass - so, without Crow, a fast, slippery glider has little chance of landing where intended or without damage.

Ailerons up and flaps down at the same time means the flaps create drag and the ailerons imitate lift-killing spoilers. It's a very effective braking combination, one that can slow a slippery glider right down, sometimes stopping it in its tracks. The ailerons continue to operate (albeit from a raised position) with the bonus that they change the wing T.E. camber nearer the tips to prevent stalling (a crude but effective form of washout).

POWER SWITCH

Newcomers make the mistake of seeing Crow as a bolt-on. Something that's allocated to a two or three-way switch, then used at some point in the flight, probably landing. Big mistake; you wouldn't stop your car with an all-or-nothing two-way switch, and the same applies to a moving glider. Crow needs to be proportional, controlled using a slider or, preferably, the throttle stick.



To coax a little more power the 3-blade props will be switched out for 2-bladers.

Understandably, some power flyers find that difficult to appreciate, but getting a motor glider set up properly can mean breaking a few habits. Forget Crow for a second and think about your average electric motor glider. A Radian, or Phase 5e for instance. Sure, you can throw 'em around a bit - put the sticks in the corners - and it's fun if you want to do that. But the primary reason for having a motor in the nose is to get the glider up to soaring height after take-off or to recover height lost. The motor saves the hassle of the bungee, a towline or aerotow. A quick burst of power and the job's done.

If you intend flying your motor glider from the flat field and have plenty of room at your disposal then Crow might not be so important. You'll have the time and space to adjust the glide slope and a quick burst of power can bring the model in if it looks like landing short. Conversely, a little power swinging a large prop can have a modest braking effect too.

Even so (and especially on the hill), why have the motor on the main stick? It's just a launch system after all. It makes better sense to allocate the motor to a switch (for a quick burst of power where needed) and Crow to the main (throttle) stick where the model's speed and descent rate can be conveniently and proportionally managed.

A slider switch is fine, but you must be able to find it quickly and easily, remembering too that you'll probably lose the use of rudder for the landing phase with your hand on the slider and not on the stick.

Most flyers have the (throttle) stick at the top for a clean wing (no Crow) and stick down for full Crow. In this way the stick position replicates its use with a power model. High stick - fast. Low stick - slow.

Throttle sticks are easily knocked so it's sensible to enable the Crow function with a spare two-way switch. There's an added advantage here too. Some glider flaps are large and, when deployed, can extend beyond the fuselage, running the risk of making contact with the ground before anything else when landing. So doing means the flaps absorb the impact and you can say goodbye to the servo gears when that happens. The solution is to whip the flaps up seconds before touchdown and hitting a switch is the quickest way of achieving this.

Incidentally, it's easy to programme more upward aileron movement than needed. That may not be a problem, but if you notice the wing tips bending downwards in an anhedral-like fashion then your set-up is telling you to reduce the amount of upward aileron in the crow setting (not the amount of normal aileron travel).



The F-7F Tigercat is quite a thing. This is FMS' superb model, itself no less impressive, especially the retracts.



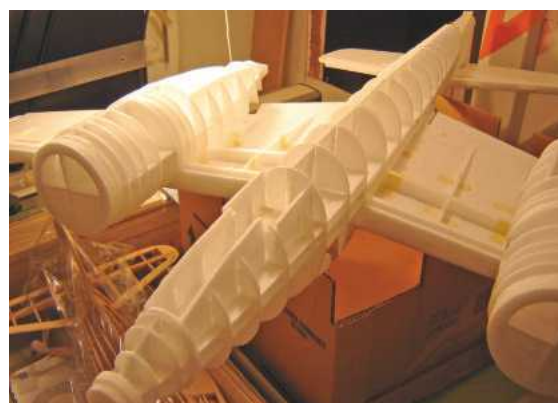
Sight, sound and emotion.



You still sometimes see ASM's ARTF Tigercat. It flew well despite some challenges during assembly. This was my electric conversion.



Above: Scott McKie opted for 3mm Depron for his own-design Tigercat. Looking around, you can see he likes building. Right: An interlocking structure means he's yet to reach for the glue.



ELEVATOR COMPENSATION

There are exceptions but, generally speaking, Crow deployment will raise the model's nose. Sometimes alarmingly so. It's why a few millimetres of proportional down elevator travel must be mixed in to compensate for this effect, and most modern radios include an elevator adjustment option within the Crow/Butterfly menu screens. Trial and error will determine the amount you'll need.

Please don't ignore this task or assume you'll somehow 'manage' things at the sticks and manually compensate for the effect; that really is last thing you need to be worrying about during the busy landing phase. Even with compensatory elevator be aware that some upward pitch may be seen if Crow (or flap) is introduced too soon (when the model is travelling too fast).

FINETUNING

Computer radios are powerful beasts, which means there are options to personalise your Crow settings. Some of these relate to competition set-ups for high performance models and won't be required by sport flyers.

For instance, Crow can mean that your ailerons are above the centre point, even when 'down' so, for some, removing differential with Crow use is a necessary refinement. To prevent accidental use, Crow can be adjusted to take effect only when the stick has moved by a certain amount too.





“...it’s important to take some time experimenting and getting things right to make landing a safe and straightforward process...”

Go easy on the amount of upward aileron deflection; you still need to maintain control of the model and too much could induce a distinct downward trajectory.

WHEN TO USE IT

Crow use can vary but, again, generally speaking, flyers introduce it on finals rather than the downwind or base legs of the landing phase. Think ‘ground speed/air speed’ and you’ll appreciate that the model could be closer to its stall point travelling downwind than seems apparent, so doesn’t need to go any slower. Even with raised ailerons, Crow doesn’t make your model stall-proof.

Remember too that applying Crow will reduce the amount of aileron travel at your disposal and finding your model buffeted by turbulence downwind behind the slope edge isn’t a good time to discover this. Ease in Crow gradually and never in one instantaneous or swift lump, especially when you are near the ground, as the initial reaction from some gliders may be to momentarily dip the nose.

Crow settings do vary from model to model so it’s important to take some time experimenting and getting things right to make landing a safe and straightforward process, and one that avoids damage to the model. And if that model happens to be £500+ worth of moulded glider then you’ll be glad you spent some time with your foamies getting to grips with the function.



Crow (Butterfly) is ailerons up and flaps down. A foamie glider like this MPX Heron is the perfect training tool.



Most pilots adopt up stick for a flat wing (fast)...



...and down stick for full Crow (slow). Thus, emulating the throttle stick’s effect with a motor.



Above: Importantly, Crow must be variable and never all or nothing. In this way the approach can be adjusted so the model lands where intended.

Right: Down elevator compensation is nearly always needed to correct the upward pitch change Crow induces. A few millimetres are usually enough.



Far left: My new wind meter is a Dwyer from the USA. No batteries required. Left: It offers two scales - low and high. Placing a finger on the top activates the high range. Bottom left: Although just a pitot-type device it seems reasonably accurate.



WIND SPEED

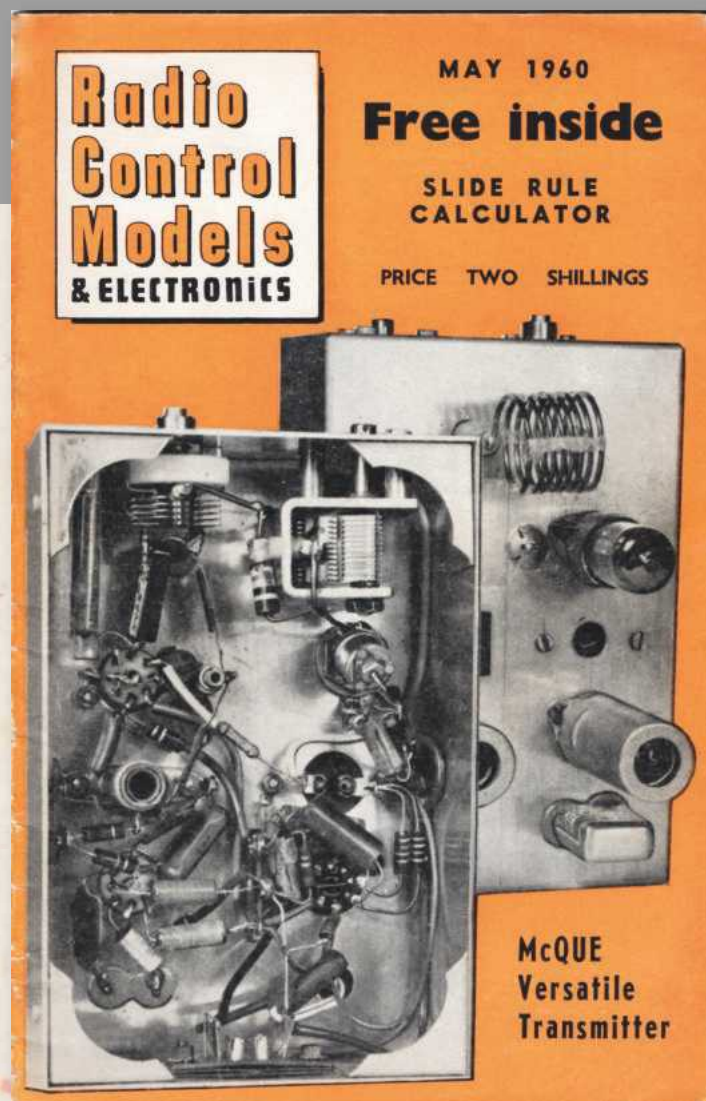
Anemometers come in several shapes and sizes, and at the cheaper end most use a button battery to power an LCD display. Batteries are inexpensive these days, although the 'five for a quid' offer on eBay may have been a tad too cheap as my device refused to respond when I needed it. I turned to a flying buddy, "You'd think they'd make a wind-powered unit!" He smiled - "Perhaps one like this?" - revealing an anemometer that doesn't require electricity.

It's made by Dwyer in the US and takes the form of a pitot with a rising pip that's read against a scale. Placing a finger on the pitot activates the other (higher speed) scale.

A quick Google found some new and second-hand examples, so £10 later mine was on the way. My friend reckons his is pretty accurate, so we'll see.

It's handy to have a little anemometer, especially on the hill, if only to boast how windy it was when you next see your flat field flying chums. Heroic tales of flying in 50mph winds while leaning forward at 45-degrees always cheers them up when they're shed-bound watching the recycling bins fly past the window.

That's it for this time but, as always, I'm at justforfunrcme@gmail.com so do drop me a line with your news and views. ✈



THE SWINGING SIXTIES

Shaun Garrity looks back at the aeromodelling scene when RCM&E was first published

words & photos » Shaun Garrity

In May 1960 Elvis Presley recorded 'It's Now or Never' and 'Are You Lonesome Tonight', the first weather satellite was launched, and the one millionth Dutch Telephone was installed. But all these events pale into insignificance because in the same month RCM&E issue No 1 was published. I thought a walk down memory lane would be a great way to remember what was on offer to aeromodellers back then.

BUS PASS READY!

Sixty years old! Wow, that's an exceptional continuous print run for a hobby magazine; this gender-neutral tome is almost a pensioner! Yes, I know Aeromodeller has been around since the dawn of time and there's an urban myth that the inaugural edition was actually seen painted on the walls of a 100,000-year-old Neanderthal cave, but RCM&E was the first dedicated magazine for R/C modellers in the UK.

Prior to its publication, if you wanted to glean information about the latest R/C developments there were basically just two options - Model Aircraft (this was the official

journal of the Society of Model Aeronautical Engineers - SMAE eventually became the BMFA) published by Percival Marshall & Co. Ltd. and Aeromodeller published by the Model Aeronautical Press Ltd. However specialised R/C articles were not available on a regular basis. They tended to be very technical, with reams of design data, circuit diagrams and theory; baffling to many aeromodellers but necessary because in the early 1960s a large percentage of radio gear used was home built. Commercial equipment cost a fortune so this was the only way many could experience the thrill of radio-controlled flight on a budget.

A quick scan of May 1960 Model Aircraft reveals that just two pages out of 30 were dedicated to all things R/C and in May 1960 Aeromodeller there was just a single page out of 36 pages, on using V tail's for R/C gliders. So even if you subscribed to both prior to RCM&E, published information was still very thin on the ground. I guess back then the main source for budding R/Cers was the local model shop and your model club's resident expert.

A CALCULATED GAMBLE

Bringing a new magazine to market is expensive and risky, especially in the hobby arena due to limited appeal. But like any new business opportunity, as long as you've taken the time to research your target market then things should work out to plan. The opening paragraph in issue one explains this very fact:

"There is something particularly exciting about starting a new venture and we have revelled in the extensive preparatory work that brought Radio Controlled Models & Electronics through the various stages from pipe dream to reality. Those eight thousand enthusiasts who returned the questionnaires circulated by our associate magazines Aeromodeller and Model Maker played a great part in convincing us all that we had a real and urgent need to fill. We only hope that our offerings from month to month will meet it. Your tolerance and patience is still solicited together with your friendly criticisms and contributions and much spreading of the word".

Over 700 issues later and still going strong, it was clearly *less risk* and more *dead cert* that the magazine would go from strength to strength, becoming a world beating R/C publication.

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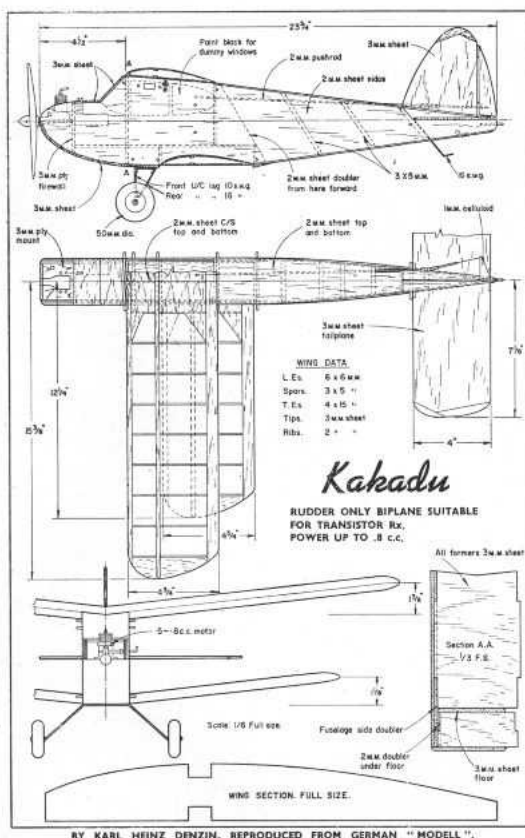
Above: My examples of the four and six channel Black Prince; agricultural but reliable. The gold set in the middle is the ED single channel Auto-Pilot. It was the last single channel radio they manufactured. Left: Electronic Developments first advert as it appeared in the inaugural copy of RCM&E, May 1960

LACK OF CHOICE

The range of kits, radios, accessories etc. available today is vast and cost far less pro rata than their 1960s equivalents. Looking through the advert pages of the inaugural issue the choice of commercial radio gear proved disappointing; it was thin on the ground. Only REP (Radio & Electronic Products) and ED (Electronic Developments) had taken out full pages, with just one model shop offering Graupner radio. Virtually all the other adverts were for kit-built gear, highlighting the DIY nature of the hobby back then. This was reinforced with the magazine having construction articles for the McQue Versatile valve transmitter, a transistor receiver, an add on joystick pulser (to convert a single channel set to galloping ghost proportional) and even a Multimeter. The only plan

feature for an R/C model was a cute little 31" wingspan biplane called the Kakadu. At 1/6 scale it was reproduced from the German magazine 'Modell' and a full-sized rib drawing was included if you were keen to get building. It's clear that in the early days of R/C there were two distinct sides to the hobby: aeromodellers and electronic whiz kids, with a lucky few having skills in both camps, so unless you were landed gentry and spare cash wasn't a problem it would have been very handy to have a mate who could wield a soldering iron.

As the 60s headed towards the 70s, single channel radios from an ever-growing myriad of manufacturers started appearing on the market at a rate that would put any rabbit warren to shame. This proved to be the peak of development for the button pushing aficionados before its rapid decline.



As mentioned, this reduced sized plan for the Kakadu was included for budding builders.



A selection of REP reed and single channel radios. REP was the only other manufacturer to take a full-page advert in May RCM&E



Above: Henry J Nicholls saw the potential in this competition winning model and bought the rights to it from designer Frank Knowles, with the intention of offering a kit. Right: FROG (Flies Right Off the Ground) didn't have the range of models that Keil Kraft and Veron had, but what they did have was excellent and well designed.



This is a later version of Galahad that was distributed by Keil Kraft. Another of my kits that I intend to build one day...



At last year's Retro and Single Channel Fly-In fellow club member Arthur turned up with this superbly constructed and finished Galahad, flown on three channel propo.



Above: The Veron Stentorian is one of my all-time favourite sports aircraft; a true builder's model, expertly designed, elegant and way ahead of the curve. This example was actually built for me in the late 1990s by Phil Smith, Veron's chief designer.



Right: Keil Kraft's Super Scale range would make perfect candidates to convert with modern micro R/C.



Left: Just a few of Veron's many excellent prefabricated kits on offer to the 1960s R/C modeller.

TOYS FOR BOYS (AND GIRLS)

So back in the 1960s what could you get for your precious modelling tokens? Keil Kraft and Veron had a healthy range of free flight, control line and a few R/C kits, along with some excellent offerings from the Graupner stable, which were starting to gain popularity. FROG also had a range of kits, as did Yeoman.

Henry J Nicholls (if you're over 50 you may remember him and his model shop, often referred to as an Aladdin's Cave of goodies at 308 Holloway Road, London) had bought the rights to the winning model of the 1959 SMAE Southern Area radio event. Designed by Frank Knowles, it was an interesting rudder only job having a low wing and powered by a 1.5cc diesel. However, a fellow modeller installed multi channel gear and a 2.5cc motor and being a 50" span model it coped admirably with the

additional payload, proving it was a great multi purpose offering. His intention was to kit the design and call it the H.J.N. Galahad.

Making its appearance in May 1960, this was the first low wing R/C model kit to be marketed by a UK manufacturer. Costing just under £2.00 it became a top selling product in the Mercury range of kits that Henry J established around the late 1940s. Along with the Galahad, Mercury had the 47" wingspan Matador and 65" wingspan Aeronca Sedan that were also suitable for radio.

Keil Kraft sold what was vaunted as being the most popular R/C model aircraft of the 1960s, the Junior 60. Winner of many competitions and looking like a converted free flight model, it was actually purpose designed for radio control. Costing nearly 50% more than the Galahad it featured

rugged, traditional construction and its steady flying characteristics made it the perfect beginner's model. When your radio stopped playing ball (a not infrequent occurrence back then) it would usually find its way back to terra firma, landing in one piece ready for the next foray skyward.

It's a pity modellers didn't have access to micro radio back then as Keil Kraft had some great model kits in their range that could easily be converted, especially the Super-Scale range. This included the Cessna 170, Luscombe Silhouette and Piper Super Cruiser.

Veron also had some cracking models on offer. Around the time that Keil Kraft were selling their Junior 60, Veron's Stentorian was an extremely elegant, scale influenced model originally designed in 1946 and along with the later Sky Scooter these models offered other options for R/C flight.

[illegible]

OLD TIME ELECTRIC

Mentioning Graupner earlier reminded me that electric flight models are far from new. Ahead of the game was the Silentius, designed by Fred Militky. It used a new motor that had been developed by Dr. Ing. Fritz Faulhaber. This was initially intended for remote controlled camera shutters, but he saw an opportunity for it to be used in model aircraft and a special two bladed folding propeller was developed by Graupner to maximise the available power output. As lightweight NiCad cells were still not available to modellers at this time, saltwater activated cells were used along with small accumulators; both options were expensive though.

The German manufacturers such as Graupner were definitely trailblazers; I may be suffering from a touch of the old 'rose tinted spectacles' but from memory all their R/C kits, along with Hegi were far more elegant in design, completeness and presentation than our home brewed offerings.

POWER TO THE PEOPLE

Just as Keil Kraft, Veron, Mercury and FROG were the go-to kits for the 1960s aeromodeller, ED, Mills, DC, AM, PAW and FROG were the top choices of engines. UK modellers supported home grown products and although diesels were very popular, Merco had gained a reputation for reliable larger glow plug motors. Yes, 5 to 10 cc engines were considered large back then!

OS produced some superb glows, as did Enya and Cox, and there were a number of other manufacturers that found favour. But for the true connoisseur of diesel power you only had one choice – the exceptional Oliver Tiger. Another piece of modelling jewellery worthy of note is the 7cc Taplin Twin. This in-line diesel, although used successfully in a number of record-breaking model aircraft, also found favour with boat modellers as a reliable power plant in the water-cooled version.



Above: From the left, a Comp Special, an early version Bee and the 0.5cc Baby.
Left: Along with their radio gear ED produced some excellent, reliable small diesel engines.

[illegible]

Cox glow engines were also available in the UK. Engineering magnificence but many aeromodellers still preferred diesels back in the 60s.



Remember when we got fuel in tins like this?



Above: As a youngster Davis Charlton (DC) engines were my favoured choice. Being relatively inexpensive was a major factor in that decision! **Left:** HJN always had a great choice of engines in stock to tempt modellers.

[illegible]

The Taplin Twin was a beast of a motor and was used in a number of record-breaking model aircraft and boats.

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JOY QUALITY PRODUCTS

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Above: Joy-Plane was another brand of balsa cement often seen in model shops.

Right: Who says modellers are hoarders? Well, I definitely am because these were found in the workshop recently.



A STICKY SITUATION

Back in the 1960s modellers didn't have a vast choice when it came to gluing things together. We had moved on from animal glues but basically there was just balsa cement, PVA white glue and epoxy (which took 24 hours to set). Cyanoacrylate was still relatively unknown to aeromodellers; first appearing on the market in 1958, marketed by Kodak and called Eastman 910, it quickly became known as Super Glue. Britfix 66 and Joy-Plane were very well-known brands of balsa cement, along with LePage's and Britfix 55 white glues (PVA), and there was also Cascamite (a powder mixed up with water). I seem to remember it was pretty good for filling gaps, and waterproof as well.

For painting and decorating your creations almost everybody used clear dopes for shrinking tissue, nylon or silk covering with brushed on coloured dopes or enamels to finish off. Humbrol used to sell tins of fuel proofer that always seemed to have a strange burnt orange tinge and would take days to set properly. Aero Gloss from the USA was very similar. My personal favourite was Color-Craft clear lacquer.

It was very easy to add a lot of weight if you got carried away though because although patented in 1951, rattle can paints were not that popular with modellers back then, so to keep the weight down many modellers used a

range of coloured tissue, nylon or silk and clear dope on sport models to great effect. Clear spray dope under the brand name Pli was available from Henry J Nicholls, however.

Vinyl Cut Decals are three words that would have been as alien to the 60s modeller as High Speed Broadband, so any letters or numbering used was generally water slide transfers (decals) or laboriously cut from tissue.

So, there you go - a very brief look at the aeromodelling swinging sixties. It's made me realise that today we've never had it so good - and long may it continue! ✈

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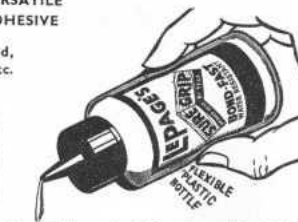
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Above: Adhesive choices were not as plentiful back in the 60s, but every modeller would have used a tube of Britfix balsa glue at some point.

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Above: This was a revelation when I first used it—spray dope. Whatever next - coloured paint in rattle cans..?

Left: LePages PVA offered an alternative to balsa cement and is still widely used today.

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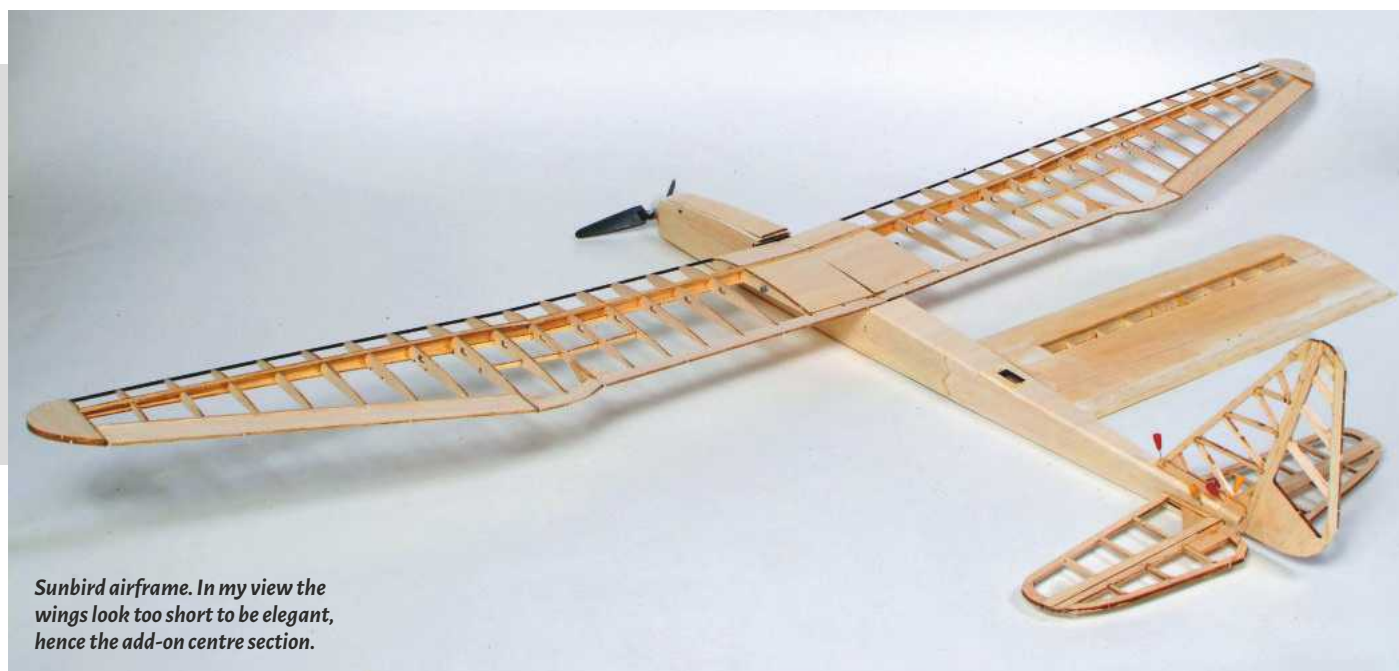
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Sunbird airframe. In my view the wings look too short to be elegant, hence the add-on centre section.

SUNBIRD

Tim Hooper builds
- and modifies - a
classically shaped
e-soarer

words & photos » Tim Hooper

Several years ago, my wife, Netty declared her intention to build a big, all-balsa thermal soarer and was smitten by the highly individual looks of the 120" Dynaflyte Bird of Time. I can't say I blame her really; the BoT has a graceful avian appearance and with its swept wing tips it's a million miles away from the uber-functional stick insects that we often see in the current competition reports.

Sure enough, Netty built her Bird of Time herself, although I helped out, both with its conversion to an electric soarer and with the fitment of air brakes in the upper surface of the wing. She elected to cover it in jet black film, with transparent yellow panels on the wing and tail's open structures. It looked great. Matter of fact, it still does.

The thing is, we were both a little disappointed with its flight behaviour, which is why it's not clocked up as many flying hours as you might expect. The carefully fettled 3S power system hauls its 4lb weight skywards in shortish order, but its glide characteristics have always seemed a little bit lacking. It 'hunts' in the pitch axis, vacillating between nodding its head in a series of stalls and then abruptly diving towards the ground.

We fiddled with the CG position to find the mythical 'sweet spot' but to no avail.



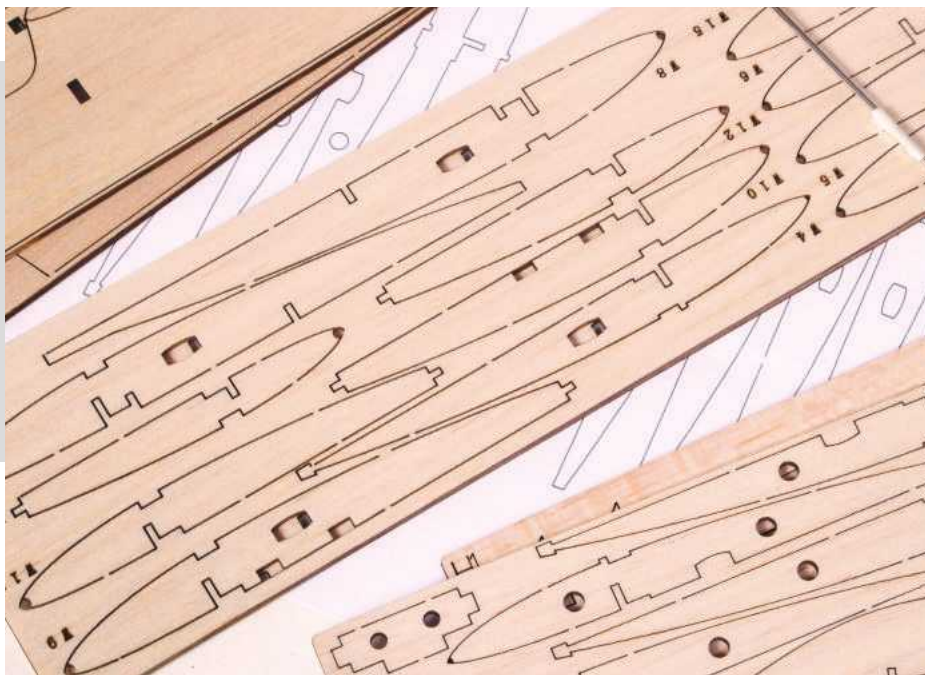
The plane that Netty built. The Dynaflyte Bird of Time is the obvious inspiration for this project.

Eventually, I stripped out and rebuilt the control system for the elevator (replacing the snake and tube linkage with a sturdy carbon pushrod) and this helped a bit. I say 'elevator' but in reality, the BoT is fitted with an all-flying tailplane of balsa strip construction and it's a very flexible structure indeed. I'm pretty convinced that this is the core of the Bird's anxieties and why she's become something of a hangar queen.

Anyway, this project isn't really about the Bird of Time, but about an obvious derivation that I saw advertised recently

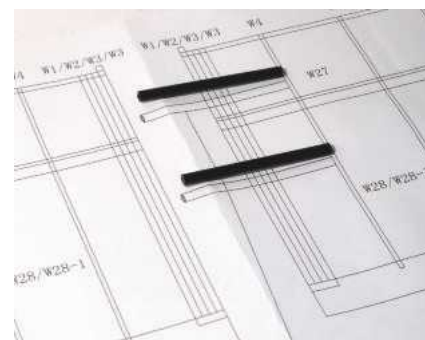
- the Dancing Wings Hobby 'Sunbird', marketed as a proper kit under the HobbyKing umbrella. Think of the original ten-foot BoT scaled down to around 50% at 62" span, and with a motor up front. The fact that the Sunbird kit was offered for pennies over £30 was the final clincher and so the 'buy' button was duly pressed.

A postage charge of just over a fiver saw the box arrive from HK's UK warehouse a couple of days later, so I could have a quick shufti at the contents before the kit was shelved to allow the current project to be continued. Fast forwards several weeks...



Left: Sunbird's lasered ribs are cleanly cut out of firm balsa.

Below: Uh-oh... The given method of joining the wing panels, using stacked ribs and short joiners, didn't inspire confidence.



A bash with a hammer produced these cranked 8SWG joiners to give a tad of dihedral at the centre join, so we could forget about fitting ailerons.



Wing tubes were cut from arrow shafts. Large triangular gussets will help distribute the loads.



Clever stuff this. Aluminium cored arrow shafts are both light and very strong.

SUNBIRD REVEALED

Here we are, with the Sunbird kit revealed in all its CNC-crafted glory. First impressions are that whilst it's a cartoon-esque homage to the original Bird of Time, it's still a bit of a bargain! Lots of pre-cut balsa-ish parts, a rolled wing plan, carbon fibre rod for the wing leading edges and a bag of hardware fill the box quite snugly.

No, it's not an ARTE. It's a kit. There's no power train or servos included, and no covering supplied. All of this is good, to my mind. I like to be able to make my own choices and modifications when assembling a project, so the bare bones of a design are all we really need.

A couple of things were decided immediately: the squared off fuselage would get some rounded corners, whilst the wings might benefit from some leading-edge sheeting to stop the covering from sagging between the ribs. Additionally, the wings would lose their ailerons to yield a three channel, Rudder/Elevator/Throttle, e-soarer, even if I needed to increase the dihedral a tad to increase stability as a consequence.

There's also the strong possibility of building an additional centre-section wing panel of, say, 20" span to increase the Sunbird's total span to over 80" for maximum lift, allied to its low wing loading. I've carried out this particular mod on a previous project some years ago, and took the opportunity to build in a very effective airbrake (running the full span of the panel) so I can get the model to actually land on our club strip, and not just go eternally floating past in ground effect when it should actually be touching down!

The folded plan was gently ironed flat and then it was time for a closer look at the structure. The wing's overall design looks

very slick indeed, but the execution of the centre joint lets it down a little. But this is proper aeromodelling, right? So, everything becomes a challenge to be considered, wrestled with and (eventually) conquered.

WING MODS

First off, as designed, the two halves of the wing are set to be permanently joined in the middle using short 5mm carbon tubes that stretch across the first rib bays. Thing is, even though the carbon fibre tubes are of the specified 70mm in length, this isn't long enough to bridge the gap to the adjacent ribs.

