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FEBRUARY 2016 • ISSUE #385

FRONT COVER

Paul Gosling of Nexus Modelling Supplies is the owner of this dramatic needle nosed Diamond sport jet. Despite its futuristic looks Paul reveals that it is easy to fly, as he talks to Mark Beacham in our latest Model Spotlight feature, starting on page 90

REGULARS

REVIEWS

FEATURES

PRE-FLIGHT

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Welcome to the February issue of RC Model World.

Like any true Brit, I like to have a good moan about the weather. But I guess without all that wet stuff we wouldn't have all that lovely scenery to admire around our beautiful United Kingdom. I could do without the high winds though! But after yet another weekend has passed me by without getting a chance to twiddle the sticks I'm really starting to getting serious withdrawal symptoms.

It never seemed to be this way and even in mid-winter, just a few short years ago, I remember getting at least some flying in most weekends. So what has changed?

Weather wise probably not a lot, at least not in the 40 plus years that I have been flying model aeroplanes. But technology wise things have come on in leaps and bounds and I no longer wait for a brief update on the weather from the likes of Mr Fish and his colleagues before plugging in a solitary wall charger to top up a 600 or 1300 mAh (such luxury!) NiCad in a single plane, along with its 27 or 35 MHz transmitter. Oh, and I must not forget to mention the need to top up the glow plug battery too!

Today it's a much more well planned affair and I will have studied the forthcoming weather in much greater detail, right down to the actual hours of my planned flying session in fact, all thanks to a set of detailed weather apps on my smartphone. And if there's any chance of the weather not playing ball then chances are that I'm not going to even bother putting anything on charge, especially with the multiple LiPo's that I need to monitor.

And that's a shame as I'm sure that I've been missing out on some flyable weather. Take this Saturday for instance. Light rain was forecast all morning but in reality it was largely just dank and overcast most of the time. It did rain for brief spells once the early morning drizzle had passed by but in the periods between the showers I could have had quite a few flights. It's still late December as I write this but maybe I should ignore the fine details provided by the weather apps and just go for it for the next few weeks? I'll let you know how I get on...

Time now to have a peek at what we have in store for you this month, kicking off with our two regular plan features. Our feature plan, a two-channel A-4 Skyhawk slope soarer, celebrates the 30th anniversary of the Power Scale Soaring Association. Designed by Phillip Cooke and Matt Jones, this 36 inch span 'jet' has been specially designed for the PSSA's 'Mass Build' in 2016. A laser cut wood pack and canopy will also be available from Traplet to help builders get their Skyhawk's into the air as quickly as possible.

Meanwhile our free pull-out plan is for Decaf, a cabin style sports model that has been designed by Tony Wright to replicate the lines of the Decathlon aerobatic light aircraft – although it helps if you squint at it a bit! Maybe it's best just to treat it as a neat little sports model...

On review we return to the early years of aviation with Maxford USA's Gotha bomber, before coming smack up to date with the sleek Valkyrie 90 mm EDF jet from Taft Hobbies. We continue with our Aeroworks Laser 200 build series and then get the bike clips ready as we flight test the E-flite Rare Bear, a truly ARTF Reno racer.

Features this month include details on how to make a functional Cooper Bomb Rack for your WW1 model, an introduction to rocket powered gliders – straight up! – and we also examine how an old Comet Sparky free flight model was brought out of retirement and transformed into an electric powered R/C sportster for indoor and outdoor flying fun.

Add a couple of regular columns, plus a sprinkling of other articles and reviews, and I hope you'll enjoy sitting down for a good read. Until next time...

Happy Flying!

Kevin

Kevin

CHECK OUT **PAGE 14** FOR OUR LATEST SUBSCRIPTION DEALS

RC MODEL WORLD

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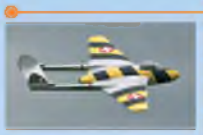

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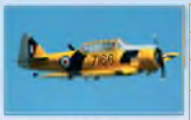

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STEVE DORLING

2/2/1954 – 12/12/2015

Picture courtesy of Alex Whittaker

We are saddened to report the death of Steve Dorling. Steve was very well known across the modelling community and will be greatly missed. We are grateful to Alex Whittaker and Peter Dawson for these kind words:

"Steve Dorling, perhaps best known as a feisty magazine correspondent and editor emeritus of Aeromodeller and AMI magazines, has died at the age of 61.

Steve was well known on the summer and winter flying circuits. In addition, he had a healthy following under his website forum handle, Enginetorque.

Besides his model aircraft articles, Steve wrote widely on technical topics in the motorcycle press. This complemented his encyclopaedic knowledge of model glow, diesel, jet and petrol engines. Indeed, he recently bought his first pulse jet.

Since he lived in North Wales, Steve became a committed slope soarer. He loved the great outdoors and successfully fought off a misbegotten plan to put wind turbines in a local place of outstanding natural beauty.

Just a few weeks before he died, he came out with me, blasting over the Irish Sea in my sports boat. He delighted in bending the throttle. Needless to say, he handled her as if he'd always been a powerboater.

Steve was always good fun in an argument. He could be very wry. Setting the world to rights with him (with a few whiskies) was always a delight. His Facebook posts were often wonderfully stroppy, which of course we all loved. We will all miss his wit and his warmth."

Alex Whittaker

"Steve's fascination for all things modelling goes right back to his early career. He started in communications with the RAF, spending time in Bletchley, Cheadle and on the Ascension Islands.

He was a lifelong modeller, cutting his teeth on control line and moving up to radio control where he enjoyed powered flight, both I/C and electric, and slope soaring gliders.

He was the Modeller's Modeller, a true enthusiast, happy to discuss and help anyone who asked and showed a real interest.

He also had many talents beyond the modelling world; an accomplished water colour artist, a musician and a talented photographer. Motorbikes were another passion, not only as a rider but right down to the workings of them. He loved the internal combustion engine in all its forms.

Steve was a regular columnist and contributor to RC Model World in the 1990s and was respected for his writing skill and ability to share his knowledge with his readers in his own unique style.

We send our sincere condolences to his wife Linda, his son Chris and all of his family and friends."

Peter Dawson

APRIL IS DRONE AWARENESS MONTH

Drones! It seems that experienced R/C aeromodellers either love them or hate them (a bit like model helicopters when they first became popular!). One thing is for sure, multirotors and the like are here to stay so the BMFA are making a big effort to try to make sure that they can be safely integrated into the model flying hobby. One initiative that the BMFA are engaged in is 'Drone Awareness Month', which is explained below. Our thanks go to Manny Williamson, Development Officer at the BMFA, for giving permission to reprint the following information from the Association's recent Club Bulletin:

"It is difficult to have missed the huge explosion in popularity of multirotor aircraft equipped with cameras, or 'drones' to use the more common reference.

Sadly not all the publicity has been good and the media have very much 'jumped on' on the relatively small number of negative stories involving the irresponsible and unlawful use of drones.

The BMFA has maintained a close working relationship with the Civil Aviation Authority, who have ultimate responsibility for all aviation in the UK, and we have jointly worked on a number of initiatives to inform and educate new drone pilots, particularly those who are not coming into model flying through the more established route of a traditional model aircraft and club membership.

Of course the latest technological developments have made drones far more accessible to the general public through lower pricing and perhaps, more significantly, ease of use and operation. For the first time ever it is possible for a complete newcomer to purchase a radio controlled aircraft (in this context we are talking mainly 'drones'), completely ready to fly, and having charged the battery to go out and fly with no training, experience or prior knowledge. It is exactly this type of new pilot that we are wanting to target in order that they can be provided with the knowledge and information to fly safely and lawfully.

A Joint Initiative

We are working with the Civil Aviation Authority (CAA) on the concept of the Drone Awareness initiative, as they also see the benefit in educating and informing the wider general public on the safe and lawful operation of drones.

The Drone Awareness initiative will be taking place for the whole month of April 2016 and will feature a number of elements, which when combined will help to raise awareness of the legal requirements and considerations when operating a drone. It will also help improve public perception and knowledge of drones.

Of course, an important aspect of the initiative is to raise awareness of the BMFA as the 'go to' association for sport and recreational drone and model aircraft pilots, both in terms of the insurance package provided as part of the membership, and also in terms of the range of services and support provided to members, and also the benefits of being part of a recognised and well respected association.

BMFA Members And Clubs

The beginning of the Drone Awareness Month will be marked by a high profile launch with significant press attendance. However, the primary aim is to involve BMFA members, areas and clubs as part of the ongoing activity. Clubs that feature drones and multirotors as part of their regular activity will be encouraged to put on events and initiatives, not only to raise awareness and knowledge in their specific area but also as a method of recruiting new members.

We will be contacting clubs and making resources packs available early in the New Year and further updates will be published as the project moves forward.

Partners And Sponsors

The aim is to engage a range of partners to support Drone Aware and to help in promoting the initiative as widely as possible, both from inside the modelling trade and also with external organisations.

We are already working with a number of organisations and clubs and the initial response has been very positive. If you would like your club to be involved then contact the BMFA office for further information.

Keep an eye on the BMFA website for further updates and also the dedicated Drone Aware website: www.droneaware.org

A smart phone friendly version of the site can be viewed using the QR code below.

The message is: "Be Safe, be Lawful, be Drone Aware"

THE WRONG ENGINE

Oops! We had a slight editorial glitch in the January issue when we attempted to jazz up the title of Peter Miller's how-to article on 'Building A Dummy Rotary Engine'. This should have course read 'Building A Dummy Radial Engine' as the Rotec 2800 that Peter based his replica engine on is a seven cylinder radial.

Much to our amazement (and relief!) only two readers seem to have spotted this mistake and we thank them for their letters, which we show below. But we are sure that there are many more of you who probably just tutted and moved on. Apologies to all, not the least to Peter for fiddling with his text!

Alun Thomas was the first to comment:

"Dear Editor,

Following the sudden demise of Quiet and Electric Flight International, I have now received my first copy of RCMW; it is noticeable, at a glance, that someone there has failed to appreciate the difference between rotary and radial engines! The engines described in the article are RADIAL and I suggest you look into ROTARY engines and their characteristics; in particular, much is made in various fora of 'blipping' to control power, but with little understanding of the fact that rotary engines could not incorporate a proper throttle, due to their induction arrangements. Switching off the magneto was the only means by which power could be moderated."

It took Peter Kraus, a regular correspondent and contributor, a bit longer to respond. But his copy of the magazine has a bit more distance to cover to reach his home in Australia...

"Hi Kevin,

I've just received my latest issue of RCMW and look forward to a good read over the forthcoming holidays. So far I have only just scanned the contents but, probably because I'm a bit OCD, one point hit me.

That is that the Rotec R2800 is called a rotary engine. It is not, it is a radial. The rotary engine, as used in many WW1 era aircraft, looks similar when not running but the rotary engine's crankshaft is fixed to the firewall and the whole engine rotates around it when running. A radial engine has the engine fixed to the firewall and the crankshaft, with propeller, is what rotates.

When I attended Oshkosh in 2002 the late Norm Goyer, then editor of Custom Planes

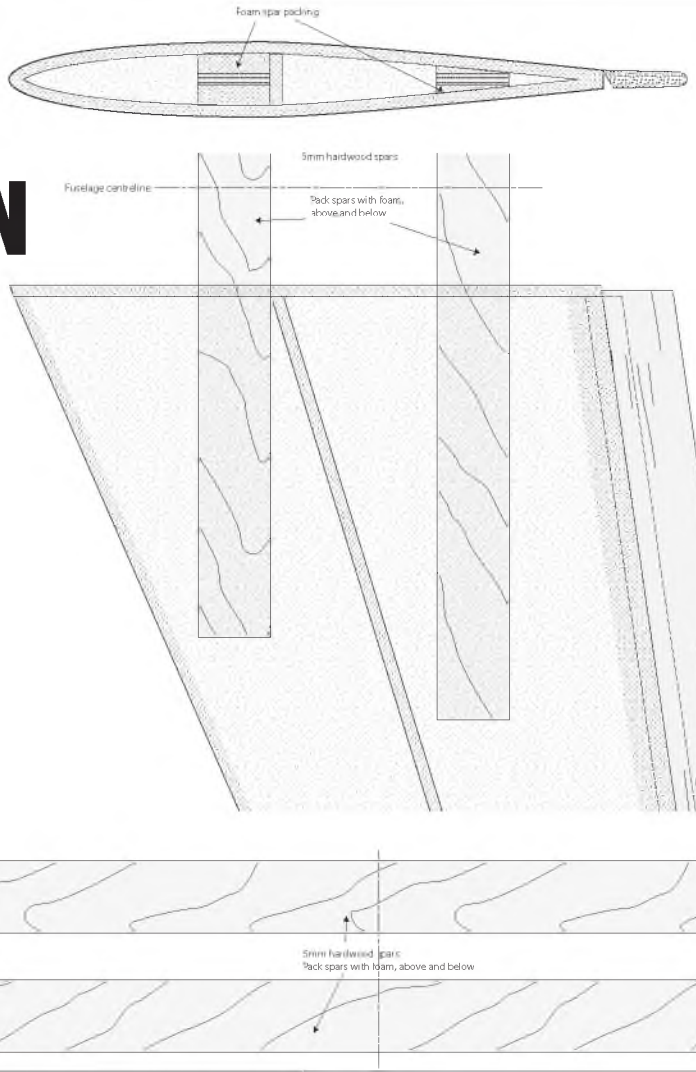
magazine for which I wrote the odd article, tasked me with reviewing the R2800 as it is an Australian design, being produced by the Chernikeef brothers in Melbourne. It is a very nice piece of engineering too. My photo of the R2800 running prior to take-off in the US agent's Kitfox graced the cover of the December 2002 issue of Custom Planes.

A major characteristic of the rotary engine is that with that large mass spinning up the front of the aircraft there was considerable gyroscopic precession, which could easily lead to your demise – or save your life if you needed to turn sharply to avoid being shot.

I notice that with the advances allowed by our technology with electric motors and such some scale modellers are now actually putting rotating dummy rotary engines, no doubt made of light materials, on the front of their aeroplanes."

E-SHARK CORRECTION

The free plan for E-Shark published in the October 2015 issue of RC Model World contained an error in which the spar width and distance was incorrect on sheet 2. The dimensions shown on sheet 1 were correct, and this part-drawing shows the corrected parts of sheet 2. The spar length is not affected.



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www.opale-parmodels.com

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www.andersonpower.com/us/en/products/sbs/sbs-mini.aspx

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Available from Hacker at www.zoomport.eu

YAK 55 SP 3.3 M

The CARF Yak is back and better than ever! CARF-Models have revised the moulds and significantly increased the degree of prefabrication. All servos are now in optimised mounting positions, which simplifies their installation. Wings and stabilisers are now attached with massive carbon tubes. A new, longer cowling with a horizontal split line has been created, allowing the easy installation of large and powerful engines and their silencers. Four-cylinder engines can be bolted right against the firewall, but for shorter two-cylinder engines a dome extension is included.

www.carf-models.com

New kits and accessories

PARROT BEBOP 2

The latest Parrot Bebop Drone 2 retains many of the popular features of the classic Parrot product, including a high definition, 14 megapixels fisheye camera, with digital 3-axis video stabilisation to get the clearest shot, plus 8 GB of internal storage for your photographs and video files. Bebop Drone 2 also incorporates a new 2700 mAh battery, which is cleverly built into the streamlined body and which provides a continuous flight time of up to 25 minutes, more than doubling the previous duration. It weighs a little more than its predecessor at around 500 grams but is still remarkably lightweight for a leisure drone with a professional specification. Performance has been improved by incorporating four powerful brushless motors fitted with slightly larger propellers to provide additional thrust, so the Bebop 2 can climb vertically upwards at 13 mph and fly forward faster at up to 37 mph, allowing the drone to cope with headwinds better.

www.flyingtoys.com

POWERBOX SENSOR AND DIGISWITCH

New versions of the PowerBox Sensor and DigiSwitch are available, with an output voltage of 7.4 V. This means that HV servos can also be operated with a constant regulated voltage, ensuring consistent servo running characteristics regardless of battery voltage. Further advantages are extended effective life for the servos and an increase in available output power, since the integral regulators do not have to reduce the voltage by so much. The 7.4 V versions are supplied with MPX connectors on the battery side.

A new version of the SparkSwitch is also available. This unit has an output voltage of 12 V, making it suitable for use with ignition units designed to operate on a 3S LiPo, such as MVVS.

www.powerbox-systems.com

HUBSAN H501S X4 FPV BRUSHLESS QUAD

With a stylish and sleek new body shape and LED's lighting up the feet the 501S is the ideal entry to a more rewarding FPV and aerial camera footage experience. With built-in GPS and a multitude of flying modes the H501S caters for all flying styles and levels. Also the built-in 1080p HD camera is tuned to capture stunning pictures and video footage from the sky. Aerial live feed provides an amazing flying and visual experience. The multi-function transmitter features a built-in 4.3" FPV LCD screen displaying clear 5.8 GHz real-time video transmission from the quad's on-board HD camera. Conveniently placed switches and buttons on the front face of the transmitter for GPS, RTH and camera/video functions make this quad a pleasure to fly.

www.cmldistribution.co.uk

BAR5 Light Bar

These lights, designed for model aircraft use, enable you to reach maximum light power within a minimum of space. This particular light bar is the size of a match and gives up to 700 lumens of light output! They are so small, they can be installed in any model with minimal effort. Ideal for gliders, sport models, training helicopters, UAVs and all kinds of helicopters and sport jets with thin wings or rounded wingtips. More versions and styles are available.

www.unilight.at

VECTOR GPS/MAGNETOMETER V2

The GPS/Magnetometer V2 simultaneously receives and monitors both GPS and GLONASS satellites, in addition to other improvements, which can provide the following benefits: Improved position accuracy for more precise hovering and tracking, improved RFI rejection – especially with noisy video transmitters and cameras, faster fix time and up to 24 satellites in view. The GPS/Mag V2 is compatible with all Vector systems, after a firmware update. Vector software version 11.78 or higher is required for correct GPS V2 operation.

www.eagletreesystems.com

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GOTHA G.IV

The Gotha G.IV heavy bomber was used by the Imperial German Air Service during World War I and it certainly makes for an unusual subject for a scale model aeroplane. Matthew Boddington investigates Maxford USA's almost ready to fly version

Old style packaging, with stuck on labels. But it's what's inside that really counts!

There's lots more parts to assemble than is usual with an ARTF

The Gotha Bomber of the First World War was, by the standards of the day, a huge aeroplane and along with the Zeppelin Airships it was responsible for bringing the First World War to the British people. The first Blitz on London on the 25th May 1917 caused the most severe casualties of any bombing raid of WW1.

Up to 1,100 lb of bombs were carried externally, the pilot's seat was offset to port and a walkway allowed the crew to move between gun positions. The rear gun position offered a novel feature in the fact that the underside of the fuselage was open and a slot in the upper surface allowed the rear gunner to fire through the fuselage and provide defence for attack from below.

It is not a usual subject for an ARTF R/C model - or in fact any R/C model! And Maxford USA are to be congratulated on doing something different by producing this 62.5" sport scale kit for twin electric brushless motors.

What's In the Box

For what is a reasonable size model at 62" the box is actually quite small and is almost old-fashioned in its basic brown appearance with a pasted on box logo. Inside all the major components come individually wrapped in bubble wrap for protection.

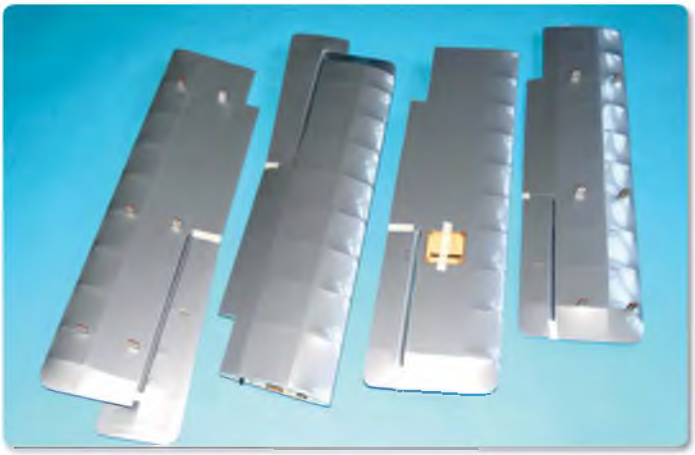
The construction is of traditional balsa and plywood covered in film and consists of a fuselage, upper and lower wing centre sections, upper and lower outer wing sections and tail surfaces. Also in the box are wheels and composite landing gear struts, wing struts, pre-painted ABS engine nacelles, motor boxes and all the necessary hardware.

Also included in the lower centre section is a pre-installed electric harness that includes the aileron and ESC connections, and the harness for connecting the two required 3S 2200 mAh LiPo batteries in series.

There are no servos, motors or ESC's included in the kit but two sets of Maxford U28309 brushless motors and two 25 A ESCs were supplied with the review kit. Compared to most ARTFs these days the parts count is quite high so the build time for this is probably a bit longer than normal!

Let's Put It Together

The first port of call is the fuselage and the installation of the rudder and elevator servos into the built-in servo tray. The pre-installed pushrods connect to the servos with supplied EZ-Link connectors; these can be slid in place but not tightened up at this point.