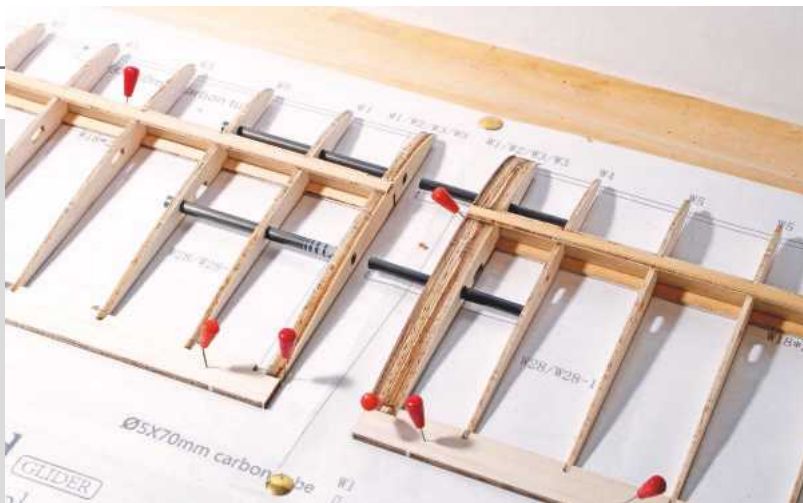
Secondly, the joiners aren't within, or even next to, the main spar, but are anchored solely in the ribs. The front joiner is around 10mm away from the spar, with the rear joiner over twice that distance away. This isn't good design in my book; I've known a similarly designed wing fail under sudden moderate G force, with the joiners ripping out of the rib structure and out through the underside of the wing.

Thirdly, and here's the rub, the centre section halves don't have any dihedral between them, so why bother having them in two pieces anyway? Other than allowing a shorter packing box (which means cheaper shipping, I guess), there's no reason not to have the complete central panel built as a one-piece item.

And fourth, before I forget, the wing is designed to be bolted to the fuselage. A single bolt at the rear and a 'dowel' at the front. Actually, the dowel is simply a rather flimsy extension of the inner ply ribs. No thanks.

So, the first area to tackle is that centre join. Now, because I'm not bothering to fit ailerons, I thought it best to introduce a little bit of dihedral in the centre joint.





Left; Comparison shot: longer arrow shaft joiner tubes on the left compared to the short kit items on the right. Below: I modified the plan to draw the new centre section using a pink highlighter. The span of the panel was determined by the length of the available arrow shafts.

The easiest way to achieve this is to bin the supplied carbon joiners and substitute my own steel items. Fortunately, I have a small stock of carbon fibre arrow shafts, which have an outer diameter of 5.2mm. These shafts have a clever construction, an inner aluminium tube coated with a layer of carbon fibre on the outside, which means that an 8SWG piano joiner is a perfect, sliding fit inside. That's handy.

Given that I'm eventually aiming to add an additional, optional, centre-section to the wing, it made sense to stop procrastinating and make a commitment, and to fabricate enough joiners all in one hit. With a cut-off wheel in the Dremel, I made four joiners from 8SWG wire, deburred the ends, and then cold bent them all at 5° in their centres, using a vice and a big hammer.

The laser cutting on the Sunbird's balsa sheets parts is very accurate, although the cutting doesn't penetrate all the way through on some of the thicker sheets. So, the wing tubes were a nice snug fit in the ribs. Rather than bunch all the pierced ribs together at the root, as the plan shows, I spaced them apart in the conventional way. This will spread the flight loads over a larger area.

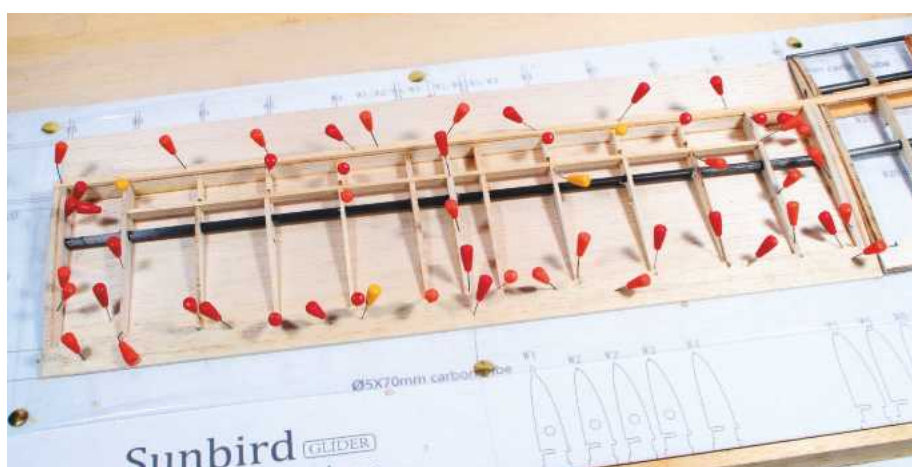
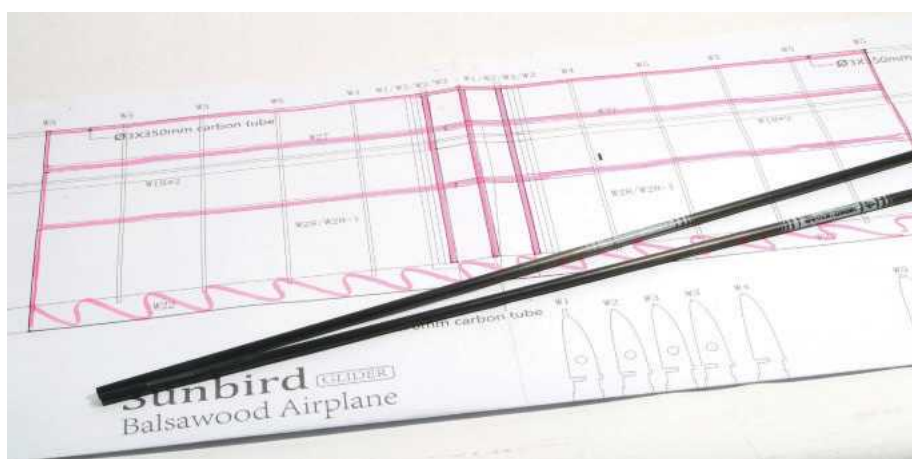
The main spar is a full depth, slotted balsa item. The ribs are a good, snug fit on the spar, which is capped top and bottom with 1/16" ply strip to produce a C section. I used aliphatic glue to secure it all together, whilst held aloft in my mitt, and then pinned it down over the plan to dry.

The notched trailing edge and 3mm carbon leading edge were added, and the same procedure ensured that the other centre panel was built to match.

The outer panels have that distinctive bird-wing shape, which so identifies this model as a Bird of Time clone and were built over the plan as per the instructions. The only places where I differed a bit were to glue the ailerons in place and to omit the inner ribs and mounts for the aileron servos. My version is a rudder-controlled model, remember?

CENTRAL IMPLANT

Now, it's not often that I experience an epiphany these days, and when I do it can be quite disturbing to all those nearby!



The additional centre section was built onto a 1/16" balsa lower skin.

I'd planned to build the wing halves first, complete the rest of the model, and then have a think about that optional centre-section that I mentioned earlier. However, it suddenly seemed a better idea to tackle this item whilst the inner bits of the wing were separate and conveniently sized to fit on the board. The thing is, I needed to have the existing bits of the wing to hand whilst I built the new centre section, so I could get all the joiners to line up properly.

Given that I'd already formed the 8SWG wire joiners to suit the carbon fibre joining tubes in the existing wing panels, it seemed a no-brainer to have the same tubes

running the full length of the new CS (that's Centre Section to you), not only to receive the wire joiners but also to act as spars, comfortably able to absorb all of the expected flight loads.

The actual length of the proposed centre section was determined by the length of the available arrow shafts and turned out to be 17-inches, giving the model an additional 120 square inches of wing area.

Thankfully, the wing structure is drawn conventionally on the plan, so I was able to use the existing plan as a basis for the design of my new CS. To avoid confusing myself, I coloured in the new structure with



The rear joiner was used as a datum to trial fit the outer panels.

“Think of the original ten-foot BoT scaled down to around 50% at 62” span, and with a motor up front.”

a suitably macho pink highlighter pen.

I opted for a fully sheeted construction for the CS so, after notching and pinning down a suitable length of trailing edge stock, I book-joined the bottom skin from 1/16” balsa sheet and built the rest of the CS on top of it.

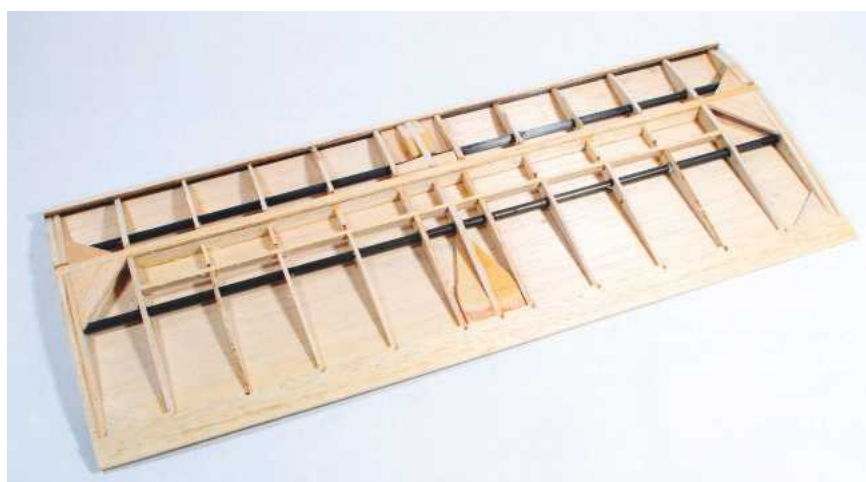
First to be added was the main spar. Paying homage to the C-sectioned item in the kit's wing, I laminated a spar from 3/16 hard balsa, capped top and bottom with 1/16 ply, and glued that onto the skin.

I'd already taken a 1/32” ply template from the kit's wing ribs and used it to draw and cut enough additional ribs for the job in hand. The ribs at the panel's centre line (where it'll sit on the fuselage) were hewn from tough 1/8” sheet, whilst the ones at the ends of the CS were laminated from balsa and ply, as these will have to absorb the loads transmitted by the outer wing panels in flight. Each rib was cut into front and rear parts to allow for the full-depth main spar. Some of the rear portions were relieved on their tops to provide a seating for the yet-to-be devised airbrake.

The fiddly part was to pierce each rib to accept the arrow shaft spar - a process that called for a bit of careful measuring, a sharp awl and, finally, a round file to ream each hole to the correct size.

Just to guarantee the modification's success, the adjoining wing panels were hooked up to the new spars with the piano wire joiners to ensure they were in the right place for assembly at the field. In practice, I had to thread the ribs along the arrow shafts, glue the ribs to the bottom skin and then swiftly add the outer panels. The arrow shafts could finally be glued to each of the ribs with a dab of thick CA. Lots of pins held everything in place whilst the aliphatic dried.

This operation was then virtually repeated with the front arrow shaft spar, before mimicking the kit with yet another length of carbon fibre tube to act as the leading edge. Additional block was added to provide anchorages for the front dowel and rear wing bolts. To tie the arrow shafts to the balsa main spar I installed substantial, triangular gussets at each end of the panel to spread the loads over a larger area.



New centre section awaits its top skin.

Finally, and with the CS pinned back onto the board to ensure straightness, I added the 1/16” balsa upper skin, leaving a central, rectangular void to accept the air brake later.

BELT & BRACES

My limited attention could now be diverted back to the bird-shaped outer panels, which were built previously, and their marriage to their adjoining inner panels. This was accomplished with the aid of the pre-cut 1/16” ply braces and, in my opinion, they're simply not up to the job, so I needed to supplement them somehow.

What was needed was a simple full-depth ply brace, which could be glued flat against the front of the join in the main spar across the dihedral break, in the time-honoured fashion. That's exactly what happened. Incidentally, there's no mention of how to manage the butt joint in the CF tube leading edges in the instructions, but it would have seemed silly not to use a short length (25mm) of suitable piano wire as an internal joiner.

So, now we have a wing with two options: either as a 63” two-piece affair, or as an 80” three-piece structure, complete with air brake to help with shortening the landing approach.

BODY TALK

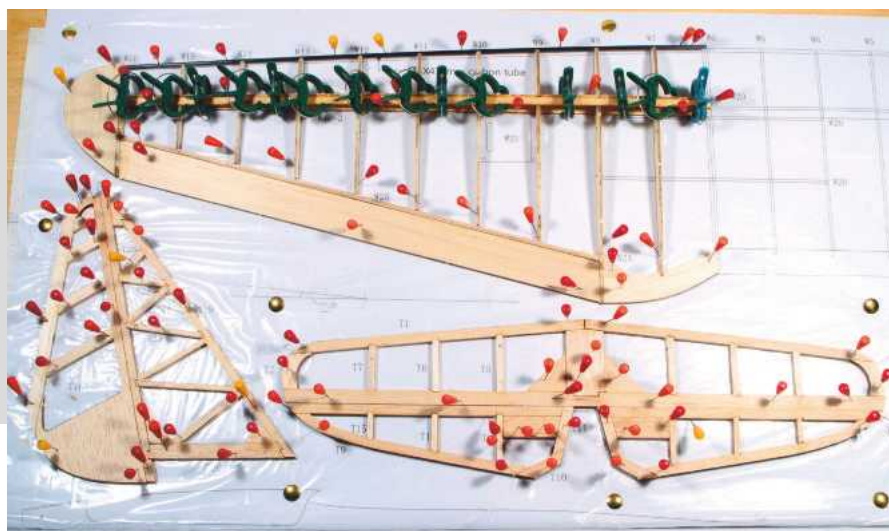
With the wing stashed to one side of the workshop, I emptied out the final pieces of the kit's box onto the bench and took stock of the fuselage parts.

The fuselage sides and bottom are too long to fit within the box and so are each split into two parts, with a zigzag at the join line. Given the comparative length of the fuselage parts, combined with the brevity of the joint line, it's no real surprise that there's a bit of wobble possible with the alignment. In hindsight I should have used a straight edge to align the sides when I glued the parts together. However, I didn't and had to do a bit of judicious trimming afterwards to get the sides to complement each other.



Using a 3mm tap to thread the ply plate in the fuselage, followed by a trickle of thin CA to toughen it up. Top of F2 was reinforced with a short length of CF tube.





Left: Tail surfaces and outer wing panels are quick to fabricate. I replaced several cross pieces to yield the correct grain direction. Below: Tail surfaces will benefit from a good sanding. The hole in the top of the fuselage may become the home of the rudder servo. We'll have to see...



The instruction leaflet is pretty vague about the fuselage's internal structure (longerons and doublers etc.) and the laser cut formers all seemed to be significantly undersized for the job in hand. Never mind, the formers were glued to one fuselage side, checked for squareness and left to dry. Using a simple, drawn centreline the fuselage sides were joined together, the insides of the tail end chamfered and also glued.

Given my rejection of the supplied wing dowels, I reckoned this would be the best time to sort out my own system, before the nose former was installed, which might well get in the way of any drilling that needed to be carried out. I drove a 3mm nail into the front of each wing panel to act as a temporary dowel and then reversed the beheaded nail, using the protruding pointy end to mark F2 for a place to drill. The rear of the wing panels were drilled immediately forwards of the trailing edge to accommodate the rear bolts. A ply receiving plate was installed into the fuselage, which was drilled and tapped. A quick squirt of thin CA glue toughened the threads considerably.

TAIL PARTS

Whilst the final wing panels were curing, I set about the strip wood tail surfaces. All the parts are lasered to length, but I decided to cut my own internal crosspieces rather than use the included items, some of which had the wood grain running in the wrong direction. I added a couple of internal corner gussets while I was in the mood, too.

The rudder is a one-piece item. It's very nicely lasered, but again its open structure means that the inner cross-pieces have their wood grain all wrong. In consequence, I kept the front hinge post and replaced most of the rest with a conventionally built structure instead.

ON THE MOVE

Well, that's the current state of play here in Sunbird-land. I have to confess that the project has been temporarily suspended.

Rectangular slot in the centre section is home for the airbrake, to help with getting the glider back on the ground.

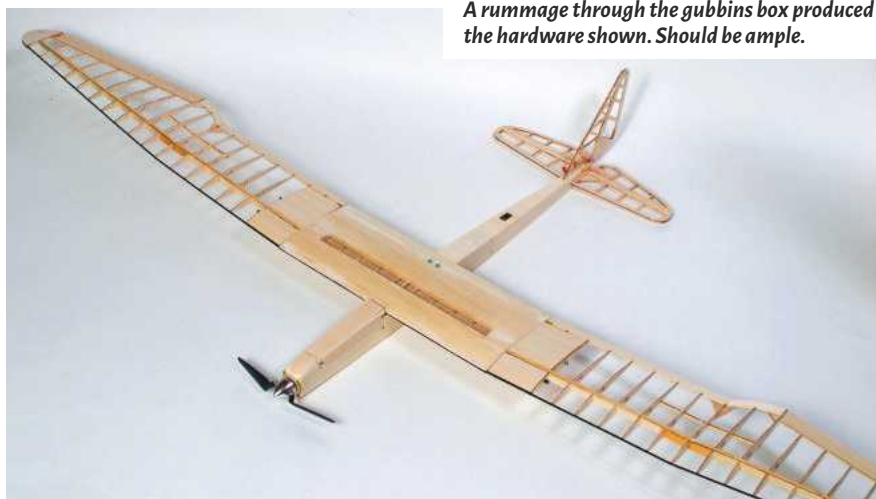


Real life has got in the way in the form of a house move at quite short notice and our new home has to be beaten into shape to allow the provision of a new work room before any more serious aeromodelling can be committed.

It's only a short-term hiccup, and we'll be back to carry on with the Sunbird shortly. Stay tuned! ✈



A rummage through the gubbins box produced the hardware shown. Should be ample.



Pinned together for the first time. Now at 80" span, it's an impressive beast, I feel.



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TIGER MOTH

Arnaldo Correia pores over João Pereira's superb 1/3 scale DH.82A - four years in the making and a true labour of love. words » Arnaldo Correia | photos » Arnaldo Correia & João Pereira

Developed from the DH.60T Moth Trainer, the DH.82 Tiger Moth was designed in accordance with Air Ministry Specification 15/31, which stated that when using a service parachute the instructor's egress from the front seat should be easier than on the DH.60, where the centre section struts hindered this, especially if wearing a parachute. The centre section struts were therefore moved forward in order to clear the front cockpit, but to keep the C of G at the correct location the wings had to be given some sweepback, however this put the tips of the lower wings too near the ground so the lower wing dihedral was increased, achieved by shortening the wing struts (the upper wing retained the original dihedral). Designated the DH.82 and powered by an inverted 120hp Gipsy III engine, the aircraft first flew in October 1931 and in 1934 was further improved, receiving a 130hp Gipsy Major engine and plywood rear deck; the definitive DH.82A Tiger Moth Mk.II was born.



João displaying his Tiggie, which he has every reason to feel proud of.



Left: João chose to reproduce G-AGHY because of its attractive colour scheme.



To make the low-pressure wheels, João used tyres from Du-Bro 6" wheels and turned new aluminium hubs on a lathe.

THE MODEL

Portuguese resident João Pereira is a self-confessed Tiger Moth enthusiast and having decided to build a large scale model of the type he went in search of a suitable plan. However he wasn't wholly satisfied with those available so he embarked on a scratch-build, drawing his own plan based on information gathered from the study and measurement of a completely uncovered Tiggy airframe resident at the 'Museu do Ar' in Alverca, Portugal and incorporating some of the constructional solutions from the plans he'd studied initially.

The Tiggy was widely used in Portugal by both aeroclubs and armed forces, and looked very attractive in the yellow and blue training scheme adopted by the Portuguese Army Air Service training scheme. So why did João choose to reproduce G-AGHY instead?

"We're all passionate about a certain car. I would love to have a red Ferrari... If someone gave me a yellow one it would be good, but it wouldn't be the same thing, would it? In this case I fell in love with the dark greyish green of G-AGHY, which in my opinion goes beautifully with the light grey. The fact that the fuselage has both colours gives it a special touch; there's the added advantage of the original not having wing slats or anti-spin strakes at the back of the fuselage, details I wanted to avoid in my model. I got in contact with the owner of the aircraft who, in addition to allowing me to reproduce his aircraft, sent me a lot of information and detailed photographs."

That explains the model's unusual cockpit upholstery, which is a faithful reproduction of that found on the subject full-size and typical of João's attention to detail.

AIRFRAME

João drew his plan using AutoCAD, which opened the door to having some items (e.g. metal fittings) cut by laser for better precision and to save time. Where soldering was required the parts were silver soldered together.

WHEELS & LANDING GEAR

The wheels were originally 6" Du-Bro items. João discarded the plastic hubs and turned new items from aluminium, fitted with ball bearings for smoother operation. The wheel covers are moulded from glass fibre.

The landing gear follows the full-size as closely as possible. The main gear shock absorbers are made from two sliding tubes with a spring inside to take the loads and provide some damping. The fairings are from carved balsa strips. As can be seen from the photos, João's Tiggy is fitted with a tailwheel, as most of his flying has been done from tarmac but, as per the original G-AGHY, this is interchangeable with a tail skid. Simply undo two screws to remove the tailwheel and in goes the tail skid for flying from grass.



All the fairings were simulated with balsa, carved to shape.

Left: On large scale models the best approach is usually to replicate, as far as possible, the component forms of the full-size.



The tail skid was also made by copying the components of the full-size.



As per the full-size, the tail skid and tailwheel are interchangeable.



It helps if you have a friend that has a paint booth! João used matt acrylic automotive paints matched to the colours of the full-size.



COVERING AND PAINTING

The model was covered in Antique Solartex before being spray painted by João in a friend's paint booth using matt automotive acrylic, the colours being carefully matched to the original. The 'DH' decals came from Flightline Graphics and were applied before spraying the entire model with semi-matt clear automotive acrylic varnish to give it a realistic sheen.

CONTROL CABLES AND FITTINGS

The control cables are nylon covered stainless steel fishing wires, with scale clevises at the ends. The flying and landing wires (custom made by Aero Scale Products in Switzerland) were supplied with right and left hand clevises.



DH decals came from Flightline Graphics and were applied before the model was sprayed with semi-matt clear acrylic automotive varnish.



Above: Flying wires were custom made by Aero Scale Products in Switzerland.

Right: Tail control surfaces are actuated by nylon covered stainless steel fishing wires, with scale clevises at the ends. Note the use of double cables on the rudder.



The cowling was made mainly from plywood with Styrofoam being used for compound curve areas before it was fibre glassed.

COWL

Made mainly from plywood, with Styrofoam used in compound curve areas (e.g. the cowl underside) to create the shape before fibre-glassing the entire cowl. The side panels are hinged with piano hinges (hand made by João), giving easy access to the engine.



Ply instrument panels are fitted with instruments sourced from Aerocockpits.

DASHBOARDS AND CONTROLS

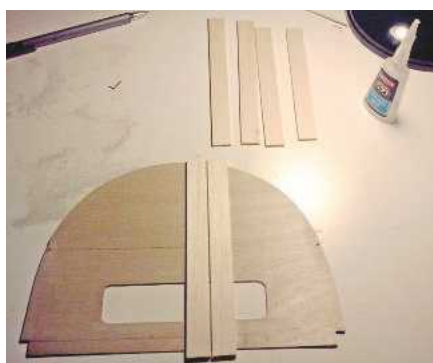
1/16" ply instrument panels are fitted with flight instruments sourced from Aerocockpits. The compass is home-made, the body being turned from aluminium and the rest of the details, including the compass shelf, were made by hand. Other details - e.g. the control column, throttle and trimmer - were also made from aluminium.

COCKPIT UPHOLSTERY

To reproduce the leather upholstery at the back of G-AGHY's cockpits, João cut several balsa strips, sanded them to the desired shape and glued them to the back of the cockpit plywood formers at intervals of about 1/16". Kidskin was then contact glued to the balsa strips, the handle of a teaspoon being used to make sure the kidskin followed the contours of the balsa strips; the elasticity of natural kidskin helping to achieve this.



Any full-size Tiggie pilot would feel right at home here. Note the throttle and trimmer on the left sidewall.



COCKPIT DOOR LOCKS

Made from piano wire, brass and aluminium, the piano wires run inside a brass U-channel and are tensioned by light springs, the components being tin soldered together where needed.

Cockpit door locks are made from piano wire, springs, brass U-channel and a bit of aluminium rod for the lock knobs.

Above: Upholstery in the making: Step 1 - Balsa strips are glued to the cockpit plywood former.

Above right: Step 2 - The strips are sanded to look like the upholstery cushions.

Right: Step 3 - Ready for adding the leather covering, secured with contact adhesive. The leather's flexibility helps to achieve the desired look.





Above: Disguising the switch can sometimes be a problem on a scale model, but not here - you just need to make a working baggage locker! Right: The windshield frames had to be cut and folded very accurately.



LUGGAGE COMPARTMENT

It's the luggage compartment on the full-size, but on the model it's the switch and battery compartment, hosting a double battery system, with a pair of 6.6V 2500mAh LiFePO4 batteries feeding through a PowerBox sensor switch and a voltage regulator that supplies 5.9V to the Rx.

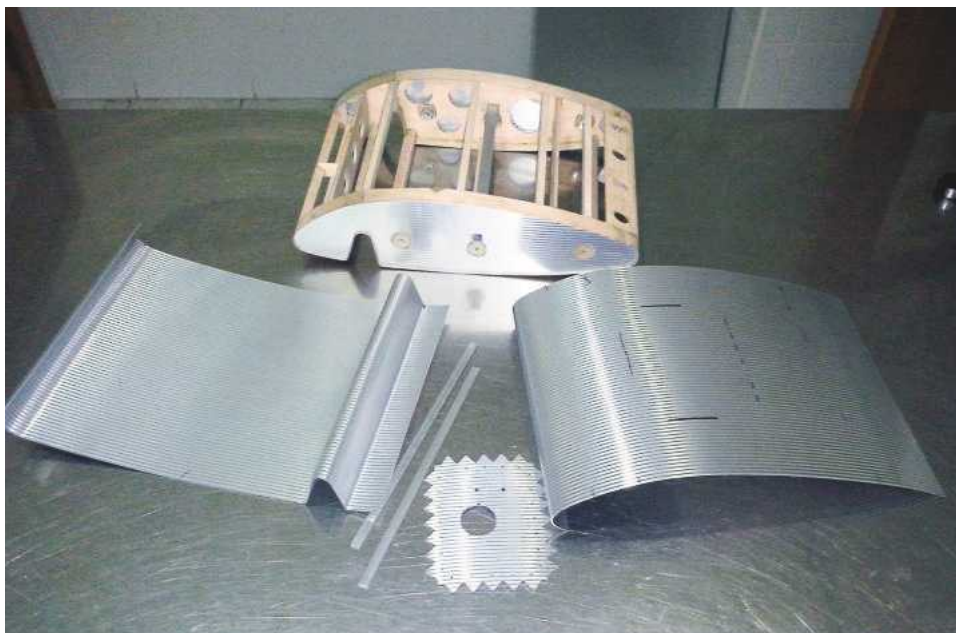
Closing the lid with the scale latches hides everything from view.

WINDSHIELDS

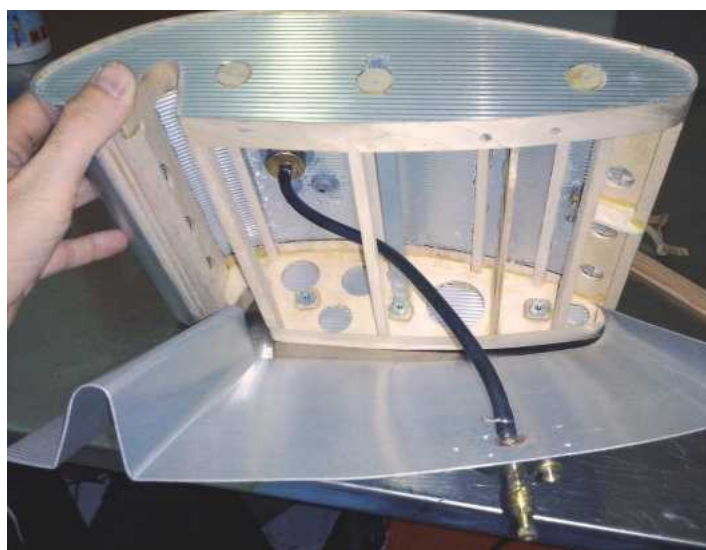
These were the most arduous parts to make as 1/32" aluminium sheet had to be cut in a single piece to make both the front and back frames of the windshield, then bent accurately so that acetate sheet could be neatly encased between them.

FUEL TANK

A corrugated tank can be a challenge to reproduce, especially at such a large scale. João was fortunate to find 0.5mm corrugated aluminium sheet (from Leroy Merlin, a continental DIY chain store) with the right pitch to emulate the Tiggy's tank. A wooden structure was built, onto which the corrugated sheet, moulded beforehand, was glued with the help of lots of bulldog clips and clamps. The model's refuelling point is hidden under the fuel cap at the top of the centre section tank - simply unscrew the fuel cap to reveal the fuel nozzle



Centre section fuel tank was tricky to make due to the corrugations. Fortunately, João found some aluminium sheet with the correct indentations and pitch.



Far left: For improved authenticity it's best to take advantage of the full-size refuelling point location for topping up the model. Left: From the scale refuelling point, fuel flows through the black rubber hose and fuel line into the fuel tank.



Details such as the rib stitches, rib tapes and inspection hole covers help bring the model to life.

STITCH AND TAPE

Stitching was simulated in traditional fashion by gluing cotton thread to a Solartex piece with PVA glue, cutting this into thin, rib-wide strips and ironing these over the previously covered wing at the rib stations.

The rib tapes that cover the stitches and the flying surfaces inspection covers were also cut from Solartex using pinking shears.

ENGINE

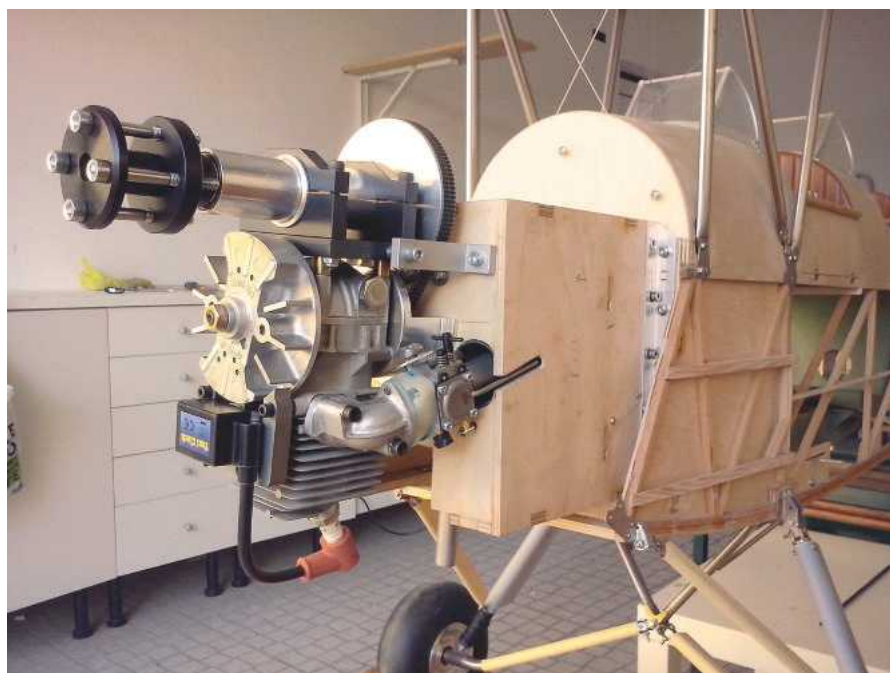
Up front is a Zenoah 38 (probably better known as a Titan ZG 38) petrol engine with a Toni Clark reduction gear and 31.5" x 18" glass fibre prop (as recommended by Toni). The functional scale exhaust was made by João from stainless steel tube, connected to the silencer recommended by Toni.

PILOT NOTES

"The model flies just like you'd expect a Tiger Moth would - slow and stable, with rudder being the most effective directional control. The Zenoah 38 engine is a bit short on power for what is an overweight model. This makes for a much more realistic flight but means it lacks the reserve of power needed to get out of trouble quickly (due to a wind gust, for example). So, all manoeuvres must be thought of first to avoid suddenly finding yourself in a tight spot - just like the full-size Tiger Moth."

When asked why he has not replaced the engine if he felt it was short on power, João commented that not only had the entire nose of the model been designed around the Zenoah 38 but, most importantly, he very much enjoyed the way the reduction gear-equipped engine sounded in flight. A hard-to-beat argument.

With the kind of attention to detail and commitment described above, it's hardly surprising it took João four years to build his Tiggy, bearing in mind his commitments of earning a living and raising a young family, who unstintingly supported him during the build of this exquisite scale biplane. ✈



Zenoah 38 with the Toni Clark reduction gear. A bit short on power for such a large model.



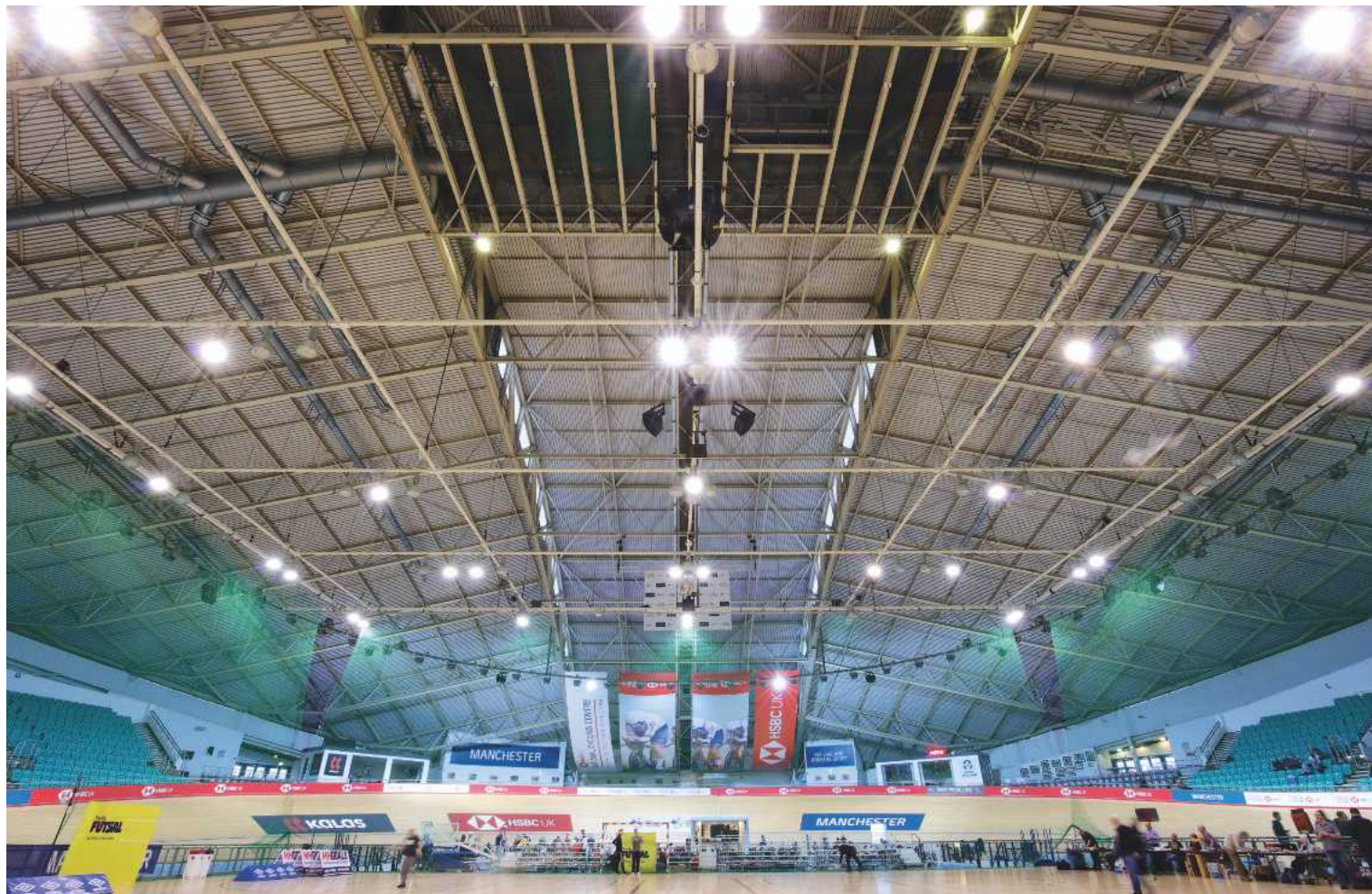
A replica of the venturi used to power the DH.82's vacuum-driven instruments.

DATAFILE

Model:	DH.82 Tiger Moth
Builder:	Scratch-built by João Pereira
Scale:	1/3
Wingspan:	117.3" (3m)
Engine:	Zenoah 38
Prop:	31.5" x 18"
Wing area:	26.5sq. ft. (2.5sq.m)
All-up weight:	44lb (20kg)
Wing loading:	26.5oz/sq.ft. (8.1kg/sq.m)



Above: The model is slow and stable, with rudder being the most effective directional control. Left: All manoeuvres must be thought through first to avoid finding yourself in a tight spot - just like the full-size Tiger Moth.



The Manchester Velodrome is an excellent indoor flying venue - lofty and airy.

A WINTER'S TALE

Whittaker visits the BMFA NW Area Manchester Velodrome Fun Fly, a friendly and well-regarded indoor event. words & photos » Alex Whittaker

Early Saturday morning in February and Big Suzy's enormous windscreen wipers were having trouble coping with Storm Dennis. Now, although Manchester's microclimate is famously damp, this deluge really put the tin hat on it. Some roads were flooded, others blocked, and a long diversion halfway to the Pennines prompted a hasty and lengthy re-route. As we crossed the dystopian metropolises of Mankland in the pouring rain I finally understood all those dirgey pop lyrics by Manchester Miserablists like Morrissey and The Smiths.

ENTER THE VELODROME

Being a goodie two shoes, I still managed to arrive early at this rather unusual indoor venue. Inside the Manchester Velodrome is a dramatic, steeply banked, wooden indoor bicycle track. I watched open mouthed as a peloton of exotically clad riders in skintight Lycra hammered away at the finer points of indoor tactical racing. When they decided to open up to top speed, it was truly thrilling. You could literally feel the air move. It was amazing to be so close to the action and witnessing the pursuit of excellence.



Lord of F/F Scale, Tim Horne with his exquisite Douglas World Cruiser.

"I watched open mouthed as a peloton of riders in skintight Lycra hammered away at the finer points of indoor racing..."

However, it was soon 11.00am and time to enter the Velo's huge central area. It is an airy, lofty space and the floor to ceiling badminton nets keep models and cycles safely apart. An ideal venue for flying model aircraft.

ULTRALIGHT RUBBER

Enthusiastic pilots were arranged on tables about two sides of the rectangular space. Slots divided the airtime for Free Flight and Radio Control classes. It was all so civilised and unhurried. I noticed that - all day - a deep contentment settled on the event. Everyone was happy. The flying was continuous, and you never had to wait too long for your slot to come around again. Of course, the trick is to fly both R/C and F/F classes!

Speaking of free flight, I am always delighted to see the ultra-light free flight indoor duration models take to the air. They slowly and gracefully gain height, with a just gentle turn tweaked in to nudge them safely within the airspace. There is a special elegance to these sparsely constructed mylar, condenser paper, or microfilm covered marvels. Tom Tomlinson's Limited Penny Plane was a good example.

The slow prop speeds of such rubber models are astounding. These arcane aerodynes, with their mystical winding and trimming procedures, are mesmeric to watch. You wish to gaze on silently, maybe like me, with your mouth open in wonder. They are worth the entrance fee alone.

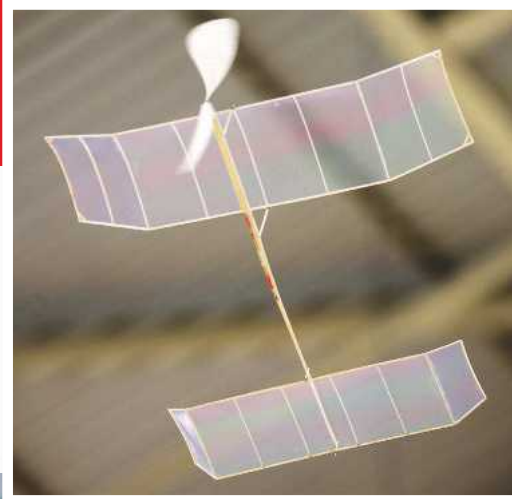


Tom Tomlinson with his Limited Penny Plane. Weighs 3.1 grams in total.

SCALE MODELS

There were some very fine rubber and electric powered scale models present, with some sporting radio control. I spotted a number of Free Flight Scale stars using this event as a prelude to the forthcoming BMFA F/F Scale Indoor Nats at Walsall University in April. Indeed, I was delighted to catch up with noted Free Flight Scale man, Pete Fardell and behold his new Dewoitine D500 in a smart silver finish. Pete scratch built this 28.5" span rubber sweetie. She weighs in at just 70 grams minus her rubber motor.

I also spotted noted 'multi-engine' moulded foam man, Graham Green campaigning his astounding 28" span Halifax. What a performer! Made from moulded



Left: S-l-o-w flying Limited Penny Plane tickling the rafters.

Below: Lord of F/F Scale, Pete Fardell with his new scratch built Dewoitine D500.



Pete's 28.5" span Dewoitine is rubber-powered.



Dave Crompton's scratch built 18" rubber powered DH Hornet Moth.



*Above: Graham Green's scratch built, 28" span Halifax is hand-crafted from moulded Depron.
Left: The astounding Depron Halifax on a bombing run.*

Depron finished with Tamiya paints, she was about the size of a large series Airfix kit - but with radio inside!

At the smaller end of the scale was an utterly immaculate 18" span Lysander from the famed Keil Kraft plan. This has been painstakingly assembled by Mark Brill. She was petite and perfect in every way. Unless you saw her in the balsa you would not believe that such a mass market design could come out so well. Of course, besides his accomplished building skills, Mark must have put a huge amount of thought into the selection of his balsa wood. If you have any Keil Kraft kits in your modelling past, then his model was one of the great sights of this event.

Mind you, there was quality in depth at this event. To my eyes the finest scale model on the day was the brand new, not yet trimmed, Douglas World Cruiser. This was from my old mate, and Lord of F/F Scale, Tim Horne. I wanted to do this significant 1/20th scale, 30" span model justice but the lighting and circumstance at Manchester was just not suitable. Therefore, I promise to get you some pukka shots of this exquisite scale aircraft with my portable studio at the forthcoming BMFA Indoor F/F Scale Nats at Walsall. In the meantime, to whet your appetite, I've included a shot of Tim with his model at the start of this article.

FOAMIE FUN

Two mates, Joe Ormerod and Andy Bell, whom I know from Rochdale indoor events, were flying two nifty R/C foamie high wingers. These inexpensive and fine performing models were Telink Tetras from Robotbirds. Apparently, £30 each in the bag! Definitely worth a look if you are after a tough, sporty, highly aerobatic indoor radio model.



Left: Mark Brill's immaculate Lysander from the classic Keil Kraft kit plan. Wow!

*Below left: Pete Fardell's nifty Blue Box kits 'Tin-Tin' schemed Messerschmitt Me 109.
Below: Busy man! Dave Crompton's 10" rubber powered Backyard Observation.*



Joe Ormerod (left) and Andy Bell were flying two nifty foamie R/C Telink Tetras.

“There were some fine rubber and electric powered scale models present, with some sporting radio control”



RCM&E readers Tim Hill, Tony Smithstone and Ian Benson.

*Trike undercart T-28 foamie
Trojans were everywhere!*



TERRIBLE TRIO

I chatted to three irrepressible RCM&E readers, Tim Hill, Tony Smithstone and Ian Benson. It's always great to chat to readers 'cos they put you right about so many things! Anyway, Tim and Tony were flying bright yellow HobbyZone T-28 Trojans, whilst Ian Benson was flying his Parkzone Mosquito.

Now, since my only indoor model was cream-cracked last time out, I was in the market for an indoor R/C chuck-about. Those three tricycle undercart'd 17" span Trojans looked just the job. I may try one.

INDOOR FOAMIE JETS

I have just realised that I was fibbing about only having one serviceable indoor R/C model. I do in fact have a brand new, in the box, Electric Ducted Fan foamie jet in my shed. It even came with a module to match most modern transmitters. I remembered this fact when I saw Charles Vandenberg flying his Great Planes F-86. The sleek and silver 15" span model flies very well indeed and looks utterly spot-on. Charles did give me one tip though - add a bit of nose weight, since the stated CG is too far aft. I shall, mate. I shall!



Charles Vandenberg flew his Great Planes F-86. I have one - must fly it!



Graham Green's 18" span (Strefford) Hawk. Superb indoor design.

“A superb day out in a venue that could have been designed for our needs.”

THE VERDICT

A superb day out in a venue that could have been designed for our needs. Whilst there are vending machines a few yards away, and a cafe just a bit further, it pays to take your own flask and butties. Some pilots even take a kettle!

There were tables provided, but some preferred to take their own, plus a folding seat. Indoor flying requires a good bit of kit - chargers, batteries, rubber motor winders, turn counters and so forth - so you may need your own spread space.

The day runs from 11.00am - 16.00pm, so you get your money's worth. Parking is easy and free, and the entry fee is buttons. All in all, a well-run, very friendly and enjoyable event, with a high 'feel-good factor'.

Arrive early, and you can also spend a little bit of your day marvelling at the spectacle of indoor bike racing. A winter tonic! ✈️



Above: Trimming and getting the correct turns on a rubber motor are Ye Dark Artes...



Left: Charles Vandenberg flew this aerobatic Extra.



Above: Father of the F/F Chapel, Reg Boor with his Aerographics Fairey Swordfish.
Below: Reg Boor's table of free-flight delights.



Above: Dave's scratch-built Piper Super Cruiser spans 28-inches.



Left: Dave Crompton tweaks his own-design Piper Super Cruiser.

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Hill's Hurricane

Next up, this image comes from Marc Hill, who writes:

"Here is a picture of my Hurricane, powered by a Saito 82 and built from the plan by Tony Nijhuis. She is unfortunately currently undergoing repairs, due to stalling in a crosswind, but I hope to have it back in the air by the end of spring.

I enjoyed building this one so much that I think the next model on the building board will be the Tony Nijhuis 50" BAE Hawk."



Quo Tyro

The first entry in this issue comes from Nick Ward, who describes how his latest scratch build - a model stitched together from multiple plans - came to be:

"Work commitments last year due to a profession change found me struggling for regular flying time. Electric foamies took over for a while, but although I enjoyed my Parkzone Trojan and F4F Wildcat, my ageing and rather tired Hobby Zone Super Cub was the only suitable electric model I had for instructing newcomers.

Reflection prompted me to put my DB Mannock build on hold and construct a brace of electric powered 'sport' models that cater for my instructing duties (both three and four channel), as well as allowing a little fun for myself.

The model pictured is a direct replacement for the Super Cub and is the first of three planned builds to satisfy the above before resuming other projects.

Based on the Quo Vadis IV free plan from the December 2012 issue of RC Model World, the wings are actually from a David Boddington Tyro with an extra rib on each side, taking the wingspan up to 49". Construction is balsa and ply, covered in Sig Koverall. The power train and servos were scavenged from a Hobby Zone Glasair Sportsman. It uses a brushless '480' motor and an 18A ESC. With plenty of downthrust and an AUW of 32 ounces the model floats along on half throttle. A 3S 2200mAh pack gives 10 minutes plus.

The wing loading works out at around 13.5 oz/sq. ft., allowing slow flight - good for coaching newcomers or just providing relaxing three channel flying. I flew it in blustery weather a few days ago and it coped very well, despite the wind blowing it upside down after touch-down on one flight!"



Classic Pair

Reader Rob Kronenburg and his friend Nick Cooper have sent in an image of their Junior 60s powered by modern brushless motors. Here's what Rob had to say:

"My red and black Junior is covered in Solartex and is powered by an old motor out of a long since crashed foam Wot 4 with a 40A esc. I have installed some old Drexler inflatable wheels - plugging up the holes with canopy glue works a treat, though they do have to be re-inflated from time to time.

Nick's blue and white model is covered in Solarfilm and has a camera mount. These planes are a lot of fun, not just restricted to floating around on a summer's evening. Since they are so reliable, I rarely leave mine in the car. Low level antics and rudder/elevator aerobatics look clumsy but are a lot of fun to try.

Having more than one is even better! We have even tried some (not very successful) formation flying at our field near Halsall in Lancashire in between the rain showers this winter."





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SIGMA

To celebrate RCM&E's 60th birthday, please enjoy our recreation of an old-school centre-fold plan. Shaun Garrity describes building this neat 45" span mini-glider, complete with carry case!

words & photos » Shaun Garrity

Here's another bucket list model but this time it's actually a refurb, not a rebuild; I'll explain later. I remember receiving my October 1971 RCM&E and as usual I had to beat my sister's evil dog Butch to the letter box, who had a talent for turning printed material into a soggy shredded mess.

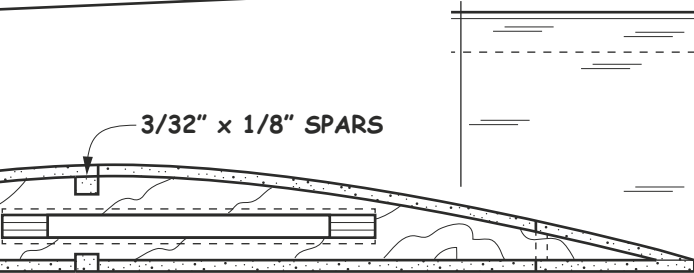
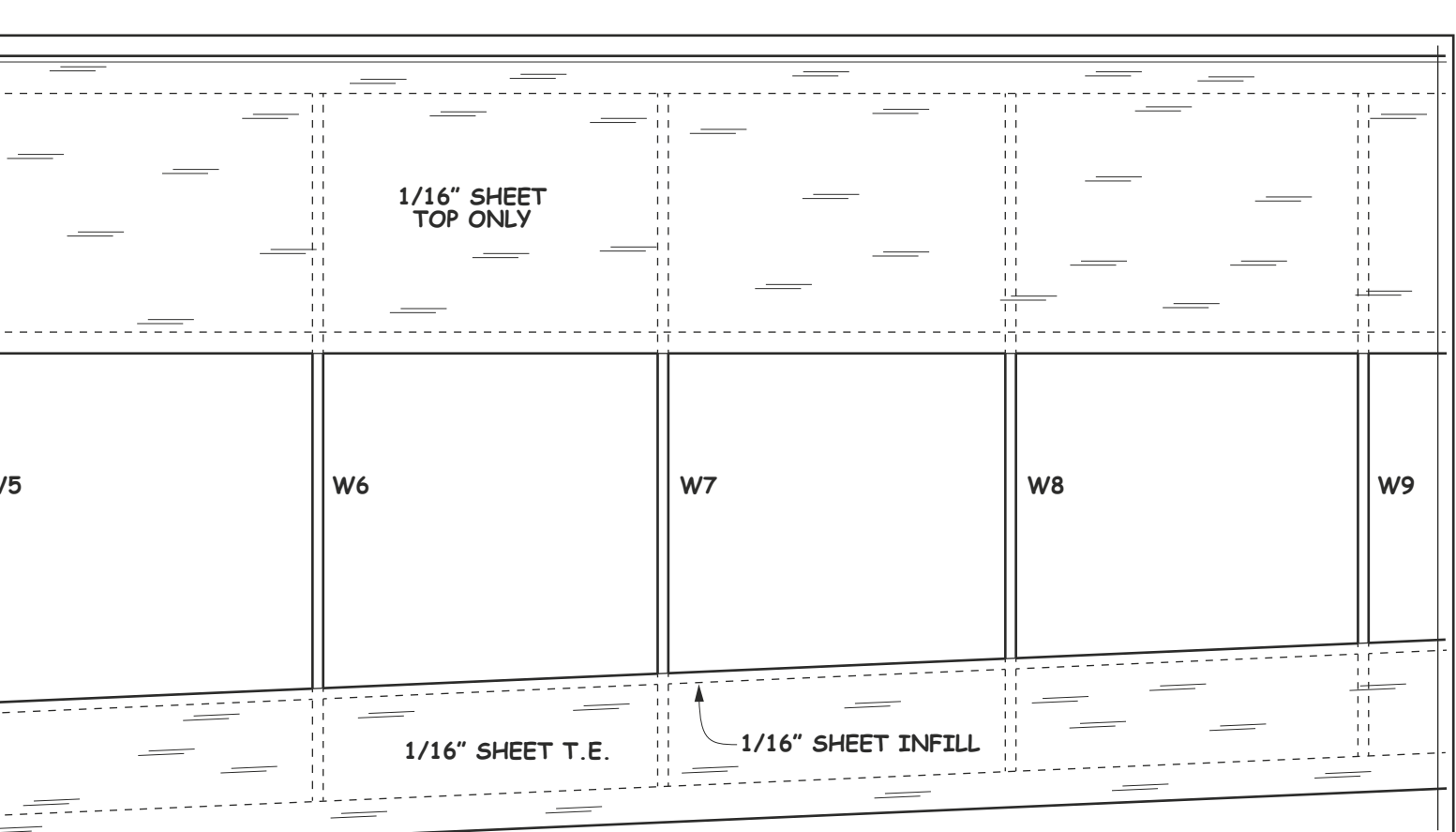
Fortunately the magazine survived and I remember being immediately impressed with the Sigma for two reasons; firstly it looked very different to your average slope kipper, with its short tail moment and high aspect ratio wing, and secondly it was designed to fit in a custom built carry case that was also detailed on the plan.

Why was this important, you may ask? Well, even back in the olden days a 15-year-old couldn't legally drive a car, so it was either the bus or push bike to get to the slope and it made Sigma very easy to transport. Originally designed for single channel Pulse Proportional radio it also detailed how to modify a rubber powered escapement to convert to a pushrod. This appealed to me as the lads at the slope would be fooled into thinking this lowly teenager could actually afford to buy a servo.

Normally a 45" wingspan plane would have a one-piece wing but obviously, as Sigma was designed to be portable, it's a two-piece design. The sensibly sized rudder and appropriate dihedral produced a model that had a quick response to any control input. Although single

Older radio gear can still be reliably used as long as a few basic rules are followed, as detailed in this article.

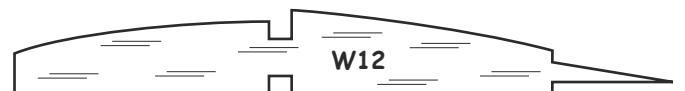
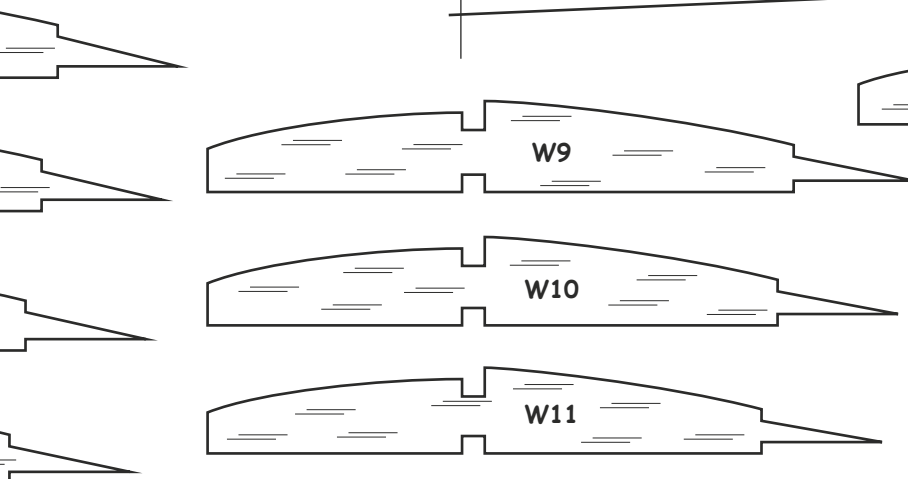
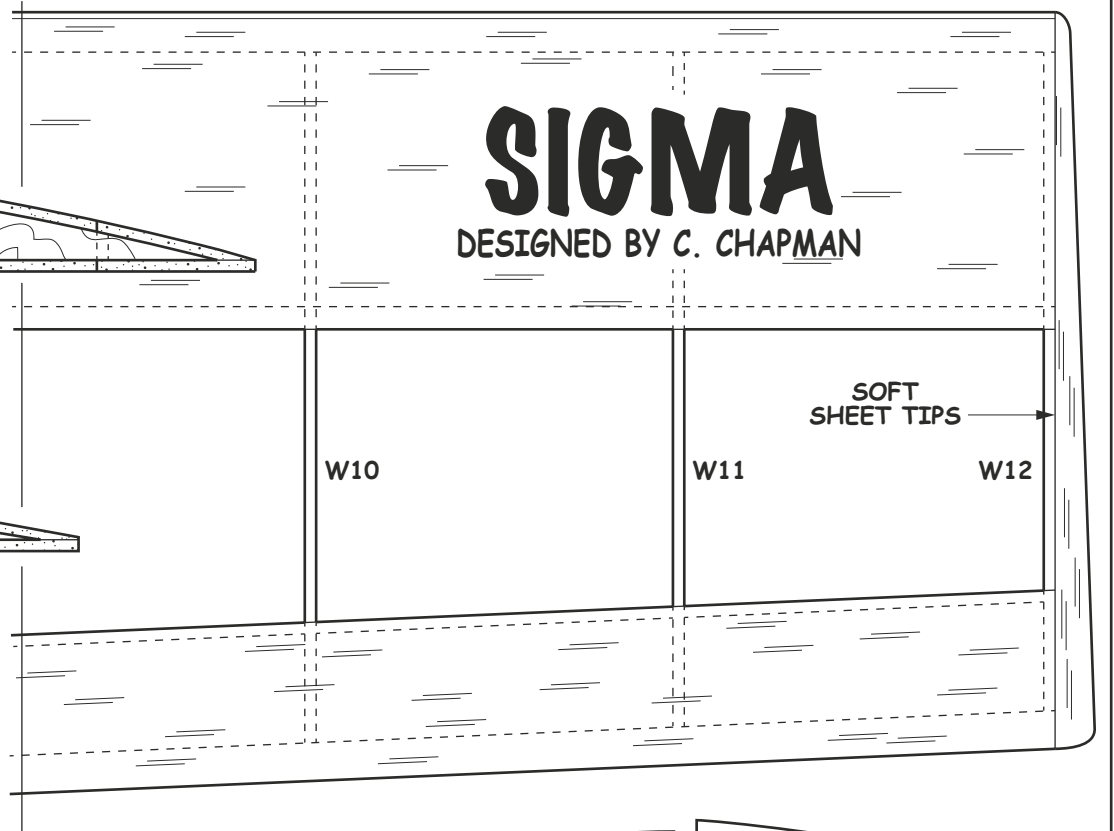




ROOT SECTION

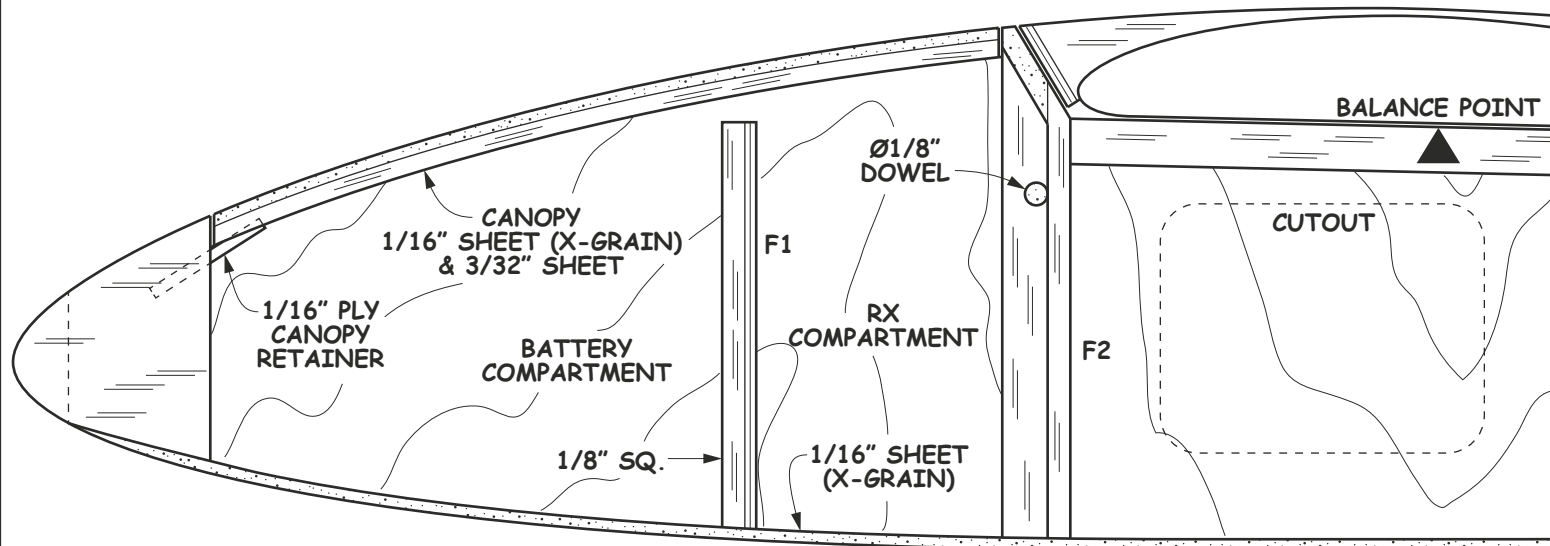


W12 - 1/16" SHEET
TIP SECTION



BASIC MATERIALS:

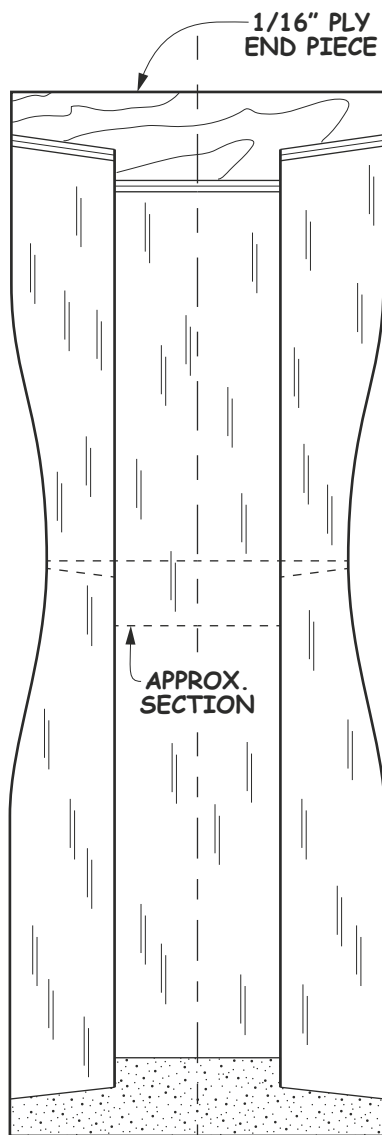
- 3 OFF 1/16" x 3" x 36" MED. SHEET BALSA
- 2 OFF 3/32" x 3" x 36" MED. SHEET BALSA
- 1 OFF 1/8" x 3" x 36" HARD SHEET BALSA
- 2 OFF 1/4" x 1/4" x 36" MED. STRIP BALSA
- 1 OFF 1/8" x 1/8" x 9" SPRUCE
- 4 OFF 3/32" x 1/8" x 36" MED. STRIP BALSA
- 1 OFF 1/8" x 1/8" x 36" MED. STRIP BALSA
- 1 PIECE 1/32" x 12" x 12" PLYWOOD
- 1 PIECE 1/16" x 6" x 6" PLYWOOD
- 1 PIECE Ø1/8" x 9" DOWEL



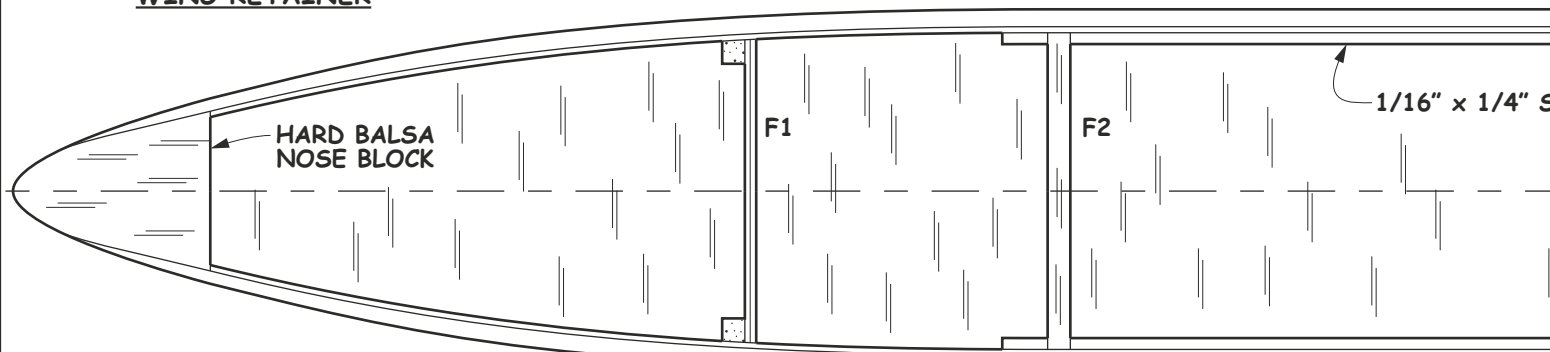
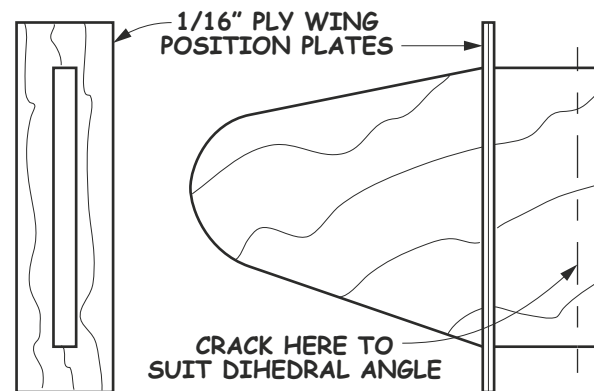
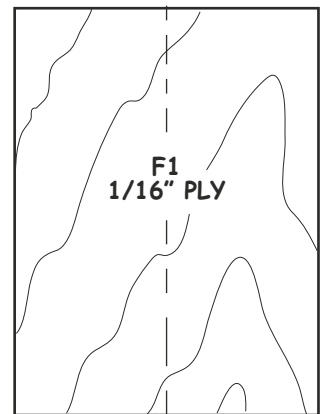
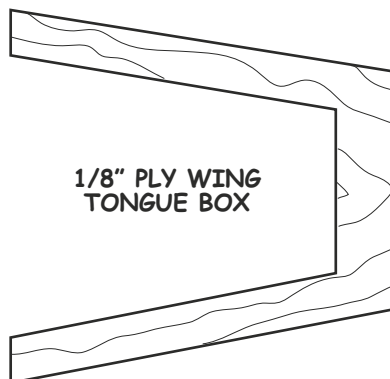
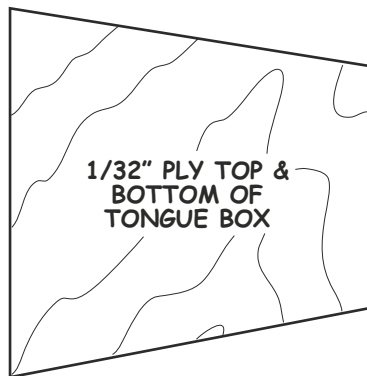
A 45" SPAN R/C GLIDER