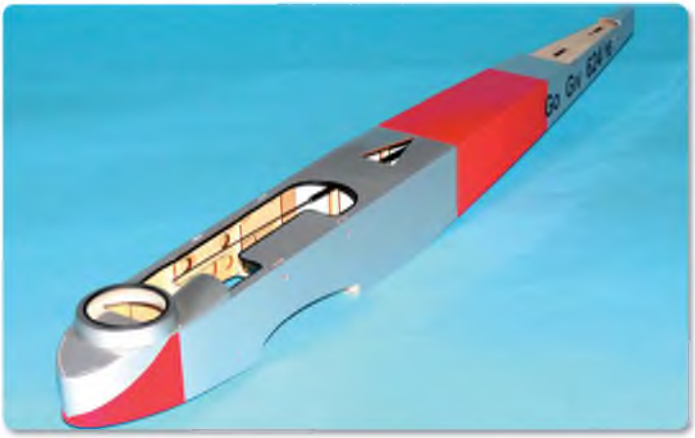


The ready made wing sets

Centre section is fitted with a wiring harness

Front and rear views of the engine nacelles

Simple sheet tail parts



Fuselage is a simple box affair

Wing seat detail

Some laser cut scale propeller guards are attached either side of the rear cockpit with self-tapping screws. For now the fuselage can be put to one side.

The brushless motors and ESCs are attached to two laser-cut motor boxes that then slide into the engine nacelles. At this point both motors need to be test run to make sure they run in the clockwise direction. You can, if you wish, run counter rotating engines, although the prototype was successfully flown with same direction motors, and if you do you need to mark the motor boxes left and right. For the review model I went with same direction motors.

Next the U/C assemblies are attached to the engine nacelles. The legs are made from two different lengths of dural that screw to the sides of the engine nacelles, and two pairs of U/C legs are joined by an M3 axle. The instructions showed collars holding the wheels on but in the review kit nyloc nuts were provided, with no

Maxford recommend a pair of Electrospeed Power Pack 2 motor sets for the Gotha. Each pack contains a 2830/09 1300KV motor and an XP2 30A BEC brushless ESC

The optional front and rear guns add to the scale appearance

View of the twin pusher set up

Front view showing the two wheeled undercarriage legs

Chunky interplane struts and rigging

Rigging the Gotha adds a new dimension to an ARTF build

reference to this. But it was kind of obvious by the number in the bag.

The axles were rather over length and needed trimming to remove the excess. Also the screws that hold the U/C legs were more than long enough and protruded well into the engine nacelle!

The tail surfaces come covered in film and before they are attached to the fuselage the film needs to be removed from the required places to ensure a good glue joint. Unlike many ARTF's the control surface are not installed at the factory and need to be fitted. Hinges are supplied and the slots are cut in the balsa. Do a trial dry fit before getting the glue out to make sure they all line up okay. The elevators also need to be joined with a piano wire joiner, and this needs to be done prior to them being attached to the tailplane.

Before installing the centre section the pre-installed harness needs to be marked for the aileron and the throttle servo leads. At this point you also need to decide whether you plan to power the receiver with one of the two power-train LiPo's or fit a separate battery and make the necessary modification to the harness, as indicated in the instructions.

The centre section is held in place by two carbon dowels at the front that need to be glued into the leading edge of the centre section, and two machine screws at the rear. The engine nacelles, with the U/C attached, slide onto the carbon spars of the centre section, where they meet the centre section. The film needs to be removed to ensure a good glue joint. As they are being fitted the aileron and throttle leads need to be fed through their relevant holes; be sure that they don't get trapped between the nacelle and the wing.

The upper wing centre section is in one piece and requires the inner and outer ali struts to be screwed on before it's fitted. Also the swivels for connecting the rigging to are screwed on at this point. The upper centre section is now positioned onto the fuselage and nacelles and screwed into place. Some care is needed when doing this to make sure the alignment is good and that the upper centre section is square with the lower. Also you need to check that the dimension between the upper and lower carbon spars is correct; it should be 52 mm.

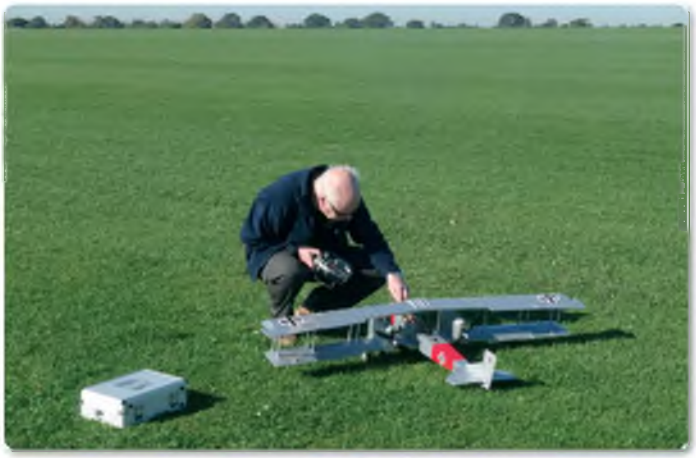
The outer wing panels require the ailerons, top and bottom, fitting to the wings in the same manner as the elevators and the rudder. The lower ailerons need to have the control horn fitted and the

The micro servos (not supplied) are connected using EZ-Link connectors

Simulated bracing wires run through holes in the tailplane and fin

Ready to fly – when the wind drops!

The Gotha is certainly a bit different. Well done Maxford for thinking outside the box



Matthew prepares the Gotha for its first flight

Climbing away after take - off

aileron servos need to be fitted into the lower wings. The servos will need to have extension leads fitted; there are strings in the wings to pull the servo leads through with.

The lower wings slide onto the carbon spars that protrude from the lower centre section, connecting up the aileron leads as they are slid on, You can decide if you want to leave the outer panels to be removable or glue them on permanently. If you want them to be removable then the non-structural rigging is designed to hold them in place. I wasn't too sure how good this was going to be but I wanted the option of being able to remove the outer panels if I wanted to for storage so I fixed them in place with some small dobs of silicon to help hold them in place.

The upper panels slide onto the top carbon spars in the same manner and the interplane struts are held in place with small nuts and bolts. The struts are different lengths and it is a good idea to sort them out into pairs before you fit them.

The upper and lower ailerons are connected by a carbon rod and EZ-Link connectors. Make sure that these line up correctly with the T/E of the wings.

The motor boxes that were made up earlier need to be slid into the nacelles and the cowlings put in place so that the correct prop clearance can be set up. Mark the side of the boxes with a pencil and then fix them by putting two screws in from the sides or glue them in place. I elected to screw them on so that if needs be they can be removed. The cowls can then be fitted (I used UHU POR) before installing the slow fly props.

All that is left to do was the scale rigging and fitting of the scale guns that had been supplied with the review kit. With the self-adhesive decals added we were now ready to go flying!

Off On A Raid

I set up the movements as per the instructions, but for the ailerons I set up quite a bit of differential as with those long wings and no dihedral I think adverse yaw is going to be an issue! With the two 2200 mAh LiPo batteries in the front the C of G was as per the instructions, so we were ready to go.

As always we needed to wait for a nice sunny day for the pictures. But we also needed a calm day for this one as I didn't think she was going to like the wind too much!

After what seemed like an age we had what seemed like a nice day with some good light. But when we got to the field it was far too windy so we had to just make do with the ground photos.

After another wait we finally had a good day with blue sky and no wind. The only issue this time was that as we walked out to the flying area I managed to catch the forward machine gun on my jacket and broke it off!

No, the props haven't dropped off! They are spinning around behind the wing, pusher style

Running in for a straight and level pass

After all the checks were complete I lined up the Gotha for take - off. I opened up the throttle slowly and let the speed build up before relaxing the elevator to lift the tail. As I did she became light and at this point there was a marked swing to the left with the engine torque. I have to say I was most impressed with Tony as he stood fast with the camera as I attempted to avoid taking his legs out from under him!

The Gotha leapt into the air and climbed sharply, continuing the turn to the left. Some swift stick inputs got things under control and I gained some height so that I could get things trimmed out a bit as she was tending to climb steeply.

A few moments later and we were settled down and taking some pictures. First impressions were that there was certainly no lack of power and she was quite happily flying around at about half throttle. And, I have to say, looking and sounding quite impressive!

For a draggy biplane she soon picked up speed when the nose was lowered but she also lost it quite quickly when the nose was raised. When I tried a stall there seemed no sign of a wing drop. One thing was apparent and that was that the rudder was the main control in the turns; the turns needed to be initiated with the rudder and then balanced with the ailerons, as any attempt to turn on ailerons alone would result in disaster! To be fair this is what would be expected of a model of this kind.

A few wing overs were carried out for the camera and a few low passes to show her off. But any thoughts of aerobatics were soon forgotten; if you want to throw something around the sky then this is not for you! It is more a case of guiding it around the sky and coaxing it to go in the direction that you want it to!

When the Gotha was brought around for a landing she was stable on the approach but with all that drag you don't want to take the power off too soon because when you do the rate of descent is quite high! A touch down on the grass and taxi back to my feet completed a successful first flight.

Underside view as the Gotha passes overhead

Maxford's Gotha is sure to turn heads at the flying field

Summing Up

The Gotha is certainly something a bit different and Maxford should be applauded for thinking outside the box. The kit is of good quality with easy to follow instructions, giving a stress free build with plenty to do for those who want something more than the usual ARTFs. It does fly well, as long as you understand the limitations of this type of model.

If you want something that will turn heads at the flying field to fly on those calm, summer evenings then the Maxford Gotha could well be for you. **RCMW**

MODEL WORLD DETAILS

MODEL INFORMATION

NAME:	Gotha G.IV Heavy Bomber
MANUFACTURER:	Maxford USA
DISTRIBUTOR:	MacGregor Industries
WEBSITE:	www.macgregor.co.uk/maxford/max046.htm
PRICE:	£169.95 SRP
MODEL TYPE:	Sport-Scale Electric Twin Pusher
CONSTRUCTION:	Built up ARTF
PARTS SUPPLIED:	Airframe
PARTS REQUIRED:	2 x Electrospeed Power Pack 2 (each pack contains 1 x Electrospeed 2830/09 1300KV Brushless Motor and 1 x Electrospeed XP2 30A BEC Brushless ESC). Or brushless outrunner motors, minimum 160 W each. Micro servo x 4 (JR ES375 recommended)

R/C FUNCTIONS

1: Throttle	3: Elevator
2: Aileron	4: Rudder

MODEL SPECIFICATIONS

WINGSPAN:	62.5 in (1587 mm)
LENGTH:	33 in (838 mm)
WING AREA:	609 sq in
WEIGHT:	2 lb 7 oz (1.11 kg)

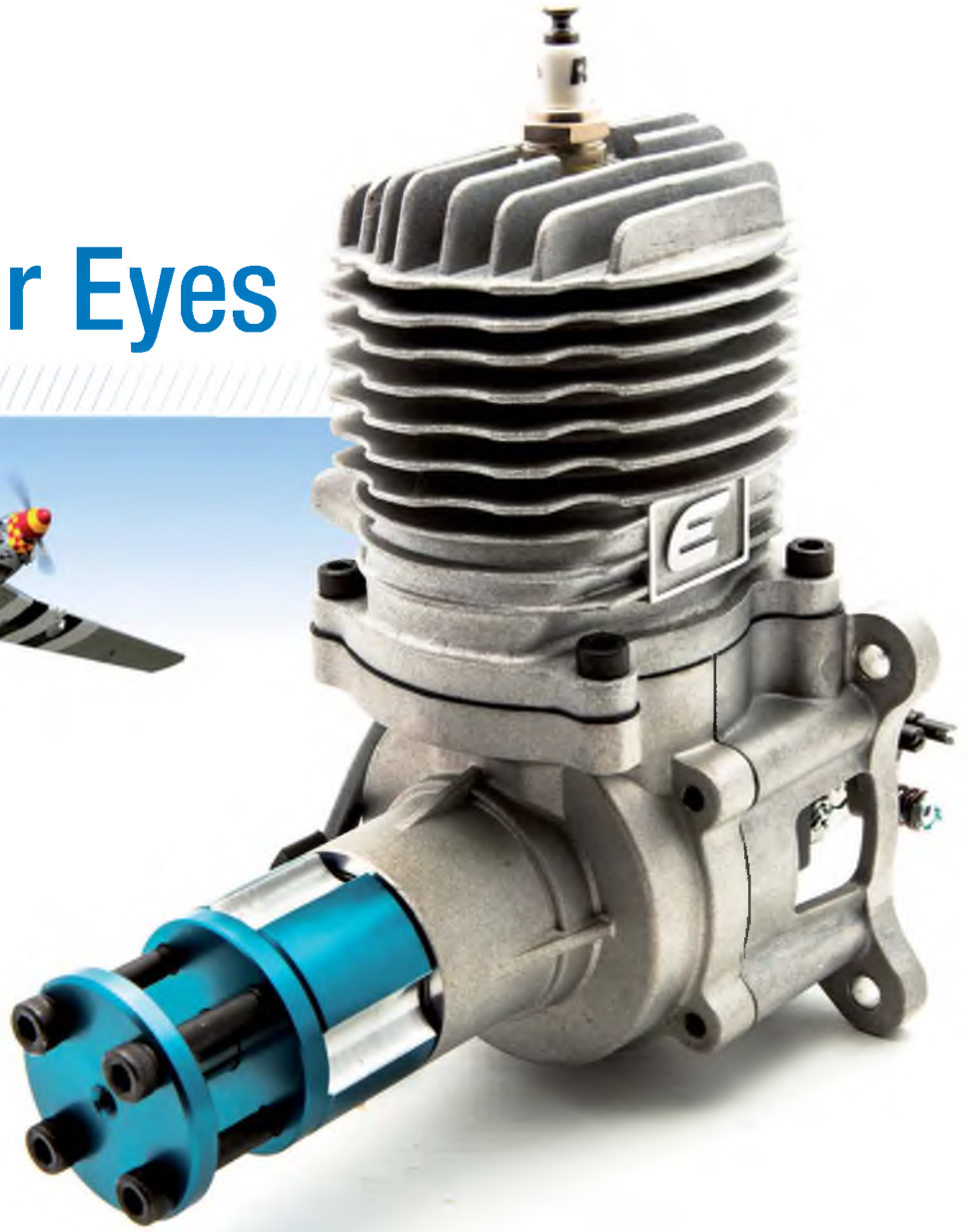
DISLIKES

Instructions didn't always match the parts supplied • Some screws too long

LIKES

Kit quality • It's something different!

Feast Your Eyes



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- Common propeller bolt pattern
- Custom velocity stack for improved power output
- Dual ball-bearing cantilevered crankshaft
- Compact CM6 spark plug
- Slender 2S LiPo compatible electronic ignition
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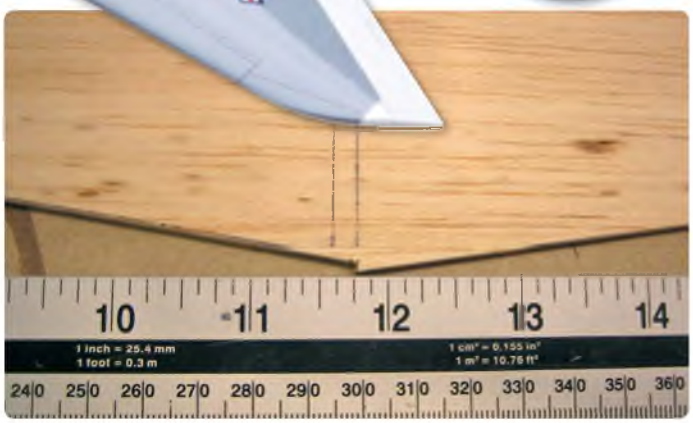
A-4 SKYHAWK

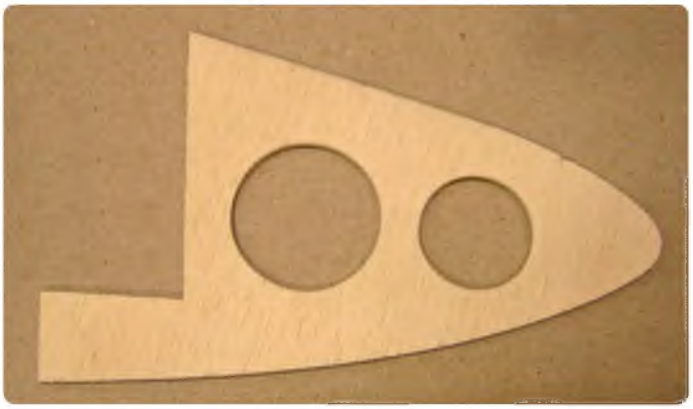
Feature Plan

Phil Cooke and Matt Jones designed this 36" span, two-function power scale slope soarer specially for the PSSA Mass Build Project for 2016

Basic fuselage component layout: F1 to F8, wing bay doublers, liteply nose profile



Fuselage sides are formed from three pieces of 1/8" balsa to achieve full depth. This picture shows the small piece fitted at the wing T/E position, just above the ruler



Fuselage nose profile from 1/8" lite-ply keys into the front fuselage base sheeting

Fuselage side assembly with triangular sections, 3/16" wing root doublers and 1/4" front nose doublers

In June 2014, the Power Scale Soaring Association staged a Mass Build PSS event on the Great Orme that saw members building in parallel their rendition of the Jet Provost RAF trainer designed by Andy Blackburn and made into a plan and laser cut wood pack by Traplet (Plan MW3182 and Wood Pack WP3182). The event was deemed a huge success. Modellers travelled from all over the UK and 17 JPs were flown for the first time on the day, with over 70 airframes built worldwide. As well as increasing PSSA membership the project rekindled folks' interest in building traditionally from plans. And with the modelling press and internet coverage before and after the event it helped raise the profile of the PSSA.

We agreed soon after that we would repeat the event in 2016, the 30th Anniversary year of the Association. But following the success of the Jet Provost, which plan should we adopt?

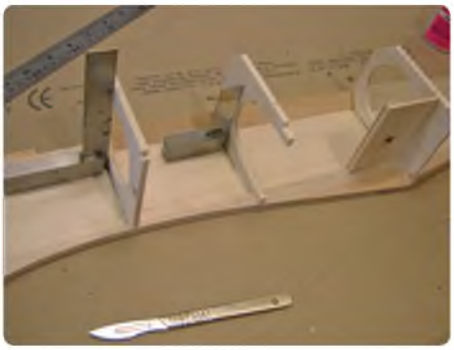
After some thought, Matt Jones and I settled upon the A-4 Skyhawk as a good subject. The airframe offered ample wing area, the fuselage was clean and relatively simple to build and the type offered a huge amount of variety in mark numbers, operators and colour schemes – ideal for a mass build. Plus, the A-4 hadn't been over-modelled like some other types we had considered. PSSA member Andy Conway

Forward fuselage side showing position of F1 and F2. The 1/4" doubler requires trimming to clear F1 as assembled

Forward fuselage 1/4" doubler cut back to sit on top of F1 when fuselage sides are pulled in at the nose

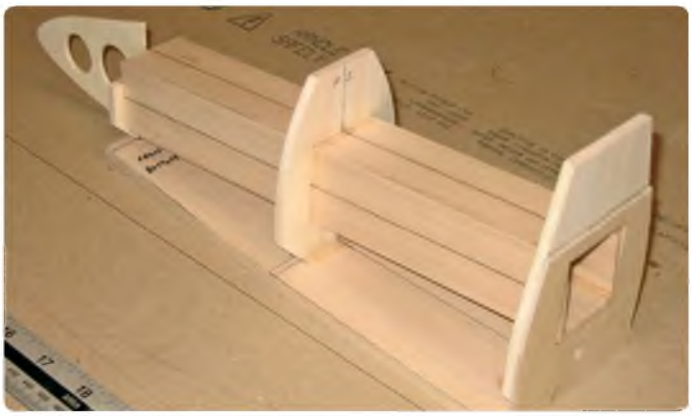
Detail at base of F3. The triangular section runs short to allow the 1/16" ply overhang on F3

Composite wing bolt former F6 from 1/8" ply and balsa laminate glued square into slot in fuselage doubler. The captive nut 'pulls' against the ply face on the top side of F6. F7 is glued square onto the fuselage side



Formers F4 and F5 are glued square onto the fuselage side

Second fuselage side is added to form a basic box structure. Take care to check alignment over the plan



Forward nose section and battery tube with F1 to F3 fitted. The tube sits on the nose profile 'seat' and is angled up against F1. Note the 1/16" ply laminate rear of F3

Triangular support between F3 and fuselage floor. Note 1/16" ply overlap

had drawn one back in the eighties, but this was deemed a little smaller than ideal, so we decided to draw up our own plans.

The design intent was for a fully built up model utilising simple, traditional construction throughout, and suitable for two-channel, standard sized R/C gear. It should be true scale in profile, with the wing and tail areas increased slightly to give the estimated 2 lb 8 oz airframe a wing loading of approximately 18 oz/sq ft, producing an 'everyday' flying model. At 1:12 scale, this has been achieved with a wing of slightly increased chord and area spanning 36 inches. With the plans drawn up, and a prototype model built and test flown by October 2015, the A-4 mass build project was born.

A laser cut Wood Pack consisting of intricate-shaped parts only (no sheet wood is included) is available from Traplet to speed up the cutting of parts for the build - see Plan Details at the end.

Fuselage Construction

Start by making up the fuselage sides. Each is made from three pieces of 1/8" medium balsa to achieve the total height across the widest section. Lay the three parts aligned and flat, and tape them together on the outer surface. Then turn them over, open the joints along the tape and lightly glue with PVA or Aliphatic resin. Then lay flat to cure overnight.