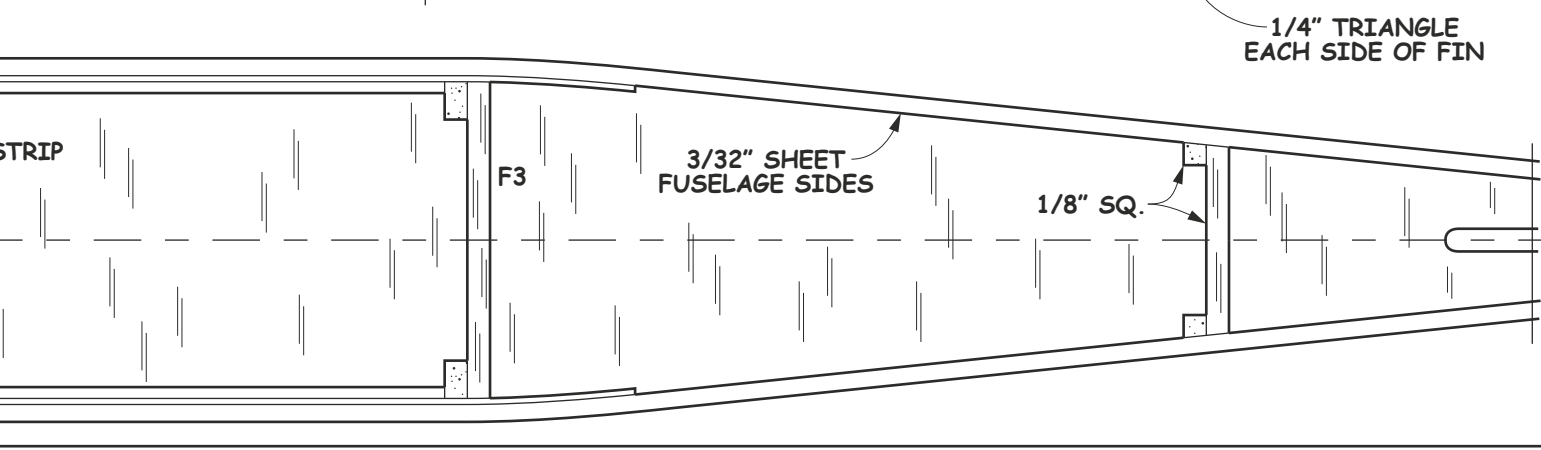
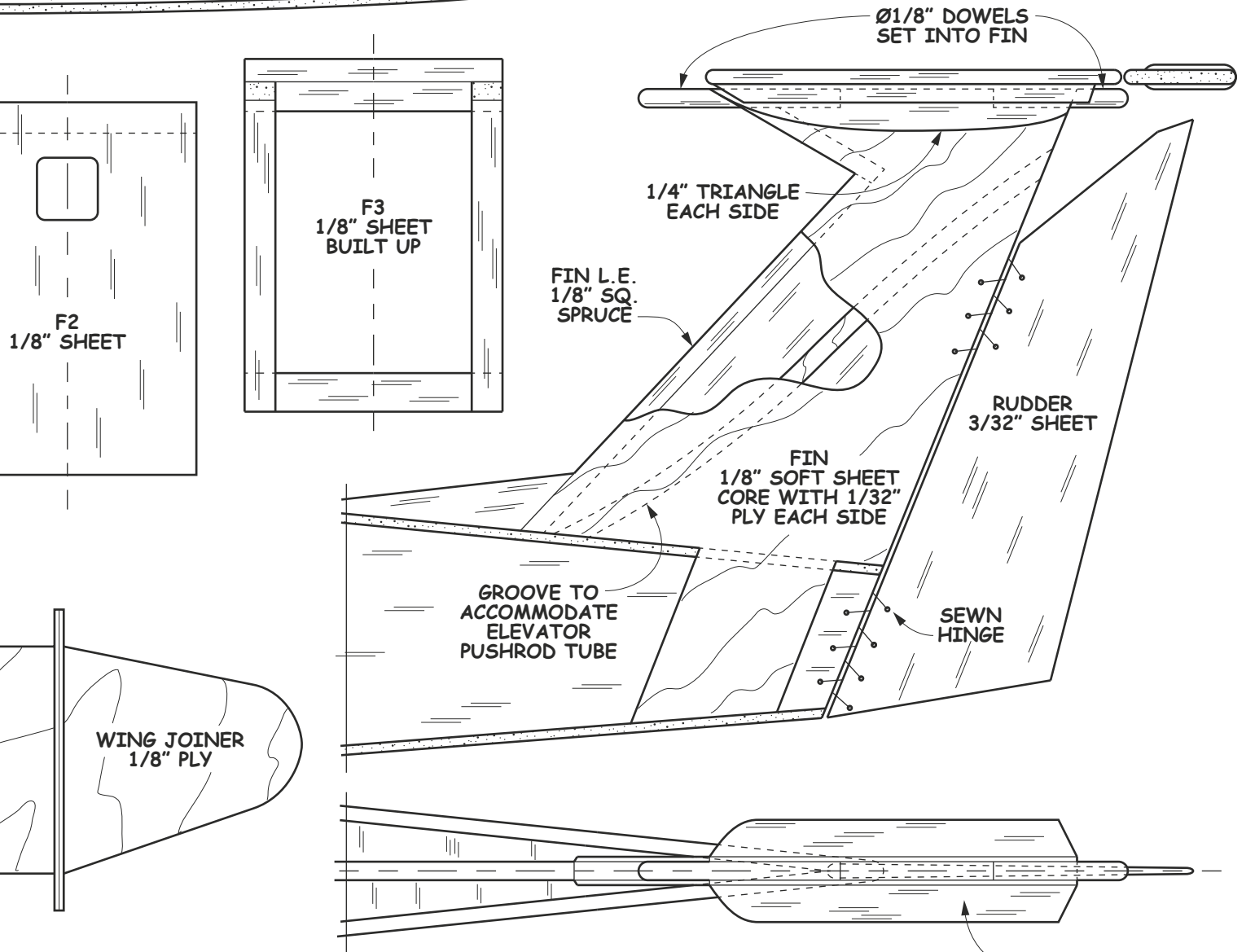
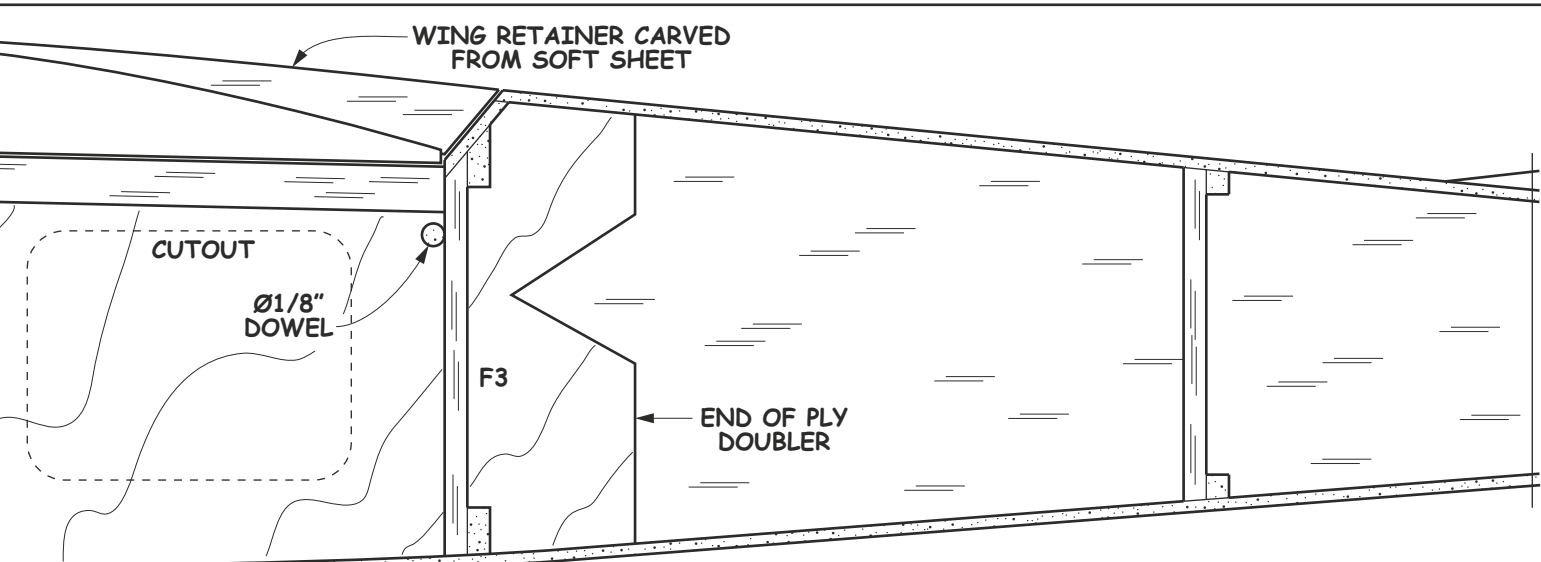
SIGMA

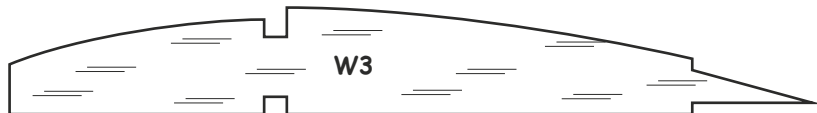
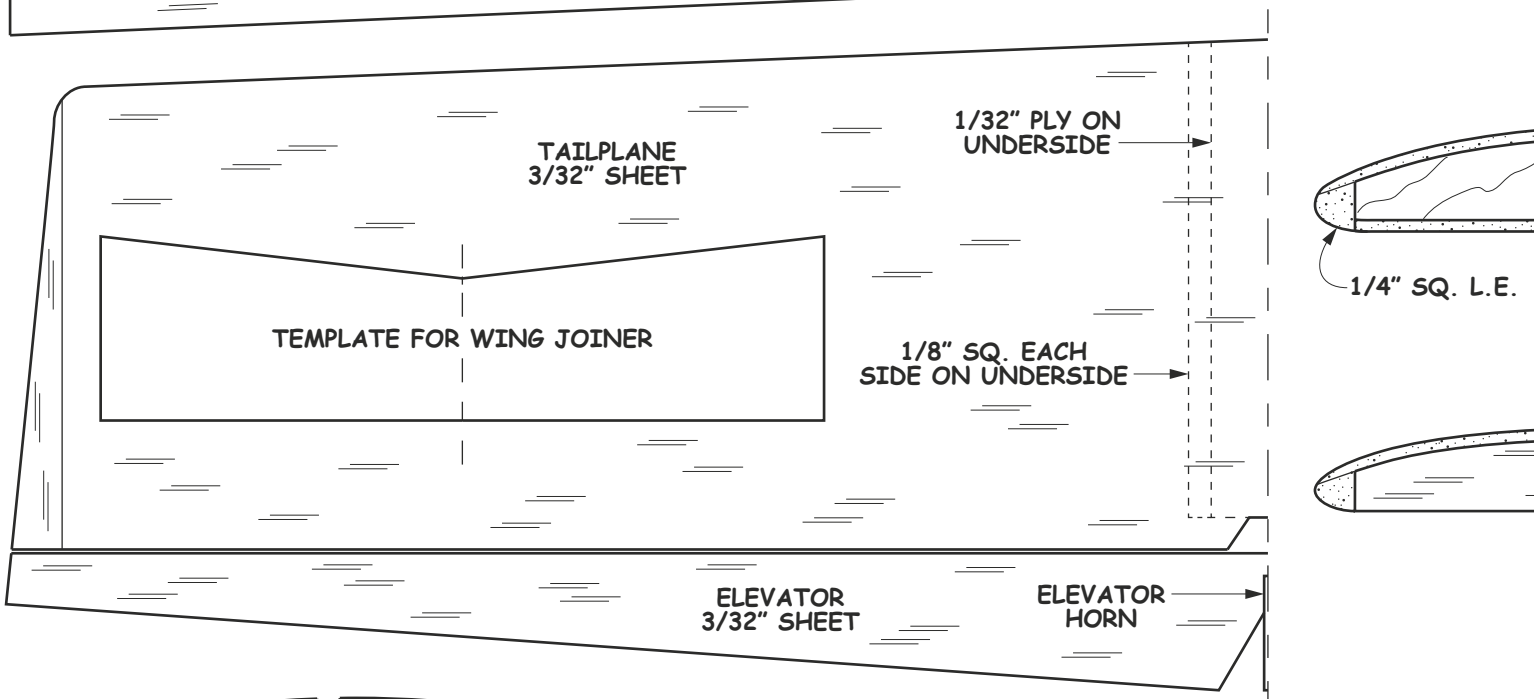
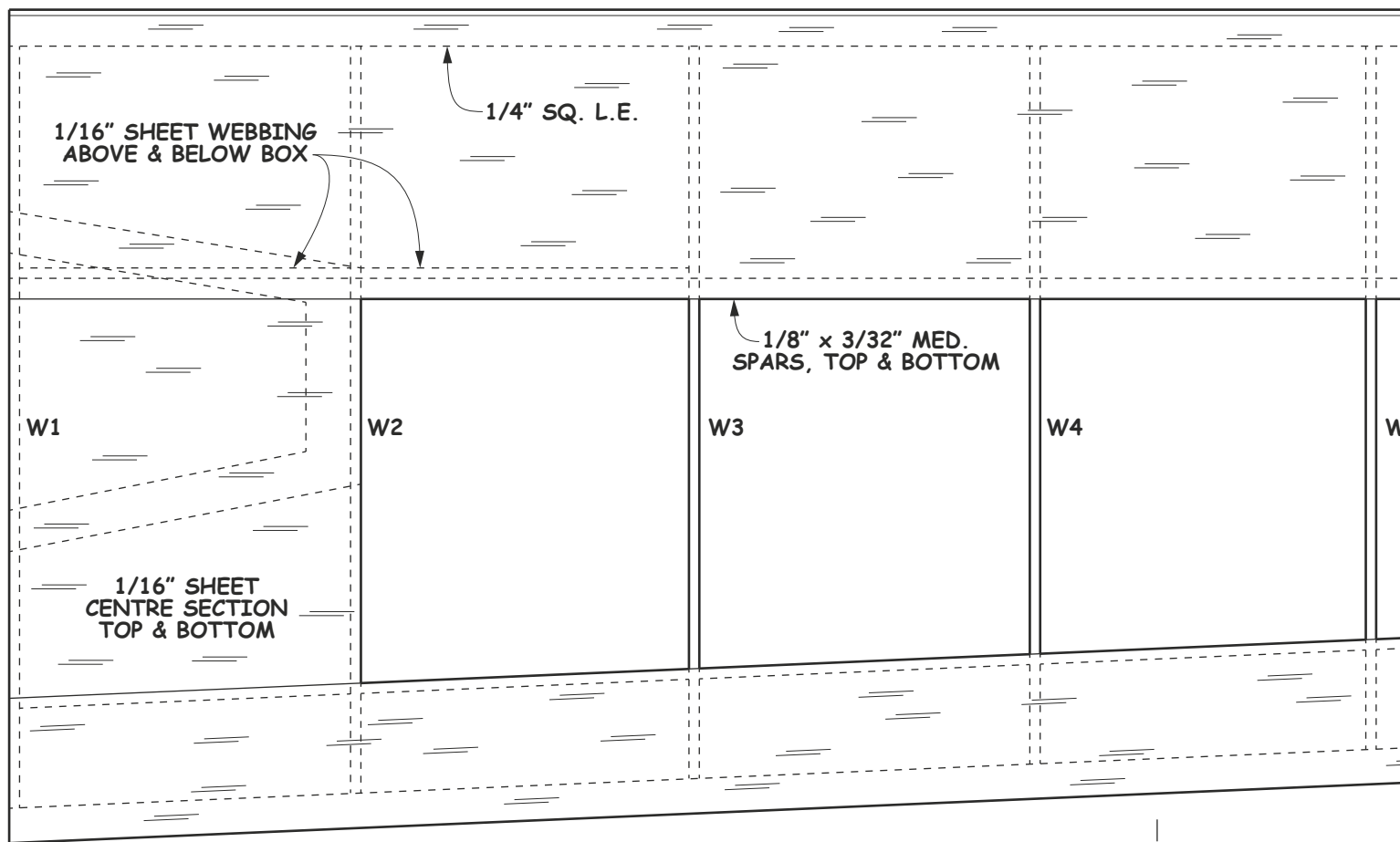
DESIGNED BY C. CHAPMAN



WING RETAINER









A refurb instead of starting from scratch can be a viable option. But if it's a basket case don't bother - it will be quicker to start anew.



Although a simple piece, the wing joiner needs to be strong otherwise your pride and joy will cease to glide and emulate a brick when the wings fold!



You can see the purpose of the 1/16" ply wing position plates here. They keep the wings aligned and make a space for the soft block wing retainer to locate into.

channel slope soaring was fun it made sense to update Sigma by adding an elevator, allowing flying in a greater range of wind conditions.

Modern radio is almost microscopic in comparison to period examples but as the model featured here was recently bought along with some old but very usable 27 MHz Horizon proportional gear, the decision was made to use this to guide Sigma after the refurb. I also saw the potential to possibly add a small pylon mounted brushless motor for flat field use, as I had previously done on my Veron Impala slope soarer.

WINGS AND THINGS

First job is to make up two sets of wing ribs (R3 – R12) using medium 1/16" balsa. You could cut them individually, but the good old sandwich method will be the easiest way. R1 and R2 are shown as 1/16" marine ply but 1/8" lite ply will do as an alternative. There's nothing difficult about building the wings; the box for the ply wing tongue may be new to you but it works well. However, if you're not keen on this method then possibly just use piano wire and brass tubes instead.

Start by placing the lower 1/8" x 3/32" spar over the wing plan. Specified as balsa, I would replace these with spruce as this will add significant strength for nominal weight gain. Position the lower trailing edge and leading edge, then add ribs R1 and R2, assemble the wing tongue box, then the remaining ribs. Glue on the 1/8" x 3/32" top spar and top 1/16" trailing edge and let set. The plan shows shear webbing between R1 to R3 but again for the negligible weight gain I would continue this to R12; don't forget the 1/16" infill pieces on the trailing edge. Once dry, shape the leading edge, add the top 1/16" sheeting and wing tip. A final sanding, then do it all again for the other panel.

You'll now need to make the wing joiner from 1/8" ply, as detailed on the plan; an alternative would be aluminium or Dural. If using ply, then reinforce the dihedral crack line with a piece of bandage and epoxy. The final part of the wing is the soft balsa wing retainer, but this will need constructing after the fuselage is completed because you need to fit the wing to get the perfect shape.

The tailplane is a simple sheet affair and if you look at the relevant photo, you'll see the elevator detail. I would use medium hard 3/32" balsa and don't forget the 1/32" ply shown on the under side.

FUSELAGE

Again, nothing difficult here so start by cutting out the sides from medium 3/32" balsa; you will be able to get both out of one 3" wide sheet. Next cut and glue the 1/32" ply doublers with Aliphatic or PVA as shown, weighing down on a flat surface until dry. Now stick the 1/16" x 1/4" and 1/8" square balsa strips in place. When set glue F2 and F3, ensuring everything is square and true. Next job is to join the fuselage rear, then add F1 (a clamp will keep it in place until set) and ensure it isn't emulating a banana. Leave to dry then fix the nose block on; again a clamp will help things stay in place until firmly set. Sheet the underside of the fuselage with 1/16" med balsa. Depending on how rugged your slope is, it may be worth using 1/16" ply from the nose block back to F2. As mentioned, the ideal way to connect up the elevator is using a thin piano wire push rod in a PTFE or nylon outer tube. Tube in tube will also be fine for the rudder but to make things easier it's better to accommodate these before sheeting the fuselage top rear with 1/16" balsa. The plan also details a weight box; this was useful because it allowed you to securely add up to 6 ozs of lead to increase the wing loading when

flying single channel, as it extended the range of wind speeds you could commit aviation in. With an elevator this is less of an issue and left out on the refurbished model.

Regarding the modified fin (to accommodate an elevator push rod) it's probably simpler to look at the accompanying photo to see how it was constructed rather than describing its assembly. Originally made from 1/8" hard balsa, you can cut the new fin core from 1/8" soft balsa and skin either side with 1/32" ply after cutting a channel out for the push rod outer.

Don't forget the triangular fillets as they form the base for the tailplane. Another modification is to extend the fin post so it protrudes through the fuselage bottom; this raises the rudder from the ground so could potentially help prevent damage. If you look at my model, you'll see I've also extended the rudder to compensate for the section removed to facilitate the elevator push rod. The canopy hatch was originally made by laminating a lengthwise 3/32" balsa piece with 1/16" cross



When adding an elevator, the fin needs modifying to accommodate the pushrod outer. The final position ended up being lower than depicted here.



My elevator pushrod and horn set up. The horn was made from thin glass fibre board but 1/16" ply could also be used. I know it looks a little strange, but it works. Take your time so it is bind free.



Traditional tube in tube set up for the rudder. When modifying for an elevator the rudder area needs increasing as shown due to the section that's removed to accommodate the elevator push rod.

grained balsa, but 1/16" lite ply would make a very suitable alternative. After an overall final sanding you are ready to get covering.

PAINTING AND DECORATING

Slope soarers generally experience more punishment than your average grass strip model, especially the fuselage, so need to be robust. For balsa fuselages, nylon or Solartex type coverings are ideal; glassing is better but like nylon and dope it's definitely a messier option. Although our beloved Solarfilm and Solartex products are no longer manufactured, there's a surprising amount still available if you ask around, because most modellers are hoarders.

There, I've said it! We have a problem, but it's not a bad thing is it? Thousands of metres of film are languishing in workshops and sheds all over the world just waiting to be liberated.

The model featured here (being refurbished) had a nylon and dope finished fuselage, with Solarfilmed wings and tail, as per the 1971 RCM&E article model. The fuselage was in pretty good condition so it was simply wiped down with thinners after giving an overall sanding with 400 grit flour paper, followed by a coat of stabilising primer and the original colour reapplied from a rattle can. The fin, tailplane, elevator and rudder were filmed, with control surfaces hinged using furry Mylar glue-in types. Although the wings were film covered, they were tired and needed redoing. I also wanted to check that the structure was intact, with no broken ribs or detached glue joints etc.

My preference was always to use Solarspan on slope soarers as it was less prone to damage and not significantly heavier than Solarfilm. But the new films now available from China work very well and appear to have excellent puncture resistance in use. Keeping with the original colour scheme I recovered them in yellow, with some custom cut vinyl decals.

RETRO RADIO OR NEW?

As previously noted, along with the Sigma I also bought a retro two channel Horizon 27MHz set with the intention of installing it in the model. Now there's nothing wrong using older gear as long as a few rules are followed.

Obviously, it needs to operate reliably, with full range and any unexpected signal loss, dithering or twitching should give immediate cause for concern. Assuming this base level of functionality is passed then check inside to see if there's any evidence of corrosion to the circuit board, electronics, switches etc. (caused by leaving the batteries inside or storing in a damp shed). If so don't use it as it's an accident waiting to happen, but you will have a unique paper weight.

Receivers of this era usually had the cases fixed together with tape or, in the case of MacGregor, screws. You'll need to have a look in here as well but be careful not to disturb any of the wires and damage the soldered joints. Next, inspect the plugs, leads, battery box, switch and carefully examine servos for erratic movement, poor centering, cracks or damage. Servos on some early radios had four wires, the extra wire being a centre tap on the power supply; modern servos can be used but you need to have some

understanding of electronics. Later sets have three wires, so it's not a problem, except Sanwa used a different ordering on the servo wires and certain examples, such as the Horizon were unique to the brand.

Assuming you're happy at this point replace all the batteries and give the set a soak test, i.e. leave it on (with the aerial extended) for a good few hours and keep wiggling the sticks to check all is in order. Remember at the end of the day it's your responsibility to ensure the gear you use is safe and serviceable - and don't forget the frequency flag.

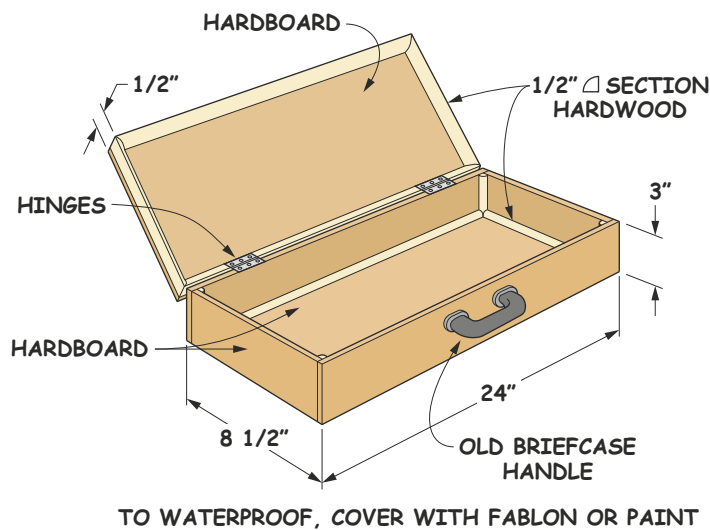
Now you may well be asking why bother, especially as 27MHz is more prone to interference and you have to wield an aerial that's as long as a fishing rod. But why not? It will certainly provoke comments at the slope (not all may be favourable, however!) and remember modellers have made millions of successful flights over the years on 27 and 35MHz frequencies.



Old school servos are huge in comparison to modern types. For current radio gear 9g servos will be fine, but metal geared examples are worth the small additional cost to survive the rough and tumble when landing on a slope.



Like the servos this retro receiver is a big lump and it's only two-channel! It was a squeeze to get it in. Using four AA cells the C of G came out spot on. I didn't use a switch, just plugging the battery into the receiver as required.



Left: A simple carry box was shown on the original plan.
Below: The carry box needs building along with the model.
Novel, quick and easy, it will protect your Sigma.



Just waiting for the delivery of some foam so I can make a custom interior to keep everything in place and damage free in transit.

It really brings home how far we have come - after installing the Horizon gear, the fuselage felt like a brick! I've got so used to the feather weight of modern 2.4G radio and powerful but small servos.

TIME TO FLY

Check the Centre of Gravity is as shown on the plan, the wings are warp free, control surfaces move in the correct direction and don't bind. I would suggest that a 15mph wind straight up the slope would be ideal for the test flights. The speed range of the original was between 8mph to 35mph when ballasted. My Sigma was heavier due to the two-channel retro gear, but it still flew well. Sigma is capable of loops, rolls, rolls off the top and many more, but as the designer, Mr. C. Chapman, noted in his original article, make sure you have a strong wing joiner.

THE BOX

The carry case was what initially appealed to me on reading the article and its construction is very simple but remember don't make it heavy; it's not a piece of furniture. The one featured in the original article used simple hardboard sheets, 1/2" quadrant hardwood strip and was covered in vinyl to waterproof. It can be made larger than shown if you want to include your transmitter, sandwiches, flask and usual field repair kit - a slope session in a box!

My Sigma box has a hardwood top and bottom with 1/4" lite ply for the sides, then painted. You could even use 8-10mm Depron, I guess?

Have fun on the slope and remember, how can your significant other ever complain when you go flying, because the real reason you do it is that you are selflessly exercising and getting fresh air to keep fit for them... Will that work as an excuse?

As always, don't forget to send in your pictures to: thatbloke@garritys.net

DATAFILE

Designer:	C. Chapman
Model type:	Sport Slope Soarer
Wingspan:	45"
Length:	22"
Weight:	17 ozs max



"Sigma is capable of loops, rolls, rolls off the top and many more"

On the slope and ready to get skyward.
This pocket rocket won't disappoint.
Mental note to self - remember to extend the transmitter aerial!

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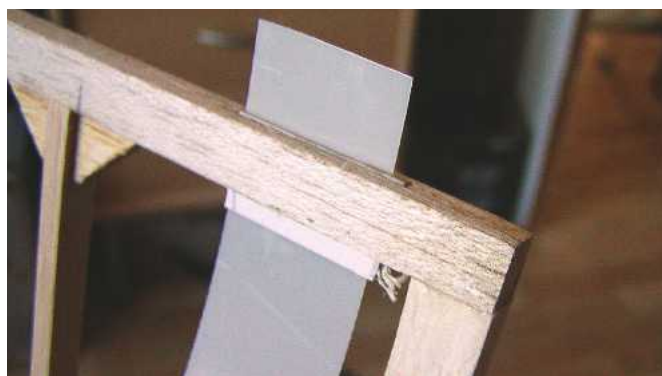


Kevin.Crozier@mytimemedia.com



TOP LETTER

Now this, dear reader, is a handy gift. For his letter this month Andrew McKelvey wins a very popular LiPo and low self-discharge Rx pack combo courtesy of Overlander Batteries - www.overlander.co.uk



REVERSE WOOD BUTCHERY

Flying my Seagull Extra 300S in a stalled condition through a stand of willow trees resulted in clipped wings and a severely damaged tailplane. Repairing the latter meant removing the elevator, the hinges of which were very firmly affixed and needed a lot of digging to get them out. When doing this I made a bit of a mess of the surrounding balsa, to the point that the replacement hinges would be a very sloppy fit. I didn't want to build another tailplane, so what to do?

My initial brainstorming conjured up the idea of using 0.8mm ply to make the proposed repair but this turned out to be too thick, so my

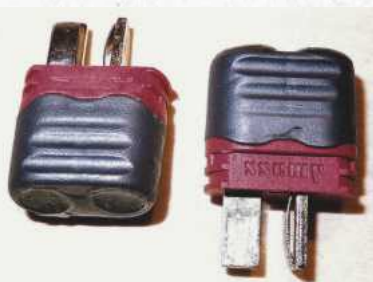


thoughts turned instead to thin cardboard, which looked about the right thickness when folded double.

I cleaned each old, butchered hinge slot with a broken hacksaw blade, cut the cardboard to size, doubled it over and stuck it firmly in the slot with PVA, separating the folded halves with a length of Mylar hinge material to avoid them getting stuck together whilst the glue dried. I then removed the Mylar and fitted a new hinge into the snug slot. Works a treat.

Andrew McKelvey

PERFECT ISOLATION



I enjoyed reading David Ashby's 'Perfect Isolation' article in the March issue and wholeheartedly agree that it's so important to take great care with the throttle stick when handling 'live' electric-powered models. To that end, I use a trick that I picked up from members of the Truro MFC to make the

throttle stick safe. Simply wrap a daisy chain of elastic bands around the Tx handle, run it down the back of the case, around the underside and back up the front under tension, looping around the throttle stick to keep it at its lowest setting. Works a treat.

I'm also a great believer in having an arming plug system to isolate the battery, as discussed in RCM&E some time ago. I use the Deans system as sold by HobbyKing, however the kit doesn't include a



proprietary finished arming plug so I fabricate my own using Deans connectors that have a plastic cap to cover the soldering tabs. I solder a brass finger (cannibalised from another Deans) across the solder tabs of a male Deans connector and then epoxy a covering cap in place. It's a good idea to make plenty of spares because they're easily lost, especially in long grass.

R.G.Willis



HIGH ON HAHNENMOOS

Although no longer an active modeller I still very much enjoy reading RCM&E. Simon Cocker's article in the March issue about Alpine flying reminded me of a tour I was leading in Switzerland back in 2005 where, whilst walking over the Hahnenmoos, we came across an annual event with flyers from all over Europe enjoying perfect weather soaring from the ridge. The German gentleman in the photo attended every year and was kind enough to allow one of my group to hold his model – one of many packed into the adjacent hotel.

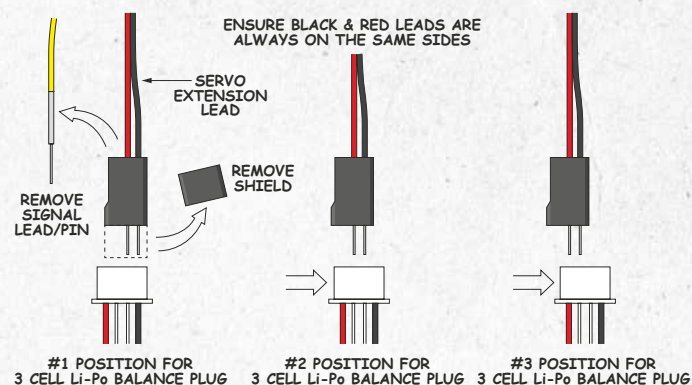
Brian Bloomfield

EASY CHARGE LEAD

Having trouble getting a well-balanced charge on my 3S LiPos, over 300mV low to high, I remembered Dave Burton's article in the November 2018 issue RCM&E regarding charging single cells to rectify balance issues. Reading the article again and duly making up the lead mentioned in the article, I found that by taking a standard (Futaba) type servo extension lead the charge lead could be made as follows:

- Remove the shielding from the male end
 - Remove the signal lead and pin (yellow) from the male end (apply pressure on the pin end whilst pulling the wire and it comes out quite easily)
 - Remove the signal lead from the female end (similar method to above)
- There you have it - a single-cell charge lead without the need to of source a pin header, and no soldering.

A note on safety - double check you've connected the black wire towards the black wire end of your balance plug and red towards the red.



IN A STROP

Alex Whittaker's piece on fuel proofers in the February issue prompted me to relate my experience using Ronseal floor varnish as a fuel proofer on models using fuel containing fully synthetic oil with 5% nitro.

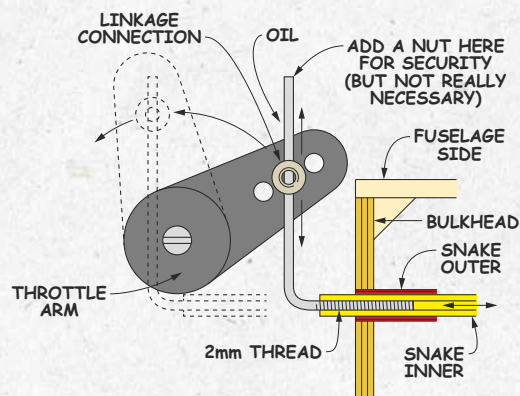
After the first flight of my Ronseal-proofed SE5a, any area that received a coat of engine exhaust turned to a sticky treacle-like surface that proved to be impossible to rectify, even after several years.

More recently, despite all my models now being fully electric, I've once again been affected by old, burnt synthetic fuel. My models are stored hanging from the ceiling of my workshop by strops made from

leatherette (a synthetic upholstery material with a fabric backing), some of which were contaminated with small amounts of burnt fuel from when they were used with IC models. The issue came to light when I used these to hang up my latest creation which, as opposed to the film covering of the rest of my squadron, is finished in Halford's rattle can enamel; where the affected strops touched the suspended fuselage the paint finish is now dull and matted.

Goes to show that burnt exhaust material doesn't lose its potency over time, so beware!