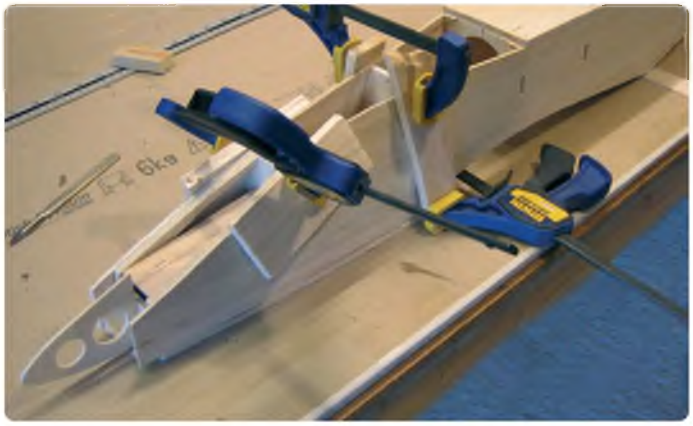
Cut out all formers F1 to F9 and assemble the composite former F6 with 1/8" balsa and 1/8" ply, and securely fit the captive nut for the wing bolt. Note that F3 is also composite, with 1/16" ply on the rear face that extends 1/4" below the bottom of the balsa former.

Mark the positions of the formers, doublers and triangular section on the inside of each fuselage side, aiding accurate assembly. Add the triangular sections, taking note of termination/transition points between the different sizes. Add the 3/16" wing seat doublers and 1/4" balsa doublers to the nose, ensuring that a left and right handed pair is made.

Pin one fuselage side to the plan and glue in formers F4, F5, F6 and F7, ensuring that they are square and vertical. Start with F6, which seats accurately into the slot in the wing seat doubler, then add F7, F4 and F5 in that order. Once cured, glue the second fuselage side on top of the formers, ensuring a good fit between former chamfers and the fuselage triangular section; dress where required. Double check all is square over the plan, then glue up.

Make up the battery box in 1/8" balsa and accurately mark the centre-line on each side to aid fuselage assembly. Mark the position and angle of F2 and F3 accurately on the sides of the box. Slide the battery box through formers F2 and F3 until positioned on the marks; dry fit only for now.

Nose section pulled in and clamped, with 1/8" packing under F7 at rear of wing to correctly level fuselage onto front base sheeting, which is pinned to the board. Scrap blocks are used to protect the model from clamp damage



Fuselage sides are 'rolled' around the curved section of F2 and F3, then clamped (see text). Ensure you add the 1/4" top sheet between F4 and F7 prior to bending to help avoid bowing the fuselage

Fuselage sides cut back flush to F1 and front top fuselage 1/2" soft balsa sheeting added

Balsa sheeting added behind the canopy to F4. The false cockpit floor from 1/8" balsa should also be added at this stage

Pin the 1/4" balsa lower front fuselage base to the plan on a centreline. Glue the 1/8" light ply nose section into the 1/4" forward fuselage base, ensuring it is vertical and true, and angled so the apex of the nose profile is set exactly 1" from the building board. Once set glue F1 into position over the nose former, ensuring it is square and rests up against the 1/8" liteply nose former.

With the lower front fuselage base pinned down bring the battery box assembly with the dry fitted F2 and F3 into place. Ensure the front of the battery box butts up to F1 and sits onto the 1/8" liteply step, and that the 1/16" ply overhang on F3 mates against the end of the balsa base sheet and bottoms out on the building board. With everything aligned and square glue into position, adding glue between the formers and the battery box also at this stage.

With the nose assembly still pinned on the board along the centreline (ensuring that the pins are positioned into the side wall of the 1/4" base sheet and do not protrude above it) offer the main fuselage section to the nose section by splaying out the forward fuselage sides around F3. Dress if required and once the fit is tailored remove it again ready for gluing.

To enable the fuselage to seat properly on the front base material the fuselage needs to be raised by 1/8" at the Trailing Edge (T/E) of the wing saddle. Pin a scrap piece of 1/8" to the board where F7 resides to correctly support the fuselage. Apply glue to the forward bottom triangular section and reposition the fuselage on the centreline and over F3. Pin the fuselage on the centreline at F7 then pull the fuselage sides in onto the vertical side portions of F3, F2 and finally F1, where you will need to clamp them quite firmly. Use scrap balsa to stop the clamps from damaging the fuselage sides.

At this stage, prior to pulling in the tops of the fuselage and the tail, it's a good idea to add the 1/4 top sheeting between F4 and F7, increasing the rigidity of the structure so far. Once this is dry you can pull the tail section in onto F8, again with the fuselage still pinned down and with everything on the centreline, to ensure accurate alignment as you pull the sides in at the back.

Softening Up

Once dry it is time to pull over the tops of the front fuselage sides onto the curved sections of F2 and F3. This takes a bit of work and to avoid the fuselage sides cracking its essential to soften the balsa in the areas needed by using a small brush or rag to paint liquid ammonia into the outside wall of the fuselage sides ahead of F4. Also ensure that the inner mounted 1/4" balsa doublers are well soaked with ammonia to enable them to twist along their length. Once the balsa is softened (having allowed the ammonia to soak in thoroughly and dry) slowly work the fuselage sides around the curved sections of F2 and F3. Add more ammonia if needed. Once dry, apply glue and clamp the fuselage sides onto F2 and F3, forming the required shape around the cockpit. Again clamp using scrap blocks to avoid damage to the fuselage. Allow to dry thoroughly.

With the fuselage shaped around the cockpit you can dress the fuselage sides back to F1; the sides were purposefully left long to allow for the shortening effect of the curvature. Gently sand the angle off the top faces of the fuselage sides between F1 and F3 to enable the top sheet to seat better, then glue the 1/2" soft balsa sheet between F1 and just rear of F2, and another 1/2" sheet between F4 and just forward of F3. Add the false cockpit floor from 1/8" balsa. Complete the top of the fuselage by adding the 1/4" sheet between F7 and F8 with overhang to match the sides.

Standard Servos

The prototype was built using standard size servos, one for the elevator and one for the ailerons, although you could easily fit two mini servos in the wing to enable flaperon operation if required. The elevator is controlled by a snake that runs from ahead of F5 to the base of the fin, exiting the top sheeting just rear of the fin post. Drill an acutely angled hole on the centreline through the top sheet, one inch ahead of F8 and insert the snake outer, ensuring a good fit. Make up the two F5 snake supports, sized to suit your chosen servo and once happy glue either side of F5 with the snake slot running at the required height and position to suit your servo. Secure the snake outer at each end (I also placed a block balsa support just behind F7), roughen up the snake outer, fix with

Recess for air-intake former in fuselage side, with three each side for each semi-former A1 to A3

Rear top 1/4" balsa sheeting added to fuselage

Laminating the nose section with soft 1/2" balsa

View at F3 wing L/E. The doublers and fuselage sides need to be relieved at an angle to allow the wing to seat fully

Snake supports fitted either side of F5 to suit required height of chosen servo

Snake exit through top skin rear of fin post. Ensure a good fit here and glue the snake outer securely!

epoxy and trim the snake outer to length. Note: It is important to fit the snake at this stage before the rear fuselage is closed off with the base sheeting.

You can now add the rear bottom 1/2" sheet to complete the basic fuselage assembly. Trim the rear fuselage overhang to length (it was left long to account for any fuselage curvature) and add the F9 1/8" balsa end cap and exhaust support. Sand the 1/2" balsa top and bottom to the correct 2D profile, blending in any joins between the sheeting.

Add the three air intake formers each side by gluing them square into their allocated slots in the fuselage sides. The air intakes are effectively skinned in one piece using medium 1/8" balsa; again ammonia is used to soften the material for making the curvature. Having applied ammonia to the outer surface only, each intake skin is partially rolled around a tube of a representative diameter. Secure with rubber bands and leave to dry out. This simplifies fitting the skins to the model. PVA was used for the majority of the mating surfaces, with cyano added at key locations to enable a fast grab.

Once dry trim the sides to the front of intake former 1. The 1/8" intake skins at the back will sit flat onto the fuselage sides. Blend this in smoothly to zero thickness with a little scrap balsa (aileron stock works well to minimise the required shaping). Add a fillet of balsa or lightweight filler along the length top and bottom to bridge the angle between the intake skin and fuselage sides.

Make up the intake fronts from balsa using a 1/4", 1/2" and 1/2" laminate. Position flat on the fuselage side and trace the profile of the skinned intake onto the rear of each laminated block, ensuring a left and right handed pair are made. Rough sand to shape and profile.

Top Tip

If you are covering the model in film I would recommend temporarily gluing the intakes into position to enable accurate final sanding, then remove them again for covering as this will be far easier. Of course, if you are not using heat shrink film then they can be permanently mounted now, prior to covering in glass/tissue etc.

Add basic cockpit detail including a seat and pilot's head, and trim the vac-formed canopy (CA3775CY – see Plan Details) to suit.

Shaping the fuselage accurately is important to get the right look. To help, use the former cross sections as a reference guide to mark up the 45 degree corners to be removed from the box fuselage construction and razor plane the corners off to size. Round the corners into a smooth blended radius. Quite a lot of material needs to be removed to create the right shape, so don't be shy!

Next Month

Follow the build in Part 2, where we complete the model and give it a test flight.

RCMW

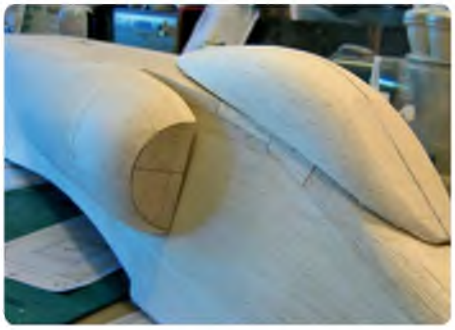
The three 3/16" balsa air-intake formers A1 to A3 are glued into the recess slots in the fuselage side. The former tops should create a straight line running into the fuselage at F7

Air-intake skins are wetted with liquid ammonia on one side prior to forming

Wrap intake skins around a tub of diameter similar to A1, then leave to dry out in this condition as this will aid assembly on the model

Intake skins glued to fuselage sides. Overhang over A1 will be dressed back later

Intake fronts made from balsa laminate, rough planed to shape



Intake fronts are temporarily glued to the fuselage for final shaping and gap filling, then removed for covering. The prototype flew with a solid balsa canopy prior to a vac-form version being released by Traplet

Working With Ammonia

I use pure ammonia in a non-diluted state. It's fine to use so long as you don't inhale the fumes so you must apply it to the balsa sheet you want to bend in a well ventilated area – outdoors ideally – and wearing a face mask. I use disposable gloves too as a precaution; it does not burn the skin, but using gloves to limit any direct exposure risk has to be a sensible idea.

It is only nasty whilst wet, but it very quickly dries and in that state its vapours are no longer in effect, so handling the parts once they have dried out is no issue.

Diluting the ammonia will erode its benefit somewhat – it does more than just wet and relax the wood. It actually breaks down the balsa's cell wall structure, leaving the sheeting far more compliant to bending both with and across the grain. I'm not saying that the amount of bending required in the fuselage sides isn't possible via the long warm soak in hot water method, but the ammonia is far quicker to use and it is easier to apply it only where needed locally on the front half of the fuselage sides. You can also assemble the parts in the dried out state, whereas I think with water you would have to dry assemble and clamp until it is dried out, then unclamp and reassemble with glue.

As for sourcing, I bought mine in a bottle from Homebase, but most household stores sell it. However its not on the shelf in supermarkets.

I found it best applied to the outside of the fuselage sides using a 3/4" short haired brush, effectively 'rubbing' it into the surface. Paper towels can be used too, rolled up into a 1" swab and then used in a similar manner. Use white paper towels as any colour from the towel will be left on/in the balsa.

Once the balsa surface is impregnated you will find that adding more ammonia is easier – it almost becomes more porous.

Regarding health and safety, if you treat it as you would any wing skinning epoxy or resin, applying it in a well ventilated area whilst using a face mask and wearing gloves, you won't go too far wrong. In my experience it is far better than water alone in allowing the balsa sheeting to comply without cracking.

The best way of launching the Skyhawk into a good blow. Flying report next month

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MODEL WORLD DETAILS

MODEL SPECIFICATIONS

SCALE:	1:12
WINGSPAN:	36 in (915 mm)
WING LOADING:	18 oz/sq ft
LENGTH:	41.25 in (1022 mm)
WEIGHT:	2 lb 8 oz
RADIO FUNCTIONS:	Ailerons, Elevator
SERVOS:	2 x standard size
BASIC CONSTRUCTION MATERIALS:	Balsa, Ply
COVERING MATERIAL:	Heatshrink film
CENTRE OF GRAVITY:	6.1" (155 mm) from Leading Edge

CONTROL THROWS:
Ailerons: 40 mm up, 20 mm down
Elevator: 45 mm up, 30 mm down

PLAN DETAILS

NAME:	A-4 Skyhawk
BUILD CATEGORY:	Intermediate
PLAN NUMBER:	MW3775
PLAN PRICE:	£16.99 ($28.99)
CANOPY NO:	CA3775CY
CANOPY PRICE:	£6.99 ($11.99)
LASER WOOD PACK NO:	WP3775
LASER WOOD PACK:	P.O.A.

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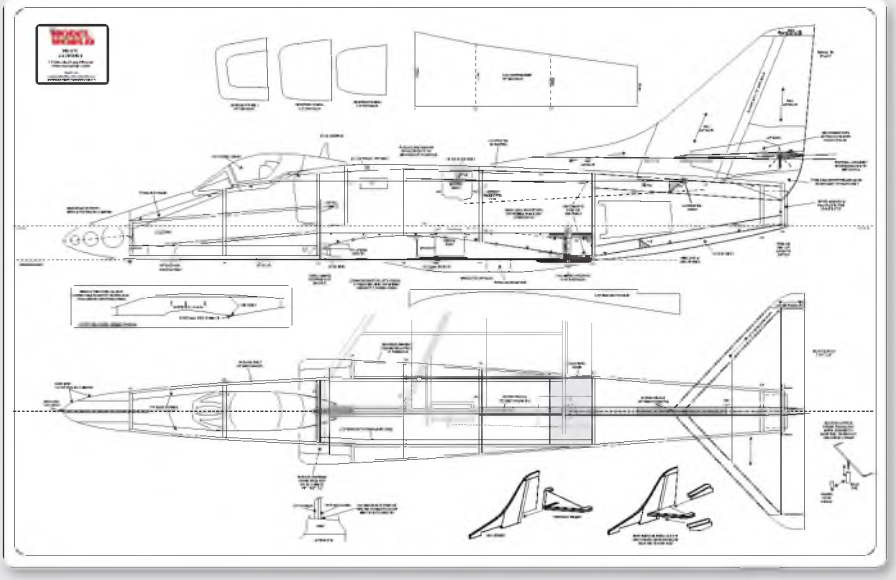

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RIDING THE VALKYRIE!

Taft Hobbies' Valkyrie 90 mm EDF jet is reviewed by Josh Spiers. Flying pictures by Roger Laskey

One very happy model pilot!

The electric retracts proved to be robust, even when flying off a rough strip at the local common

The first flight highlighted a couple of issues. The nose wheel came loose after losing the grubscrew that fixes the yoke to the leg

And the live foam hinges on the ailerons separated. Quickly fixed all round using pin hinges

Picture this... A perfect autumn warm and windless sunny day at the flying field. There is a huge expanse of tarmac in front of you upon which is sat a spanking brand new 90 mm EDF jet ready for its first flight. In the back of my mind there is a well known composition by Wagner playing, made famous in the film 'Apocalypse Now', because the jet in question is the new Taft Hobby Valkyrie 90 mm EDF.

This is a particularly unusual and striking model jet, boasting a T-tail and tapered swept wings, with additional tip winglets. Adding to the overall effect is the vibrant yellow base coat enhanced with red and black painted trim. Anyway, you get the picture!

Flying – Take One

So the Valkyrie is lined up on the tarmac and loaded with an Optipower Ultra 5000 6S LiPo, looking the business on its tricycle retracts and champing at the bit to get airborne. A quick check that Roger the lensman is ready and away we go.

Acceleration is very brisk and results in an extremely gentle and scale rotation followed by retraction of the legs and final closure of the nose leg gear door. My first impression was of the almost turbine-like sound coming from the 11-blade fan unit and how little trimming was needed to attain level flight. A tad of down, a smidge of right and there you go, she was tracking like a good 'un!

It was on the second circuit that Roger suggested that a landing might be in order, which coincided with an uneasy feeling I was getting that all was not as it should be with the Valkyrie. As I was on the downwind leg I popped the gear, dropped

Flaps down for a slow pass

Inverted is easy with the Valkyrie

Valkyrie shows off her clean underside

Showing off her sleek lines on a fast and low flypast

the flaps and came straight in for a real smooth touchdown on the tarmac right in front of us. It was at this point that the left aileron finally detached itself from the wing trailing edge and dangled down off the pushrod, followed shortly by the nose wheel doing the same thing off the bottom of the leg...

Time for analysis in the pits with the jet up on my stand. The ailerons and the elevator and rudder are live hinged using the EPO foam that the model is made from. Century UK, who supplied the kit to RCMW, have put a note in the box alerting you to the fact that the cockpit seat in the removable canopy section is a push fit and needs securing before running up the fan. This I did when I fitted my jet pilot to the seat.

The second part of the note suggests that if you have any concerns about the live hinges you should cut them free and fit conventional hinges of your choice. The reason that I did not do this was that in the interest of the review I wanted to fly it as it comes out of the box. After all there are several other jets of this type and construction using the live hinge method with no problems. In fact my photographer has one with over 200 flights on the clock, which is still performing perfectly.

Suffice to say an hour on the bench with a new scalpel blade and some pin hinges saw all the surfaces re-hinged and ready to go. It is worth mentioning here that the very effective flaps have been fitted at the factory with plastic hinges so it is a bit surprising that they didn't go the extra mile and do the ailerons at the same time if they had concerns.

The nose leg was a very simple fix as the detachment was caused by a missing grub screw that held the wheel yoke on to the

I just love the way this jet lands...

Rock steady all the way, with no shimmies or twitchy wing rocking...

Followed by a gentle kiss of the mains and a gradual drop of the nose wheel onto the strip

Wing panel straight from the box with flap and ailerons linked up and electric retracts in position

Ditto for the fin and rudder

And again on the tailplane. Note the use of ball links at each end of the pushrods

bottom of the sprung leg. Examination of the stem showed no circular mark, which the screw would have made when tightened so presumably it was missed during assembly. Again a few minutes on the bench fitting a replacement grub screw sorted out the problem, with the addition of some locking juice to provide extra security.

Flying – Take Two

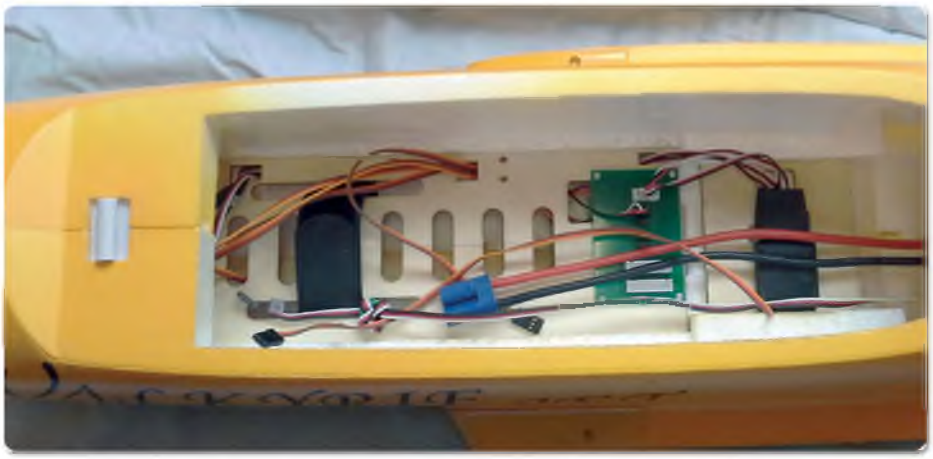
The next day was just as good weather wise and again saw the Valkyrie back on the strip for another session in front of the camera. This time all was as it should be and a shed load of photos were taken for the review on the first flight so that I could really wring it out on the next two flights that I had batteries for.

So what do I think of the Valkyrie in the flying department? Well, if a certain lager company made model jets it would probably be a Valkyrie, because this is one very smooth and slippery machine to fly, with a very high grin factor!

Take-offs are smooth and very scale-like, with the gear tucking away in a steady manner and the speed building nicely as you get into the circuit. She feels nicely balanced with the 6S tucked into the front of the battery bay, putting the C of G smack on the recommended mark, 200 mm back from the root leading edge. You can stooge around at almost tick-over with no problems or thrash by with your hair on fire at full hammer! Make no mistake this jet is quick and more than holds its own with other competitors in the marketplace, at the same time producing that delicious multi-blade 'swoosh' we have grown to love.

Just to reinforce that particular point, I took the Valkyrie to the RNAS Museum, Yeovilton on the 24th of October for their model show. During the flying display one of the turbine flyers remarked how much he was impressed with the look and sound of the model in the air. He wanted to know how much it cost and where could he get one?