Alan Howland



PLAN VIEW WITH SIDE MOUNTED ENGINE

REAR CARB LINKAGE

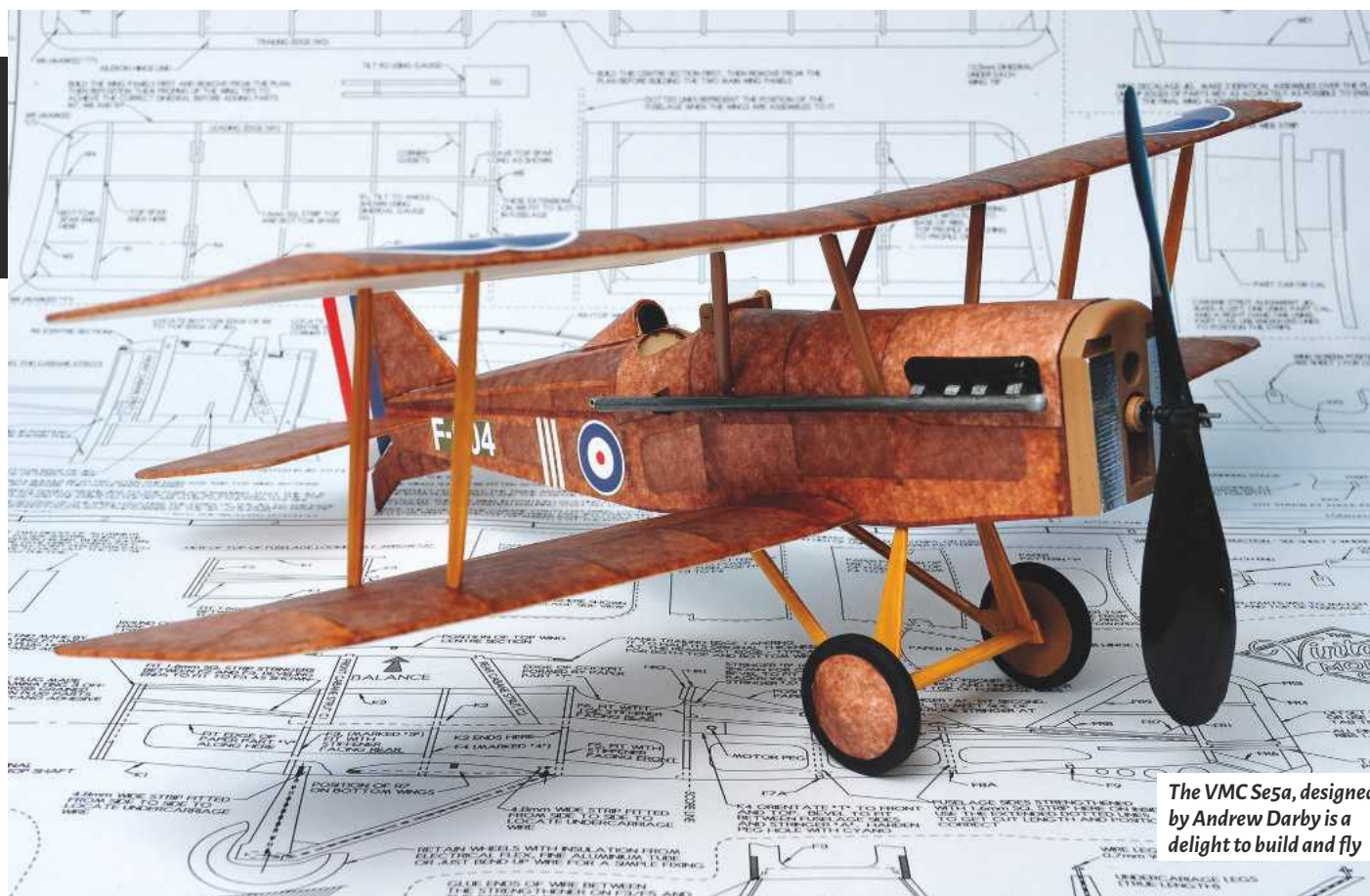
I thought RCM&E readers might be interested in my solution to the problems I experienced when fitting a side-mounted four-stroke engine with a rear carburettor to a narrow fuselage. The issues were two-fold: firstly, the throttle arm was very close to the bulkhead and secondly, it was beyond the outer edge of the fuselage.

Fit a metal linkage connector to the throttle arm, minus its locking screw. Select a length of piano wire (or bicycle spoke) that's the correct diameter to pass through the linkage retainer and into one end cut a 2mm thread, approximately 12mm long. As shown in the diagram, bend the unthreaded part of the wire at 90° to produce an L-shape (dimensioned to suit the installation – mine measured approx. 20mm x 20mm), the threaded end of which is then self-tapped into a fluted-type snake inner. The corresponding snake outer is then fitted, the end of which is lightly belled out and glued almost flush to the bulkhead. It may be necessary to add additional support along the snake's length depending on where the throttle servo is located. The servo end of the snake inner is fitted with a longer length of part-threaded piano wire, cranked to align with the throttle servo arm and secured to it with a second linkage connector.

In operation the linear motion of the snake inner is transmitted to the movement arc of the throttle arm by part of the L-shaped wire sliding in the linkage connector (the small amount of throttle barrel vertical movement is allowed for by the inner snake flexing, helped by the belled outer snake). For added security (although in my experience it's not necessary), fit a nut onto the exposed wire end beyond the throttle arm.

With careful alignment the above produces a neat, low-friction solution.

John Cleverley



The VMC Se5a, designed by Andrew Darby is a delight to build and fly

INDOOR SCALE

What with all the poor weather lately, and then global health concerns, Danny Fenton has been keeping busy with regular doses of indoor scale modelling

words & photos » Danny Fenton

I have had an eventful time since our last coffee and biccys. I have had to take a step back from the Scale Indoor R/C Nationals as I disagree with the direction it is going, not that I doubt for one minute it will be a wonderful event; I struggle with how free flight modellers can truly understand the need of the R/C community.

As I type the decision has just been made that the Scale Indoor Nationals event is to go ahead. My preparations and those of my friends are forging ahead. Many of which are on models which will only fly for three minutes in a fun pylon race over lunch. The enthusiasm of some of my indoor friends is quite astounding. As such I will be awarding an extra trophy for the modeller that inspires, encourages or just shows the most enthusiasm for the event. I picked up a nice vintage desk clock, based on an aircraft altimeter, but with hindsight, as it's for a speed event, perhaps a clock based on an airspeed indicator would have been more appropriate!

I am really looking forward to flying indoors over 12 badminton courts and under terrific lighting for a change. It should be a great day with great friends.

The dates to remember are April 18/19th at the Wolverhampton Sports Complex (Walsall), The University of Wolverhampton, Magdalene Road, Walsall WS1 3TA.



Transair sell these desk clocks, based on vintage aircraft instruments. This one is a prize for my most inspiring Pylon modeller.

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Scale Indoor Nats - still on as of this time.

FURY UPDATE

The Hawker Fury that I have been trying to finish has had to take a back burner over the last few months as I have been struggling to get a kit scale entry ready for the Indoor Nats. But hopefully I'll come back to it soon.

SE5A CONVERSION

You may recall a few years ago, with just two weeks to go to the Free Flight Nationals, I built a Vintage Model Co. SE5a - my first free flight rubber powered model in nearly five decades! As this year we are introducing a new class at the Scale Indoor R/C Nationals - Kit Class - I thought I would convert that VMC model to R/C. It has been good fun.

I got into trouble on the maiden at Shawbury and the model crashed, wiping out all four wing panels, so I have had to repair it. The method I have used to operate the flying surfaces on the tail (Elevator/Rudder) is quite ingenious, if I do say so myself. I hope it proves reliable as it is a bit sensitive to temperature changes, but the beauty of the tensioned pull system is it adds virtually no weight to the tail end of the model, reducing the need for nose weight.

The VMC SE5a was a delight to build and I would highly recommend one of Andrew Darby's designs as an introduction to the world of indoor free flight modelling. They fly extremely well.

The SE5a lends itself perfectly to an R/C conversion using one of the Spektrum AR6400 Rx bricks. These units are very simple and have two onboard linear servos, and a built-in brushed 2A ESC, though they are a bit expensive at around £40 each. A cheaper route is to pick up a tatty old indoor E-Flite or Parkzone model and harvest the bits. Unfortunately, this has pushed the price of second-hand models up a bit. A lesson in supply and demand!

The tailplane was supported and the elevators separated along a convenient balsa spar; the same for the rudder. For Kit scale you can deviate from the plan only in a few areas. Cutting movable surfaces is obviously one. The modeller must however follow the correct scale outline of the surface, be it an aileron/elevator/rudder/flap etc. So, if the full size has an all moving tailplane the model should also have this style and slitting the tail plane to give separate elevators would be penalised. Other modifications allow access to the radio and battery, as well as the fitment of an electric motor. Additional exits are allowed for pushrods, etc. Otherwise the model must be as per the plan. Covering can be altered from tissue, but you need to



Left: Elevator and rudder separated from the model. Hinged with diskette internal film.

Below: Motor fitted to nose block and Rx brick ready for fitting.



Above: Very popular AR6400 Rx brick positioned on a small shelf. This is a 3-channel unit, with a built-in brushed ESC and two linear servos

Left: Polythene sheet keeps the magnets from sticking together when glued in place





The completed model ready to try.

Wings re-attached and sporting a rather fine Dave Banks pilot figure.



remember that the judges will need to at least see the outline of the internal balsa structure to ensure it is as per plan.

So, with the rudder and elevators separated the elevator halves were joined with a small section of 0.5mm carbon rod. Carbon rods were also used to create the control horns. The surfaces are hinged using strips cut from the inside of diskette drives.

For free flight the nose block is normally retained simply by tension in the rubber motor, so all I did in this respect was remove the prop and bushing, then hollow out the rear of the block to allow space for the gear box of the brushed motor. Six 1mm neodymium magnets hold the nose block and motor in place. Inside the nose of the fuselage a small shelf is fitted onto which is attached the AR6400 Rx brick and onboard linear servos.

The conventional route here would be to fashion some carbon push rods to operate the control surface to the rear of the fuselage. But you know me well enough by now -

convention is not always my strong point! I used some 1lb fishing line to run a pull line to the horn on the control surface. The other pull line is fed back to the nose, where it is attached to a 25mm length of 0.5mm elastic. This pulls the surface up, the servo pulling the surface down. Similarly, for the rudder.

On the bench it works just fine, however the first trip to the freezing cold RAF Shawbury hangar caused the elasticity to alter and the surfaces could not be trimmed to be level. A tweak at home sorted that out and the next visit saw the surfaces aligned. However, an extremely close near-miss incident during the maiden caused me to panic and I crashed the model, taking the wings off.

Repairs have been carried out and longer horns fitted to the elevator, to reduce sensitivity, so I am hoping to try again at the High Wycombe taster session this weekend - fingers crossed! I won't get any practice before the Nats, but hopefully it will fly predictably. It is an SE5a and they ALWAYS fly well!

ONE CELL WATTMETER

I hope you aren't getting too bored with all this indoor scale. I am a bit obsessed with indoor scale at the moment. With all the rain and wind, and now the potential restriction on group gatherings thanks to the COVID-19 outbreak, indoor scale keeps the enthusiasm going. I hope to be back onto outdoor scale in the next few months, so be patient.

Staying with indoor, it has become apparent that us indoor (low power typically, using a single LiPo cell) modellers could do with some tools suitable for our requirements. With that in mind my modelling chum and ace electronics guru, Chris Bott has been designing gadgets for me. I am constantly in awe of his creations and I know he does get some help from other electronics egg heads on the forum, but Chris is able to work it all out and pull it together. I am indebted to you Chris.

The first gadget is a wattmeter. Now you are going to say, we already have those. Well that's not strictly true. What we have are modified larger scale watt-meters, for measuring hundreds of Watts and up to 100A in some cases. When you try to use these on a 1S system you hit a few issues. First, the 1S cell is often not enough to power



Chris even programmed the Arduino panel to personalise the wattmeter he made for me!



The wattmeter ready for action. It works well. Colour display coming next.

the meter itself. Second, the AR6400 Rx has a max current rating of 2 - 2.5A typically. The modified watt-meters are quite poor at that very low end of the range.

This is where Chris stepped up to the plate. He has designed a self-powered meter (9V battery inside) that will measure up to 5A, roughly a staggering 20W. I have used the unit for several weeks now and it is fabulous for checking power sag with various LiPo cells and for getting an idea of the power output for various models and set ups.

Chris wasn't happy with the monochrome display and has updated the design to include a colour display. I am trying to get Chris to supply a kit of parts and an article for these hallowed pages, so if you are interested email me and we will see if Chris can be persuaded.

IN A BIND

Another area with indoor modelling which can be very frustrating is with regards to the bind and fly models all having different protocols. I built a Spektrum module (well, okay, Chris did!) and that has been great, not missing a beat in three years. However, the holy grail has been to find a way to bind to Hitec/ARES models, of which I have several. These have to be flown currently with the rather budget handset that comes with the models - or the electronics removed and replaced with an AR6400.

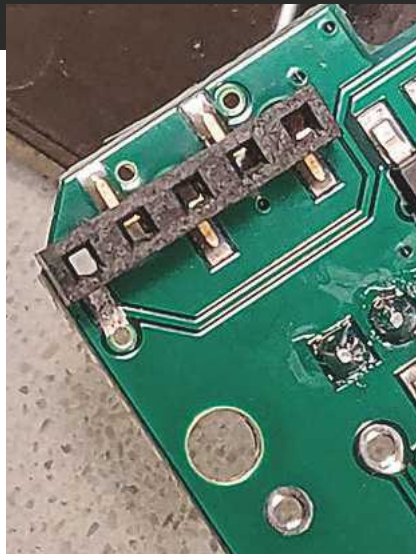
Hitec Red protocol seems to have been a difficult one to accommodate.

This is where we stumbled across a new multi-protocol module made by Jumper. This module does all the usual protocols that we usually see, however the blurb quotes Hitec and Graupner HOTT, which I hadn't seen before.

I duly ordered a unit and sent it over to Chris for him to tinker with. Pointless me looking at it - I do the rivets and he does the clever stuff! Anyway, to cut a long story short, we ended up with three modules from Flying Tech Models. Flying Tech specialise in the FPV and drone community and although the module is available cheaper elsewhere, I wanted to go with somebody that could help if things didn't go to plan. And I am glad I followed that route.

The module looks basic and incorporates (in my simplistic understanding) four RF chips. These four chips cover the majority used by all the manufacturers. For example, Hitec and FrSky use the CC2500 RF chip. They then encode it in their unique way.

In the menu of the FrSky Taranis Tx (OpenTX) the various protocols are selectable as an external protocol. The one



Multimodule showing the missing contact on the left pin.



Multimodule board opened up. No doubt we voided the warranty, but it is now fixed.

I was really interested in was Hitec Minima and Spektrum DSM/DSMX/DSM2.

To cut a long story short, the first module had to be flashed to the latest firmware from GITHUB to support Hitec Minima. The Open TX also had to be at the latest version. Once done the module did indeed bind to an ARES Fokker DVII as hoped, and all was rosy. However, a couple of minutes later the module unbound. This required the Tx to be power cycled before it would re-bind. Chris thought the CC2500 chip was overheating as the same was happening when FrSky (which uses the same chip) was selected. But it worked fine with Spektrum.

Will at Flying Tech was very helpful and shipped us another module. In the meantime, another friend who was following our activity offered to send Chris his unit to play with. This unit duly arrived and worked fine with FrSky for a prolonged time. Chris then updated the firmware; this unit then bound and stayed bound to Hitec and FrSky, so was a great result. However, the telemetry wasn't working. Not a big deal for me indoors, but it should work.

Chris poked around inside and spotted that the connector was missing a contact in the end pin. This carries the telemetry information. Chris fashioned a repair to prove his theory and of course that cured the issue (I had no doubt he would be right).

The replacement unit arrived for the overheating module from Will at Flying Tech and that one worked in all respects.

So, the module does seem to do what we want and handle lots of protocols, meaning that I can now fly my ARES foamies using my Taranis X7, as well as my other bind and fly Spektrum based models, as well, of

course, as my FrSky ones.

This does highlight that of the three modules, two had problems. Flying Tech were great in responding to my queries, but it may be something to watch if you buy a module from outside the UK?

SCALE UNCOVERED

This last weekend I was delighted to be invited along to Buckminster in support of Graham Kennedy's first in a series of Scale Uncovered events. Scale Uncovered is a series that Graham is going to run to try and embrace and encourage budding scale flyers into scale competition. Alas the weather didn't play ball and the hoped-for flying session couldn't take place; that has been postponed to a later date.

Watch this space for updates on that event and more Scale Uncovered events over the next year, perhaps exploring areas of detailing, design and building. Plus, of course, your feedback on flying the scale schedule.

The event on Sunday was well supported, especially when you consider the poor weather and that the demographic of scale modellers is at the older end of the spectrum. Some 20 people enjoyed talks by Graham Kennedy and John Carpenter on all aspects of scale competition and what to expect. Manoeuvre selection, documentation etc. were all topics that were explored.

There was plenty of time to discuss techniques etc. as several models had been bought along to encourage discussion. My Chipmunk had me explaining panel lines, rivet application and glue choice, and all manner of subjects. Very enjoyable.





Twenty scale buffs enjoyed the first 'Scale Uncovered' workshop at Buckminster.



Graham Kennedy, who master minded the day, explaining some of the aspects that are key to good documentation.



John Minchell helped co-ordinate proceedings and gave valuable insight as a recent Team Manager.



John Carpenter shone the bright light of scale wisdom in our eyes.

“Gyros don’t make the modeller fly better; they make the model fly better.”

Perhaps some areas were not discussed in fine detail, but the day was more about encouragement and harnessing the enthusiasm. The breakout sessions over the next 12 months will fill those gaps and build on the obvious enthusiasm that was shown by all. An interesting note is that the age of those that attended was younger than the normal scale crowd, which is very encouraging.

One comment that John Carpenter made rang true with me. This was regarding the use of gyros in scale competition: “Gyros don’t make the modeller fly better; they make the model fly better.”

As always if you want to drop me an e-mail, I can be reached at: cammnut@gmail.com ✈



Before everybody arrived, but showing the relaxed nature of the Scale Uncovered Event

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IN SHORT SUPPLY

Despite supply problems from virus hit China in particular, some new tech is making it through.
Lee Schofield takes a look at recent arrivals

words & photos » Lee Schofield

The recent issues around the Covid-19 (Coronavirus) virus have shown how reliant on Chinese manufacturing large parts of the modern hobby are. Every year there is a lull in supply of new technology and products, with the impact being felt towards the last week of January and right through to around the 11th February. The supply issues were compounded this year as many vendors and factories staying closed well into the second half of February as measures were taken to stop further the spread of the virus.

Many products and prototypes that I have been waiting to get my hands on have been impacted by these closures, so some of the products expected have still not made it into my hands. Products affected include new technology for flight controllers, models, FPV and

radio systems, with manufacturers still playing 'catch up' with the pent-up demand.

The issues have been felt all through the hobby as not only the brand-new products have been affected. Stock of existing favourites and essentials were impacted, with the delays in manufacture and shipping causing restocking problems. Many resellers found themselves unable to keep a stock of the basics, with lead times far longer than normal. So, if your local hobby shop hasn't been able to get you something you need it's not their fault.

The result is a slightly shorter round-up this month. The effects are still being felt in terms of supply but here is the best of the new technology that has come across my desk over the last few months.

LI-ION BATTERY PACKS

GET IT FROM: ZOHD stockists

I was made aware of the usefulness of Li-Ion batteries about two years ago. Lithium Polymer (LiPo) batteries are the go-to for electric flying. A lot of the innovation over recent years has been driven by the ever-increasing demands for high currents from multirotor pilots. Many LiPo batteries have huge 'C' ratings (the 'C' rating is how much current the battery can supply safely) and these modern LiPo packs have more material in the internal electrodes and conductors to handle those higher amp draws. That adds a lot of weight. With a fixed wing model, it is far more common to just have one motor and prop, so huge currents are not needed. The Li-Ion pack has the majority of the weight of the battery as the electrolyte rather than the electrodes. This means that it can store far more energy, weight for weight, than a LiPo. The drawback is a lower maximum amp draw but this can be a far better fit for many fixed wing models. For the same weight of battery, a Li-Ion can provide well over twice the flight time when compared to a high C rated LiPo pack. Despite these clear advantages for fixed wing flyers few vendors are producing the packs in volume, so it's great to see a company like ZOHD starting to produce them. Maximum continuous current is just over 10A and the packs can sustain around 15A for a few seconds (handy for take-offs and high throttle climbs). While this will not be enough for a larger fixed wing model, aerobatic or high-performance models, it's perfect for smaller models or those with efficient motor and prop setups. There are a few things to be aware of with Li-Ion packs: the discharged voltage is lower than a LiPo, so you may need to tweak the voltage cut-off on your ESC if you want to use the full capacity of the pack. And the lower current rating needs to be checked so that you have enough power available for take-offs and short full throttle manoeuvres. If you've never investigated using a Li-Ion for your model, then it is worth a look.





FRSKY ROVER3

GET IT FROM: FrSky stockists

It is interesting to see that over the past 4 - 6 months many of the vendors who have enjoyed a lot of growth from the multirotor boom are now looking to new markets as that part of the hobby shrinks. We've already looked at the fun, inexpensive EMAX Interceptor R/C FPV car and the BrainDART from BrainFPV. The FrSky VANTAC Rover 3 is something that a few of you may recognise. Pre-release samples of this product were shipped to a small number of testers in November last year. Resembling something that would look more at home in a science fiction film, this tri-copter has more to it than you'd expect at first glance. It is beginner friendly, with a very stable flight and no need to use a computer to set up anything - just follow the manual, bind and you're set. The front two motors are tilted with servos to allow for pitch and yaw and it comes complete with a decent FPV system. Since the model flies by tilting the rotors rather than the whole chassis the FPV camera is always looking forward and this makes for a very different flying experience. Flight times of around 15 minutes are easy to get and its unusual appearance turns heads – in a good way. Sadly, there isn't a case with it and you'll need a LiPo battery and an FrSky radio to bind to it. If you have been looking for a multirotor but don't want something that's all carbon fibre and exposed wiring, then this may be for you.



MENACERC AEROPOD FPV ANTENNA

GET IT FROM: MenaceRC stockists

Over the past year the interest in flying first person view (FPV) in fixed wing models has increased dramatically. Flying wings are inexpensive and can be built cheaply, while offering a world of new challenges and fun for the fixed wing flyer. Until now if you wanted to add FPV to any model you will have used the 'electric dandelion' or similar design of antenna that has the antenna elements arranged at the end of a length of stiff co-axial cable. I have been pestering MenaceRC for nearly two years (apologies to the team at MenaceRC) to create an FPV antenna designed specifically for fixed wing flyers and they have finally released it. The AeroPOD is a one of their excellent pagoda style antennas, enclosed in an aerodynamic shell that can be mounted on the underside of a wing out of the way of harm and not causing the same drag as a traditional antenna. The AeroPOD is designed to be sunk into the wing of the model so that only the active antenna elements are proud and covered. A short length of RG402 and a longer length of RG178 terminated in a UFL or MMCX miniature coaxial connector allows for the cable to be run easily inside the wing, or a channel, and connected to a traditional FPV video transmitter. The AeroPOD is only 10mm high and 28mm wide and has the same performance as the existing excellent MenaceRC 'Thrasher' antenna. This is a much neater solution for fixed wing FPV, with the antenna pointing down towards the pilot, giving better performance. I'm sure other antenna manufacturers will design something similar if it is a big hit.



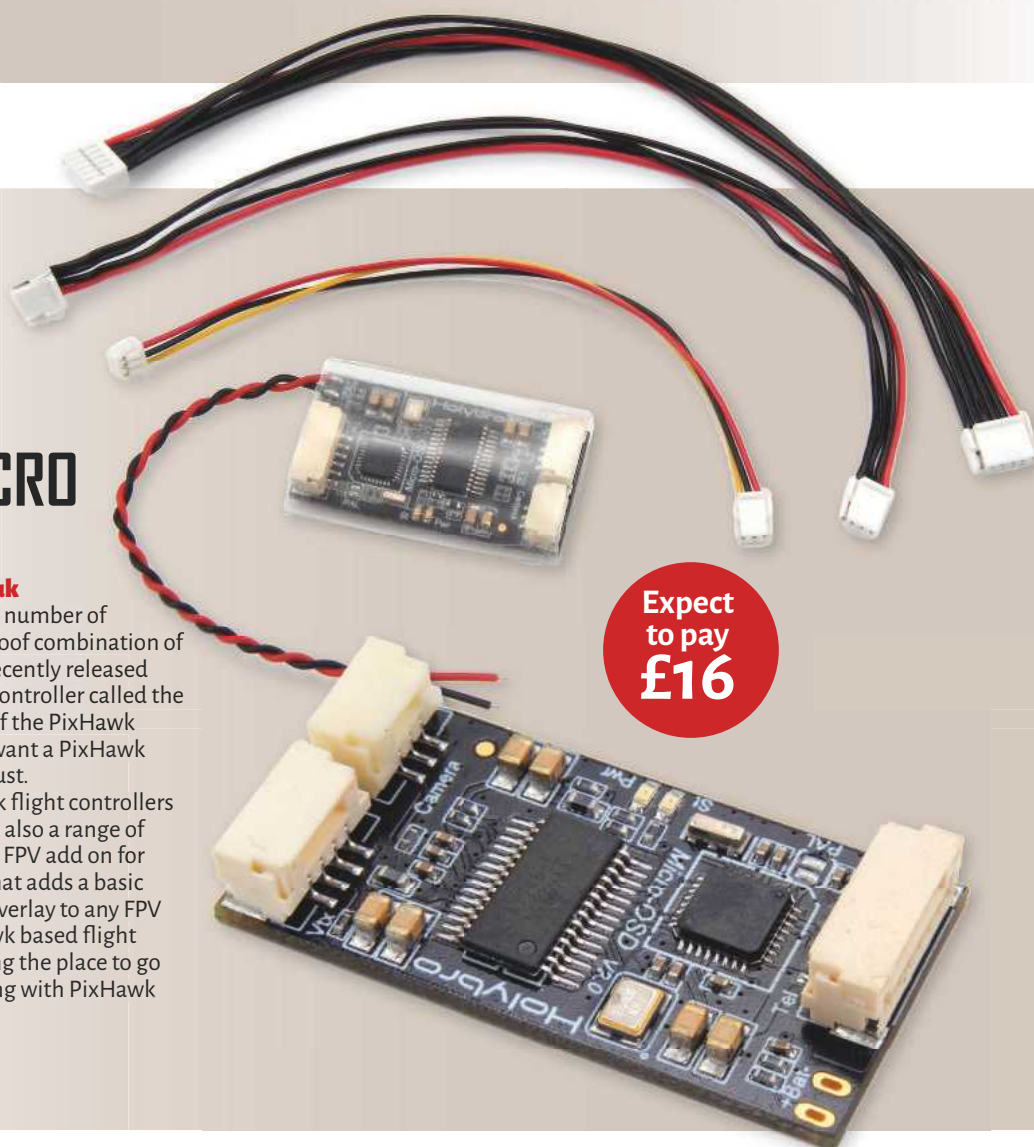
Expect
to pay
\$14

HOLYBRO MICRO OSD V2

GET IT FROM: www.3dxc.co.uk

Holybro continue to bring out a number of products based on the bullet proof combination of PixHawk and ArduPilot. They recently released another PixHawk based flight controller called the Durandal that is a good choice if the PixHawk Cube is too expensive, but you want a PixHawk system from a brand you can trust.

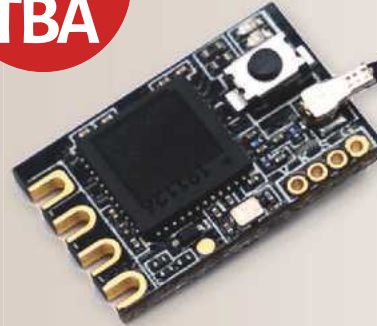
In addition to all of the PixHawk flight controllers they are making now, they have also a range of sensors and add-ons. The latest FPV add on for PixHawk is the Micro OSD V2 that adds a basic ASCII based on screen display overlay to any FPV image you have on your PixHawk based flight controller. HolyBro are becoming the place to go to if you want to build something with PixHawk but don't want a PixHawk Cube.



Expect
to pay
£16



Expect
to pay
TBA



FRSKY 'ARCHER' RECEIVERS

GET IT FROM: FrSky stockists

FrSky continue to release new products on a regular basis. The new Archer-M+ receiver is tiny and uses the new ACCESS protocol. ACCESS provides the lower latency and increased performance of their popular XM+ receivers, which are very popular. As with all of the latest receivers from FrSky it has lots of new features and supports OTA (Over-The-Air) firmware upgrades, so there's no need to remove it from the model to update things. This receiver is handy if you want to connect it to a stabiliser or flight controller as it only has support for SBUS and iBus but does support telemetry with around 500m range. The other new receiver is the Archer-GR8 (see what they did there?) This is a larger unit with an inbuilt variometer, which makes it perfect for slope-soaring or gliding. Weighing 9.8g it's still compact enough to squeeze into those places where you can't spare much space or weight. It features ACCESS protocol and receiver redundancy with eight high precision PWM outputs. Sadly, these newer receivers from FrSky are no longer supporting the hugely successful D16 ACCST protocols that most FrSky pilots have been using for years. If you want to use these latest receivers, then you will sadly need to update your radio or get a new one with ACCESS support.

FRSKY RB30 & RB40

GET IT FROM: FrSky stockists

FrSky have had the RB20 predecessor of these latest products out for a while. These newest switchboard modules from FrSky allow you to connect multiple receivers, batteries and manage all of the power systems and redundancy from one place, perfect if you are building a large sailplane or glider. This smart hub connects all of the pieces of the model together and adds a number of very useful features that include overload protection, redundant receiver support, full telemetry feedback, LCD screen (RB-40 only) and non-contact switching. In addition to the hub features, these latest switchboard modules also provide a stabilisation feature using an inbuilt gyroscope and current sensors for a complete view of the model's health and performance while flying. Dimensions are 114.4 x 73.4 x 18.7mm (RB-30) and 163.2 x 100 x 23.5mm (RB-40) and weighing 97g for the smaller RB-30 and 265g for the RB-40. You will need to plan your build to fit one of these inside but if you are running a larger electric model on 11 - 26V and have been looking for a way to reduce the chance of a failure in flight bringing down your pride and joy then these are worth a look.



Expect
to pay
TBA



GOING PLACES

Diary dates for the coming season

APRIL 2020

April 11 Indoor Flying At Sutton St. Helens. Elton Head Rd. WA9 5AU Merseyside. From 1pm - 4pm. £80 for September - April payable in advance or £13 per session on the day. Shockies not allowed, heli's and quadcopters small 1S only. Contact Eric Strefford on 07711 268699 or email ericstrefford@gmail.com

April 14 Waltham Chase Aeromodellers Indoor FPV Meeting in the Meon Room at Wickham Community Centre, Mill Lane, Wickham, Hants, PO17 5AL. From 7pm to 9.30pm. Admission £4 for fliers and £1 for spectators, accompanied children free. Junior fliers charged as adult spectators. Proof of insurance required. Multicopters limited to a maximum weight of 95g in flight trim, including battery (not to exceed 2-cell LiPo) and a motor to motor diameter not exceeding 6" (152mm). Helicopters and fixed-wing models may not be flown. For further details please contact Alan Wallington on 01489 895157.

April 18 Tonbridge Gassers and Rubber Fanciers Indoor Flying at King's Rochester Sports Centre, 601 Maidstone Road, Rochester, Kent, ME1 3QJ. From 6.30pm until 10pm - free flight and lightweight R/C timed flying sessions throughout the evening. Contact Steve on 0208 942 5000 or Eric on 01622 737814.

April 18 Scale Indoor R/C Nationals at Wolverhampton Sports Complex (Walsall), The University of Wolverhampton, Magdalene Road, Walsall WS1 3TA. See the finest indoor R/C scale models in the well lit, spacious Wolverhampton University Sports hall. Three competition classes: Scale, Flying Only and Kit Scale. Lunchtime fun pylon races for scale competitors. From 8.30am - 6pm. For more information email Danny Fenton at camnut@gmail.com or visit scale.BMFA.org.

April 19 GBR/CAA F3A National League competition. Skelbrooke. All schedules. See gbrcaa.org 'Competition Entry Form' for fees and payment, and 'forum' 'Competition News' for details. Visitors welcome but please contact Contest Director, Bob Rowland, on 07368 521164 for details.

April 19 Frome Model Flying Club Spring Swapmeet at The Conygre Hall, North Road, Timsbury, Bath, BA2 0JQ. From 9am till 12.30. Tea, coffee and bacon rolls available. Entry £1 per person and tables are free. Pre-booking required for tables. Entry from 8.30am for sellers. For more information and to book a table please contact Rob Buckley 07791 278292 or email rob@rwbuckley.co.uk

April 24 We Fly Indoors at the Weatherly Centre, Eagle Farm Road, Biggleswade, Bedfordshire, SG18 8JH. From 6.30pm till 10pm, door open at 6.15pm. Free Flight - Hangar Rat, Gyminnie, Easy Bee or similar. Electric Fixed Wing - Vapor, Lightweight - Slow Fly style. Heli's - MSR style etc. max rotor 410mm, quads max overall 200mm diagonal. Shockies - 500mm max size. All models at organiser's discretion. Flying in approx. 10-15 minute sessions, BMFA insurance to be shown. Admission £5, spectators 50p; includes tea/coffee and biscuits. Good access from north and south on A1, venue is next to Stratton Upper School, good parking. Queries to Andrew on 07974 800463 or email andrewleftwich@virginmedia.com

April 25 UK Classic Aerobatic Association (UKCAA) Fly-in at Loughborough MFC, Northants. This is a Saturday Fly-in with Round 1 contest to Pick5, Pick7 and 1979 rules during the lunch break. Visitors welcome but pre-registration is required at ukcaa.org.uk/events. Contact Martyn Kinder on 079890 25198 or email ukcaa2013@gmail.com

NOTICE:

A number of events have been cancelled as a result of the Coronavirus outbreak and notifications may have missed our print deadline. Please check the events page at model flying.co.uk or contact the organisers direct before travelling

April 25-26 Windermere Model Waterplane Flyers Ullswater Splash-in. Waterside House Campsite, Howtown, Penrith. From 10am to 4pm each day. WMWF members £1 per day. Non-members £3 per day. Proof of BMFA or SAA insurance req'd. Pilots to have min. of a BMFA 'A' cert or SAA Bronze. Car parking to be paid at shop at campsite entrance. Further details on windermere-model-waterplane-flyers.co.uk, call 07775 506842 or email andrew@windermere-model-waterplane-flyers.co.uk

April 28 Waltham Chase Aeromodellers Indoor R/C Small Models Meeting. Main Hall at Wickham Community Centre, Mill Lane, Wickham, Hants PO17 5AL. From 7pm to 9.30pm. Models limited to a max weight of 95g for fixed wing aircraft in flight trim, including battery (not to exceed a 2-cell LiPo). Helicopters limited to a rotor diameter of 12" (305mm). Admission £5 for fliers, £1 for spectators and junior fliers, accompanied children free. Flyers will be required to show proof of insurance. For further details please contact Alan Wallington on 01489 895157 or email WCAero@outlook.com

May 2 Fun Flying at Chigwell School Sports Hall, High Road, Chigwell, London, IG7 6QF. For small models, all types, maximum wingspan 20". Flyers £10, spectators £2. For details contact Mike Quille on 0208 500 3549 or email mp.quille@live.co.uk

MAY 2020

May 2 Bickley Model Flying Club Car Boot Swapmeet at the club's flying field: Church Road, Sutton at Hone, Kent, DA4 9EX. From 11am till 3pm. The first of this year's opportunities to move on some of the models, engines and other modelling equipment that you have not used for ages and to pick up a bargain at the same time. Open to all with free entry, but with a £5 charge to sellers who are not BMFC members. Selling only from designated pitches for each vehicle. You will need to supply your own display table. Toilets on site. Free access to food facilities at the gun club down the lane. Details at bickleymfc.org/events or contact John Veasey on 01474 852015.

May 2 Chris Foss Fly-in at St Austell & District Modelling Club, Maggie Pie Dam, St Stephen, Cornwall, PL26 7SB. Join us for a day of anything Foss designed. Sorry, no toilet facilities or glider tug available. Starts at 10am, a relaxed, friendly fly-in and a warm welcome. See staustell-dmc.bmfa.org/ club-flying-diary or call Peter on 01208 879065 or email joandpetersmedley@hotmail.com

May 3 Open Fly-in and 50th Anniversary Celebration at Bickley MFC. At the club's flying field, Church Road, Sutton at Hone, Kent, DA4 9EX. This was historically the event when we had our electric fly-in, but as electric is now mainstream it is now a general fly-in. Open to members and visitors wishing to fly models of all types. Flying will start at 10.30am, so arrive before for the pilot's briefing. No models over 25kg. Camping available at the field by prior arrangement. Food available. Toilets on site. Free access also to food facilities at the gun club down the lane. Details on our website bickleymfc.org/events or contact John Veasey 01474 852015.

May 3 GBRCAA F3A New Pilots Open Day. Leicester. See gbrcaa.org 'forum', 'NOPD' for details. Visitors welcome but please contact Contest Director, Chris Bond on 07811 196418 for details before travelling.

May 3 Wessex Soaring Association Slope Fly-In, first Saturday or Sunday of the month. Various slopes approx. 5 miles east of



For more events go to modelflying.co.uk

Shaftesbury. Non-powered gliders and e-soarers permitted. All welcome but must have BMFA insurance. Contact Pete Carpenter for more details, email pete.carpenter12@gmail.com or call 07919 903742.

May 9-10 PSSA Fly-in at The Blwch, Nant-y-Moel, Bridgend, South Wales. Kindly supported by the SWSA: a470soaring.blogspot.co.uk/. Meet at the 'ice-cream' car park for 10am each day. Proof of BMFA insurance (or equivalent) required. Steve Houghton 07762 256126 or email steve.houghton59@gmail.com

May 10 UK Classic Aerobatic Association (UKCAA) Fly-in at Watford Wayfarers MFC. Fly-in with round 1 contest to Pick5, Pick7 and 1979 rules during the lunch break. Visitors welcome but pre-registration is required at ukcaa.org.uk/events. Contact Martyn Kinder on 079890 25198 or email ukcaa2013@gmail.com

May 10 GBRCAA F3A National League competition at Warboys, Cambridgeshire. All schedules. See gbrcaa.org 'Competition Entry Form' for fees and payment and 'forum' 'Competition News' for details. Visitors welcome but please contact Contest Director, Clive Whitwood on 07941 441090 for details.

May 12 Southend Radio Flying Club Table Top Sale at The Ecko Club, Thornford Gardens, Southend-on-Sea, Essex, SS2 6PU. From 8pm till 10pm. Entry £2, tables £4 including entry. Please book tables in advance with Den on 07745 2219443, or Les on 07729 421939.

May 12 Waltham Chase Aeromodellers Indoor FPV Meeting in the Meon Room at Wickham Community Centre, Mill Lane, Wickham, Hants, PO17 5AL. From 7pm to 9.30pm. Admission £4 for fliers and £1 for spectators, accompanied children free. Junior fliers charged as adult spectators. Flyers will be required to show proof of insurance. Multicopters limited to a maximum weight of 95g in flight trim, including battery (not to exceed 2-cell LiPo) and a motor to motor diameter not exceeding 6" (152mm). Helicopters and fixed-wing models may not be flown. For further details please contact Alan Wallington on 01489 895157.

May 16 Blackpool & Fylde Radio Controlled Model Society Flightfest (sponsored by BMFA NW) at the club field Singleton Road, Weeton, PR4 3NB. From 10am till 5pm. A great opportunity for all those interested in taking up the hobby to chat with club members and have the opportunity to fly using club trainers and BMFA qualified instructors. All ages welcome (Under 16s accompanied by an adult please.) Free car park and refreshments available. Membership concessions for those joining on the day. For further details contact David Kirkbride on 07872 108297 or email david_kirkbride@btinternet.com

May 16 Retro Glider Fly-in on the Leek and Moorland Slopes. For year-2000 designed slope and thermal soarers. Hosted by the Leek and Moorland MGA. Prizes for best retro glider and pilot's retro pilot. A fun event with the possibility of a few fun tasks thrown in for good measure. Exact location is wind dependent so please email or phone the day before for confirmation. Contact Martyn Kinder by email at ukcaa2013@gmail.com or call 07989 025198. Please note that Sunday the 17th May will be a reserve date in case the weather isn't as kind as hoped.

May 16-17 Windermere Model Waterplane Flyers Ullswater Splash-in. Waterside House Campsite, Howtown. Penrith. From 10am to 4pm each day. WMWF members £1 per day. Non-members £3 per day. Proof of BMFA or SAA insurance req'd. Pilots to

have min. of a BMFA 'A' cert or SAA Bronze. Car parking to be paid at shop at campsite entrance. Further details on windermere-model-waterplane-flyers.co.uk, call 07775 506842 or email andrew@windermere-model-waterplane-flyers.co.uk

May 16-17 MiniAirshow UK 6 at at Popham Airfield, nr Micheldever, Hampshire, SO21 3BD. After the success of the past couple of years (at the dedicated Popham Drone Zone for unmanned aircraft) Team MiniAirshow are growing the event to use a whole manned runway in 2020! Harking back to the days of Blackbushe, whilst also looking to the future of model flight, Team MiniAirshow are bringing together FPV'ers, large scale models, turbines, heli's, multirotors and more to MA6 at Popham Airfield. More details and tickets available on the website and facebook pages at miniirshow.co.uk. Email contact@miniirshow.co.uk

May 23 Dorset Model Aeroplane Spring Swapmeet at Charlton Marshall Village Hall, Green Close, Charlton Marshall, DT11 9PF. All under cover. Mainly model aeroplanes, but there may be some cars, boats and trains. Main hall at ground floor however there is an available upper level too. Traders from 8.30am at £7 inc. one table and one free entrance. Buyers entry at 9am for £4. Café and free car park plus street parking. Contact John Bainbridge on 01258 458749 or 07864 297226.

May 23-24 Greenacres May Fly-in, Aldridge Airport, off Bosty Lane, Aldridge near Walsall, West Midlands, WS9 0QQ. Campers and caravans can arrive after 1pm on the Friday before. Water, toilets, raffle and catering are all available for a small donation. Visiting pilots fly for £5 per day, but spectators and the public are free! If you have any special requests or requirements, please contact Jim Mchugh at jim.mchugh@greenacresmac.co.uk, see www.greenacresmac.co.uk or www.facebook.com/GreenacresMAC

May 24 GBRCAA F3A National League competition Hurley, Warwickshire. This is designated as a BMFA Team Selection (P21) and BMFA Open Competition. All schedules. See gbrcaa.org 'Competition Entry Form' for fees and payment, and 'forum', 'Competition News' for details. Visitors welcome but please contact Contest Director, Adrian Harrison on 07976 244004 for further details.

May 26 Waltham Chase Aeromodellers Indoor R/C Small Models Meeting, Main Hall at Wickham Community Centre, Mill Lane, Wickham, Hants PO17 5AL. From 7pm to 9.30pm. Models limited to a max weight of 95g for fixed wing aircraft in flight trim, including battery (not to exceed a 2-cell LiPo). Helicopters limited to a rotor diameter of 12" (305mm). Admission £5 for fliers, £1 for spectators and junior fliers, accompanied children free. Flyers will be required to show proof of insurance. For further details please contact Alan Wallington on 01489 895157 or email WCAero@outlook.com

May 29 We Fly Indoors, at the Weatherly Centre, Eagle Farm Road, Biggleswade, Bedfordshire, SG18 8JH. From 6.30pm till 10pm, door open at 6.15pm. Free Flight - Hangar Rat, GYminnie, Easy Bee or similar. Electric Fixed Wing - Vapor, Lightweight - Slow Fly style. Heli's - MSR style etc. max rotor 410mm, quads max overall 200mm diagonal. Shockies - 500mm max size. All models at organiser's discretion. Flying in approx. 10-15 minute sessions, BMFA insurance to be shown. Admission £5, spectators 50p; includes tea/coffee and biscuits. Good access from north and south on A1, venue is next to Stratton Upper School, good parking by venue. Queries to Andrew on 07974 800463 or email andrewleftwich@virginmedia.com

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PO-3535-	870kv, 1090kv, 1390kv	£28.99
PO-3541-	920kv, 1070kv , 1270kv	£33.99
PO-3547-	700kv, 800kv, 960kv, 1190kv	£35.99
PO-5055-	500kv, 595kv	£61.00
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PPL-25C2S-0450	25C/50C, 2S (7.4V) 450mAh	£3.49
PPL-40C2S-0800	40C/80C, 2S (7.4V) 800mAh	£4.49
PPL-40C2S-1000	40C/80C, 2S (7.4V) 1000mAh	£7.99
PPL-40C2S-1300	40C/80C, 2S (7.4V) 1300mAh	£8.99
PPL-40C2S-1800	40C/80C, 2S (7.4V) 1800mAh	£11.99
PPL-40C2S-2200	40C/80C, 2S (7.4V) 2200mAh	£13.49
PPL-40C2S-2600	40C/80C, 2S (7.4V) 2600mAh	£16.49
PPL-40C2S-3300	40C/80C, 2S (7.4V) 3300mAh	£21.99
PPL-25C3S-0350	25C/50C, 3S (11.1V) 350mAh	£4.49
PPL-25C3S-0450	25C/50C, 3S (11.1V) 450mAh	£4.99
PPL-40C3S-0800	40C/80C, 3S (11.1V) 800mAh	£6.49
PPL-40C3S-1000	40C/80C, 3S (11.1V) 1000mAh	£10.99
PPL-40C3S-1300	40C/80C, 3S (11.1V) 1300mAh	£12.99
PPL-40C3S-1800	40C/80C, 3S (11.1V) 1800mAh	£16.99
PPL-40C3S-2200	40C/80C, 3S (11.1V) 2200mAh	£19.99
PPL-40C3S-2600	40C/80C, 3S (11.1V) 2600mAh	£25.99
PPL-40C3S-3300	40C/80C, 3S (11.1V) 3300mAh	£32.99
PPL-40C3S-3700	40C/80C, 3S (11.1V) 3700mAh	£36.99
PPL-40C3S-4500	40C/80C, 3S (11.1V) 4500mAh	£43.99
PPL-40C3S-5000	40C/80C, 3S (11.1V) 5000mAh	£47.99
PPL-40C3S-6000	40C/80C, 3S (11.1V) 6000mAh	£56.99
PPL-40C4S-1300	40C/80C, 4S (14.8V) 1300mAh	£18.49
PPL-40C4S-1800	40C/80C, 4S (14.8V) 1800mAh	£24.49
PPL-40C4S-2200	40C/80C, 4S (14.8V) 2200mAh	£26.99
PPL-40C4S-2600	40C/80C, 4S (14.8V) 2600mAh	£33.99
PPL-40C4S-3300	40C/80C, 4S (14.8V) 3300mAh	£43.99
PPL-40C4S-3700	40C/80C, 4S (14.8V) 3700mAh	£47.99
PPL-40C4S-4500	40C/80C, 4S (14.8V) 4500mAh	£58.99
PPL-40C4S-5000	40C/80C, 4S (14.8V) 5000mAh	£63.99
PPL-40C4S-6000	40C/80C, 4S (14.8V) 6000mAh	£74.99
PPL-40C5S-3300	40C/80C, 5S (18.5V) 3300mAh	£54.99
PPL-40C5S-3700	40C/80C, 5S (18.5V) 3700mAh	£59.99
PPL-40C5S-4500	40C/80C, 5S (18.5V) 4500mAh	£71.99
PPL-40C5S-5000	40C/80C, 5S (18.5V) 5000mAh	£79.99
PPL-40C5S-6000	40C/80C, 5S (18.5V) 6000mAh	£95.99
PPL-40C6S-3300	40C/80C, 6S (22.2V) 3300mAh	£68.99
PPL-40C6S-3700	40C/80C, 6S (22.2V) 3700mAh	£76.99
PPL-40C6S-4500	40C/80C, 6S (22.2V) 4500mAh	£93.99
PPL-40C6S-5000	40C/80C, 6S (22.2V) 5000mAh	£99.99
PPL-40C6S-6000	40C/80C, 6S (22.2V) 6000mAh	£119.99

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PP-PDRV23-47	For 2.3mm shafts	£2.50
PP-PDRV30-50	For 3mm shafts	£2.75
PP-PDRV32-50	For 3.2mm shafts	£2.75
PP-PDRV40-50	For 4mm shafts	£2.95
PP-PDRV50-60	For 5mm shafts	£3.95
PP-PDRV60-60	For 6mm shafts	£4.75
PP-PDRV80-80	For 8mm shafts	£5.95
PP-PDRV10-12	For 10mm shafts	£7.95



Brushless Electronic Speed Controllers

4M-ESC6A	6A, Burst 10A, 5.5V 1.5A BEC, 2 LiPo	£ 9.99
4M-ESC12A35	12A, Burst 15A, 5.5V 2A BEC, 2-3 LiPo	£13.50
4M-ESC20A	20A, Burst 23A, 5.5V 4A BEC, 2-4 LiPo	£13.95
PP-TESC25AU	25A, Burst 29A, 5.5V 4A BEC, 2-4 LiPo	£15.95
4M-ESC30A	30A, Burst 35A, 5.5V 4A BEC, 2-4 LiPo	£17.95
4M-ESC40A	40A, Burst 50A, 5.5V 5A BEC, 2-6 LiPo	£28.95
4M-ESC50A	50A, Burst 60A, 5.5V 5A BEC, 2-6 LiPo	£39.95
4M-ESC60A35	60A, Burst 70A, 5.5V 5A BEC, 2-6 LiPo	£44.95
4M-ESC60A40	60A, Burst 70A, 5.5V 5A BEC, 2-6 LiPo	£44.95
4M-ESC70A	70A, Burst 80A, 5.5V 5A BEC, 2-6 LiPo	£49.95
PP-TESC80AU	80A, Burst 90A, 5.5V 5A BEC, 2-6 LiPo	£55.00
4M-ESC90A	90A, Burst 100A, 5.5V 5A BEC, 2-6 LiPo	£57.50
PP-TESC90HVAU	90A, Burst 100A, OPTO, 5-12 LiPo	£89.99
PP-TESC120HVAU	120A, Burst 140A, OPTO, 5-12 LiPo	£99.99



UBEC's (Voltage Stabilisers/Regulators)

PP-UBEC4A	4A UBEC, 5A Peak, 8-22V I/P	£10.34
PP-UBEC5A	5A UBEC, 6A Peak, 9-33V I/P	£11.28
PP-UBEC6A	6A UBEC, 7A Peak, 6-25V I/P	£18.62
PP-UBEC20A	20A UBEC, 22A Peak, 9-50V I/P	£24.99
5A UBEC	With Switch and Digital Display	£16.99
15A UBEC	With Switch and Digital Display	£29.99

Part numbers in **RED** are approved by the BMFA for their Payload and Egg Challenges

Servos From



£2.42!

	Part Number	Type	Torque / Speed	Price
	4M-045DH-005	Digital Sub Micro - 4.5g	0.5Kg @ 4.8V - 0.10sec/60° 0.6Kg @ 6.0V - 0.08sec/60°	1pcs £3.99ea 5pcs £3.59ea
	4M-094DMGB-014	Digital Metal Geared Ballraced Wing Servo. 8mm Thick - 9.4g	1.4Kg @ 4.8V - 0.12sec/60° 1.9Kg @ 6.0V - 0.10sec/60°	1pcs £10.99ea 5pcs £9.89ea
	4M-090AH-017	Micro - 9g	1.7Kg @ 4.8V - 0.09sec/60° 1.9Kg @ 6.0V - 0.07sec/60°	1pcs £2.69ea 5pcs £2.42ea
	4M-100AMG-022	Micro Metal Geared - 10g	2.2Kg @ 4.8V - 0.12sec/60° 2.5Kg @ 6.0V - 0.10sec/60°	1pcs £4.99ea 5pcs £4.49ea
	4M-100DMG-022	Digital Micro Metal Geared - 10g	2.2Kg @ 4.8V - 0.12sec/60° 2.5Kg @ 6.0V - 0.10sec/60°	1pcs £6.49ea 5pcs £5.84ea
	4M-160AH-027	Mini - 16g	2.7Kg @ 4.8V - 0.13sec/60° 3.0Kg @ 6.0V - 0.11sec/60°	1pcs £5.99ea 5pcs £5.39ea
	4M-175DMG-030	Mini Digital Metal Geared - 17.5g	3.0Kg @ 4.8V - 0.13sec/60° 3.5Kg @ 6.0V - 0.11sec/60°	1pcs £7.49ea 5pcs £6.74ea
	4M-253AB-028	Standard/Mini Size - 25.3g	2.8Kg @ 4.8V - 0.12sec/60° 3.3Kg @ 6.0V - 0.10sec/60°	1pcs £5.99ea 5pcs £5.39ea
	4M-455AH-033	Standard - 45.5g	3.3Kg @ 4.8V - 0.15sec/60° 4.0Kg @ 6.0V - 0.12sec/60°	1pcs £6.12ea 5pcs £5.51ea
	4M-556AMG-087	Standard Metal Geared - 55.6g	8.7Kg @ 4.8V - 0.15sec/60° 9.4Kg @ 6.0V - 0.13sec/60°	1pcs £11.99ea 5pcs £10.79ea
	4M-556AMG-118	Standard Metal Geared - 55.6g	11.8Kg @ 4.8V - 0.20sec/60° 13.2Kg @ 6.0V - 0.18sec/60°	1pcs £13.99ea 5pcs £12.59ea



**Ultra Light Weight Spinners
With Dynamic Cooling Holes**

Diameter	Part Number	Weight	Price
51mm	4M-51SPIN-COOL-*	19g	£7.99
57mm	4M-57SPIN-COOL-*	22g	£8.99
63mm	4M-63SPIN-COOL-*	25g	£9.99
70mm	4M-70SPIN-COOL-*	36g	£11.99
75mm	4M-75SPIN-COOL-*	43g	£13.99
83mm	4M-83SPIN-COOL-*	48g	£15.49

These ultra light weight spinners for electric motors are supplied with a specially cut aluminium backplate which pulls cooling air through the nose of the spinner and then forces it out of the back and in to the motor, helping keep the motor cool even on a hot day. Available in 6 sizes and 5 colours.



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SIMPLES MAX

Mike Bell offers up an outdoor version of his Simples flying wing but with a separate tail that echoes the style of 1970s C/L combat models. words » Mike Bell | photos » Mike Bell and David Ashby

Simples Max is an evolution of my Simples indoor flying wing design, published in the April 2018 issue of RCM&E. That design has been tweaked, with the addition of a separate tail and elevator, the intention being to decouple the roll and pitch functions. While the aerodynamic improvement wasn't dramatic the biggest benefit was the appearance, which reminded me of the C/L combat wings that my friends and I had so much fun with back in the 70s. These machines combined rugged simplicity with extreme manoeuvrability and were cheap to make. This look-alike ticks all the same boxes and at one metre span it is compact enough to keep in the car for impromptu flying sessions.

I wanted to keep it small, to suit the popular 3S 2200mAh batteries, but it could also be suitable for a .25 glow motor. Regarding motor choice, I am not a 'leccy' expert, but I had a few spare bits lying around. One was a 4-MAX PO-3547-1190 motor that turned out okay when matched to an 11 x 5.5 APC E propeller and a 60A ESC. At a bit over 400 watts this gives 200W/lb, which is a lot more than it needs but it does make big loops really easy!



Simples Max evokes memories of control line combat wings.



C/L wing style construction results in an easy to build airframe that's tough too!



Fun to cost ratio of this one is pretty high.

GREAT EXPECTATIONS

So, what can you expect from Simplex Max? You get a simple and cheap to build flying wing with styling that's a bit different from typical foam wing offerings. From a flying point of view, you can expect a smooth flying model capable of all the usual aerobatics that can be done without a rudder. It isn't designed for out and out speed, although it is pretty quick if you need it to be.

The fact that the design looks like a combat wing inspired me to adopt a construction technique that was popular for many of those models. While the plan form of the wing is tapered, the thickness is constant, and the wing section is flat for much of its chord, which makes for easy building with no complicated packing. The leading edge is a composite of balsa strips that makes up a kind of D box and can easily be shaped into a fairly blunt nosed section that is good for benign stall characteristics.

Conventional spars can't be used as they would pass through the fuselage box where the battery (or fuel tank) would sit. I realised that I could get all the strength I needed by embedding spruce 'spars' in the leading and trailing edges. Due to the sweep of the leading and trailing edges these spars have to take on a bend and this further enhances their stiffening effect. Besides, combat wings rarely had conventional spars and they were plenty strong enough under very high G manoeuvres.

If you fancy giving Simplex Max a go you should select balsa that is soft, or on the soft side of medium, for most parts, except the ribs, which will benefit from being medium grade. Heavier grades just add weight with no real benefit.

CONSTRUCTION

Start by making up the leading and trailing edges of the wing. Since the spruce spars have to take a significant bend you will need to pin the parts down very securely to a wooden building board. I used fine nails hammered into a wooden board to resist the spring back while the glue set.

Taking the leading edge first, cut out the upper and lower laminations from 3/8" balsa sheet and cut the angles where they will join



Mike's prototype on a flypast at last year's RCM&E Fly-In at Buckminster.

at the centre line. Pin the lower laminations over the plan and glue the centre join. Next, glue the 1/4" sq. balsa centre lamination over the lowers. I used white glue for all lamination jobs as it gives you plenty of time to position the parts. Don't worry about using fancy scarf joints at the centre join as the spruce spar is going to provide all the reinforcement you need. Talking about the spar, we need to fit that next. I bought my 1/4" x 1/8" spruce in 1m lengths but don't worry if you only have 36" strip. Make sure you place the spar centrally, then just make up the length at the tips with balsa strip; the loads out there are low so this won't weaken the structure significantly. The bend can be induced easily, and the spar can be held to the centre lamination using plastic ratchet clamps. There will be a small gap between the spar and the centre lamination at the centreline, but this is fine. Once this is dry you can glue the upper laminations in place.

Now cut out the LH and RH trailing edge parts, plus the tail, elevator parts and fill in piece, all from 1/4" sheet. Use light wood for these parts and glue together over the plan

but DO NOT cut out the ailerons. Leaving the ailerons uncut will help to maintain the shape of the trailing edge assembly against the spring of the curved spar.

Make sure the assembly is very firmly pinned to the board before gluing the spar, using clamps and pins to keep it in place while the glue sets. Once the trailing edge assembly is fully cured it can be removed from the board, packed up with 3/8" spacers and then re-pinned over the plan.

Cut out the ribs, following the sequence shown on the plan for the trailing edge notch. If you try to cut the notch out after cutting the main rib profile you will break the thin sections of the rib. The rear ribs of the ribs are deliberately not cut to a sharp edge as they will be too weak; you can always sand them down after assembly, but I didn't bother.

With the leading and trailing edge assemblies in place over the plan you can now dry fit all the ribs. Depending on whether there was any spring back in the leading and trailing edge assemblies you may find that some adjustment to the ribs is required. If too tight



Simple firewall mounted motor suits electric or a .25 glow engine.



Open up the wiring access hole to get some cooling air to the LiPo.



Leave the slot open at the back of the fuselage to let the cooling air escape.

sand the T.E. notch a bit deeper (a 1/4" sq. Permagrit tool is ideal for this) or if it is a bit loose just pack with scrap balsa. Once satisfied glue all the ribs in place. Note that W1 and W2 are shallower to accommodate the centre sheeting and be sure to get both W1s the right width apart as the fuselage sides butt up against them. It is a good idea to add gussets to the rear of the ribs now as this helps avoid breaking the narrow rear rib section whilst handling.

Once dry you can release the wing from the board, trim the L.E. and T.E. to length and glue the tip pieces in place. Use scrap balsa to make L.E. tip fairing pieces; these will help support the covering and give the tip pieces some bracing. Using a razor plane and sanding block shape the L.E. Aim for a smooth, rounded shape with a fairly blunt nose.

BOX FUZ

The fuselage is next but before you cut the sides check one of your batteries over the plan to make sure it will fit for height above the L.E. spar (we will notch into the top L.E. lamination for the battery to fit into). If the fit looks a bit tight add a few mm to the height of the fuselage side above the centre line. Once satisfied the sides are cut out in one piece. While you have the knife in your hand cut the 1/32" ply doublers as well.

Cut the L.E. profile out of each fuselage side then cut each of the sides in half lengthwise along their centrelines. Doing this will allow you to fit the sides over the L.E. and T.E. When you are happy with the fit you can glue the fuselage halves together against W1, which acts as a doubler over the join. Adding ply doublers at the front ties the longitudinal fuselage joint together.

While the fuselage dries cut the firewall from 3/16" marine ply (1/4" ply will be fine too). Mark the position of your motor mount and drill the mounting holes and a central hole for the rear motor shaft, if required. Fit your mount using T nuts, securing the nuts with thin cyano once they have been pulled in by the bolts. When the fuselage is sheeted you won't have access, so they need to be secure. While the mount is in place mark out a slot for the motor wires to pass through the firewall and cut it generously to let a bit of air through to cool the ESC. When happy you can unbolt your motor mount and glue 1/4" square balsa strip to the back of the ply, then glue the

firewall to the inside of the fuselage halves. Make sure the firewall is square; there should be no down thrust, and I haven't felt the need for side thrust either. Use epoxy or PU to secure the firewall.

Cut a slot in the top lamination of the L.E. between the fuselage sides, but DO NOT cut into the spruce spar. This should provide an easy fit for your battery to slide through. Cutting this notch does not weaken the structure to any significant degree, as confirmed by the flight testing, but it does allow the battery to be moved backwards and forwards to achieve the all-important balance. My prototype was built with a much shorter fuselage, but it quickly became clear that to achieve the C of G, I would need to add a drastic amount of nose weight. So out came the saw and a longer nose was grafted on. Such are the tribulations of own design development!

If you intend to fit an IC engine you will probably have to shorten the nose to achieve balance.

Add the 1/4" triangular stock to the fuselage upper and lower edges to provide a seat for the top and bottom sheeting. For the bottom sheet use 1/4" soft balsa; longitudinal grain is fine. Leave the top sheet off for now as you are going to need access for the innards.

Now apply the centre section sheeting using medium 1/16" balsa to avoid damage from clumsy handling. Prior to fitting you might want to feather in the rear ribs of ribs W1 and W2. Apply the sheet cross grain in the normal manner, gluing to the top of W1 and W2 and butting against the L.E. and fuselage sides.

While the above assembly is drying cut out and glue up the fin using light wood as we don't want too much weight at the back. Round the leading edge and top a bit for appearances sake but leave the trailing edge square; it will make the fin more effective.

With the fin built you will need something to stick it to, so cut a 1/4" balsa fill-in piece to extend the T.E. assembly further into the fuselage. This forms a platform to support the front end of the fin and I also used it to attach the elevator servo rails. Mark the centre line on the platform and T.E. to help align the fin. Cut some 3/8" triangular stock and glue it to the platform/T.E. just far enough apart to afford a tight fit of the fin in-between. Do not glue the fin in place yet. Once dry, sand the rear ends of the triangular fillets to fair them in.

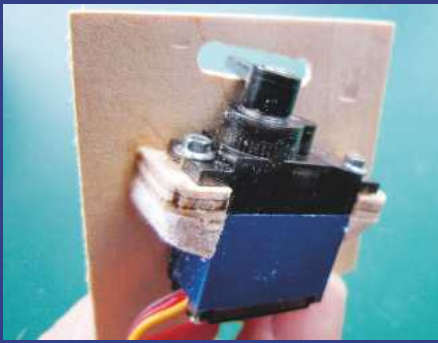


Elevator servo and receiver are located at the back of the R/C bay.

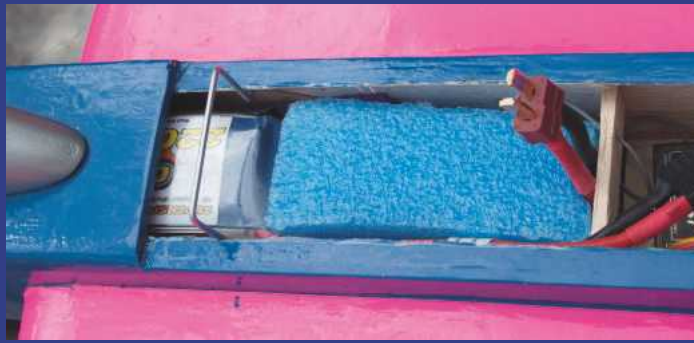
RADIO FIT

You will need three mini-servos, one for each aileron and one for the elevator. I would advise using metal gear jobs, simply because it is possible for the control horns to get snatched by the undergrowth during belly landings, with consequent shock to the servo transmission. I used Tower Pro MG92B units from Webbies Servo Shop. Whatever you use, mount them so that the push rods are kept as short as possible to discourage any control surface flutter at high speed.

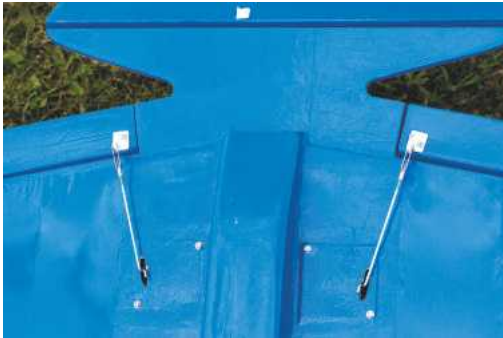
The elevator servo is mounted via the fin platform, as described earlier, whilst the aileron servos are mounted in the wings. The 1/16" ply hatch/servo mount assembly is easy to knock up but remember that the wing depth is pretty shallow so make sure you have enough clearance. You may have to sand back the ends of the servo rails to match the internal profile. The hatch can be tack glued, then held in by the covering material. Or, as I did, provide supports for two short hatch retaining screws to be added after covering and don't bother tack gluing. This allows the servo bay to be opened up in future if required.



Each aileron servo is mounted beneath its hatch.



Battery bay showing the rear foam packing piece and the temporary C of G checking wire hooked under the upper triangular support strips.



Aileron pushrods are short and slop free.



Elevator pushrod has a straight run too.



With the wire hooked in place checking the C of G is a doddle.

“...before you cut the sides check one of your batteries over the plan to make sure it will fit”

My Futaba receiver tucks in at the back behind a battery retaining former, leaving all of the rest of the fuselage for the battery. The ESC sits on the floor under a cross grained 1/8" balsa insert that serves as a support for the foam packing used to keep the battery in place. Place another cross-grained insert in front of the wing to support the foam, which will locate the front end of the battery.

A QUESTION OF BALANCE

Next, have a quick sanity check on the C of G. With the servos, Rx, ESC and fin all in place the motor is temporarily bolted to the front and the battery slipped in. Place a wire rod across the fuselage, under the triangular strip where the balance point should be (70mm from the L.E. at the root). When holding the model up by the wire rod it should hang horizontally. If it doesn't then correct by moving the battery backwards or forwards. In the unlikely event that you can't get the battery far enough forward to achieve balance then you may have to consider moving the motor forwards by use of stand offs.

Top sheeting and a hatch can now be fitted and the whole thing sanded to round the corners. My canopy was made from scrap block balsa sanded to shape, filled and painted. No covering was applied.

The ailerons can now be cut from the T.E. Make sure you mark them L and R, as there is bound to be some small difference, and also make sure that there is a small amount removed from each end to make them bind free when covered. Depending on whether you are going to top or centre hinge, chamfer the aileron L.E. accordingly, but DO NOT round off or taper the T.E.

If you haven't already done so, cut the elevator from the tail and prep its front edge as per the ailerons - again do not round or taper its T.E.

PRETTY IN PINK

Time for a good sanding all over and a decision on covering medium and colour scheme. The obvious choice is film, especially for electric, but whatever you choose keep it light. I went for the scientific 'what do I have in my left-over film box?' approach. The rather

gaudy fluorescent pink Solarfilm I found promised good visibility when matched with a darkish blue for the underside. There was enough of each colour in my box, so the decision was made.