Anyway back to the flying. Inverted flight is easily achieved, needing just a touch of down, and inverted circuits come easily to hand. Rolls to the left and right are nicely axial, with the ailerons feeling firm but not overpowering. As far as movement goes you are on your own as there is no guidance on throws in the manual. I left it at 100% and dialled in 30% expo on just the ailerons, which suited me fine. As for the elevator I left that at 100%, which I am happy with as at certain attitudes it



Battery and radio bay, showing the mysterious connector board. A bit of advice on what the connectors do would have been helpful

Rear view of the 1450 KV motor and 11 blade fan unit

A neat canopy with instrument panel and the nicely painted pilot, which needs to be glued in securely

Wing panels are located using sturdy tabs. A carbon rod provides the main support

feels like a small amount of blanking of the elevator is going on, making it feel like there's a small delay in reaction on the pull out.

I have tried to knife-edge the model, which I have yet to perfect. I suspect that I need full throw on the rudder and to possibly play around with the C of G a little to get a better result. There is plenty of power on tap to perform some nice large and graceful loops. Pull-ups into a reversal look particularly good, followed by a nicely banked Farnborough pass along the flight line. Sweet!

So on to the manoeuvre that all models have to do, which is the landing. Here is the sequence I use with the Valkyrie, which gives totally stress free landings every time. On the downwind leg I drop the legs, followed by full flap; at this point I am down to quarter throttle. Swing on to the base leg and then line up with the strip. You do not have to be a long way out as the flaps are very effective and don't upset the trim of the model. If you get the distance right you don't have to use the elevator at all, just letting it sink naturally until the final flare. But beware it will float on in ground effect for quite a way if you squeeze in a little too much elevator. I just love the way this jet lands – rock steady all the way, with no shimmies or twitchy wing rocking, followed by a gentle kiss of the mains and a gradual drop of the nose wheel onto the black top.

With the Optipower Ultra 5000 6S packs that I am using in the Valkyrie the Watt

Ready to test fly. Is anyone reminded of an Angel Interceptor? Cloudbase is looking a bit scruffy though!

meter is showing 88 amps, 1982 watts, so flight time is generally around three to four minutes depending on how hard you play with the loud stick. As I remarked earlier this jet will safely stooge around at low throttle quite safely, as you really have to work at inducing a stall in the Valkyrie, greatly increasing the flight envelope and the time in the air.

The Build

Well that's the first impressions and flying sorted, so let's retire to the bench and take a closer look at what you get in the box and how it goes together.

First impressions upon lifting the lid is that everything has been done to protect the contents within, with copious amounts of tape holding everything in place in the foam base unit. When I work on a foam ARTF I keep an old duvet to cover the bench with, which really helps to prevent any dings during assembly.

With the airframe components laid out it was easy to see the level of prefabrication in the model. The wing panels are complete with 9 g metal gear servos fitted for the ailerons and flaps, and already connected up with ball link pushrods of the correct length. The electric sprung retracts, complete with gear doors, are also in place. All of these components culminate in leads

emanating from the retract bay into a multi-pin JST type plug, which plugs into a tray in the fuselage bay when the wings are slid into place on the carbon spar.

The fin and elevator both have servos in place and connected up, with hard points for the assembly screws to fix into.

Last but not least is the muscular looking fuselage, fitted with a beautifully moulded and painted canopy complete with a seat and dashboard to finish it off. Immediately behind the canopy on either side are the two flared intakes to funnel the incoming air into the fan. The Valkyrie employs the plenum chamber system for the fan unit, with no enclosed ducts leading to the fan face. This means that it draws its air not only from the ducts but also from inside the fuselage, which has the added benefit of passing air over the 80 amp ESC and the BEC unit. In view of this there must not be anything at all loose left inside the fuselage that could be drawn through the fan blades when they are rotating.

Assembly is fairly straightforward, which is just as well as the instruction manual contains no written instructions, just an exploded schematic of five line drawings, starting with the fin and tailplane attachment, followed by the two wing panels and finally the winglets. The manual also gives you a diagram showing the C of G point, which is at 200 mm back from the root leading edge. This was achieved spot on with the 6S pack tucked into the front of the bay.

However, there is no information about where all the leads go or what size screws to use, and whether the three spare sets of pins on the connecting board need to be used for anything. A conversation with James at Century, who was most helpful, revealed that this board was used in other models with extra functions like lights, but those pins were not required for the Valkyrie.

All well and good, but my feeling about the manual is that if a customer is prepared to pay out £350 for a model then they should get a decent set of instructions to remove any confusion. My reason for being a little bit critical here is because the Valkyrie is such a joy to fly and is a cut above the rest in its unusual shape and configuration topped of by its impeccable handling. A case of 'don't spoil the ship for a ha'p'orth of tar', yes?

Nice shot by Roger as the wheels tuck away

Valkyrie is smooth and slippery to fly, and provides a very high grin factor

A cracking 90 mm EDF jet package. Try one for the ride of your life!

Thumbs Up!

I have now had a dozen or so flights with the Valkyrie prior to writing this review. Some off tarmac and others off our none too smooth open common flying site. It has been a good test of the durability and robustness of the Valkyrie, especially when flown off the grass. The airframe and retracts have handled everything that they have been asked to do with aplomb.

So apart from the aforementioned niggles this is a cracking 90 mm EDF jet package that delivers a real jet experience and looks attractively different from the rest of the pack. Try one for the ride of your life!

RCMW

Century Assembly Note

Century UK have asked us to point out that current Valkyrie kits have an addendum sheet that recommends re-hinging the control surfaces. And the next batch will have factory fitted hinges instead of the live foam hinges.

RC MODEL WORLD DETAILS

MODEL INFORMATION

NAME:	Valkyrie EDF 'Plug 'N' Play'
MANUFACTURER:	Taft Hobby Limited
DISTRIBUTOR:	Century UK
WEBSITE:	www.centuryuk.com/RC-Planes/Electric-Jets/Taft-Valkyrie
PRICE:	£359.99
MODEL TYPE:	EDF Jet
CONSTRUCTION:	Fully moulded in EPOFLEXY
PARTS SUPPLIED:	Airframe, EDF set with motor & ESC, 9 g servos, electric retracts
PARTS REQUIRED:	6 channel radio and 6S 5000 mAh LiPo

R/C FUNCTIONS

1: Throttle
2: Ailerons
3: Elevator
4: Rudder
5: Flaps
6: Electric Retracts

MODEL SPECIFICATIONS

WINGSPAN:	1287 mm (50.7 inches)
LENGTH:	1439 mm (57.6 inches)
WING AREA:	26.4 sq dm
FLYING WEIGHT:	3200 g (112.9 oz)
FAN UNIT:	90 mm, 11 blade (supplied)
MOTOR:	BL3541, KV 1450 (supplied)
ESC:	80 amp with 8 amp UBEC (supplied)
SERVOS:	8 x 9 g digital MG (supplied)
RETRACTS:	Electric, metal (supplied)

DISLIKES

Instructions lack some important information

LIKES

Delivers a real jet experience • An unusual and striking model jet • Great to fly, with excellent landing characteristics

RIOT XL MAX-THRUST New

This stunning new plane from the Max-Thrust hanger takes all we've learned and all you have loved from the original Riot and super sized it! Supplied as a Plug and Play model, you just need to add your favourite brand of receiver and battery and you have a very versatile aircraft that will quickly become your favourite goto plane. The Riot XL is very stable thanks to its large 1600mm wingspan and will handle the wind with ease and it also comes with a prefitted glider release system and flaps. With plenty of power to spare you won't be in two minds whether to take this beauty out on a typical flying day. This really is the model for all conditions and abilities.

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Techone Thunder 180

Rec. Battery 7.2v 350mAh	Wingspan: 900mm Length: 976mm Weight Inc Bat: 249g

Techone Revolution

Rec. Battery 11.1v 1800mAh	Wingspan: 1120mm Length: 1125mm Weight Inc Bat: 890g

Techone Sbach 342

Rec. Battery 11.1v 400mAh	Wingspan: 840mm Length: 960mm Weight Inc Bat: 275g

Techone Skysurfer

Rec. Battery 11.1v 1350 - 2250mAh	Wingspan: 1480mm Length: 992mm Comes with FPV Canopy as well.

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Techone Eagle One

Rec. Battery 11.1v 2200mAh	Wingspan: 2060mm Length: 1300mm Weight Inc Bat: 1100g

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SPIDEX 3D

The Editor gets in a flip with an agile 3-D quadcopter from Ares

Inside the flip top box the Spidex quad and its transmitter are protected by moulded plastic trays

These little palm size quadcopters (Spidex is just over 99 mm in length) are all the rage now and as I write this review the model and toy distributors will be working overtime to get them into the shops and on-line stores for Christmas. And not just model shops, but high street stores too.

Spidex is typical of the latest generation of R/C flying toys, which are easier to fly than ever before and its small but not tiny size makes it ideal for flying at home and in the garden. Kids and adults alike just love flying these miniature marvels and a Spidex 3D would be a sure fire way of getting any children in your family hooked on R/C model flying. I can imagine that plenty of small cube shaped presents containing one of these quadcopters will have been tucked under Christmas trees come the 25th of December.

Spidex also has a few tricks up its sleeve as it can be flipped in flight by either 180 degrees to inverted, or by 360 degrees for a full roll. Hence the 3D suffix.

Let's Take A Look

Spidex 3D is nicely presented in a cube shaped flip top box. You can buy it with either a red or blue bodyshell and matching front propellers. Inside are two plastic trays, stacked one on top of the other. The upper one contains the Spidex quad, whilst the lower one contains a miniature 2.4 GHz transmitter of conventional R/C styling. Underneath the trays are found a USB charger, a fold-out sheet of instructions, a pack of spare propellers and a pair of wide diameter Tx stick ends.

The Spidex is fitted with an Ares 1S 300 mAh LiPo, which resides in a cage underneath the main body. It is easily removed from the quadcopter if you want to charge it without risking having the machine caught by a stray hand as you type

The 2.4 GHz transmitter is small but familiar in styling

A pair of wide sticks are provided, which can either be used on their own or stacked on top of the original sticks

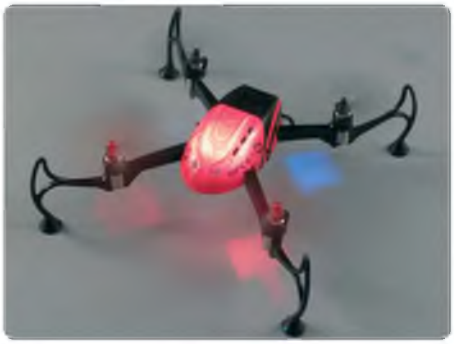
The one cell LiPo gives several minutes of flight time

The LiPo sits in a cage underneath the main body

Unclipping the thin bodyshell reveals the all-important electronics

Pressing the top right hand shoulder switch initiates flip mode

Spidex can be comfortably landed when inverted



Spinning up for take-off, this shot shows the different coloured LED lights and coloured front props, both of which aid orientation

on your computer's keyboard. Alternatively, you could use a plug-in USB wall charger or a USB powerbank.

Our sample's LiPo must have been pretty well charged as the red LED on the charger switched off after only a short while, indicating that the pack was ready to fly. So it was pushed back into place under the quad and a set of four AA cells was inserted in the battery box at the rear of the transmitter. The battery hatch is secured using a latch, which I much prefer to the screw down versions fitted to some R/C toy transmitters.

The Tx is tightly held in its tray inside the box and when I first pulled on a control stick to remove it the whole stick came away; I soon realised that this was not a fault as the stick ends are designed to be easily removed. The transmitter is supplied in Mode 2 and you can fly this model with either the standard stick ends fitted to the Tx, or you can pull them off and replace them with the wide stick ends. You can even stack the wide sticks on top of the standard sticks if you prefer a longer stick. I was happy to fly the Spidex with the standard units.

The transmitter comes with four digital trims, two shoulder mounted switches and six push buttons surrounding the small but clear LCD screen. Of the shoulder switches only the right hand button is operational and it is used to initiate flips. The three left hand buttons next to the display are used as rate switches; from top to bottom they offer 100%, 60% and 20% control sensitivity. On the right hand side of the screen the top two buttons have no function, but the bottom one can be used to switch the LED lights on the quadcopter off and on.

Gone Flying!

After the speedy first charge I walked down to Traplet's new warehouse. This is decidedly more bijou than our previous cavernous storage area, but there's still more than enough space to fly small to medium sized multicopters.

As is typical with small ready to fly R/C models the Spidex is plugged in first, whereupon the on-board LEDs will start to flash. The model is then placed on level ground and the transmitter is switched on. The red LED on the Tx will blink until the throttle stick is raised and then lowered, at which time the transmitter and Spidex will be paired and the model can be flown. I found that the Spidex would pair instantly whenever this procedure was followed and there was no lag, as can sometimes happen with this type of R/C product.

After checking that the trims were

Plug the USB charger into a spare computer port and the Spidex can be recharged while you carry on working

showing as being centred the Spidex was lifted up into a chest high hover. It proved to be very stable and there was minimal drift. A couple of clicks of forward trim soon eliminated the very slight backwards movement present, but this could easily have been held off using slight forward pressure on the right stick.

A quick circuit or two between the stacked shelves revealed that there was a noticeable difference in sensitivity when selecting the different rates, but even at 100% the Spidex proved to be easy and predictable to control. I'm not sure what the default rate is (the Tx boots up with 100% on the screen but this is quickly replaced by 000%) but I'm happy to use it for general flying.

Once I was comfortable with the feel of this little quad it was time to get some height and to make sure she was hovering safely away from any obstacles. The flip button was then quickly pressed and the right stick was jabbed to one side. Spidex then performed a quick 180 degree flip on to its back, where it resumed a comfortable hover. Another press of the button and a jab in the opposite direction soon had it flying upright once more. You can flip forwards or backwards too but do be aware that the yaw and roll controls will be reversed if you do this as the model will effectively be flying inverted towards you.

If that fries the brain a little then just spin it around using the rudder stick until it is facing away from you and the conventional controls will be resumed. Of course, as many of our readers are experienced R/C model pilots then you probably won't be too fazed by this but if you are a bit slow returning the stick to neutral after jabbing it to start a flip then it can be a bit of a surprise as this little quad nips off sideways in the opposite direction!

Spidex 3D can also perform 360 degree flips by pressing and holding the flip button until it beeps twice. But small quads have been able to do this for a while now so it's not quite so entertaining as flipping to inverted and back in 180 degree mode.

Inverted Landings

The spindly legs, which also act as prop guards, point up above the level of the props slightly, and the body shell reaches about the same height too. This means that the Spidex can be safely landed whilst inverted.

Whilst writing this article I started to play with the transmitter to see if any icons came up on the screen whilst pressing the flip button. And a 3D symbol does indeed pop up when the flip function is activated. It is too small to see when flying the Spidex, but the Tx also makes a series of beeps at the same time so there should be no doubt when the flip function has been activated.

After recharging the LiPo, I nipped outside to see how she would handle a light breeze. On this flight the Spidex was again entering 180 and 360 degree flips with ease but regardless of orientation I found the little quad a pleasure to fly. It's the perfect quad for a spot of garden flying fun!

Amazing Spidex, Man!

To sum up, the Spidex 3D is a fine example of the latest breed of palm sized quadcopters. It is easy to fly, is nicely stable in the hover (even when flown outside in a breeze) and the flips spice things up nicely when you get bored with floating it around.

Another big plus is that Ares products are distributed by J Perkins Distribution Ltd., so it is backed up by one of the UK's best known R/C distributors. And if you break it then it's nice to know that a full range of spares is available from JP stockists across the UK and Europe.

RCMW

MODEL WORLD DETAILS

MODEL INFORMATION

NAME:	Spidex 3D
MANUFACTURER:	Ares
DISTRIBUTOR:	J Perkins Distribution Ltd.
WEBSITE:	http://jperkins.com/
PRICE:	£39.99 SRP
MODEL TYPE:	Ready To Fly quadcopter
CONSTRUCTION:	Moulded plastic
PARTS SUPPLIED:	Airframe, 2.4 GHz transmitter, 1S 300 mAh 22C LiPo, 500 mA USB charger, spare props, wide Tx stick set
PARTS REQUIRED:	4 x AA batteries for transmitter

MODEL SPECIFICATIONS

LENGTH:	99.15 mm (170.4 mm to prop guards)
HEIGHT:	44.54 mm
WEIGHT:	31.84 g

DISLIKES

All too easy to get out of sequence with the flip function

LIKES

Truly ready to fly – just needs a pack of AA batteries! • Easy to fly and stable when hovering • Flip function, especially 180 degrees, is great fun – provided you can keep them going! • Parts and product support from a leading distributor

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Flying Weight: 23-28lbs.
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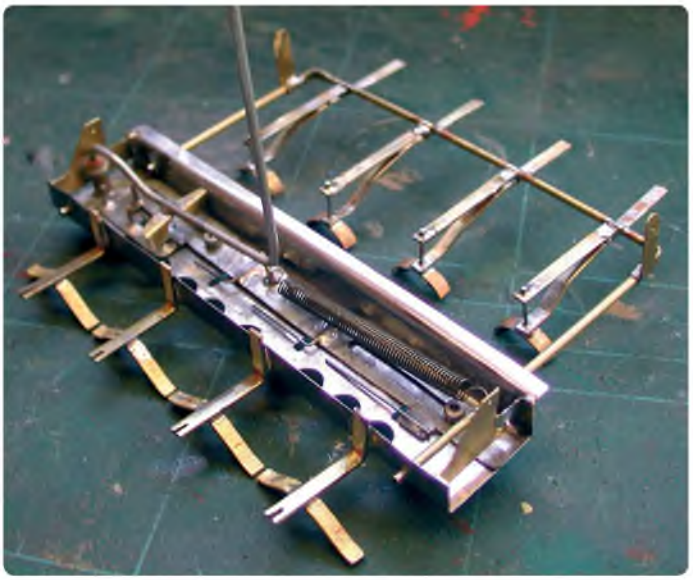
BUILDING A COOPER BOMB RACK

More WW1 scale modelling techniques from Grahame Wren

The Cooper bomb rack, complete with ordnance, can be seen mounted between the undercarriage of Grahame's lovely SE5a



Tackling a metal working project like this one makes a nice change from balsa bashing

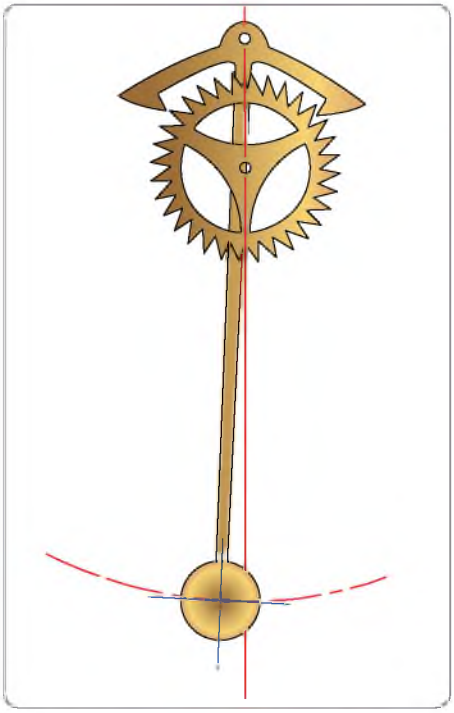
A set of lightweight bombs fitted with rubber nose cones

Hanging some ordnance under a warbird certainly increases the interest. All the more so if it can be made to work. (Up to a point of course – no explosives involved!) And that is what this article is all about.

The example used is a WW1 Cooper bomb rack with four '20 pounders'. But the basic principle could be adapted for any bomb release system – and even parachutes or toffees! The bomb rack was soldered up from tin plate, thin brass tube and strip, and the bombs were turned from obeche with thin ply fins. I moulded scale nose cones from rubber, just to be on the safe side, but these proved not to be fuel proof and soon turned to a sticky mess. I replaced them with self-adhesive rubber feet from Maplin. The fuse arming vanes are simply cut from tin plate and soldered to a pin so they are easily removed before flying.

The basic construction presented no particular problems (if you are interested more details can be found at: tinyurl.com/great-war-scout) but the same cannot be said for 'if it can be made to work'! The full size has a complicated ratchet system connected to a lever in the cockpit and as the bombs are not dropped 'en masse' but in sequence a servo operating a simple loop and pin release mechanism wouldn't do the job, unless I had a servo for each bomb and four spare channels!

The answer seemed quite simple. Four pins of increasing length, one for each bomb. That was the easy bit, but now I needed a way of stepping the release pins and it must be ultra-reliable. We can't have bombs dropping off the model in the



Pendulum clock escapement mechanism

Release plate

wrong place! I took my inspiration from a pendulum clock mechanism; after all these have been reliably sequencing one-second releases for over 350 years.

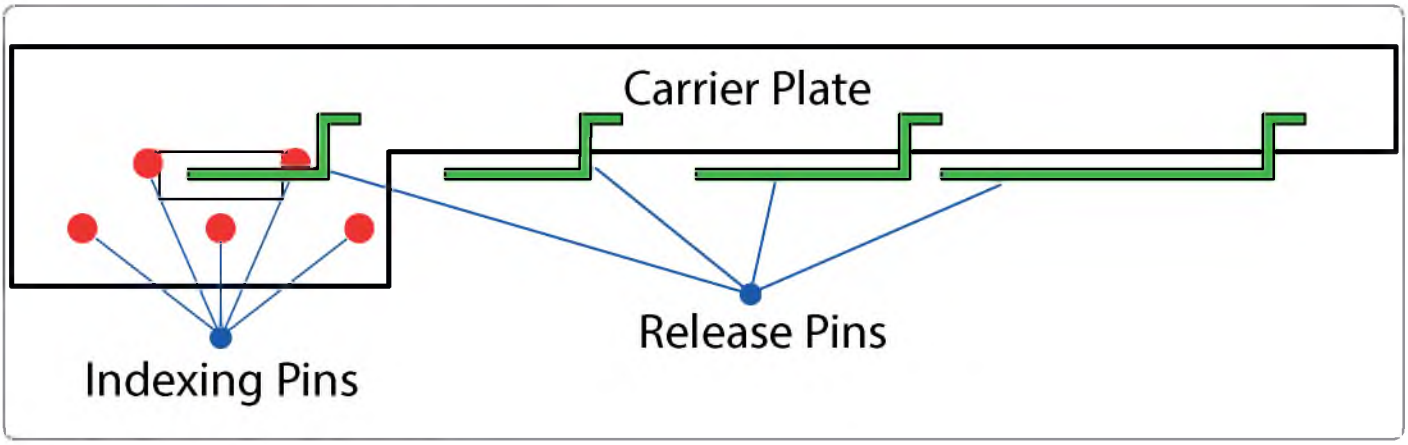
The reliability comes from the design of the pawl, which is double ended. Before the cog wheel is released the other end of the pawl is already in position to stop the cog rotating more than required; as the pendulum swings to the other side the role of the ends of the pawl are reversed. Those of us of a certain age will remember the rubber powered escapements that used the same principle. But of course both these produce a rotary movement whereas I required linear!

The 'Eureka' moment came when I realised that using staggered indexing pins could give the linear movement required.

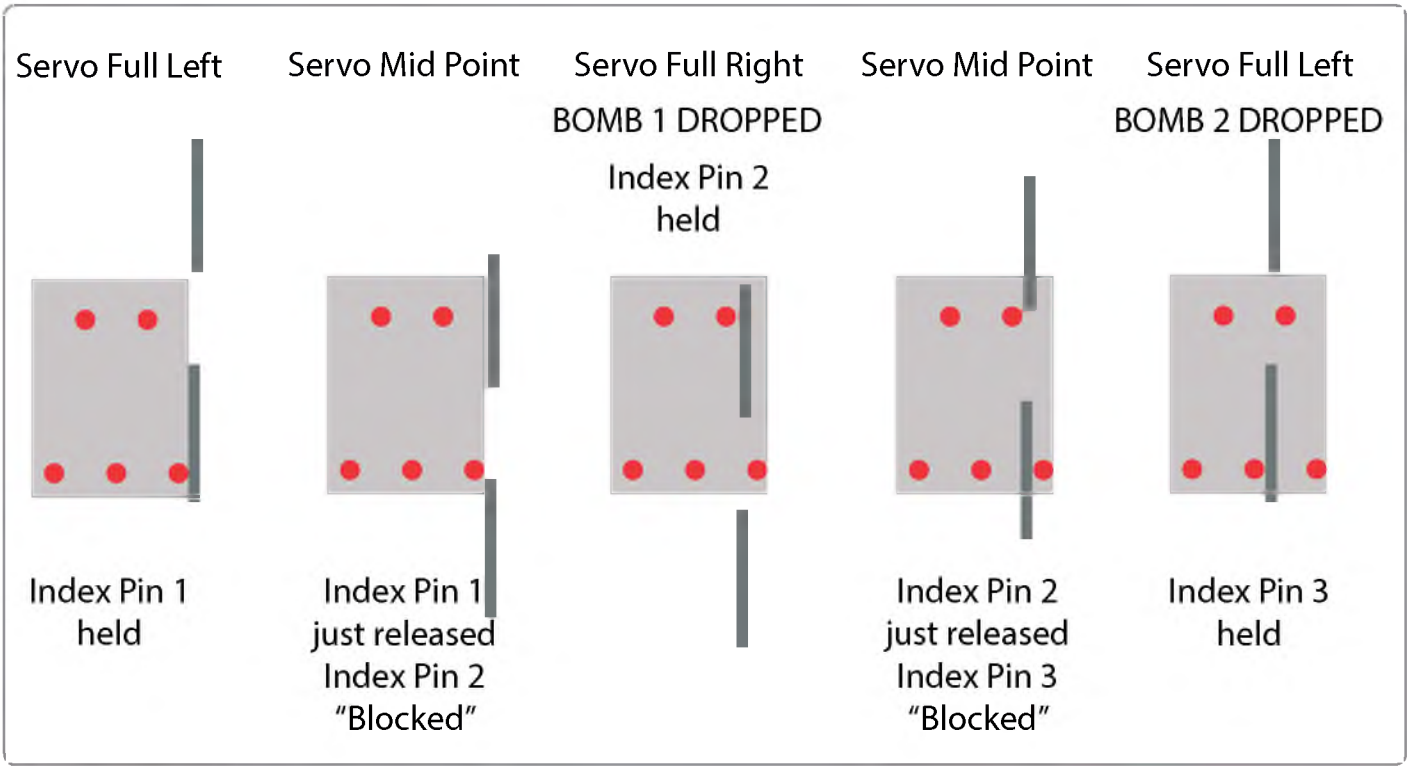
The release plate, made from sheet brass, has a central 'release' slot narrower than the distance between the two rows of indexing pins. It is soldered to a pivoted rod, which in turn is connected to a servo. As the servo only needs to travel from one extreme to the other to operate the bomb release mechanism I used the retract channel. And for my model, an SE5a, it was a 'redundant' channel anyway.

Nearby is a schematic showing the sequence of events, left to right, as the bomb release servo does a complete cycle, left, right, left. The carrier plate is sprung loaded to the 'bombs gone' position, the indexing pins allowing one bomb to be released with each throw of the retract switch.

So much for the theory but can I make it work in practice? Since it has to fit in the body of the bomb rack the design of the carrier plate holding the release and indexing pins was complicated somewhat, with the first release pin and the five indexing pins having to occupy the same space.



Carrier plate showing index and release pins



Bomb drop sequence

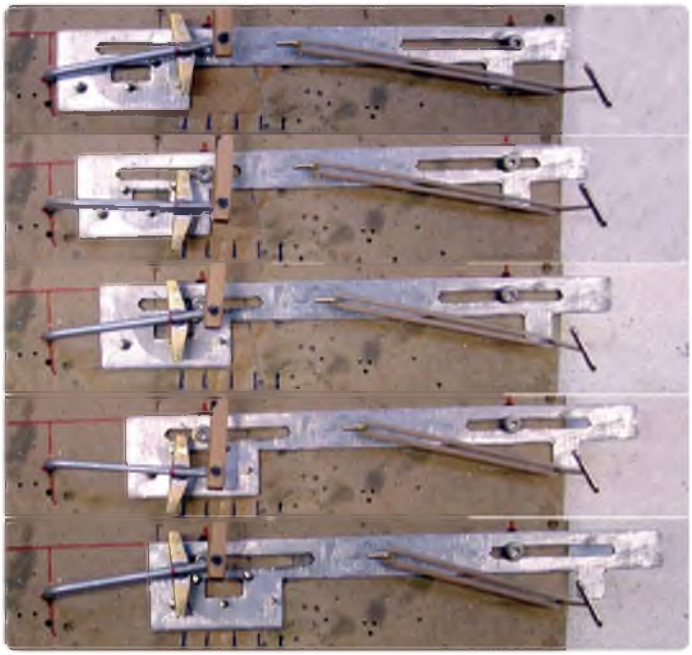
Time For Some Experimenting!

I made a 'mock-up' and as the composite photo shows the stepping mechanism works. A bit of tweaking to the design of the 'pendulum' and it all fits; just the release pins to make and then find a suitable tension spring.

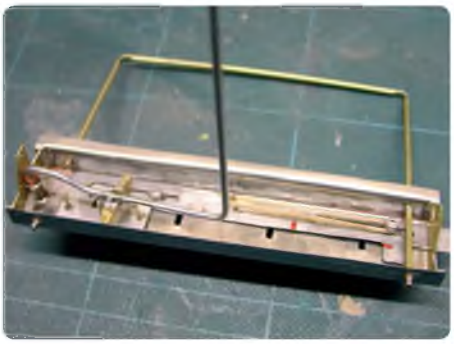
A nearby photo shows the bomb rack fully armed and ready for action! Hopefully taken along with the schematic, drawings and the other photos it'll make the operation of the release mechanism clear. As the bombs are released the end of the carrier plate protrudes from the side of the bomb rack. The bombs are loaded in the reverse order and the whole process is surprisingly easy.

The loop of bomb four is passed through the slot in the base of the bomb rack and the carrier plate is gently pushed back against the spring until it hits the indexing pin; at this point the bomb is just held by the release pin. The servo switch is operated whilst keeping pressure against the indexing pin, which passes through the release slot. Bomb 4 is now fully held in position and the process is repeated for the other bombs.

So was it all worth it? In the final analysis I have to say yes, on three levels. It adds a 'wow' factor to the model, the all-metal construction of the bomb rack made a pleasant change from the usual balsa bashing and, last but not least, there's the satisfaction of an engineering problem solved! ***RCMW***



Right: *Bomb release sequence*



The rack was soldered up from tin plate, thin brass tube and strip

Close - up of the release mechanism

Rigged up and ready for testing

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RARE BEAR

Tony King gets up to speed with this brightly coloured Reno racer from E-flite

Rare Bear maybe fast but is straightforward to fly

Typically smart box artwork from E-flite

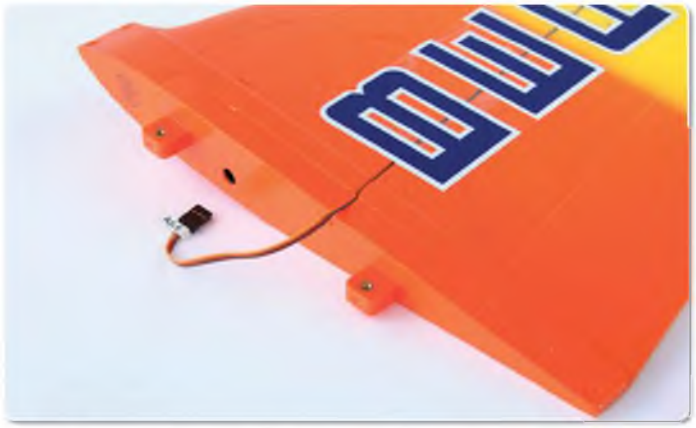
My first impression on opening the box was wow! What an attractive looking model. Finished in a very accurate colour scheme, it was actually used on the full size 'Rare Bear', a highly modified Grumman F8F-2 Bearcat, as seen at the 2014 World Championship Air Races, and is fully licensed to be used on the model. The beautiful and highly visible purple and orange colours will no doubt please any pilot who flies this very fast model.

The model supplied for review was the 'Bind N Fly' version, which required very little in the way of assembly. In fact the model only required the wings and elevator section to be attached, and a suitable battery to be fitted.

So let's have a look at the contents of the box and the general impression of its contents. The fuselage and wings are constructed of reinforced Z-Foam, which come fully painted and with all decals applied. The two piece plug-in wing and stabiliser are reinforced with carbon fibre joiner tubes.

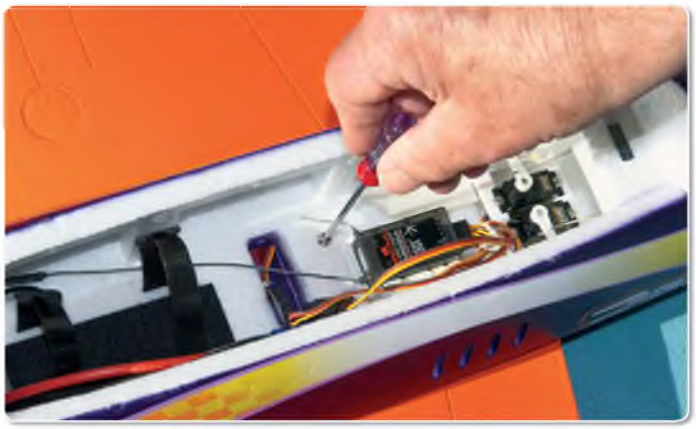
There's not many parts so assembly is very quick

Short span ailerons are operated using 16 g metal geared micro servos

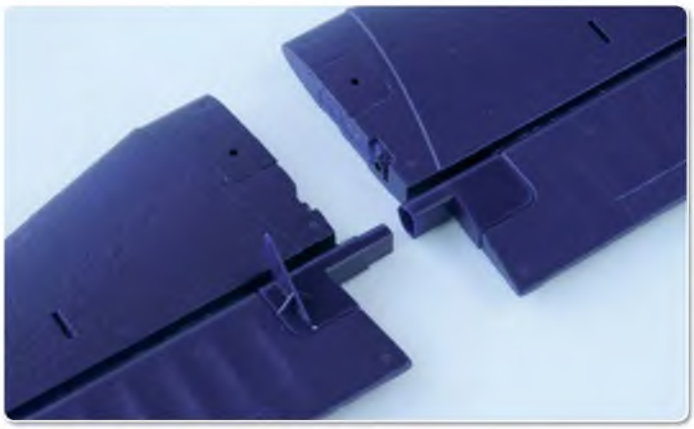


Plastic root cuffs have sturdy wing mounting tabs

Sliding the wing panels over the carbon joiner rod



Securing the wings using the bolts supplied



Close up detail of the push together elevator joiner

The tailplane halves push into cuffs moulded into the rear fuselage

The power unit is a powerful .15 size 'E-flite' 1200 KV brushless motor, which drives a specially reinforced two-blade 8" x 8" propeller. The motor is mounted on a combined motor mount/cooling tube, which provides good airflow over the speed controller and LiPo battery. Generous air exit holes are also provided in the fuselage sides. The speed controller is a 70 amp switch-mode BEC brushless ESC fitted with EC3 plugs.

The fuselage is fitted with moulded-in handgrip slots on the underside. But these are quite narrow making it uncomfortable to grip the plane without digging your nails into the fuselage foam. My remedy for this was to glue a couple of narrow strips of coarse emery cloth into the grooves, making gripping much easier for such a bulky model.

Fitting the wing panels is quite straightforward. Simply insert the carbon tubes onto the fuselage and then slide the wings into place. Plastic cuffs fitted with locating lugs are attached to the root of each wing, which when pushed into place are secured by four screws inside the fuselage (after feeding the servo leads through a slot into the fuselage).

The fit of the wings was very accurate and the method of securing the wings was found to be very positive. The horizontal stabiliser was also found to be a very good and strong fit, requiring just two screws to secure it into place.

A lot of thought has gone into the design of the control horns, which have moulded-in load spreaders fitted to both the ailerons and the elevator. All control surfaces are controlled by sturdy Spektrum 16 g metal gear servos.

The model comes with a Spektrum AR636A DSMX six channel receiver pre-installed. This Rx incorporates AS3X technology, which is designed to deliver gyro assisted, rock-solid handling. It is pre-set with optimum settings and only requires to be initialised on a level surface after switch on.

The wing servos are connected to the receiver via the supplied Y-lead. The elevator and rudder control rods need to be attached after making careful note of the horn/clevis positions as advised in the manual.

With all connections made a recommended 3300 mAh 50C 4-cell LiPo battery was fitted and the radio was bound to a JR DX9 transmitter. Control movements were checked and some minor adjustments were made to the control surfaces. It should be emphasised that with a fast model like this it is important that the recommended settings are followed for the first flights:

Ailerons: High rates - 14 mm up, 12 mm down; Low rates -11 mm up, 9 mm down

Elevator: High rates - 5 mm up/down; Low rates - 3 mm up/down

Rudder: High rates - 10 mm right/left; Low rates - 8 mm right/left

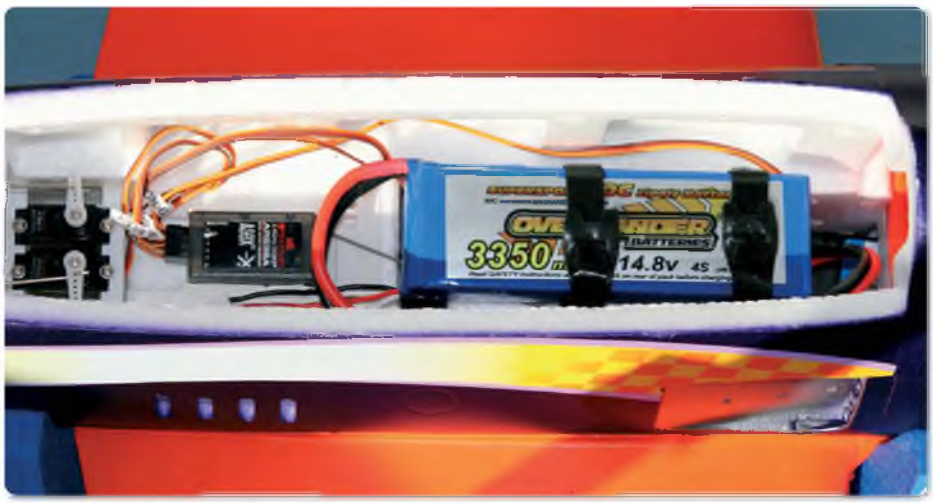
Sliding the tailplane halves into place

BNF planes often use clear tape to secure the tailplane, which works well, but the high performance of Rare Bear dictates the use of screw fixings

The nicely moulded canopy/radio hatch includes a painted pilot and an instrument panel

A long underbelly skid plate protects the fuselage during landing

The stubby 8" x 8" prop is covered by a nearly 3-inch diameter spinner



Spacious avionics bay showing the factory fitted AR636A Spektrum receiver and 16 g servos. Plenty of space for the recommended 4S LiPo

The ailerons, which are short in length but wide in surface area, needed to be levelled. The amount of elevator movement seemed to be alarmingly shallow but the recommended settings were followed to the letter. All mechanical adjustments are best made with the radio switched on and the servos under load, and with the prop removed for safety.

After the propeller was re-attached I took the opportunity to carry out some quick tests with a power meter. At full throttle the motor was found to be drawing just 55 amps at 830 watts, well within the limits of the supplied 70 amp speed controller.

Although the fully assembled model can be easily carried in any small car it will take a matter of minutes to disassemble if required.

Race Ready

The Rare Bear feels quite 'chunky' in one's hands and gives the impression it will shrug off any turbulence. This is, of course, a good thing bearing in mind our increasingly gusty British weather.

Although there is a hand hold on the underside of the fuselage to assist in launching the model, and this could be undertaken single-handedly by the pilot, we felt it would be wise to let someone else do the launching for the first flight, just in case there were any trim issues that would require some speedy stick inputs to correct.

In the event the Rare Bear went away from a hand launch very well and climbed solidly. The power was superb and it was a pleasure to climb vertically (and quickly) until the model became a dot in the sky. This is a model with a genuinely correct power-to-weight ratio required for its class and, what's more, it is an intelligent package which works straight out of the box.

The control authority on all three axis was good but the controls are definitely set-up for fast flying and then turning round at the end of a run to come back and do it all over again. This speedy action is great and adrenaline-pumping fun!

However, those who prefer to fly aerobatics at a more sedate pace might find the controls (especially the rudder) need a bit more bite to get the job done. To get the best of both worlds it would be advisable to set the switchable rates to higher throws for aerobatics and finer movements for fast flying.

It is worth mentioning here that the throw on the elevator may look very small but be wary about increasing it. It is a very effective elevator and is perfectly adequate across the entire speed range.

3-Axis Stabilisation

Normally these things are fabulous and are really useful for ironing out any little bits of turbulence which can throw a model off course. But the one in our Rare Bear was just a bit too intrusive and seemed too fussy at correcting the ailerons, so the model would fly along with the wings waggling slightly. The amount of waggling wasn't great but it looked untidy at times, especially when flying at fast speeds. Also, when trying to fly some wild manoeuvres the AS3X stabiliser would decide to interfere and calm things down a bit. This intrusion was somewhat unwelcome and to be honest the model would have been more pleasant to fly without the stabilisation activated.

However, when the power and then the airspeed were reduced the stabiliser wasn't overwhelmed and it coped quite well and kept the model on the straight and narrow.

The speed of this model is quite addictive and it flies well on a 4S LiPo. But there is a rumour going round that the standard 'out of the box' set-up will handle a 6S LiPo. Now that would be fun to play with!

Conclusion

Make no mistake, this Rare Bear is a fast aeroplane and it tracks like it is on rails. It is thrilling to fly at high speeds but the slow speed handling is also superb and it can waft past at slow speeds just looking pretty and without trying to drop out of the sky.

The only detail to be aware of is the radial engine cowl, which produces a bit of drag so it is best to keep a modicum of power applied during landing approaches to prevent the flying speed from dropping into the stall. And then, because there is no undercarriage, stop the motor when the model is about 1 ft off the ground. The touchdown speed is about 10 mph.

Apart from that the model is very straightforward to fly. It is equally happy flying upright or inverted and has silky-smooth control responses. It's a pilots' aeroplane and is sure to be a winner!

RCMW

Tony looks pleased with his new racing plane

It makes sense to get a friend to launch the Rare Bear for the first trimming flights

There's no missing this bright aeroplane when it's in the air!

Rare Bear is a fast aeroplane and it tracks like it is on rails

Inverted? No problem!

High speedy flying is great fun and sure gets the adrenaline pumping!