After covering cut a slot in the rear upper fuselage sheet to accept the fin and glue in place. Fit plastic horns of your choice but keep the aileron ones as short as possible to minimise snagging in the grass, cutting off any excess above the clevis. Connect to the servos with 2mm rod. I use a Z bend at the servo and a metal clevis at the horn, but whatever method you use make sure it is slop free. Adjust ailerons and elevator to be at zero degrees at servo neutral. There is no reflex with this aircraft and as for movements use the settings in the Datafile as a starting point, then tweak to your own taste:

Repeat the C of G check, this time in the fully finished condition, and shuffle the battery to achieve the location marked on the plan. Slide some firm foam in front of the battery so that each time you insert a fresh pack you just have to slide it to a stop and the C of G will be the same. Fit a similar packing piece behind the battery.

*Grooving around
- as if on Laystrate!*



*Square fuselage
provides a good
grip for hand
launching.*



BEST BIT

I knew from extensive flying with the indoor version that the C of G should be somewhere near correct. Still, there is always some element of doubt...

The day came and with control checks complete my assistant, Richard got the nod to launch for the maiden flight. Mindful of the excess power available, I was only on half throttle. Even so it climbed alarmingly steeply on release, so the throttle was pulled back a bit while I fumbled for some down trim and soon things were a lot calmer. The elevator was more sensitive than expected and my experience with the indoor Simplex led me to believe the C of G was a bit rearward. It was still easily controllable though, so I flew on and felt reasonably happy with it. A stall check resulted in a nodding steep descent, with no wing drop. Back on the power and a roll to inverted resulted in another desire to climb steeply, which further confirmed my suspicion of a rearward C of G.

Safely down, the battery was moved forward. Re-launching with a fresh battery, the flight characteristics were truly transformed. Pitch was now quite neutral at different throttle



*Simplex Max can be
flown tight and low.*



Be sure to use a contrasting colour for the underside.

“The moral is that it is worth taking some time to fine tune the C of G and control movements.”

settings and inverted flight required just a dab of down, just as it should be. This was much more confidence inspiring, so the flight envelope was explored a bit more deeply.

Rolls are fast, but with 40% expo programmed in you wouldn't call it twitchy. In pitch it is responsive, but I found that during max rate turns the model would nod its head a bit. Funnily enough I remember our C/L combat wings doing the same if the elevator movement was too great, so for future flights the elevator end points were turned down a bit and now this characteristic only recurs if I try to turn too tight at very low airspeed.

The moral of the above story is that it is worth taking some time to fine tune the C of G and control movements. If you have to introduce up elevator trim more than a couple of millimetres from the zero datum, then you probably need to make a C of G adjustment. Do it a little at a time and you will be rewarded with a sweet spot that will make all the difference. If you have any down elevator trim you definitely need to move the balance forward.

After being concerned that the excess power could prove to be a handful, I was happy to find that it is fine so long as you remember that you do have a throttle stick and use it progressively rather than as an on/off switch. As I said at the start, this model was never designed for speed

so while it will go quite fast, it is much better to use the high end of the stick for vertical punch and lower settings for everything else. Your reward will be longer flight times - expect to get seven minutes plus from your 3S 2200mAh packs.

PILOTS NOTES

Pilot skill level - not for beginners, but if you have low wing sports model experience you should be fine.

Take off - can be launched over or underarm, but don't use full throttle unless your set up is of modest power. There is no tendency to torque roll so everything should be smooth and uneventful.

Aeros - just do it! (But remember it doesn't have a rudder.)

Landing - This is no thermal soarer, even though the wing loading is pretty low. You can do a full gliding approach given decent height, but it is much better to have some power available. Once you are over the patch and just a couple of feet up, you can throttle back and let it sink onto the grass. The APC prop has shown itself to be tough enough for these belly landings.

So, if you fancy a compact, easy to build, cheap fun machine, this one might be just the job. ✈

DATAFILE

Model:	Simples Max
Model type:	Sports aerobatic
Designed by:	Mike Bell
Wingspan:	1m (39in)
Fuselage length: (inc. motor)	64cm (26in)
Wing area:	0.3sq.m. (456sq.in.)
All-up weight:	0.9kg with battery (2lbs)
Wing loading:	3kg/sq.m. (100z/sq.ft.)
Power:	300-400W electric or o. 25 cu. in. IC
Rec'd LiPo:	3S 2200mAh
ESC:	50 - 60A
Servos:	3 mini (metal gear recommended)
Control deflections:	Elevator - 20mm up and down, 40% expo. Ailerons - 20mm up, 15mm down, 40% expo.

Once over the patch and a couple of feet up, throttle back and let it sink onto the grass.



Performance EDF's at Affordable Prices

These EDF units are a new generation of performance EDF units at an affordable price.

The prices include a brushless outrunner specifically designed and developed to work with these units. All of the fans are dynamically balanced at the factory and are therefore vibration free and very efficient. All fans have either 11 or 12 blades which gives them a great "turbine" like sound which adds to the experience of owning a "jet" model.

The 50mm FMS fans are those as used in the Tony Nijhuis "Mini Jet" series, as recently published in the RCM&E.

Diameter	Part Number	Thrust	Price
50mm	FMS 5400kv (3S LiPo - 358W)	620g	£36.99
50mm	PowerFun 4900kv (3S LiPo - 318W)	605g	£28.99
50mm	PowerFun 4430kv (4S LiPo - 458W)	765g	£28.99
50mm	FMS 4500kv (4S LiPo - 486W)	1,086g	£36.99
64mm	PowerFun 3900kv (3S LiPo - 434W)	872g	£32.99
64mm	PowerFun 3500kv (4S LiPo - 541W)	1,072g	£32.99
70mm	FMS 2750kv (4S LiPo - 740W)	1,253g	£64.99
70mm	PowerFun 3400kv (4S LiPo - 776W)	1,435g	£39.99
70mm	PowerFun 2300kv (6S LiPo - 1148W)	1,816g	£39.99
90mm	PowerFun 1450kv (6S LiPo - 1561W)	2,924g	£79.99
90mm	PowerFun 1450kv (8S LiPo - 1528W)	3,360g	£79.99



Complete Electrical Setup For Simplex Max by Mike Bell



Please visit www.4-max.co.uk/customermodels98.htm



Part No.	Description	RRP
PO-3547-1190	35mm Brushless Outrunner Motor	£35.99
4M-ESC60A35	60A Brushless ESC	£44.95
APCE 11x5.5	APC Electric 11" x 5.5" Prop	£4.30
3x 4M-175DMG-030	3x 17.5g Digital Metal Gear Servo 3.0Kg	£22.47
PPL-40C3S-2200	11.1, 40C, 3S, 2200mAh LiPo Battery	£19.99

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A simple tool board like this offers easy access to your most used tools.



It's simply made from scrap wood.



The basic structure can easily be modified to suit your own needs.

TOOL CADDY

In response to our recent request for your workshop pictures (feature coming soon!), Nick Ward also sent in details of this handy tool carry board.
words & photos » Nick Ward

This tool board project is a response to my realisation that despite attempting to confine my model building to the shed and the dog-room, where our springer spaniels sleep, I was steadily creeping back into old habits; the kitchen bench-top is perfectly flat and large, perfect for laying out plans, framing up fuselages/wing panels etc., all much to the annoyance of my beloved wife.

Don't get me wrong, my wife is extremely supportive of my hobby; she has her own creative interests and when we are not gardening together, we often find ourselves sharing the kitchen/living area doing our respective thing.

What annoys her (and frustrates me) is the constant to-ing and fro-ing from the other modelling areas to retrieve tools, followed by the inevitable leaving of most of it out overnight while glue dries and I can't be bothered making the necessary trips to return said tools to their original storage positions!

Most of what I do on the kitchen bench and dining table is related to 'fitting out' radio gear, making up push rods etc. and balsa bashing. Even basic tasks in the building process require a surprising number of different tools and measuring equipment - too much to carry in a couple of handfuls.

This project is not trying to cater for covering and finishing as these operations require 'smelly-stuff', hence they are better left for the shed.

Rather than give a definitive plan to follow, I thought I would give the approximate

dimensions of the bench top tool caddy I came up with. Together with some photographs these should be enough of a guide to get you started if you fancy making one, as I am sure that everyone's requirements in terms of size/shape/tool capacity etc. will be different.

THE BASICS

My caddy was built from some scrap 12mm indoor ply I had left over from another project. The main tool board/carry handle piece measures 16 x 12 inches (x 25.4 to convert to mm).

The base is 13 x 9 ins (allowing for wood thickness) and the front/back walls were 1.5 ins, with the sides triangulated to a height of 3 or 4 inches where they join the tool board for better reinforcement. All pieces were cut out with a jigsaw and the edges cleaned up with 100 grit sandpaper/emery cloth.

I tend to 'over-engineer' my projects; I like to screw them together first, ensuring a satisfactory fit, before taking apart and liberally applying PVA to all the joints before screwing back together and wiping excess glue into the seams with a damp rag.

Sealing with a couple of coats of polyurethane varnish is a good idea to prevent any coffee or tea spills getting into the wood.

The fittings were a combination of cup hooks, plastic U-clamps from garden irrigation and galvanised plumbing brackets of various sizes that I had lying around in my shed. The ledge is there to support pencils and modelling knives etc.

MAKE IT YOUR OWN

There is so much scope to personalise one of these. So for any of you who have not yet delved into the dying art of scratch-building, or if you just fancy building your own version as a project to suit other hobby requirements, this caddy is a great way to store in one place your basic tools in an easily transported, compact package. Mine is in constant use.

*Greta should approve.
Traditional models, engines
and radios are eco-friendly!*



THUNBERG-ING THE FUTURE

According to Whittaker, modern eco-awareness dovetails nicely with traditional modelling techniques. words & photos » Alex Whittaker

The truth is, many modern foam models are very easy to put together. Assembly barely requires the IQ of a fridge magnet. Now there is nowt wrong with that. However, as many modellers are re-discovering, making things yourself can be very rewarding. A few years back I decided to make my own homage to the great David Boddington, and my 'Keil Kraft Years'. In their joint honour, I designed my own Boddo-esque RCM&E Bushwhacker, a traditional 52" span high-winger. It turned out as an easy-build, three-channel, trainer-cum-sports model. I even put G-BODD on the fin and the printed plans. Bushwhacker did well as a free RCM&E plan (MAG1560) and, almost two decades on, it is still available as a Ben Buckle traditional kit.

Now before you ask, no, I have never received any kit, plan or CNC pack royalties! We do this all for the love. At least that's what the Editor tells me...

TRAD BRIT DIY

However, I had an ulterior motive behind the design of Bushwhacker. At the time wooden Clubman ARTFs were at their zenith, and I wanted to re-affirm traditional values. I decided to use the Bushwhacker build process, and its articles and plan, as a thinly disguised 'teach in' for Trad. Brit. constructional techniques. Therefore, Bushwhacker had banded-on wings, hand-made wheels, and a hand-bent piano wire undercart. Furthermore, she had other traditional features like sewn-on hinges for her control surfaces. As we used to do in ye olden days, the new model even had its own (pre-nylon) home-brew bespoke radio clevises.

BACK TO THE FUTURE

The threat to model shops, the reduction in the easy local availability of commercial accessories, plus the rise of the eco frame of mind, now renders those traditional 'DIY' ideas suddenly fashionable again. Mind you, saving

dosh and building everything yourself has never been out of fashion with many careful Trad. Brit. types. As we all know, there are still many unashamed, ruggedly individualistic shed survivalists out there. Those who eschew excessive plastic modernity and prefer traditional hand fabricated solutions.

So, aside from the balsa, everything in Bushwhacker was deliberately chosen so as not to be 'mission critical'. Aye, you could totally ignore modern fripperies like plastic servo mounts, nylon control horns, plastic hinges, plastic tanks and plastic wheels. Now for many 'build it yourself' modellers this minimalistic concept remains a truly liberating thought. You can do it all yourself, lo-tech, and within your shed, and reduce your reliance on petro-chemicals, world transport and toxic plastics. Basic renewable materials in one end of the shed and a fully functional radio model out the other. Yay!



Building your own traditional model is truly satisfying.

ENGINE MOUNTING

Eschewing the plastic, I also dispensed with the use of a commercial nylon engine mount. In fact, I had a bit of innocent fun with my faux-patented 'Pow'R Plate'. This was no more than a slide-in flat plywood engine mount.

It let me test-fly the prototype with four different powerplants: diesel, glow two-stroke, four stroke and a 'leccy motor. Aye, electric recidivism was alive and well then, too. In this way I knew my design was viable with a variety of power plants. My ace clubmate, Neil Shirley even made his Bushwhacker 'Dual Fuel' - both glow and electric. Niftily, my slide in Pow'R Plates had the required IC engine off-set fretted into the plywood, so I could vary the right-thrust for each power of engine. The plate was held between two beech beams on each side and simply secured with some wood screws.

Slacken the screws, slide out the first engine, pop in the second on its own Pow'R Plate and an engine swap took five minutes flat up at the field.

The only issue was that, for lightness, I originally used quite thin plywood for the engine plate. Oddly enough, the two strokes were okay but the less frequent bangs of the .30 four stroke glow option resonated a bit too much! Next time I reckon I would use slightly thicker ply for four strokes to dampen the vibe. Beyond that, it is a system that works well.



Enya SS 15 glow on the Pow'R Plate!



These screws retain the plate in the tight slot, facilitating easy engine swaps.



Ply engine plate slides into a tight slot between beech bearers.





Use good quality colour coded thread from the haberdashers or craft shop.



Mock-up surfaces to develop your sewn hinge skills. Use cyano to seal the knots.

SEWN HINGES

Let's start simply. Most of us these days will use commercial nylon or plastic hinges, or those nifty cyano-in 'paper hinges'. These require adequately thick balsa sheet for the control surfaces because we have to slit the balsa to slide the hinge in and glue it up. Now, when we were nippers making traditional control line kits there were no commercial hinges and we used other means to hinge elevators. Also, in such models the balsa used for elevators and rudders was often too thin to slit. Thus, we used sewn-in hinges.

Therefore, my method with radio models like Bushwhacker is to first build and cover the model. I then take the covered control surface, say the elevator, and mark out where I want the holes for the stitches of the hinge to fall. To mark these out, I use a handy Rollertec drawing aid whose ruler has a neat run of holes at 1/4" centres. (About a tenner second hand on ebay UK). This gives me the pitch of the holes on the elevator. This line of holes runs about 1/4" in from the edge of the projected hinge line. The line of holes on the tailplane are similarly marked out at 1/4" centres. However, these were offset by 1/4". This is to allow the hinge thread to zigzag down the surface as it is sewn.

The photos show you what I mean. I use thick thread from the haberdashery shop, craft shop or sewing machine shop. I was careful to 'code' my thread. In other words, to choose a colour to match my covering, in this case yellow.

Before tackling your model, I advise you to mock-up a short test piece of a dummy tailplane and elevator joint to practise getting your stitches correct. With my method (there are others), I use a thick needle or bodkin to open the sewing holes through the covered surfaces. I then use masking tape to hold the tailplane and elevator together at the correct place relative to each other. Then, beginning at a hole at one end, I take a quick stitch at the end of the elevator, to secure the thread. This first stitch holds the hinge line as I proceed to sew.



I used my trusty Rollertec drawing instrument to mark out the hinge holes.



Up through the elevator, down through the gap, and up through the tailplane.

The sewing method is to come up through the elevator from below, pass the needle down through the gap between the tailplane and elevator, and then loop up to the meet the bottom of the next diagonal hole. The needle then takes the thread up through the next tailplane hole to make the hinge, and repeat. It's like a figure of eight stitch: up through the elevator, down through the hinge gap and then upwards through the next diagonal hole on the tailplane. And sew on!

Note that if you don't go diagonally to the next hole, you will not progress down the elevator! It's much harder to read about than do. Trust me, your test piece experiments will make it all obvious. You only have to draw the thread tight enough to pull the surface against the thread in the gap. When you get to the end, and you are satisfied with that minimal gap, you can make an end stitch, and seal the knot off with bit of cyano. The completed sewn hinge should fall easily under its own weight, without any binding. Such hinges are wonderfully free in action, induce only tiny servo loads, and add negligible weight.



Rudder and fin with staggered holes so the thread will zig-zag down the hinge.

They distribute the load throughout the hinge line too, unlike spot hinges. I have control liners with fifty odd year-old sewn hinges that still work freely and correctly.

DIY CLEVISES

These are easy. With your servo fitted in the fuselage, you make up your 1/4" hard balsa pushrod as normal. You now need piano wire pushrod ends. So, using some piano wire that's thin enough to pass through the hole in your chosen servo output arm, make up, say, a six-inch pushrod end. The last 1/4" of this piano wire is now bent smartly at 90 degrees, to mate with the hole in your servo output arm. Once the wire pushrod end is bound and epoxied to the balsa pushrod the piano wire angle is pushed down from the top, locating into the servo arm. Now this could vibrate out of the servo arm in flight. So, we need to simply solder and bind (with tinned copper wire) a small length of very thin piano wire as a keeper.

The photos show you how. You repeat the process at either end of the pushrod, and Bob's your mother's brother.



Clevis piano wire matches the servo output arm hole. Keeper is thinner wire.



Balsa wheel blanks are scored or cut from sheet with dividers or compasses.



Balsa blanks on a set-screw mandrel are trued up in the drill chuck with a sanding block.



Sanding block set over at an angle to sand a chamfer on the wheel trim blank.

HOMEBREW WHEELS

Although I was a child of The Plastics Age, budget considerations in the 1960s and 1970s meant that those smart but sexy R/C wheels advertised in RCM&E were well beyond my pay grade. I lusted after those German chrome plastic wheels with their stylish whitewall tyres wheels, too. Ineffably cool, but way beyond my student grant. So, many of my early models used home-brew wooden wheels.

On Bushwhacker I revived the old technique: laminated balsa wheels, with brass tube hubs. These latter were cut to length with a tube rolled under a fresh scalpel blade. It works well on brass, ali or copper tube, but nowadays I tend to use a mini tube cutter.

To make the wheels I chose 1/4" balsa sheet. I scribed the diameter of the wheel I wanted on the sheet with compasses or dividers. If you scribe deeply from both sides of the sheet, the wheel blank soon falls out. I tend to use three laminations per wheel. The laminations were glued together with balsa glue, and a nice tight hole drilled to take the brass tube hub.

This hole is also used to mount the wheel blanks on an M2.5 x 60mm set screw. This screw, with the widest washer I had to hand under its head, was passed through the laminations and secured on the other side, with another large washer, topped off with two locknuts. This in effect becomes a mandrel, with its protruding thread used to mount the balsa blanks in the drilling machine chuck. When spun up in the drilling machine, I used my Permagrit sanding block to sand the wheel rims exactly round.

I then used a rat-tail file on the circumference of the wheel to cut a depression in the edge of the rim to take the intended rubber tyre. If you wish, you can use files or mini gouges to cut scale hub lines or profiles into the face of the balsa wheel as it spins.

On Bushwhacker, just for swank, I made slightly coned balsa hubcaps with sanded-in chamfered edges. It is all very quick easy and great fun to do. Once all parts were sanded smooth, I used lots of



Wheel (left) has a seat for the tyre cut with a rat-tail file, with chamfered wheel trim on right.



Inside face of wheel showing brass axle and washer.

ciano glue to harden the deep groove at the rim where the tyre will sit.

Obviously, my original choice of balsa diameter matched my intended tyre. For years, I used Hoover drive belts as tyres. I bought these in bulk in two sizes from market stalls or 'appliance fixer' shops. Rubber drive bands for machine tools and sewing machines provide another happy hunting ground. As for tyres in other sizes, I have found that miscellaneous exhaust and car part rubber rings, seals and doughnuts can produce suitable 'tyres'. Have a good nose around a car accessory shop - you may be surprised at what you might turn up. The brass tube hubs were simply epoxied into the wheels and finished with washers at the hub.

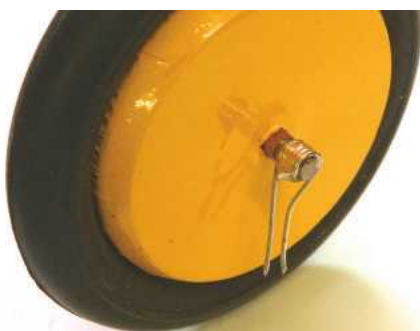
All in all, such wheels are a nice easy project. After literally thousands of landings my home-brew wheels have never given up the ghost. Laminated balsa, stiffened with cyano glue, is much tougher than it looks. Just make sure the



Wheel with tyre fitted and wheel trim ready to be glued on.



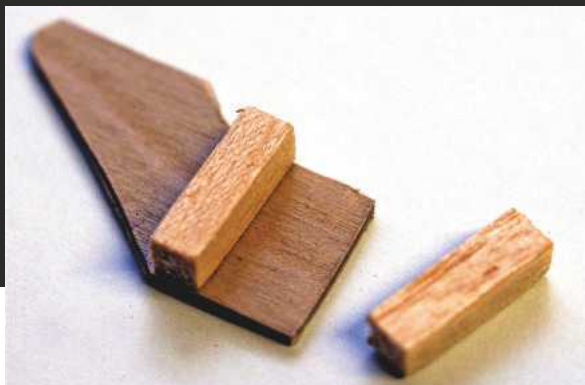
Wheel with tyre fitted and Solarfilm applied.



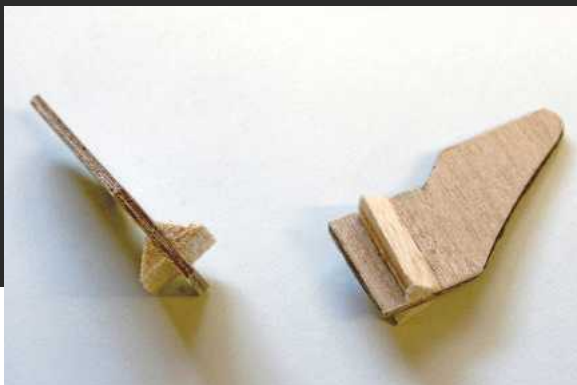
Use a twist of tinned copper wire and some solder to retain wheel. Snip off the excess!

lamination blanks are 'quartered' before you glue them up. In other words, their grains are set at right angles to each other. Finally, for wheel retention onto the piano wire axle, two or three neat turns of tinned copper wire soldered on works well. Be sure to thoroughly clean the jointing areas first with wire wool or emery cloth.

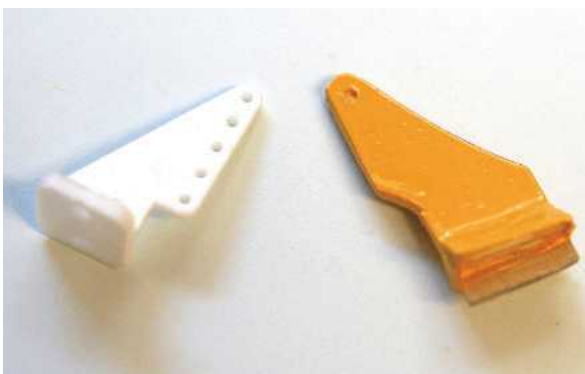




Basic idea of a DIY control horn: a plywood blade with balsa feet.



I found it sleeker to use triangular balsa for the feet.



Once covered in Solarfilm or painted it will look like a commercial item.



Hardest bit is cutting the neat slot for the blade through the control surface!

DIY CONTROL HORNS

These are a doddle to make. In fact, I just copied the normal commercial nylon design in wood. There are a number of ways to make them. Essentially, I make a lite ply blade, to site the clevis holes, and add two quarter inch balsa feet to support this blade.

Naturally, the flat blade blanks have first to be drilled to be a neat fit with your chosen DIY piano wire clevis. Note that the foot of the lite ply blade has to be long enough to go right through the control surface, where it is glued with epoxy. I cut the balsa square strip into triangular sections to 'fair in' the feet of the horns.

The hardest bit of this system is to cut the neat, tight slots through the balsa control surface. Sometimes, I make the lite ply blade long enough to go right through the control surface, with some blade deliberately protruding on the other side. This protrusion takes a keeper made from a short section of cocktail stick, pushed through. The lot is then epoxied up so it cannot pull out!

I confess that with normal commercial nylon horns I do prefer those that bolt through a surface to mate up to fishplates on the other side. Very secure indeed. However, these simple glued-in jobs on the Bushwhacker have lasted almost twenty years with no issues.

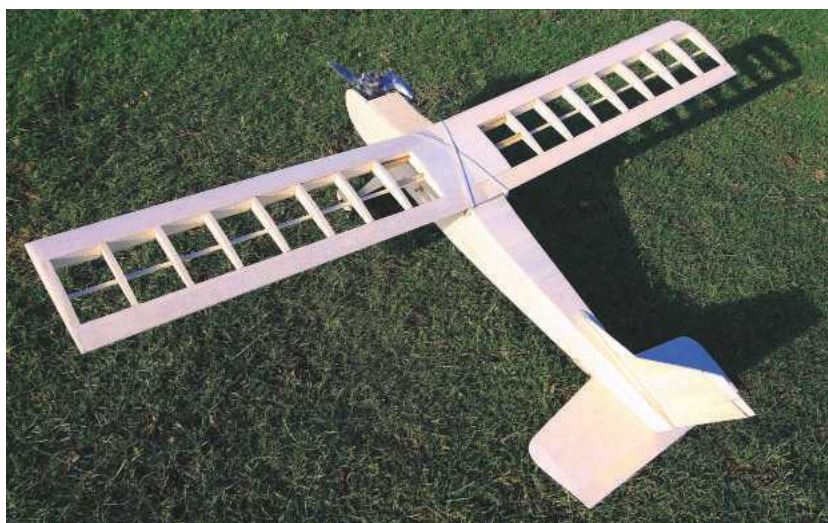
BANDED ON WINGS

Banded on wings are quintessentially traditional, wonderfully crash-proof, and quick and easy to install.

In the days of single channel, where you had no control over throttle or elevator, different engines of different power outputs produced different rates of climb. So, slipping

some balsa packing under either the leading or trailing edge of the banded-on wing could provide some adjustment to the rate of climb. For beginners at the building stage banded-on wings mean that no critically accurate marking out for wing pegs or retaining bolts is required.

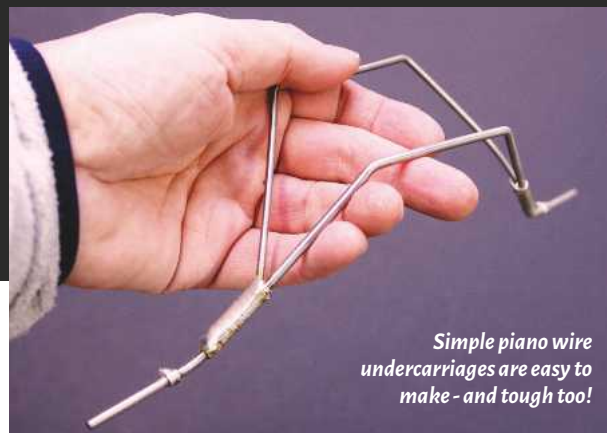
I love banded-on wings, though naturally,



Boddo and KK inspired Bushwhacker, a one-time free plan in RCM&E. Copies can be obtained from Sarik Hobbies.



Left: Banded-on wings and undercarriages aid a trainer's survivability in a crash.



Simple piano wire undercarriages are easy to make - and tough too!

with any traditional design that uses them, you can always choose to retrofit alternative bolt-on methods. Bushwhacker uses simple pine wing band dowels from the DIY store, with the ends lightly chamfered with a pencil sharpener, or the touch of a sanding block as you spin them up in your power drill.

For constructional simplicity Bushwhacker also has a banded-on DIY piano wire undercarriage. Now the Aeromodelling Ancients of Days Past were not stupid people. Banded-on wings and banded-on undercarriage can take a terrific amount of trainer punishment, avoiding all those bitter tears and emotional setbacks whilst you are learning.

Again, you can retro-fit bolt-on systems later if you prefer, which is a nifty compact learning project in its own right. Most of us like tinkering with established designs. Anyhow, both systems require local hardening of the airframe where the wing securing loads are to be transmitted to the fuselage via the dowels. In Bushwhacker I wanted simplicity. So, I went for simple lite ply strengthening discs, with neatly fitting dowel-sized holes in the middle. I simply stamped these flat doughnuts out of lite ply with one of my set of leather punches.

I got these inexpensive Chinese implements from a tool stall at a big summer show. These discs are simply epoxied on to the fuselage sides where the dowels need to be fitted. I also used identical discs to support where the radio aerial came out of the balsa fuselage. I even used one where the receiver switch's piano wire extension exited the fuselage.

Job done.

NEXT TIME

We'll make our own DIY tin fuel tank! ✈️



Above: Doughnuts provide local strength where needed for wings, undercarriage and aials.

Left: Using a leather punch to knock out doughnuts from scraps of lite ply.



You can still get the Bushwhacker traditional kit from Ben Buckle #NoRoyalties!

WOT 40!

40 years on, David Ashby finds designer Chris Foss still cutting WOT4 kits. words & photos » David Ashby





After 40 years, the Wot 4 remains in production.



That the first ARTF version of the WOT4 was so well received was thanks in no small way to Chris Foss' overview of the production process.

Here's a little-known fact of model aviation; I bet you didn't know that the WOT4 name first appeared on an experimental glider, and a V-tail one at that? It was one of Chris Foss' prototypes that didn't progress to a plan or kit, but he liked the name and gave it to the power model he'd been developing since the mid-70s.

The WOT4 first arrived as a foam wing/plan pack in 1979 and was so successful that word soon got around and shops started asking for a kit version. Chris obliged and the first boxes hit the shelves a year or so later. Not that the Foss name was unknown. The Middle Phase slope glider had been selling very well since its launch in 1976, alongside Chris' glider plan range. A versatile multi-purpose power sport model was the next logical development for the business.

DNA

Although the prototype first flew in 1977, the WOT4's DNA can be traced to the fun fly multi-task competitions earlier in the decade. Models were required to compete in a number of disciplines including limbo, touch & goes, climb & spin and pylon racing. With a built-up wing and matched with an O.S. 61 two-stroke, Chris' lightweight, 4.5lb design performed well. Flyers who saw it wanted one and a foam wing/plan pack was the eventual result.

Speaking of engines, Chris thinks that a .70 four-stroke is the IC sweet spot but a good .46 suits the '4 nicely too. The Mk.2 prototype flew with an unusual engine in the form of a Webra four-stroke, and the model still sits in a corner of the factory. Although some have tried a .90 four-stroke, as Chris points out, "Anything larger than the .70 makes the model nose heavy, so the extra power is negated to a certain extent by the increased engine weight and associated tail ballast necessary to achieve the correct C of G."



Launched in 1976, the Middle Phase was the first Foss kit. Like the WOT4, it still looks fresh.



The words 'timeless classic' were never more apt. This is RCM&E's review model from 2006.



Above: The Mk.2 prototype still sits in a corner of the factory. Note the unusual Webra four-stroke. Left: It's a versatile beat where engines are concerned, although a .46 two-stroke is just fine. Below left: Would you believe the name first went on a V-tail glider wing? Below: The Mk.3 was redesigned with a pronounced under-fin to help with knife-edge flying.

EVOLUTION

Recognising the earlier 1977 design, the first kit version was a Mk.2. The Mk.3 followed in 1992 with a slightly tapered wing and restyled fuselage - in particular the under-fin and rudder were more pronounced to help with balance in positive spin and flick manoeuvres - and a variable position bulkhead so larger engines and four-strokes could be fitted with greater ease. Some flyers asked for the Mk.3 fuselage with the Mk.2's thicker, straight wing so in 1996 the Classic version was born. Both the Mk.3 and Classic have remained in continuous production ever since.

Chris admits that very little has changed over the four decades. "In some ways there was little to change, the WOT4 had its own style, and I was always conscious that it would become a different model if too much was altered."

PRODUCTION

So, what made it a best seller? For anyone who's flown one the question seems superfluous, but it was, and remains, the perfect combination of good flying traits, a very forgiving nature and strength that forgave mistakes and shrugged off the rigours imposed by a grass flying field, especially in winter. It could accept a wide range of engines and was easy to repair. Like all classic designs, be they cars or watches, there's something about the WOT4's styling that transcends fashion; it's rugged yet elegant at the same time. It looks 'designed' and modellers soon come to appreciate the thought and care invested when they start to build it.



Mk.3 was released in 1992 with a tapered wing and a restyled fuselage.



Chris' original sketches for a couple of famous designs.



Chris selects the wood for every kit....

...and every foam wing is checked before packing.



Every part of the kitting process moves through Chris' hands, and always has done.



Chris tested the water with the Wot Trainer before committing his special design to an ARTF.

Missing thus far is the word 'quality'. Chris' kits were always lauded for the fact, but the word takes on special significance when he reflects, "I was producing 100 kits a week at its peak, and at least 50 of those were WOT4s".

What's remarkable is that Chris has cut, packed and checked every single kit he's sold over the last 40 years. Not a single pair of foam wings has left the factory without his personal scrutiny. It's not just the '4s but Middle Phases, Phase 6s, Acrowots and so on. For each and every kit he'll have personally selected and graded every single piece of balsa, cut the parts, packed the kit, printed the instructions, stapled the boxes then printed and fixed the outer label. Jane, his wife, was in charge of assembling all the accessory packs - the nuts, bolts, control fittings and associated hardware. With that all done, and especially in the early days, he'd often fill his car and delivered boxes to the local model shops.



The ARTF versions have built-up wings.



This, the light and agile ARTF Pro version, is your scribe's personal favourite.

Consider that some 20,000 WOT4's alone have been sold over the period (you can assume a similar number for Middle Phases and Acrowots etc.) then, as Chris says with typical understatement... *"that's a lot of cutting."* More to the point, through blood, sweat and tears, no one can deny that he's earned and deserves every plaudit.

ARTF

Needless to say, volumes aren't what they were in the 80s and 90s. But the quality mantra, combined with a lean 'n' mean approach, gave the business a good foundation from which to weather the 'Almost Ready To Fly' tidal wave that arrived in the early noughties.

An ARTF version might seem inevitable with hindsight, accepting that a built-up wing would replace the kit's foam core version, but when Chris was approached by Ripmax with a view to producing an ARTF WOT4, he decided to initially test the water with the Wot Trainer (itself a scaled-up Uno Wot trainer) before committing his special design to the process. That the ARTF version subsequently sold in large numbers may come as no surprise, but that's also a reflection of Chris' involvement with the design and testing process. Several prototypes were rejected until he was happy with the model's strength and overall quality. People may complain about the resilience of their ready-made models, but almost never when the subject turns to the ARTF Wots.

ONWARDS

Plenty of Wot aficionados claim there's no substitute for the real thing though, so Chris is still at it, making kits, albeit at a slower pace than the heady days when he'd fill his van with 100 boxes for the Sandown Park Show and return home empty.

He still flies, mainly e-soarers, although his favourite grab 'n' go machines over the last few years have been a WOT4 Foam-e and the electric version of the WOT4 Mk.3. What else?

WOT4 TIMELINE

- 1977 - Mk.1 prototype flies
- 1979 - Mk.2 plan pack launched
- 1980 - Mk.2 kit commenced production
- 1994 - Mk.3 version released
- 1996 - Classic version on sale
- 2009 - WOT4 ARTF (produced by Ripmax)

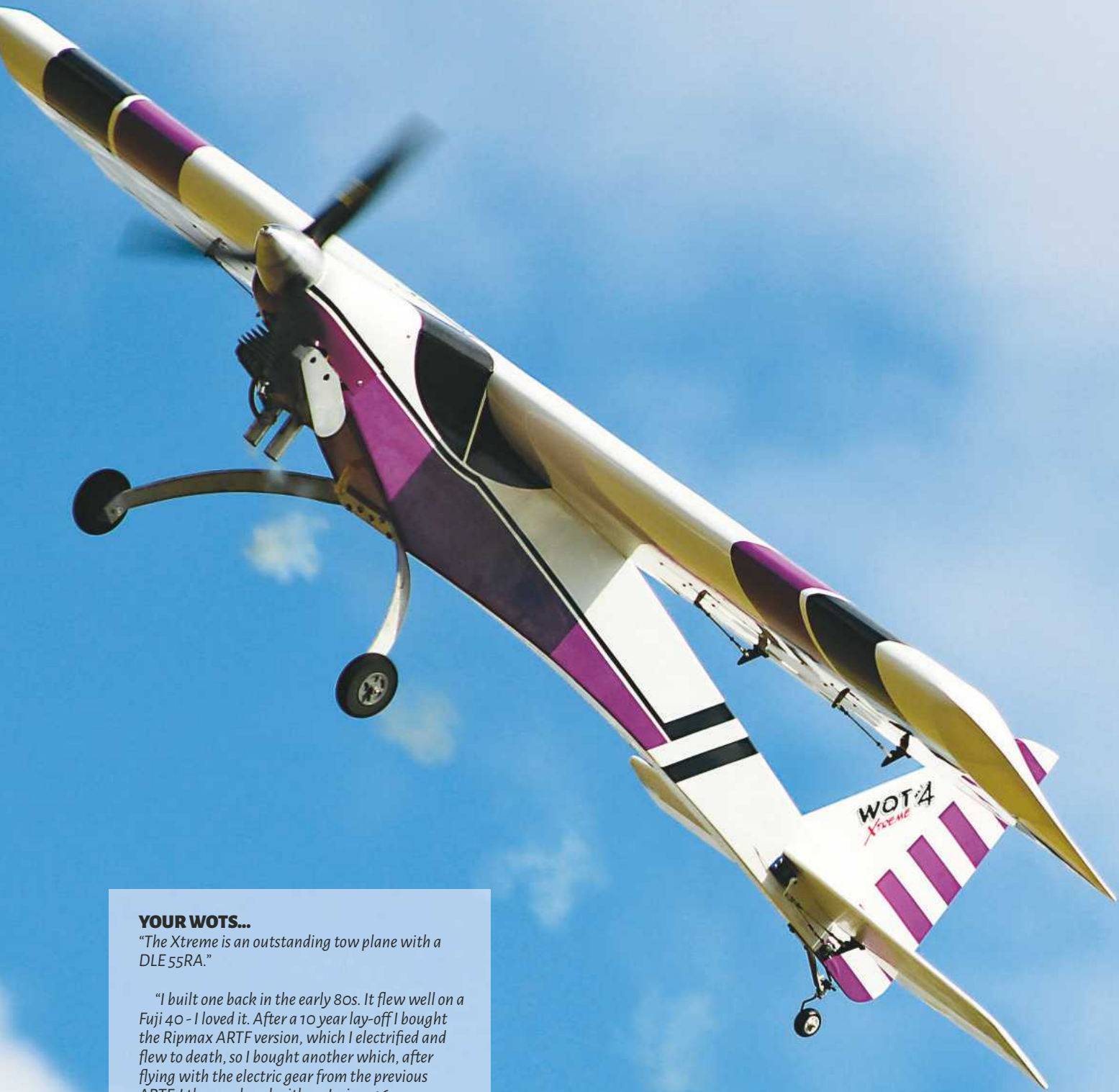
WOT variants have been plentiful. This is the balsa electric version.



WOT4's come in all sizes!



It's good to know that the kits will be in production for some time to come.



YOUR WOTS...

"The Xtreme is an outstanding tow plane with a DLE 55RA."

"I built one back in the early 80s. It flew well on a Fuji 40 - I loved it. After a 10 year lay-off I bought the Ripmax ARTF version, which I electrified and flew to death, so I bought another which, after flying with the electric gear from the previous ARTF, I then replaced with an Irvine .46 - even better. That one now is now deceased, and this time will probably be replaced by a Chris Foss 'build it yourself' Wottie."

"I had one and it was a very nimble model... Maybe mine was exceptionally nimble as, when I joined the wings, I accidentally had the halves upside down and ended up with about 1" anhedral!"

"I built my Mk.3 with extra-large control surfaces and ran an Irvine .61 two-stroke. It flew ballistic! A dead stick too far from home shortened the life when it came down in the only place in the field with rocks sticking out the ground." 

Let's not forget the XL and, this, the Xtreme, seen here with a 50cc petrol engine.

John Woodfield with a small selection from his vast collection of stunning old timers.



ELYSIUM FOR SLOPE SOARING

After last month's inspiring trip to the Alps, Simon Cocker encourages us to try coastal soaring

words » Simon Cocker | photos » Simon Cocker & John Woodfield

I am addicted to YouTube; the phenomenon is officially gripping, just like model aviation. It is captivating and absorbing, the process of being consumed by YT is a time warping experience. I will often check out a link sent to me to view a model glider video clip of just seven minutes, yet 90 minutes vanish. As YT users will already know any subject matter can prick your interest, no matter how diverse; life's fascinations are not confined to just aviation. Last night I learned how to wood turn beautiful bowls and vases using a knurled tree root blended to a pigmented clear casting resin and then a documentary about the US Navy's new Ford class aircraft carriers. Finally, I watched the flight of the first model turbine version of the Antonov An-225 Mriya, which was a stunning example of the type and built to the same scale as my PSS version. But then I spotted a clip about the new Rossi Jetman vertical take-off wing... It never ends!



Bird of Time. These boys had a relaxing time flying it over Hells Mouth.



John Beech with his high viz Bird of Time. Airbrakes were added for flying from the Cim Farm coastal site



John Woodfield shows us the unique curves of the delightful Fillions Champion. 111-inch wingspan from a 1946 free flight design.

RELAXED FLYING

Just as I decided to call it a night YT offered the next list of videos, each with a pop-up image to tempt you to open its content. A bright yellow see through glider was being presented to a sunny seascape from the edge of a Cornwall cliff and I was suckered in to see more. It was a Leprechaun vintage style, rudder/elevator floater flown in a sublime fashion by John Woodfield, who presented four minutes of beautifully filmed relaxing video. This clip had received 287,529 views at that point in time, which illustrates the level of interest in this style of cliffside soaring. The simplicity and purity of the pretty model combined with its natural propensity to soar so slowly enabled John to enjoy circuits close to the slope and then to execute a single-handed capture by its curvaceous nose. The model maintains flight while arrested in John's hand for a few moments before it is released to float on once more.

I felt immediate synergy with this scene - it was just so inspiring that I had to quell the strong urge to rush out to buy a laser cut kit and build one of my own the very next day!

Last year, while on the Welsh cliffs of the Llyn Peninsula, I spent a glorious gentle evening with a group of chilled out model aviators who were basking in the low rays of the summer sun while a lazy wind wafted up the rocky cliff face to greet us. I was a little disappointed to realise that all my gliders were inadequate to handle the conditions; they were simply too heavy to fly safely, so remained rooted to the ground for fear of them dropping into the sea if I tried my luck. I had left all my electron assisted sailplanes behind, so convinced was I that my trusty old thermal sniffing and lightweight Multiplex DG300 would be up to the job.

Paul Jubb was coasting gracefully along the cliff edge with an open structured vintage style rudder and elevator model, which I assumed he had purloined from one of the elders. It flew so majestically in the 5-10mph breeze that I became a little mesmerised by its lack of pace, but the way the ancient aircraft pirouetted around in a stall turn and hopped over the fence to pass in front of our noses was pure joy. No other models could

manage to stay aloft in the wispy lift so Paul had a captive and envious audience, all of us wishing we had a similar type of characterful model to join him on this perfect occasion.

I should mention that usually Paul is keen to thrash his moulded models on the big air days, as we all do, so this scenario once again proves that you have to have a wide variety of aircraft to contend with the ever-changing wind and weather conditions. To my surprise I discovered that Paul had built this model from scratch for just this eventuality and he graciously offered his transmitter to me so that I could sample the experience. Recently retired from a busy career, Paul returned to fill in some of his early life yearnings and he confessed that this was one of a number of projects on his long list.

I used to enjoy long boating in my younger years, where you learn to adapt from the speed of normal transport to the snail pace of a chugging diesel. I dropped into canal boat mode, added the third dimension and steered the old glider up, down and around Hells Mouth, lightly dabbing the creaky tiller/rudder to nudge the old timer to the next turn point. I really loved it, so I guess that must mean that I too am getting old...

JOHN'S VIDEO DELIGHTS

When I saw the YT video presented by John Woodfield I was immediately transported back in time to this sublime experience on the picturesque Abersochs cliffs and those ten minutes of Tx time came flooding back with feelings of fondness and inner peace.

The Leprechaun that John had built was scaled up to a sufficient size to offer a wing loading of just 8oz./sq.ft. and it has ample presence in flight. I then found a series of further short videos posted by John, beautifully and thoughtfully edited, showing numerous variations on the theme of vintage rudder/elevator open structure, lightweight models, each with a slightly different flavour and appeal to waft about in light breeze conditions. His lilac covered Southerner is built from a Belair laser kit and has an extended nose to compensate for the removal of the diesel engine and to keep ballast down to a minimum in this section. HobbyKing supply the acres of transparent film that John consumes.

It is John's wife who calmly captures the smooth video footage; she has a steady hand and an excellent eye for recording the interesting aspects of the flights. The models



John designed this 96-inch span canard, which you can watch flying on his YouTube channel. Very manoeuvrable.

Looks windy but this model is quite slippery.



Lovely Super Sinbad floating along the Perranporth cliffside in a waft of breeze - idyllic!

are kept in reasonably close visual range to maintain the viewer's attachment to the scene being played out; focus is constant and there is never sickly induced shaky camera syndrome, all of which keeps you hooked on the sunny seascape settings. There is some lovely air to surface footage from John's Salto, which reveals the full extent of the beauty of this area - the turquoise sea below is simply magical.

John and his wife both moved down to Perranporth in Cornwall to find peace and harmony. Due to John's early retirement from the Police force he has chosen to use cliff soaring as his therapy and full-time pursuit. The building side of his obsession is as consuming as the flying aspect of the sport so that there is always a 'next model' under construction. During the course of his modelling career so far, John has built approaching 500 models of all types including scale sailplanes and a wide selection of PSS types. When John was an infant his father nurtured and encouraged his modelling enthusiasm and he recalls attending the Lakes gliding holidays, which sealed his lifelong commitment to this serene aspect of the sport. He has kindly provided some photos which illustrate the natural splendour of cliff soaring so evocatively and which I share with you here.

John's 11,100 subscribers to his YouTube channel mean that he has friends from around the world who visit the area in the summer to fly with him on those halcyon days. I do hope you find the perfect weather window to immerse yourself in 3D heaven beside the sea this year and that you become as addicted as the rest of us.

SCALE GLIDER FESTIVAL

The Scale Glider Festival was hosted by the Clwyd Soaring Association between the 6 - 8th September 2019.

Arriving at the picturesque Clwyd slope events is always a joy due to the warm Welsh welcome from Ruth and Martin Rees and all of the chatty members of this well-established club. The close proximity of the car park relative to the flying area also keeps a lovely convivial vibe in the camp.



Dave Worron about to fly a 4m span Libelle in the underwhelming lift at the Horseshoe Pass.

In fact, from rigging at their regular site up at the Horseshoe Pass to the launch point was just 25 metres. The wind shifted to their roadside take off area by lunch time, which meant a 120-metre walk, but no one complained! The topography here is undulating and certainly not overly exciting, with ample interference from other hills ahead, so the lift was underwhelming, and we all struggled to maintain flight.

The fickle wind persisted, and it started blowing tangentially to the slope face and bringing bouts of precipitation to deflate our resolve. We agreed to decamp and divert to a more favoured slope in the area overlooking Llangollen, where the remaining proceedings unfolded over the weekend. The drive up to this slope is quite steep and narrow in places, so be aware when you plan your visit to this year's event. Parking beside the road on the grass verge became a little sparse but nevertheless we all squeezed in. The walk across two fields to the slope edge was worth the extra effort and rewarded by a stunning vista and a breath-taking flying arena. The slope face is steep and smoothly consistent in its rapid decent to the valley floor 274m below, generating buoyant lift throughout the day.

The landing area was more than generous and free of immediate hazards. There is a barbed wire fence bordering the rear boundary of this field and also at the front where we launch our aircraft. The wind was charging across the valley with sufficient intent to rule out any flying from the adjacent

hang-gliding club, so we were blessed with the full and free use of the slope. Launching in this healthy breeze enabled the safe despatch of all gliders as the forward fence is positioned in lift and non-turbulent air, so no mishaps ensued. I did almost fly my 1:3.5 scale LET DG-1000 into this fence as I opted to launch from the promontory set back from the fence, with assistance from the FES. Dave Worron gave the 5.33m span model a gentle push, while the folding propeller unit was intended to whisk the model away. The DG-1000 began its climb with the reassuring sound of propeller blades biting hard into the dense Welsh air when suddenly the whole spinner/propeller assembly disconnected from the motor shaft, leaving the aircraft helpless and devoid of energy. It was hanging on the verge of a stall, so I dived at the fence for essential airspeed, the safest option as there was not enough space to touch down and stop in time. The DG-1000 kissed the grass before skimming over the top rung of the barbed wire, accompanied by shrieks of alarm from the audience. Schambeck scale spinners are held to the motor shaft with two 3mm grub screws, which is perfectly adequate provided that corresponding flat spots are first ground onto the shaft and a tiny drop of thread lock is introduced for future security...

Steve Fraquet is one of the regular attendees to this event. He campaigned many old timer sailplanes from the depths of his burgeoning van. Every few hours another glider would appear, the path from the slope



From Somerset, Steve Fraquet is a charming character and a wonderful model aviator.



Steve Fraquet's Petrel gets a Worron heave into lift over the Llangollen valley.

to the car park area wearing out rapidly in his haste. I especially enjoyed the spirited displays of vintage flavoured aerobatics from Steve's sturdy old Petrel.

I had recently purchased a 5m span Rhonadler from Chris Williams, a rare opportunity as I just happened to log on to Scale Soaring Classifieds at the precise minute the model was posted for sale. Like the rest of the modelling community I usually miss the chance to own one of Chris' masterpieces, so the moment was all the more poignant as I was standing above an ideal slope, with perfect weather conditions and poised with a stunningly pretty vintage sailplane. I felt privileged to be the pilot and owner of the Rhonadler as she sailed effortlessly away into the heavens; these are moments that become embedded in your soul and Elysium is easily achieved with the euphoria given freely by nature. Chris made this model a resilient version of the type for the purposes of aerotowing and for mild aerobatics, and I enjoyed opening the taps to execute rolls and loops. The energy build up is gradual and short lived so manoeuvres have to be conducted quickly due to the dramatic decay of airspeed, however they look quite neat and not snatched thanks to the modern wing section (HQ 35/12 to the tip), which Chris has employed on the outer 75% of the wing span. The centre section (Göttingen 535 mod) uses a scale thickness that is heavily under-cambered and prevents the Rhonadler from ever reaching its VNE.

Our hosts for the active flying elements of the day were the ever-helpful John Minshell and Dave Worron, who flew the only PSS model at the event, a 108" span B-52. The model was my original prototype from the nineties, which soared beautifully in the plentiful lift. PSS is welcome at this event and should the wind direction be from the North West again this year, I shall bring along a TR1 and large Venom to add another dimension and interest to the proceedings.

John's H-Modell DG-600 broke up in the air preceding a high-speed loop and was sadly destroyed. We discovered that the carbon extension spar had sheared off at the wing root. Inside the spar we discovered the



Left: Jeff Mortimer, retired GP, with an upgrade to a Ventus 2c at 4.5m span from Topp Modelle.

Below: Launching over the fence is no problem as the lift is working with us. But watch that the wings don't misalign on release!



material to be hard balsa and the carbon was simply a cover, which may have been damaged following a previous incident at Milson where a ground loop on take-off took its toll. As I have reported before, carbon suffers micro tears that are invisible at first and often inside the structure. They slowly work their way out until the carbon simply snaps like a twig; this was another example of the failings of this material in extreme

conditions and circumstances. The 7m span H-Modell ASH-25 uses this method and the outer wing panels are known to break off due to the spar stub snapping off at the root. Vince Cockitt experienced this occurrence in flight over the sea on the Isle of Guernsey with his ASH-25 but luckily, he safely landed the model and retrieved the errant outer wing panel. The message is clear: if you own an H-Modell airframe you should check or



Left: A rare sight in Wales these days as a B-52 cruises the valleys.

Below: My mighty DG-1000 loses its prop and spinner, which is visibly departing at this moment. The aircraft only just escaped disaster.

“New friendships were forged, and the spirit of slope scale was infectious and inspiring...”



Above: Chris Williams designed Rhonadler 35 at 5m span has proved to be a capable scale soarer - and it's just so pretty...

Right: Steve Fraquet gets the Rhonadler nicely over the fence, with airspeed to spare.



simply reinforce the carbon wing spar stubs. The fix involves cutting open the underside of the spar stub to excavate the balsa, then filling the void with laminations of 3mm fibre glass board secured with 24-hour Araldite.

Flying at this Festival was encouraged without restraint, save for a cap on the number of aircraft in the air at any one time to prevent mid-air collisions. There was enough space for six sailplanes, particularly as all pilots were courteous enough to communicate with one another to maintain a calm use of the active air space where close in slope passes and aerobatics were conducted. I really enjoyed the low-key style of the event, with not a hint of a competitive element. We all had fun, banter and outstanding camaraderie. New friendships were forged, and the spirit of slope scale was infectious and inspiring - exactly the outcome the Clwyd Club had intended. Do get in touch at: flyersanonymoust@aol.com ✈



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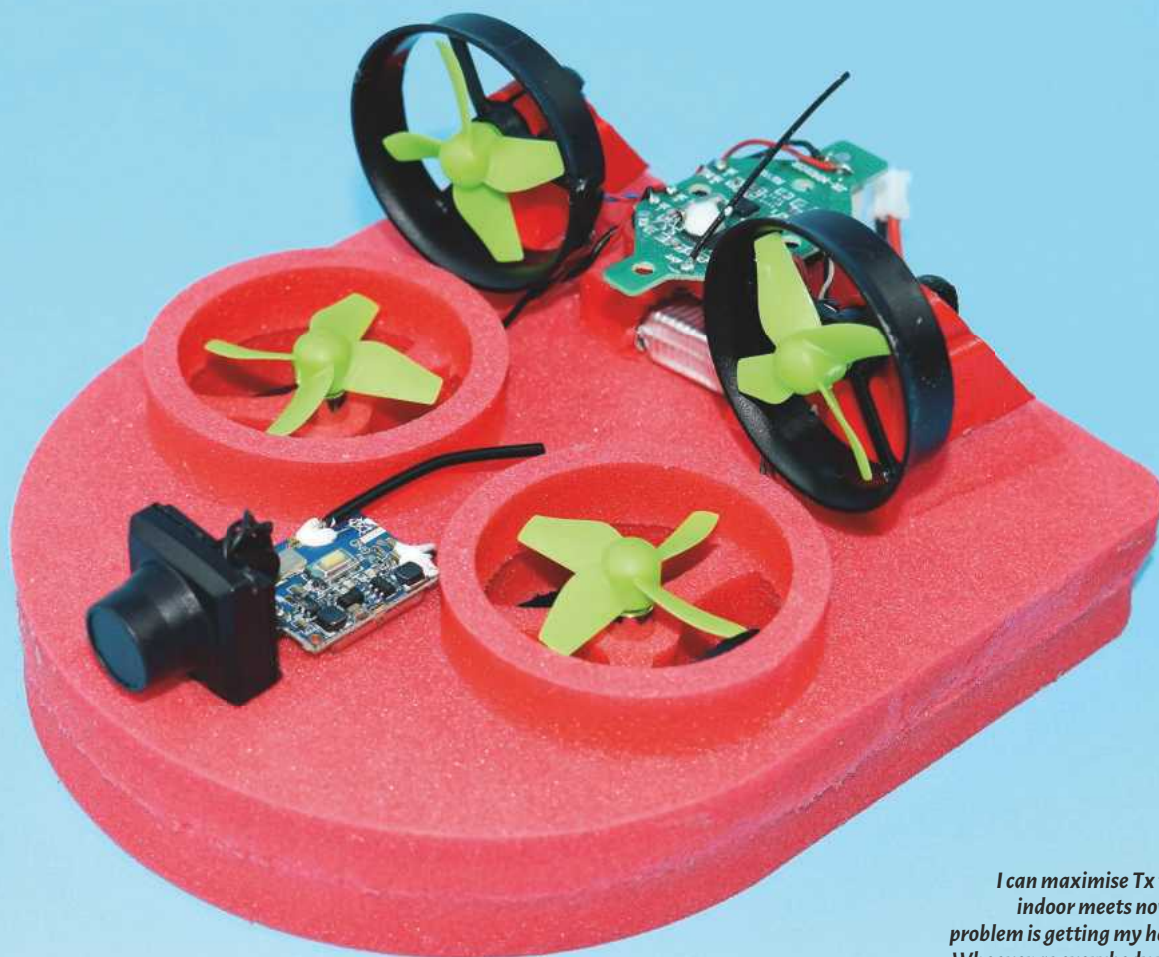
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I can maximise Tx time at our indoor meets now. The only problem is getting my hands on my Whoover as everybody wants a go!

RECYCLE YOUR MICRO DRONE

Shaun Garrity suggests a fun use for old micro drones whilst waiting for an indoor flying slot

words & photos » Shaun Garrity

I have no idea how many micro drones have been sold over the years, but it must be many hundreds of thousands. Hubsan were one of the first manufacturers on the market, with inexpensive examples appearing in model shops, toy shops and even motorway service station bargain bins to feed the demand.

Horizon Hobbies, seeing this new craze, quickly introduced the Blade Inductrix. Becoming an instant success with R/C modellers, it wasn't long before fans of this miniature revolution started bunging tiny 5.8 GHz video cameras and video transmitters on them and indoor micro drone racing was born.

Again, quick to see a commercial opportunity, Horizon started selling the Inductrix FPV, a camera equipped, FPV (first person view) drone. A raft of companies sprung up to satisfy the

demand for upgraded parts and custom frames etc. and the Tiny Whoop phenomenon, as it became known, had most definitely arrived.

As with many modelling purchases, improved versions quickly come along and eventually your original purchase is invariably consigned to the junk drawer, never to see the light of day again.

But it doesn't have to be the end of days for these poor little things because now, for under £8.00, you can repurpose them and have a new toy to entertain you.

DRONEJUNKIE

Owner Jem started the Drone Junkie company after an accident caused a serious back injury and prevented him from working in his previous career. A self confessed 'big kid' and FPV fan (especially using micro drones) he knew he had to get back on the horse quickly, so he decided to

test the water with his good friend Neil Cody and hold an FPV drone racing event to gauge interest. It was an outstanding success; he told me the three days spent in bed recovering after was worth it...

Needing to generate an income he started Drone Junkie, a web-based business. Since 2015 he has focussed on providing a wide range of products supplying the Tiny Whoop enthusiast and racing community.

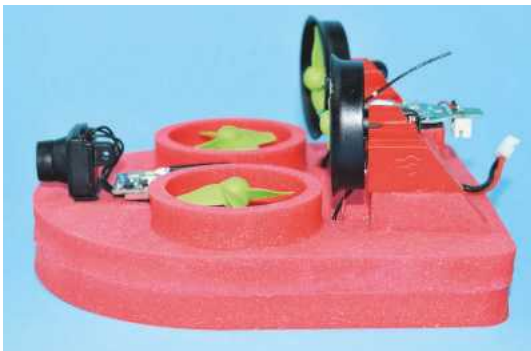
TINY WHOOVER

One of the problems we experience at our popular indoor flying events is the number of modellers that turn up, so we run a slot system. This is a sensible way to ensure everybody gets a fair share of the available time but means you can be waiting a while for your next go. Now, if only there was an FPV ground based R/C model, you could double up on your fun having races around



Pre-cut foam Whoover kit. Use an adhesive such as UHU Por to glue the few bits together.

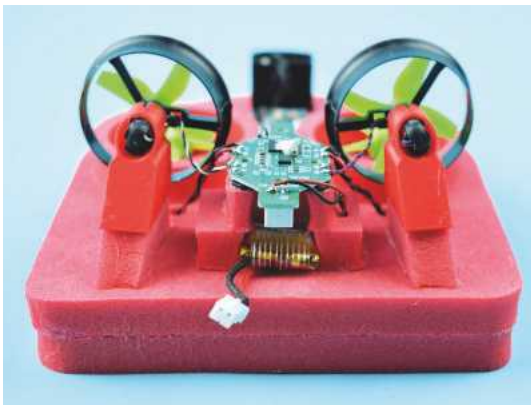
“...it doesn’t have to be the end of days for these poor little things because you can repurpose them.”



Side view shows the included 3D printed rear motor mounts and the general location of all the parts.



Above: Just one of the many suitable mini drones for a Whoover conversion. I used an inexpensive Eachine E010 to great effect. Left: The motors on the E010 control board are soldered on so these will need temporarily and carefully removing to install on the Whoover (or Tiny Wing). The ducts and battery box are cut off the frame to be reused.



A selection of foam blocks are available to build your battery box and combined controller/receiver mount. If doing it again, I would put the circuit board a little higher as it's a bit of a fiddle to plug the battery into the connector.



Front motor wiring on the E010 needs extending but may not be necessary with other drones. The central wire with a connector is the power cable for the camera and video Tx.



To run Whoover over carpets this optional Mylar slip mat keeps friction to a minimum.

“Like the Whoover, the Tiny Wing is designed to repurpose old mini drones...”

the sports hall while the aircraft fly above...

Enter the Tiny Whoover hovercraft, which is an inexpensive kit that can use the electronics from a cheap toy drone.

Jem notes, “After attending a few shows I realised I needed to find a way to get people who have never flown to NOT hit the ceiling as soon as they had control of the sticks. I wanted a way to lock them to the ground in FPV so they could see what it is we love so much about the genre before getting them airborne.

One of the early Tiny Whoover videos we posted gained a wave of hits on social media and the genre was born. It turned out it was so much fun it was copied and cloned a number of times (yes, I'm a little miffed, more because they did it so badly) but I should really see it as a compliment. I was surprised to find out that tiny Whoovers were very popular in Japan - I never expected it to have global appeal.

I have since formalised a new game - WhoovBall - that was first demonstrated at the last UK Drone & Tech Show held in the NEC, Birmingham.”

You don't need to use an Inductrix if you just want to steer the Whoover line of sight. A cheap non-camera equipped drone such as the Eachine E010 will work a treat. However, if you have a spare, lightweight, all in one camera this could be added to give you the full FPV experience.

I also believe Jem can now supply a Mylar slip-mat that fixes under the Whoover so it can be used on carpeted surfaces and not be affected by the additional friction.

Assembly time is quick and a full build video is available on the Drone Junkie website to walk you through it. Have a look at mine to see how I did it.

TINY WING

Like the Whoover, the Tiny Wing is designed to repurpose old mini drones with a duct size of 33mm and a propeller size of 30mm.

Jem says, “Tiny wing isn't an aircraft and doesn't fly like an actual wing. It still feels like a drone but imitates the look of a wing. We have tried this in FPV and personally I prefer to fly line of sight. Some of you may not agree but looking at Tiny Wing flying is just mesmerising!

Tiny Wing uses the innards from your Tiny Whoop style drone to fly and includes two 3D printed mounts, which allow the ducts from the donor frame to fit straight in with 6mm motors installed.

Although info is available to configure a more sophisticated flight controller the simple one supplied with the Inductrix or Eachine E010 will work fine. Build instructions are on the web site.”

Again, this is currently available for under £8.00.



This must be the simplest kit on the market - three pieces! Tiny Wing isn't an aircraft and doesn't behave like one but certainly changes the look of your mini drone.



One drone will do for both models as there are two ducts and a battery box spare from the Whoover build. But you'll need to do some soldering when swapping things over. I didn't want to do this, so I've ordered another E010.

REMEMBER SLOT CARS?

I know this isn't remotely aircraft related but it's worth a mention as this new concept offers a brilliant racing experience that can provide another distraction while waiting to fly indoors - 1/43rd scale Drift Racers.

Taking slot cars to the next level and beyond, 'Dr!ft Rc' cars are vehicles that you control from your smartphone (Apple or Android) through an app which is free to download. You can drive these cars in any personal space without the need for a pre-designed racetrack, which makes the

experience more exciting. Use your office desk, on the floor at home or at work - or wherever you are - and at the same time develop the skills of a professional driver.

That said there are a number of incredibly detailed pre-printed tracks available and it's highly recommend getting one to hone your skills. This is only a scant overview of this amazing product.

Have a look on the Drone Junkie website, if all this has fired your interest, for full specifications and details: www.dronejunkie.co.uk ✈

DR!FT cars are something else and are sure to become addictive, especially when raced together. That's the last time I'll mention things that don't fly (or at least hover) in any of my articles... well maybe!



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WOTS WOT XL with electric motor, ready to fly - £295. Acro Wot XL with electric motor, ready to fly - £275. Leprechaun vintage glider with servos, ready to fly - £100. Selling up. Call Mick on 07443 618928 (W.Yorks).

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SOPWITH CAMEL kit by Balsa USA. 1/4-scale, still in box and complete. These are £375 new, selling for £300. Buyer to collect. 07768 991562 (Cambridge).

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WUNBESIX

Next month's free pull-out Pro-Plan is for Wunbesix, a 73-inch electric powered, tailless sports model designed by Mike White. The Jedelsky airfoil section is simple and quick to build, and is sufficiently efficient for a sport model, making Wunbesix a surprisingly good performer. As for the name, we'll let you mull that over for the next few weeks; suffice to say that it is perfect for a fixed wing model...



FMS PITTS SPECIAL

David Ashby assembles the V2 version of the FMS Pitts Special kit, which has been thoroughly revised and redecorated in a classic colour scheme. This snazzy Pitts is moulded from EPO foam and supplied 'ready to fly', with four 17g metal gear servos, a 50A Hobbywing ESC and an on-board Reflex gyro too - a 32-bit 3-axis unit that's compatible with most radio systems.



SCALE AT OLD WARDEN

At the time of writing all events at Old Warden, home of the Shuttleworth Collection, have been cancelled until the end of June. But, fingers crossed, this year's ModelAir Scale Weekend is still on the calendar for 25-26 July. To give us something to look forward to, Alex Whittaker takes a fond look back at last year's Scale Weekend.

COVID-19 & RCM&E

Next month's issue of RCM&E will look a little bit different as our publisher, My Time Media Ltd., implements steps to try and protect the company from the worst effects caused by the Coronavirus pandemic. For RCM&E this will involve a reduction in pagination to 100 pages and there will be only one free pull-out plan - Wunbesix, as featured above. Our thanks in anticipation for your ongoing support at this difficult time.

RCM&E

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PARTING SHOT



BIG BOEING'S CLOSE SHAVE

Dario Villafañe got close to the action when this giant five metre span Boeing airliner just managed to miss a bird strike whilst displaying at the 'Vuela Termas' festival in Uruguay - see top picture.

Dario, from Buenos Aires in Argentina, writes: "The Boeing 767 was built by a group of model builders who are called 'El Taller del Tata' (The Workshop of the Tata). They are friends who meet every week to share a workshop and eat roast beef. The Workshop leader is 'El Tata', Cliver Ripani. They are members of the club 'Agrupación Aeromodelista Pucará', near Buenos Aires. The pilot of most of their models is also a renowned aircraft model builder in Argentina, Sergio Testa.

The characteristics of the model are as follows:

Wingspan: 5m

Length: 6m

Turbines: 20kg x 2

Fuel: 2 x 5 litres

Servos: 16 x 12kg

Construction time: 2 years and 9 months"



Photo: Dario Villafañe

Camera: Nikon D7200

Aperture: f/5

Focal length: 195mm

Shutter speed: 1/640

Lens: 55 - 300mm f/4.5-5.6

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*Or Electric Equivalent

Laser 73

Wingspan	Length	Wing Area	Engine Req
73in (1.85m)	69.3in (1.76m)	1,084sq in	30-40cc

*Or Electric Equivalent

Laser 88

Wingspan	Length	Wing Area	Engine Req
88in (2.24m)	83.5in (2.12m)	1,291sq in	50-76cc*

*Or Electric Equivalent

Laser 103

Wingspan	Length	Wing Area	Engine Req
103in (2.6m)	93.7in (2.38m)	1,771sq in	80-120cc

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- Power System: Inner running Brushless 3060 KV1900
- Wingspan: 900mm/35.4in
- Length: 1050mm/41.3in
- Flying Weight: Around 1750g
- Propeller/Fan: 70mm 12-blade
- Servos: 9g Metal digital x 8
- Speed Control: 80A
- Assembly Time: 15 - 30 minutes
- Wing Load: 101.7g/dm² (0.23oz/in²)
- Wing Area: 17.2dm² (266.8sq.in)
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