That large cowl produces a bit of drag so keep the power on during the approach and chop it just before touchdown

RC MODEL WORLD

DETAILS

MODEL INFORMATION

NAME:	Rare Bear
MANUFACTURER:	E-flite
DISTRIBUTOR:	Horizon Hobby UK
WEBSITE:	www.horizonhobby.co.uk/aeroonline/e2eflite/efl1250/rare-bear.html
PRICE:	£199.99 SRP
MODEL TYPE:	Semi-scale racer
CONSTRUCTION:	Reinforced Z-Foam
PARTS SUPPLIED:	Airframe with motor set, AS3X receiver and 4 x MG micro servos
PARTS REQUIRED:	4S LiPo and DSMX compatible transmitter

R/C FUNCTIONS

1: Throttle
2: Ailerons
3: Elevator
4: Rudder

MODEL SPECIFICATIONS

WINGSPAN:	34.6" (880 mm)
WING AREA:	287 sq in (18.5 sq dm)
LENGTH:	34" (865 mm)
WEIGHT:	46.7 oz (1324 g)
MOTOR:	E-flite 15BL 1200 KV brushless
ESC:	70 amp switch mode BEC, EC3 plug
BATTERY:	3300 mA 50C 4S LiPo (not supplied)
RECEIVER:	Spektrum AR636A DSMX with AS3X (included with BNF)
SERVOS:	4 x Spektrum A320 16 g metal gear micro
PROPELLER:	8" x 8", with 73 mm (2.87 inch) spinner

DISLIKES

None

LIKES

Very short assembly time • Clear and easy to read manual • General high quality and finish

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SCALE SOARING

What's in a name? Although Chris Williams has only just joined us as a regular columnist, he has been writing his Scale Soaring feature in Quiet & Electric Flight magazine for many years. But now that Q&EFI has been absorbed into RC Model World we had a quick poll over what would be the preferred name for his scale gliding column. Scale Soaring won over Silent Scale so we will use that moniker for his future articles

Motley (Geoff Crew) with his new 1:3.5 scale HW-4 Flamingo

Chris Garrod's mighty ASH 25Mi doing the opposite of the wind turbines in the distance

TVSA Aerotow, Vale of White Horse Gliding Club, Sandhills

After the demise of the TVSA's long-time home at Siege Cross Farm, on the outskirts of Thatcham, there was delight amongst the scale soaring fraternity that the guys had managed to find a new home. This was to be the Vale of White Horse Gliding Club's patch at Sandhills, near Cirencester in the county of Gloucester. Earlier in the year I had attended a try-out at this venue to see if we could co-exist with the big boys and it seemed to work out very well.

As you might expect for a full size gliding club it exists in a very large grassy area with a couple of hangars and a homely clubhouse with the usual mod cons – hot and cold running bacon butties included! The only fly in the ointment that might start buzzing would be if the wind should be in an easterly direction…

So it will come as no surprise to those who subscribe to the Conspiracy Theory of Life, that the wind was indeed blowing from said direction on the Big Day. This meant that both full size and models would have to operate side-by-side and much concern was expressed in the clubhouse from the hosts, to the extent that the briefing went on for about an hour!

About halfway thought I nudged Motley and asked to check outside and make sure we hadn't missed the ice cream van. (I love ice cream!) We hadn't. Eventually all the details had been thrashed out and we were pointed in the direction of a spot on the horizon and told we couldn't go directly to it but must perforce follow the perimeter of the field, and not to leave the cars there

Impressive wing flex from Frank Skilbeck's old HP 18 from the Pat Teakle kit

Antonia Gigg's DG 303 made the most of the booming conditions

The Darmstadt D34d prepares to land

Man-of-the-Match was tug pilot Tony Hazlehurst who towed non-stop all weekend

This Ka6 seems to have grown a moustache!

Andy Schafer with his 3rd scale Darmstadt D34d

but bring them back to the starting point.

By now we were wondering if the game was going to be worth the candle. But as Motley was the designated driver and would have to do all the walking, I felt quite sanguine. The assigned spot felt as though it was in the middle of nowhere, with a small runway facing more or less into wind, a giant haystack, a fence, a huge pile of poo and some trees, all of which were fair game to land on or in. There was no ice cream van.

So much for the negatives... On the other side of the coin we had an area all to ourselves, the sun was shining, the wind was light and all we had to do was to keep to the vast area to the West to avoid the Big Boys. If that wasn't enough the sun was behind us, which was good for both the relief of eyestrain and the benefit of photography.

Chris Garrod kicked off with his mighty ASH 25Mi and the up-and-go whirred away, carrying the model aloft. Had there been a full size up at the time it would have been a hard job indeed to distinguish between the two.

An aficionado of all things modern, TVSA's Andy Schafer had brought along his new Darmstadt D34d. This could be classified as Glass Vintage as it is one of the early glass machines from the 1960s. This is a prototype ARTF kit, with a glass fibre fuselage and foam/veneer/glass wings and built-up rudder and tailplane. Spanning 4 m, the D34 has a strange, dumpy appearance, being in some ways neither fish nor fowl, occupying as it does the space between vintage wooden and modern glass gliders.

The advantage is, of course, that it looks a little different from the many modern glass machines around and thereby stands out from the crowd. The model got plenty of airtime during the day and Andy seemed well pleased with its performance. (As I understand it, should anyone be interested, it will be imported into the UK by Glidermania.)

Motley was keen to get his Bergfalke into the air and seemed less than interested when I suggested he ought keep a look out for the ice-cream van, so I transferred the task to Smallpiece instead. On a personal note, I was able once again to discover that the Kite 2b is an excellent performer on aerotow, with a stable attitude during the tow and the ability to thermal turn at height with the minimum of interference from the squinty-eyed pilot.

Talking of which, in the thermal-rich environment of the day, an awful lot of squinting was going on. To find that I had to push my Bergfalke into a shallow spiral dive with the airbrakes out and with the altimeter still showing an upward trend, and the 1500' ceiling in danger of being broken through... well that's a trouser filling moment and no mistake! After finally landing, I collapsed into my chair, gasping, only to see Motley sail serenely by, sucking on a cornet.

'Don't panic, old swollen trousers' said Smallpiece, sitting down next to me and handing me a cone of the heavenly white stuff. Well, what can I tell you? Great days are made of this.

Amongst the fleet of gliders that were operating on the day there was K6 that seemed to be outsoaring all the rest, and one couldn't help but admire the skill of the pilot. It wasn't until the next day, when I was reviewing my photographs, that I noticed that the model was sporting a moustache. The folding prop was all but invisible to the naked eye in flight and I wished then that I had noticed at the time so that I could give its owner the third degree. Oh well, I'm sure there will be a next time.

Another 'vintage' glider was the HP 18 of Frank Skilbeck. This model was originally put together in the 1980s and has recently undergone some refurbishment. One of the popular range put together by Pat Teakle, there were many HP 18s to be seen around the country. Pat gave up production many years ago now but the good news is that the HP 18, and most of the rest of the range, have been re-engineered and re-introduced, and at prices comparable to those of the day: www.patteaklegliders.co.uk

A picture of intense concentration at the TVSA event

There were only two tugs in operation, those of Ray Watts and Tony Hazlehurst. Ray was uncharacteristically out of action a lot of the time so my Man-of-the-Match award goes to Tony, who towed the whole day long.

As it turned out there were very few full size movements during the day and when there were the arrangements to keep models and full size apart worked very well. We, the Motley Crew, were only there for the Saturday but as I understand it the next day was equally as successful. So it's a big thumbs up for the TVSA guys for organising and running this event so well, and to the host glider club for putting up with us. The guys and I look forward to repeating the experience next year.

Another Maiden Over

I alluded the last time around to the fact that my aeronautical pal Motley was engaged in the construction of another version of my 1:3.5 scale Flamingo. In the fullness of time the job was completed and it was just a day or so later that the miracle occurred. When our old friend Mr Jetstream blows down the front door, sits down on the sofa and puts his legs up on the coffee table, we know that we are usually in for a long visit.

He must have temporarily fallen asleep on this occasion, however, and Motley was on the horn toot-sweet to organise a visit to the hills. With his usual sleight-of-hand he handed me the transmitter and chucked the model into space.

From a journalistic point of view it would be nice to have lots of excitement to report but in truth the Flamingo flew 'straight from the board', as the old saying goes. It must have been as we were packing up that Mr J. woke up from his snooze because at the time of writing that was seven weeks ago and we've had nothing but rain and gales since.

The new Flamingo is as nice to fly as my original and it might be worth pointing out that the plan is available from Traplet, plan number MW3463.

The Flamingo in action on a Wessex Soaring Association slope

Author got to hold the transmitter for the maiden

Another Maiden-In-Waiting

After the conclusion of my Kite 2a project, I decided to stick patriotically to the Slingsby range and have a go at the two-seater Eagle, long on my bucket list and now at the top. Despite being known rather unflatteringly as the 'Mahogany Bomber' and other nicknames, the Eagle had a performance that belied its looks.

From a modeller's viewpoint it looks ideal, with a traditional slab-sided fuselage. But once embarked on the project it became obvious that this wasn't the simple job it seemed. The most complicated bit was the construction of the rear canopy. I peered at the limited range of photos of the full size that I had until my eyes watered and it took a good fortnight of deep cogitation to work out how it was done.

During the construction of the fuselage I came across a wrinkle that was new to me, so I thought I would share it, even if I am the last person on earth to work it out. Most fuselages taper at the front and the Eagle is no different. This means that the longerons have to have a bend in them. Holding the offending piece of wood over the spout of a boiling kettle whilst wearing a pair of Marigolds has always done the job in the past but this new way you don't get your glasses so steamed up.

Given that in this instance the longerons are 6 mm sq Cyparis, I simply cut out a piece of 6 mm ply, the top edge of which had a radius some one-and-a-half time the radius required by the plan. (The extra curve allows for the inevitable spring-back). Now it is a simple matter to wet up the wood, clamp it to the ply template and offer it up to trial-by-steam. Of course, once the fuselage sides are built flat on the plan the longerons now have to be bent in a different direction. But that's another story.

Whilst on the subject, there is always a similar problem when getting the lower rails of a canopy framework to match the curves of the fuselage side. Rather then giving the wood a good kettling, my approach is to make up the 6 mm square rail with two laminations of 3 x 6 mm spruce. The trick is to tape them to the fuselage sides as the epoxy cures, whereby it will take up the required shape, once again packing out 2 mm or so in the middle to allow for spring-back.

The forecast continues to underwhelm and the Eagle sits forlornly in the hangar. It will get better one day, right...?

Forming a bend in a fuselage longeron

The Slingsby Eagle awaits a maiden

Plenty of room for the little guys

The challenging rear canopy

Philosophy 101

Just as I was about to whizz this offering along the wires to the editor, I was called to the telephone for a consultation with my six year old granddaughter.

'Granddad, I have a question', she said

'Yes,' I replied, unsuspectingly.

'What makes the stars and all the black bits in between?'

'Good question, Milly' I replied (for that is her name), 'but the fact is nobody in the whole wide world knows.'

'What' she said, with manifest astonishment, 'Not even you?'

Funny, really. I've tried walking on water, but I just get my feet wet. **RCMW**

CONTACT
c_williams30@sky.com

BELL UH-1Y 'VENOM'

Fred Annecke takes a close look at a highly detailed Bell helicopter built by Frank Wedekind

Frank Wedekind was the proud winner of the Vario 2015 scale competition

During the Vario 'Open Door Day' a scale model exhibition is held and a three person jury judge the models. Last year the winning model was the Bell UH-1Y Venom built by Frank Wedekind.

The model represents the latest evolution of the Bell UH-1 series, being a stretched version of the Bell 412, which has been supporting the 'Marines Light Attack Helicopter Squadron 167' since 2010. The model follows the detail of the real one to such a degree that it is hard to consider a more accurate model helicopter. Here you will see some of the details of this remarkable model that took two years to build.

Stretched Fuselage

The basis of the model is a Bell 412 fuselage kit produced by Vario Helicopter. Frank did a great job by stretching the original fibreglass fuselage behind the cockpit area by about 80 mm. The complete tail and horizontal stabiliser were also modified according to the full size.

Modifying the fuselage meant it was necessary to develop a completely new set of inner frames in order to accept the Vario mechanics that originally were designed for the Sky Crane helicopter. This set of mechanics was rotated by 180°, which meant relocating the tail drive, after which it was fitted into the new fuselage. A longer main rotor shaft was needed to obtain the needed clearance between the four-blade rotor head and the top of the fuselage. A JetCat SPH5 two shaft turbine powers the model and is equipped with a double tube stainless steel exhaust outlet, just like the full size machine.

Working Cockpit Displays

It was really impressive to have a closer look at the fine scale details that Frank has implemented into this model. Not only were there countless rivets, sheet metal imitations and antennas to catch the eye, but also the fully glazed cockpit with working monitors. There are seven 1.5" colour LCD displays showing static pictures and video sequences appropriate to the original machine.

For example, there is the artificial horizon with compass, infrared camera, turbine status, checklist and command display. We have never seen such a custom made onboard information system brought to a scale model. Extendible spotlights with four one-watt flashlights, positioning lights and a load hook are the cream on the cake with this extraordinary model.

UH-1 Enthusiast

We took the opportunity to ask Frank why he focused on this type of helicopter for such a scale project? Frank told us that this model of the UH-1 series was not available in this specific scale before. And because he is a serious admirer of Bell's UH-1 helicopters in general, he decided to go with the 'Venom' and show its latest evolution.

We would like to congratulate Frank on his great build and for winning the Vario scale model building competition in 2015.

RCMW

Countless rivets, fine scale detail and decals underline the scale character of this extraordinary model helicopter

The position and shape of the horizontal stabiliser and the whole tail arrangement are exactly the same as the original helicopter

A Vario tail rotor gearbox and four-blade tail rotor are used. You will notice that one of the tail blades is attached the wrong way round. Even top modellers get stressed when preparing for this competition!

Here we see details of the stainless steel double exhaust outlets. A JetCat SPH5 turbine powers the custom modified Vario Sky Crane mechanics

The counter clockwise rotating Vario rotor head is equipped with Vario Shark Skin rotor blades

Countless rivets - no wonder it took 2 years!

Unfortunately the Vario tail gearbox isn't quite right...

The skids have been completely redesigned and the weapons are superb

The cockpit features six coloured LCD displays showing static pictures and video sequences, just like with the real one

That's the APU outlet

The detail continues underneath, including the radar dome

Everywhere you look you'll pick out more intricate detail

But what a wonderful end product?

MODEL WORLD

MODEL SPECIFICATIONS

TYPE:	Bell UH-1Y 'Venom'
SCALE:	1:6
FUSELAGE:	Vario Bell 412, custom modified
MECHANICS:	Vario Sky Crane, custom modified
MAIN ROTOR DIAMETER:	2300 mm
ROTOR HEAD:	Vario four-blade
SWASHPLATE:	eCCPM
MAIN ROTORS:	Vario Shark Skin
TAIL ROTOR:	Vario four-blade
TURBINE:	JetCat SPH5 (two shaft turbine)
ALL UP WEIGHT:	23 kg
FLYBARLESS SYSTEM:	Bavarian DEMON 3X

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SILVERLIT SPECIALS

John Stennard looks at two new versions of highly favoured indoor models

Honey, they've shrunk the record holder! The new version is distinctly smaller

The Nano Falcon XS record holder is safely 'hangared' in a travelling box with its Tx

Nano Falcon XS sits on the Tx mounted jack plug for charging

Silverlit continue to produce a wide range of R/C models, both flying and ground based. Some of their models are really innovative and break new ground. Two I have been impressed with from the latest batch are a new 'record holding' helicopter and an updated version of the Palm Z biplane.

Record Breaker

David Rawlins, Managing Director of Flying Toys, Silverlit's UK distributor, has sent details of the remarkable new Silverlit Nano Falcon XS Helicopter, certified as 'The World's Smallest Remote Controlled Helicopter' by Guinness World Records.

The Nano Falcon XS features contra rotating rotors, combined with a sophisticated electronic gyro for great directional stability. Nano Falcon XS offers a surprisingly smooth and responsive performance for a helicopter of this size.

Suitable for both beginners and enthusiasts, this tiny heli is only 45 mm long and measures just 56 mm, including its rotors.

David says, *"With the Nano Falcon XS, Silverlit have introduced their third generation of 'Guinness World Records Smallest Remote Control Helicopter', following the phenomenal success of their original PicooZ indoor helicopter, which became one of the best selling toys of all time."*

I was fortunate to be able to test fly a Nano Falcon XS and I have to say how remarkable it is that Silverlit have managed to produce an even smaller version of their World Record holding Nano helicopter. This amazing little machine weighs a mere 9.1 g and is powered by a 1S 45 mAh LiPo. The earlier record holder weighed in at 11 g.

The package includes a neat carrying case in which the helicopter and its transmitter fit very snugly. The three-channel IR Tx includes the charging jack for the helicopter flight battery and uses four AA dry cells. A light on the helicopter indicates when the charge is complete, and there is also a headlight that can be turned on and off in flight.

Three bands are available to match the IR Rx in the helicopter. If you want to change

Left: This helicopter is unbelievably tiny

it from the factory set band there is a special sequence for pairing and this must be followed. Yes, reading the instructions saves frustration! Once correctly paired the Nano Falcon XS can be flown straight away and it does fly well for something so tiny.

As usual with nano sized models a speedy take-off is best rather than rising gently. A high rotor speed is essential for stability. The Nano Falcon XS can be trimmed out for a quite steady hover and the yaw control is good. The pitch control is fairly gentle in both forwards and backwards flight. The duration is a few minutes, as you would expect when a 45 mAh battery is doing all it has to do to keep the helicopter flying!

This helicopter is a little nano gem and there are very few occasions when you can own a World Record holder and carry it around in your pocket!

Two Wing Wonder

The X-Twin Lite biplane is a real 'back to the future' experience as it uses two pusher motors with proportional motor steering. 'Been there before' you might well say, if you are of a certain age, but this time things are different. The new biplane is a very futuristic looking model and flies extremely well.

Looking back, the original Palm Z biplane also flew well and made a big difference to our indoor flying. Silverlit introduced the original Palm Z when indoor flyers were a bit stuck for alternatives to 'Shockies' and small-scale models were impractical for the average modeller.

Initially we were extremely happy just flying the Palm Z models around and some flyers cut their indoor teeth with them. The entire stock in many Maplin stores were bought up by indoor flyers wanting a new experience. The availability of 3 mm Depron and the AeroAce Toolbox website (still up and running thanks to Chris Raynak) led to many Depron designs using the 27 MHz gear and motors from the Palm Z. Suddenly you could build a micro size indoor jet that would fly in a one-court flying area.

These models were very popular and we had many successful 'own designs' built until the Kyosho Minium Cessna came along. The Minium models provided a source of micro R/C gear that could be used in alternative micro size models and this saw a decline in the use of the Palm Z gear.

The AA Toolbox also has plans available for Minium RC gear models and other micro gear models. It's worth a look at: www.aatoolbox.no-ip.org

Anyway, back to the new X-Twin Lite. By using a combination of plastic and foam a very stylish looking biplane has been produced. The wings are interesting as they are joined at the tips, so making for a very crash resistant design. The coreless pusher motors use a 1S mAh LiPo and the transmitter is a new design. It is on 2.4 GHz and is smaller than the original. The LiPo flight pack is charged from the Tx.

Flight tests indoors revealed that this model is a worthy successor to the original Palm Z design. The motors give ample power and provided the proportional motor control steering is used correctly the flight pattern is smooth and problem free. Tight turns always tend to mean a loss of height so minimal control inputs give the best results. This model can also be flown outdoors in calm conditions.

The new 'Power in the Air' X-Twin Lite biplane

Remember the Palm Z? The X-Twin Lite is a much-updated version of this classic design

Twin motors are mounted on the lower wing

Clever wing design gives added strength to this futuristic looking biplane

Silverlit have made their very successful original design even better and in many ways it's an ideal model for some stress free indoor flying.

Both of these models have a RRP of £29.99 but it's always worth a check on the internet to see what offers there may be around. **RCMW**

Build this 49-inch wingspan high wing sport model from our free pull-out plan, designed by Tony Wright for four function R/C and a .30-size two stroke glow engine

Make a pair of opposite fuselage sides by joining two lengths of balsa sheet

Add the balsa uprights

The Decaf is a semi-scale version of the Decathlon - a good looking aircraft, don't you think? This model was built before I took the plunge and converted to electric models, but it is still nice to fly an IC model now and then. But I digress. The outline of the model is near enough for our purposes. I have introduced slight dihedral because I think flat wings on cabin models always look as though they have anhedral – not a good look in my opinion.

The cabin windows are painted or you can do as I did and apply stick on windows cut from sticky back plastic in the best Blue Peter tradition. The construction is very simple. Let me take you by the hand and we should end up with a good all-round Sunday flyer.

Construction Site

All you need is a piece of MDF to build the two wing panels on. Tools used were a craft knife (with a good supply of blades), junior hacksaw, a hand or battery drill and a box of ordinary dressmaker's pins. You will also need a sanding block with medium and smooth grit glass-paper.
Not a lot, methinks?

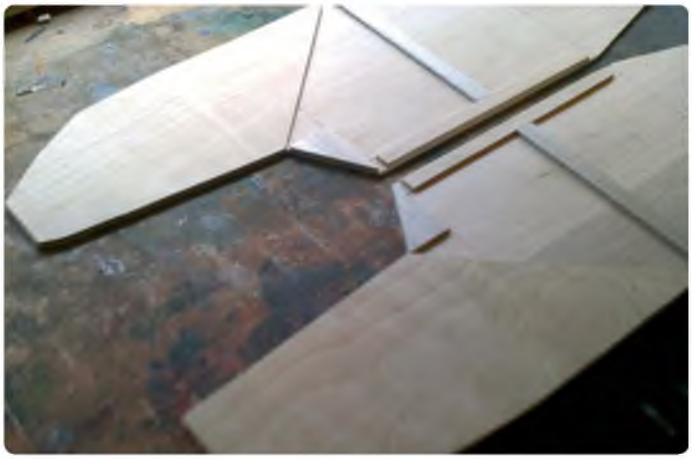
Materials

This is an all balsa construction with just a few ply parts and a couple of hardwood engine bearers. The undercarriage is a commercial item. For adhesion I used PVA glue throughout - well almost!

Building

Starting with the fuselage, you will have to join width-ways a piece of 4" sheet to a piece of 3" sheet. Lay them on the building board, join with Sellotape to form a hinge, fold back then apply adhesive thinly along the join. Hold them down on the building board using weights until set. You now have a 7" x 36" sheet of balsa. Now draw (or trace) the shape of the fuselage sides straight on to the wood. As all the lines are straight this is very simple.

Before you cut the sides mark the positions of the formers and uprights etc. It is easier to do with a tri-square before the sides are cut. Make a pair. Next we will need two-ply doublers. You can mark them out by simply drawing around the front of



1/16" plywood doublers are added to the front sections

Add small balsa doublers to the front and rear windscreen corners for the wing retaining dowels and wing seat doubler

Hardwood engine bearers are fitted now

Make up and fit formers F3 and F4 from 1/2" x 3/16" balsa strip

Heavy weights are used to hold the fuselage sides in place whilst joining them together

Bring the tail end together and hold with a suitable clip

the fuselage and marking the back edge using a rule. Traditionally the parts would have been stuck on using contact adhesive. But because they are not that big PVA will be okay, saving the cost of another pot of glue!

Finish the sides by adding the 1/8" x 1/2" balsa uprights, wing mounts and wing dowel reinforcements. Drill out for the wing and U/C dowels; you can use an old broken metal telescopic aerial section, suitably sharpened.

You will also need to make the two built up formers F3 and F4 from 1/2" x 3/16" balsa strip.

The engine bearers are required now. Any suitable hardwood will do. I have been using an old kitchen cupboard door cut up on my trusty band saw. Next mark the position of the bearers. Lay a rule along the 3"+ 4" balsa sheet join. Using a pencil draw along on to the ply doublers. This will give you an accurate position for the said bearers that can now be glued in place. PVA will be okay.

Time to join the fuselage sides now. As usual with my construction methods the sides are joined Keil Kraft style, i.e. F3 on one side and F4 on the other. Nice and square! You can then join the sides together (see photo above).

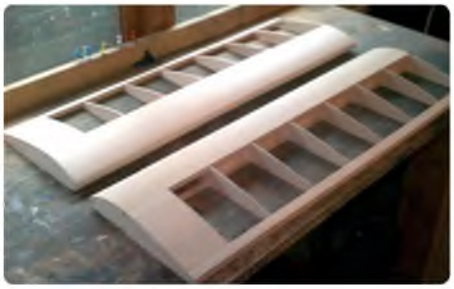
Next, fit the two other formers F1 and F2 and the 1/8" fuel tank floor. Regarding fuel tanks, I always use SLEC tanks; they are very reliable and easy to install. Temporarily position the tank on the tank floor, locate it with lengths of 1/4" balsa strips. It is held in place with foam rubber when it is finally installed. You can now sheet the cabin front and the tank compartment. Glue the lower ply and balsa sheeting up to F4.

Now it's time to join the fuselage sides together at the back end. Take a piece of glass-paper and fold it in two (scratchy side out). Trap the glass paper between the ends of the fuselage and pull it through a few times. This will increase the gluing area. Apply some glue between the ends and hold it together with a bulldog clip. To ensure a straight fuselage lay the model on its side, then measure the height from the board to the centre of the tail end. Turn it over and re-measure, adjusting until the two measurements are the same.

Fuselage complete with tail parts fitted and Dural undercarriage

Weights are used during wing construction to hold everything straight

The wing is sheeted with 1/16" balsa top and bottom



Just requiring the trailing edge stock and ailerons, plus 1/16" x 1/4" cap strips to be added

Ready for covering

There's plenty of space for the engine and fuel tank of your choice

This should produce a good straight fuselage. You can now sheet the top and bottom of the fuselage. So far so good.

Back to the front end. Unless your engine has got a very wide crankcase you will need an engine mount. You can use aluminium or Paxolin for this. Cut and drill to suit your engine (note the 3 degrees of right side thrust). Fix the engine to it with suitable nuts and bolts; and a drop of thread lock compound won't come amiss. We don't want the engine to fall out, do we? (It plays havoc with the C of G!)

The whole assembly is temporarily fixed in place. Drill pilot holes for the self-tappers or the bearers may split. You will probably need to trim the fuselage at F2 to clear the silencer (see nearby photo).

Time now to think about installing the R/C gear. The servos are fitted on cross rails. Make up suitable pushrods, with a Z-bend at the servo end and a quick link at the tail end. Use a Bowden type cable type linkage for the throttle.

The Wing

The wing is a very simple structure. This type of wing has been around for years so you should have no problems with it.

First job is to make a ply template for the ribs. Stick scraps of glass-paper to one side, as this will stop the template slipping whilst you cut the ribs. Now assuming you have cut the LE, TE and the spars to length we can start building.

As you can see in the photos, I prefer to use weights to hold the parts over the plan. You can, of course, use pins to hold the parts until the glue has done its job. To stop the parts sticking to the plan rub a candle where the joins occur; lengths of Sellotape will also do the same job.

Start by locating the trailing edge. Then, by using a rib or two, position the spar. Fit the ribs, keeping them nice and square, except the root rib, which will be slightly angled to suit the dihedral. Add the leading edge and the 1/16" balsa sheet webbing, with the grain vertical.

When all is set glue the top wing sheeting to the top spar only.

If you haven't already done so shape the trailing edge top, add the trailing edge sheeting and the cap strips. Again let the glue thoroughly set and then we can remove the wing from the clutches of the building board. You can now apply PVA to the tops of the ribs and the leading edge. Hang the wing panel just over the edge of your work bench and hold it down with suitable weights. You can then clamp the wing sheeting to the leading edge (clothes pegs are ideal). Repeat for the other wing panel. The wingtips are just a simple cutting and sanding job. Tidy the ends of the wings before gluing them in place.

Next, the strip ailerons. If you can get 1" x 3/8" shaped balsa stock of the correct section then use it. You will have to chamfer the leading edge otherwise you are going to have very restricted movement of the ailerons. If no suitable section is available you will have to cut them from

The engine is fitted to a Paxolin board, which is then screwed to the bearers

Radio compartment follows the standard layout

The undercarriage is 'banded on' to prevent damage in case of a heavy landing

A classic high wing build. Perfect for training or sport flying alike

Take - off is smooth and steady

balsa sheet. Shape the ailerons before you cut them from the mother sheet. It is a lot easier to hold.

We now have a choice to either drive the ailerons with a single servo via torque rods or fit individual servos in each wing. The advantage with separate servos is that some of you clever types who can drive a computer transmitter can mix flap movement in with the ailerons. I cannot cope with anything more than a standard four function transmitter, and even then it's all I can do to give the rudder a nudge on take-off!

The wing panels can now be joined. Cut a slot to accommodate the dihedral braces (D1 and D2 are glued together). Regarding the wing dihedral, as stated at the beginning my prototype has a small amount of non-scale dihedral. I think it looks better but you can build the wing flat if you wish. The centre section is sheeted top and bottom. If you are using torque rods for the ailerons now is the time to fit them.

Finish off by adding the centre section trailing edge and the 1/16" ply reinforcement. This is to stop the wing bands cutting the wing in half if you make anything less than a perfect landing!

Tailplane, Fin And Rudder

Cut the parts to shape and glue them together. Sand to profile. The bottom of the rudder is reinforced each side with 1/16" ply. That's it!

Covering

I used Solarfilm simply because it is just the job on a model this size. After covering you can hinge the moving surfaces. I use Mylar, secured with slow setting cyano (don't use fast cyano unless you are very confident you can position the moving parts very quickly). No need to peg them. Don't glue the tailplane to the fuselage just yet.

(Sorry to disagree, Tony. But Mylar hinges are best put into position dry, then glued into place using thin cyano, which will wick fully down the length of the hinge. Using thick or medium cyano is likely to end up with just the areas closest to the hinge line being glued. When hinges pull out this is why you often see a line of wood fibres attached to the Mylar close to the hinge line, while the rest of the hinge looks fairly clean – KC)

Final Assembly

Now we have an ARTF. Not too difficult, was it?

Fit the fuel tank with a suitable fuel filter. Re-fit the engine and the radio equipment, but not the battery! Band on the undercarriage (a Super-Sixty type will do fine). Now before we fit the tailplane, fin, etc. we will have to set the C of G. You will almost certainly have to add tail weight (yes, tail weight for a change). Mark the position of the C of G on the fuselage wing mounts, balance the model with a piece of wire between the fuselage sides at the

C of G position. Now add the tailplane/fin assembly and add weight until the model balances level.

We now know how much weight we need at the back end. Convert this in to a strip of lead sheeting. My model required a piece 1/8" (3 mm) thick x 1" (25 mm) x 3" (75 mm) folded in half and jammed in at the tail end. Secure it with scrap balsa well cemented in place. You will be able to set the final C of G by moving the battery about.

Glue the tailplane onto the fuselage, followed by the fin and rudder, making sure all is nice and square.

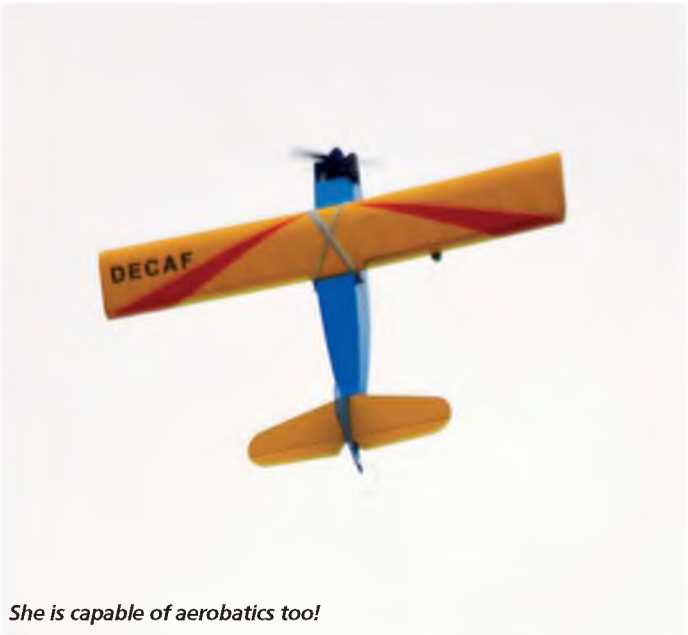
Now unless I have left out anything obvious we should have a finished aircraft.

The Flying Bit

After the usual pre-flight checks I flew the Decaf. What can I say? It flies like a dream and all of the controls are well harmonised. My flying is limited by arthritis in my hands, so if I can fly it anybody can. I just do circuits, with the odd roll and loop, and it keeps me out of trouble. Landings and take-offs are smooth and surprisingly slow.

If you do decide to build a Decaf please let me know if you have any problems (the modelling type, you understand!). Until the next one, I thank you. ***RCMW***

Flying gentle circuits, Decaf could be used as a trainer



She is capable of aerobatics too!

CONTACTS

Tony Wright
thepufango@gmail.com

RC MODEL WORLD DETAILS

MODEL SPECIFICATIONS

PLAN NAME:	Decaf
WINGSPAN:	49" (1245 mm)
LENGTH:	36.85" (936 mm)
WEIGHT:	2 lb (1792 g)
ENGINE:	.30 two-stroke glow or 5 cc diesel
RADIO FUNCTIONS:	4
BASIC CONSTRUCTION MATERIALS:	Balsa & plywood
COVERING MATERIAL:	Solarfilm

CONTROL SURFACE THROWS
Rudder: 1" (25.4 mm) left to right
Elevator: 1/2" (12.7 mm) up and down
Ailerons: 1/4" (6.35 mm) down, 3/8" (9.5 mm) up

PLAN DETAILS

NAME:	Decaf
BUILD CATEGORY:	Beginner
PLAN NUMBER:	MW3788
PLAN PRICE:	£11.99 ($20.99)

Plans and parts (if available) are subject to Postage and Packing charges at standard rates.
Copies of plan number MW3788 are available from RC Model World (Plans Service), Traplet Publications Limited, Traplet House, Willow End Park, Blackmore Park Road, Welland, WR13 6NN, England,
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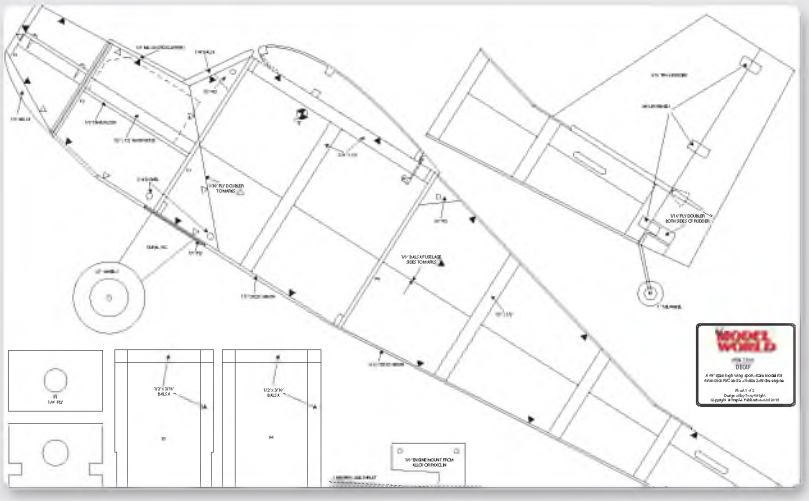
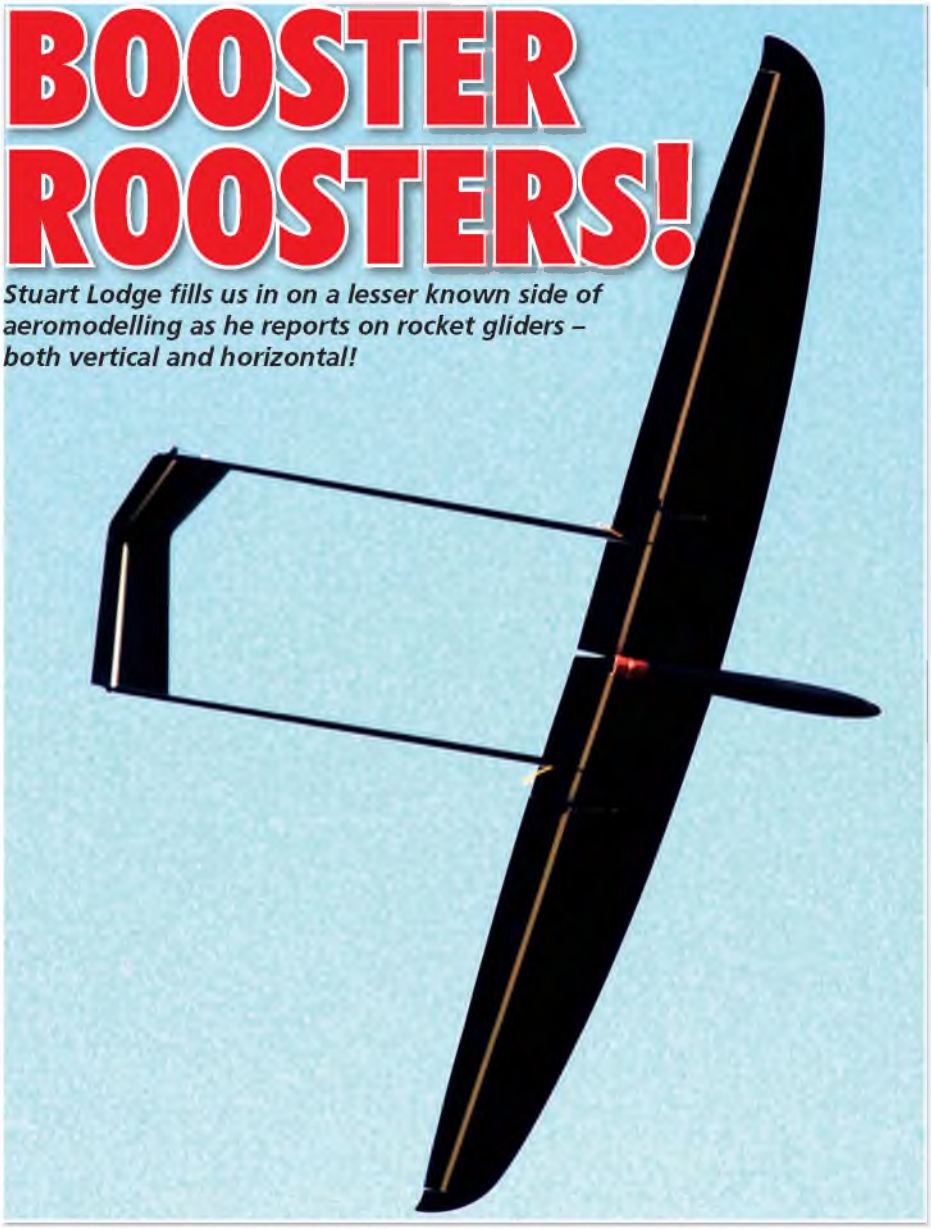


BOOSTER ROOSTERS!

Stuart Lodge fills us in on a lesser known side of aeromodelling as he reports on rocket gliders – both vertical and horizontal!



'Mars Lander' S8E/P-RC Rocket Glider by Mike Francies (GBR) in glider mode at the Ljubljana Cup, in 2010. Super!

Gliders need a 'propulsion system'! Altitude needs to be obtained from somewhere and traditionally a strong right arm, bungee, towline, a motor and even towing aircraft are de riguer. Model rockets need a 'recovery system' to prevent them plunging back to earth. 1912 saw one Carl Neubronner equip a basic model aeroplane with a fireworks type rocket. This performed tolerably, ticking both boxes and this was where rocket boosted gliders started.

In more recent decades full size aerospace needed to evolve something similar and NASA's Space Shuttle and CCCP/Russia's equivalent, Energia-Buran represent real world, 21st century rocket boosted gliders.

Some terminology and contradictions need clarifying. Model rockets boost upwards at 100's of kilometres per hour (kph); gliders soar horizontally at approximately 30 kph. Some circles to square then? The term 'rocket boosted glider' covers a multitude of sins, so what's it all about?

Flight Stability

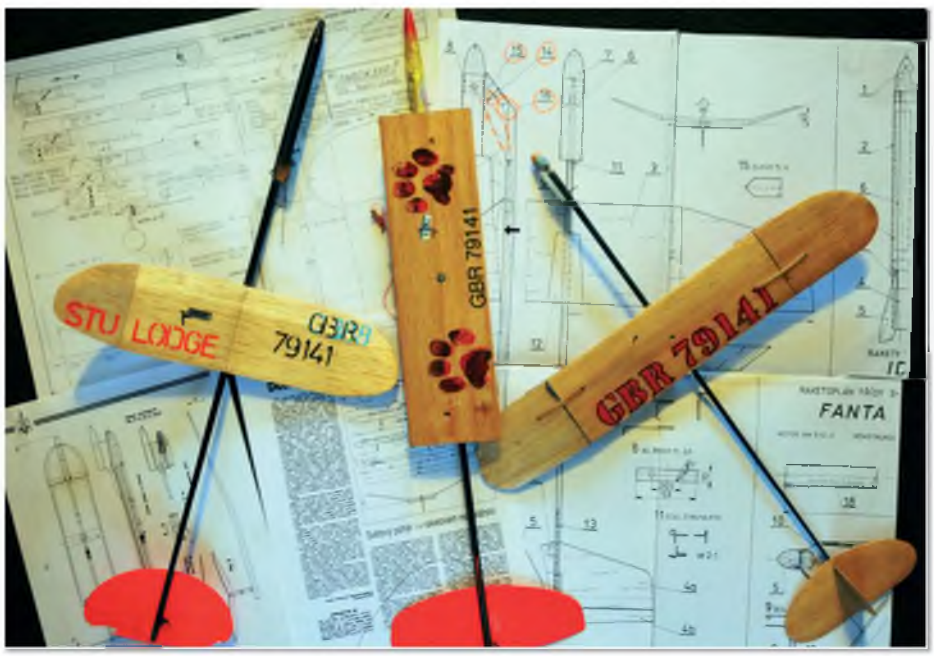
Rockets are stable because the Centre of Gravity (C of G) is 1+ body diameter ahead of the aerodynamic static Centre of Pressure (CP). Gliders are different, with their C of G and CP loci residing at the around 50% wing chord location. Glide velocity is slow – much slower than any rocket boost speed. Simply fixing a nose-mounted pod to hold the rocket motor cannot deliver… A ground-seeking trajectory is most likely!

What is needed? It is vital that a glider wing's lift potential needs neutralising whilst the model is boosting, to ensure a vertical boost.

At this stage the model rocket motor, a dense and fairly heavy piece of kit when full, plays a key role. Using a nose-mounted pod, plug the motor into this and the C of G migrates forwards to the wing's leading edge, even in front. The wing becomes ineffective as a lifting surface and many enthusiasts even add trim tabs, resembling an aileron or take-off flap, to one of the

Mike Francies (GBR) poses with his 21st century S8E/P-RC Rocket Glider at the 2011Catalunya Cup

Below: A rigid S4A-Boost Glider, with two 'folders' atop a selection of designs from around the world



Nige Bathe (GBR) sets up his 'Toblerone Special'. This S4A-Boost Glider's wing swivels 90 degrees and is then 'rolled up' around the fuselage and becomes a 'rocket'. At the top of the boost it all unrolls and becomes a glider again

S8E/P-RC Rocket Glider features bigger, more sophisticated designs. Mitja Zgajner (SLO) boosts away at the 2011 32nd Ljubljana Cup, Slovenia. Check out the snow on those mountains!

Nuria Crusellas (ESP) prepares her folding wing S4A-Boost Glider on a high efficiency piston launcher at the 2009 Catalunya Cup in Spain

Chuckie with a rocket boost! Bedrich Pavka (CZE) launches his rigid balsa boostie. When these work well we wonder why we try anything different!

Image of Carl Neubronner's rocket boosted glider on your scribe's model box

Christmas card from Raketomodelarski Klub Krupka (CZE). Note the very simple rigid S4A-Boost Glider in the foreground, with an equally simple 500 mm x 40 mm contest high performance duration rocket nearby

wings, promoting a roll during the boost segment of the flight. To learn about basic model aircraft trimming spend an hour or two with a traditional aeromodeller.

Boost gliders have the motor at the front, to make life easier. And it's obvious, when the motor's ejection charge fires and spits out the spent case, that the C of G relocates to the glide segment locus.

Decalage

These are the incidence angles of the wing and tailplane. It is a subject of debate too; some line up their wings and tails in the zero-zero state, leading to straight, high boosts, but such models are critical in the transition phase, from the coast segment into the glide – get it wrong and SPLAT! Employing a couple of degrees positive wing incidence makes things more predictable, as does inducing a roll in the boost phase.

Boost Gliders

Simple free flight models, resembling hand launched gliders commonly known as 'chuckies'. These are boosted skywards using standard model rocket motors. The key definition is that the motor is normally ejected before the glide segment of the flight starts. 'A' and 'B' motors of 2.5 and 5 Newton second (Ns) are the normal motor impulse.

Rigid Gliders

S4A Boost Gliders boost using 2.5 Ns 'A' motors. That's where the 'A' comes from. They weigh between 25 – 30 g, including motor and ready to go on the launcher. Smooth impulse delivery is vital, contrasting with the hard whoosh normally delivered by hobby shop motors.

The best boost glider propellants are made in Eastern Europe, where this event is an art form. Soft-blowing A2-2 motors are pretty typical and nothing in Estes' otherwise comprehensive array is remotely similar. Coast times must be kept short as speed decays rapidly after burn out. Wing flaps are employed by some designers, held in the up position for boosting and released as the motor ejects for the glide. Others employ differential flaps for the boost segment, one fully up, the other half down to induce a gentle, slow roll.

Folders

1980s Cold War developments led to the USSR's Sergei Illin's novel take on an S4-Boost Glider, evolving a wing that tucked in its tips and pivoted through 90 degrees on the fuselage mount. The wing now folded and was parallel with the fuselage during the boost segment of the flight. So the glider became a true rocket when boosting, the ejection charge burning through a thread and releasing the spring-loaded wing… Suddenly lots of wing area appeared and the rocket became a glider! Super, but harder to design and build.

Folders nudged traditional rigid gliders off the podium in succeeding years. Contemporary Russian developments include stowing a folded glider in a normal rocket tube, boosting to silly altitudes before spitting it out! These resemble

Nige Bathe and Mike Francies (GBR) pose at the 34th Ljubjana Cup in 2012. These S8E/P-RC Rocket Gliders are at the 'Formula 1' end of the hobby, with extensive use of contemporary composites throughout. Sensational performance

Balkan Cup, Dupnica in Bulgaria 2012. Two S4A-Boost Glider 'folders' on the launchers ready to go. Macedonian, Zoran Atanososki gets his ready

Hans Stoll (SUI) blasts off at the Tessin Olza Cup, Czech Republic in 2015. Regular campaigner and a distant traveller from Switzerland

Another super boost at 2015's Tessin Olza Cup, Czech Republic, against a magical landscape. This model is smaller than many modern designs but still flies well

Zing Wings – polystyrene wings that are designed to fold in half, before being fired upwards by catapult, springing out their wings as the velocity decays.

Balsa gliders can be made to do the same, then 'rolled up' and slid inside a lightweight body tube. Performance is stellar – almost 'fire and forget' – because of the poor visibility of the tiny airframes.

Rogallo Gliders

Boost and rocket gliders are made from rigid materials, such as balsa, polyurethane foam and contemporary composites et al. Rogallos are flexible, resembling a hang glider. These are rolled up to fit in a rocket body tube for launch, shedding this for the glide segment. Ironically, 'folders' were ousted from FAI contests by the ultra-efficient rogallo glider, which the Bulgarians brought to the USA's 1980 World Space Modelling Championships. However, rogallos were subsequently reclassified as FAI class S10 and haven't seen the light of day since! They are rare birds and won't be featuring again in this piece.

R/C Rocket Gliders

Rocket gliders are better when much bigger and radio controlled. Sorting the C of G – CP migration nicely. As for power, bigger R/C gliders need 'D' to 'E' motors of 20 – 40 Ns impulses. The spent motor is retained for the duration of the flight, although recent FAI contest rules have 'greyed' this key point.

R/C Rocket Gliders are a fantastic diversion, and are exciting and spectacular too, flying on 40 Ns impulse. That's the 'E' in S8E/P-RC Rocket Glider, reaching around 300 m (1000 feet) in 10 seconds. But more expertise is needed by the modeller as many rocket gliders have complex built-up wings, sheeted over in balsa, whilst others are layered up from contemporary composites – a case of 'experts only'.

Radio control needs? Two or three channel radio at the basic level, with rudder controlling the yaw axis and elevator controlling pitch. Ailerons (roll axis) may be controlled by the third channel. R/C gear just gets better, with ultra-lightweight receivers, servos and power packs readily available in the hobby shops. V-tails, combining rudder and elevator functions on the same surfaces, are often employed and work by 'mixing' the servos' functions. Some use 'spoilers' to flop the glider onto the turf for spot landings.

Decalage Again

Re-read the boost glider basics, but R/C rocket gliders normally feature a few degrees of wing incidence. The glider is able to be trimmed nose-heavy in the boost segment, with re-adjustments dialled in via the R/C transmitter for the glide segment. Normally a whisker of down elevator is programmed in for the boost segment, keeping the glider boosting straight.

Traditionally motors were always mounted in a nose pod, atop the fuselage, just like a big boostie. Effective, but crude and ugly! The 1990s saw underslung motor mounts coming into play and these days the motor is normally to be found under

Glide segment. A really slinky Bulgarian design at 2011's Belgrade Cup, Serbia. Note the 'old style' motor pod atop the nose

And if you get unlucky? This motor suffered a 'cato' – a catastrophic failure, and went POP!

the wing. Research has shown that to have the motor tube underslung between the wing mount and the fuselage boom, with approximately three degrees of thrust inclination, focused through the glider's C of G position, really improves the boost segment.

Composites, like aramid fibres - Kevlar, carbon and glass - are common selections in construction. FAI's contest class is a duration based, precision landing event, the objective being to land on a spot, with a flight duration of exactly six minutes. Points are lost for being early or late, and for being more than one metre from the landing spot.

Ground Support Equipment (GSE)

Regarding launchers, gliders don't resemble rockets and with the motor placement towards the nose an 'umbilical' is often needed. Consequently, simple pad and rod combinations don't work, leaving the glider's wings flapping in the breeze and the ignition wires dangling and in danger of fouling the tailplane!

All rocket boosted gliders need wing support, usually rods set up parallel with the launch rod. It's time to remind ourselves that most boost gliders usually need launch lugs too.

Big radio controlled rocket gliders have special needs, like a heavy duty launcher, usually angled upwind, facilitating better guidance of the glider during the boost segment. Reliable GSE is vital to the successful flying of rocket-boosted gliders.

Flare Out

'Booster Roosters' are complex and need more knowledge in terms of design, building and flying than virtually every other kind of model rocket. Crucially, they form a key interface between Space Modelling and Aero Modelling. This is a snapshot; we've not covered rear-motored boosties, for instance. They exist, but are more commonly found Stateside than in Europe.

Modellers in the USA are also keen on canard gliders. That is to say models with the tail at the front and the wings at the back of the fuselage.

Over five decades now almost everything has been checked out by an enthusiast somewhere, but the elite kit is to be found in FAI competitions around the World. However, to reiterate, boost gliders are where space modellers and traditional free flight and R/C aeromodellers can find common ground. Rockets and gliders form the perfect synergy. Give them a go...

RCMW

POLARON EX COMBO

Join us for a quick tour of Graupner's coupled solution to a power supply and battery charger combination

The combo comes in this chunky red flip top box

The Polaron combo is a neat space saving solution when charging from the mains

After you have been flying electric powered R/C models for a while the chances are that you will want to prepare multiple battery packs (typically LiPo's) in readiness for a flying session. The easiest and most reliable way to provide a consistent power source for your charger whilst at home is to use a mains powered power supply that you can plug in to a wall socket.

This works well but invariably the Power Supply Unit (PSU) will be quite chunky and then you have to connect it by wires to your charger, which, if it is capable of charging higher numbers of cells, is also likely to be quite large. The whole shebang is likely to take up a fair amount of space on the table that you use as a charging station, even more so when you add in the real estate taken up by the battery packs themselves, the charge cables and connectors, and the balance boards.

Enter Polaron

Therefore, wouldn't it be great if the power supply and charger could be coupled directly to save space, but were still capable of being separated so that the charger can be taken away for use at the flying field? That's exactly what the Polaron EX Combo offers, and in a range of five colours too!

It consists of a triple output 12 V, 25 A switch mode power supply (SMPS) that sits side by side with a matching charger with twin 400 W channels.

Why triple output? (Actually it's four if you include the handy 5 V, 1A USB outlet too!) Well on the front face of the power supply are two sets of output sockets into which you can plug additional chargers or maybe use them to power a mini drill or other 12 V DC powered device.

The clever bit is the set of three sockets built into the side of the unit in a triangular layout, which provide the third output to power the charger that docks alongside. The top socket is the negative terminal, with the positive terminal situated on the bottom at the front. The last socket, bottom rear, is a dummy and provides a stable third mounting point. A matching set of terminals is provided on the side of the Polaron charger and the two units simply connect together using three, double-ended lantern connectors. When the pairing is uncoupled the connectors are best removed and kept together in a safe location.

User Interface

The output from the power supply is presented via a black and white backlit LCD display that shows the actual output voltage and output current from the SMPS, as well as the external temperature. The operating temperature range is between 0 to 40 degrees Celcius, with good internal heat dispersion being supplied by an efficient cooling fan. A horizontal bar display in a vertical stack also shows any overload in 2.5 A sections.

The charger unit has a bright colour touchscreen that gives access to an easy to read set up menu. A stylus is provided if you find that you need finer control than that provided by your fingertips.

Polaron can be used to charge the usual array of R/C hobby batteries, namely those with LiPo, LiIon, LiFe, NiCad, NiMH and Pb chemistries. It offers comprehensive monitoring of the charge and discharge processes and has the usual cycling and balancing functions too.

Our sample was provided for preview only so we have been unable to test it fully, as it needs to be returned to Graupner's UK distributor, Logic RC. But it certainly appears to be a high quality and easy to use charger.

Extra Functions

A quick scan through the well illustrated and easy to read manual revealed a list of useful extra functions, which can be accessed via the MISC setup page. Here, Polaron can be used to test the performance of servos and brushless motors, as well as testing and conditioning (bedding in the brushes) of a brushed motor. If you use Graupner ESC's with telemetry then you can also use the Polaron to set up and alter your speed controller's settings without having to use a separate programming device.

Our favourite though has to be the Battery and Tyre Warmer facility.

By plugging in an optional battery warmer bag to the output terminals, and plugging a temperature sensor into the socket just below the balance port, the Polaron can be used to bring your LiPos up to the perfect temperature for winter flying, thus ensuring that they provide maximum performance.

This function can also be used to warm R/C car tyres too! Just like full size racing cars, model cars benefit from starting a race with warm tyres. **RCMW**

Lights out so we can show you the display panels. The figures on the left monitor the PSU output, whilst on the right is the main menu for the charger

Front panels, with the power supply on the left and the dual output charger on the right

Rear panels showing plenty of cooling fans. When field charging the Polaron is plugged in using a sturdy XT-90 connector

Left side view of the docked units

Right side view showing the ancillary connectors for the MISC functions, plus an extra USB output

The charger and PSU are easily undocked by unclipping the stand and simply pulling the two units apart. They are connected using double-ended lantern connectors

PRODUCT INFORMATION

NAME:	Polaron EX Combo
MANUFACTURER:	Graupner
DISTRIBUTOR:	Logic RC
WEBSITE:	www.logicrc.com
PRICE:	£399.99

Polaron EX 2 Channel DC Charger

OPERATING VOLTAGE:	11-28 V DC, or via docking system
DISPLAY:	3 inch TFT LCD touchscreen
BATTERY TYPE:	NiCad, NiMH – 1 to 14 cells LiPo, LiFe, LiIon – 1 to 7 cells Pb – 1 to 12 cells (2 V/cell)
OUTPUT:	2 channels (400 W x 2 = 800 W)
CHARGE CURRENT:	0.1 to 20 A (max 400 W on 24 V, 220 W on 12 V)
DISCHARGE CURRENT:	0.1 to 10 A (max 60 W)
MAX. BALANCING CURRENT:	350 mA
USB OUTPUT:	USB B-type, 5 V output, 2.5 A
DIMENSIONS	88.2 L x 203.4 W x 196.3 H mm
WEIGHT:	1368 g
MEMORY:	20 memories per channel (40 total)
FIRMWARE UPGRADE:	Via external mini USB device
PC COMMUNICATION:	Via Graupner Logging Software

Polaron Power Supply

INPUT POWER:	100-240 V AC
OUTPUT VOLTAGE:	12 V DC
OUTPUT CURRENT:	25 A (max 30 A)
USB OUTPUT:	5 V, 1 A
OUTPUT TERMINALS:	Front – two channels Side – one channel for Polaron EX docking
WEIGHT:	1213 g

UK DRONE SHOW

Tom Stephenson takes us on a photo tour of the new multi-rotor and UAV show held at the NEC in early December

Before the off! The RCFCA crew prepare to face the crowds before the start of the UK Drone Show

Catwalk pose to show off the other side of the RCFCA shirts

They're off! As soon as the doors were opened visitors started buying the magazine and signing up for the chance to win a Parrot AR Drone 2.0 Power Edition in the free RCFCA prize draw

Mal Luff answers questions from visitors, many of whom were impressed by the quality of parts printed by this affordable 3D printer. Ideal for making drone parts!

Held on Saturday the 5th and Sunday the 6th of December 2015 at the NEC in Birmingham, the UK Drone Show was a ground breaking new event that featured many of the latest drones and associated technologies. The show was the perfect platform for exhibitors to showcase their current product ranges and also to offer an insight into their future developments.

The show also aimed to assist drone pilots to fly safely, with lots of advice for those about to take their first flights and also for those with more experience. There was a focus on safe operation and the need to adhere to current and future regulations. Drone operators could also meet industry experts for advice on careers, training and insurance.

Watch And Buy

The British FPV Racing Association were in attendance, as well as many experts in this rapidly growing field of drone technology. The flight area was alive with demonstrations of FPV Racing, Freestyle and Proximity Agility, flying in a purpose built flying arena. Spectators were able to witness some of the most exciting drone designs being put through their paces by the new breed of FPV pilots.

In other displays pilots associated with the top brands exhibiting at the show also took the opportunity to demonstrate the unique features and abilities of the products that their companies had on display. Many companies used the busy two days to release new products and it also proved to be the ideal opportunity for consumers and journalists alike to see and interact with the latest technology prior to the Consumer Electronics Show (CES) 2016 in Las Vegas at the start of the New Year.

There was also a significant retail presence at the show, with retailers and manufacturers offering advice and expert guidance at all levels of drone technology. From sub £100 fun products right up to professional level filming platforms and their associated equipment, the show offered something for everyone regardless of their level of expertise or budget.

Be Inspired

After walking around the show visitors could relax in the Domed Auditorium, which was sponsored by the CAA, and listen to a specially selected list of guest speakers, who gave talks on a wide variety of drone related topics. Speakers ranged from the CEO's of training companies to pilots at the forefront of commercial and humanitarian work.

Visitors were also able to see the drone designs shaping the future of the industry. Our sister publication, RC Flight Camera Action magazine was a media partner for the show and on the RCFCA stand visitors could experience real-time 3D printing. On other stands visitors could find pilot training information and see the latest drone software, apps and other attractions.

Drones On Film

The role of drones in both amateur and commercial film-making were also taken into account. The show showcased the many ways that drones have been used to create stunning images, not only from the air but on land and underwater too.

The UK Drone Show 2015 proved to be a great success and it was well received by prospective pilots, designers, manufacturers and retailers.

RCMW

Visitors who purchased a subscription to RC Flight Camera Action walked away with a free gift in the shape of a Silverlit Nano Xcopter or similar palm size drone

The spacious drone display area drew large numbers of spectators

Mal Luff (left) from Traplet Publications and Barry Atkinson from Sarik Hobbies were on hand to explain the finer points of 3D printing

Revell Control and Hobbico sport drones were a popular draw. Visitors could try out R/C flying using a Great Planes Real Flight simulator

Fisher Delta 3D Printer demonstrations were carried out throughout the show by the Sarik Hobbies team. You can read a full review of this versatile machine in issue 4 of RCFCA

The lads at Midland Helicopters, a long established R/C specialist, were so busy it all became a bit of a blur!

Xiro's Xplorer is modular in construction and stands out with its stealth-like styling

How about this for a transmitter? The Yuneec ST24 Personal Ground Station offers 24 channels on 2.4 GHz, with a 5.8 GHz video downlink and First Person View via a seven inch LCD screen

Yuneec is another brand with a long history in R/C model aviation, aided by its experienced management team led by Clive Coote

First Person View (www.firstpersonview.co.uk) were on hand to answer detailed questions about the popular DJI drones

The UK Drone Show could boast a good attendance on both days of the weekend

Ehang were promoting their Ghost Drones by demonstrating them in their own mini flying arena

A noticeable feature of the Ghost is the very sturdy guard rings around each rotor for added flight safety

The inflatable Domed Auditorium beckons...

Inside visitors could listen to a wide range of drone related talks by industry leaders

It was great to see the British Model Flying Association at the show. The BMFA are working hard to integrate new drone enthusiasts into the long established world of R/C model flying. As the National Governing Body for the sport of model flying the BMFA are well worth joining, with flight insurance included as part of the membership package, which you can read about here: www.bmfa.org/Info/Articles/Know-your-insurance

Flying Tech is a Warwickshire based multi-rotor specialist. Their stand was often crowded with visitors buying kits and drone accessories

Horizon Hobby have been at the forefront of exciting developments in the R/C industry for many years and can be relied on to provide some interesting drone technology

High street giants Maplin were displaying their range of drones, with emphasis on the Parrot Bebop

Align are experts in designing and manufacturing high performance model helicopters and they have been bringing their expertise into the drone market for a few years now. Here's the impressive Align M470 with smooth body styling and folding propellers

What better way to relax than by chilling out at the Evolution Dome stand, who also make an inflatable Flight Zone that would be ideal for drone and small helicopter displays at model shows

RUSTA are a CAA approved training academy where UAV and drone operators can qualify to undertake aerial work for commercial purposes. Apologies to all the other stand holders, whom we didn't get a chance to feature in this report

No one could miss the Align/Helifest stand!

Panasonic put on a great display of cameras that are well suited to aerial photography, including the latest models with highly impressive 4K video capabilities

Leading photography retailer Jessops were on hand to give tip-top advice on how to integrate and operate aerial digital camera platforms

Fossil Stuff are UK manufacturers of FPV racing quads, such as the Gravity 280 pictured here that features durable HDPE (High Density Polyethylene) frames for improved crash resistance

REFURBISHING SPARKY

Arnaldo Correia shows how to bring a rubber powered Old Timer into the 21st century using Depron wings and micro R/C gear

Sparky handles well inside the gym's tight confines, easily making circles and figures-of-eight

Remember when, although our models had to be built, life was simpler, our waistline was slimmer than our chest and there was always good weather! How about going 'back to the future'? (And yes, I do remember the good weather was not that plentiful. It just seems so now, when we look back through our tear-stained, rose-tinted, prescription glasses!)

This is a story on how to refurbish an already built, small model and how to adapt it to R/C and electric power. It is not an article on how to build a conventional 'stick and tissue' model. Others have addressed that in the past. But if you are new to this and fancy having a go you'll find plenty of help online on how to construct a traditional 'stick and tissue' flying model.

In 1940 Ed Ligard created a nice rubber powered model in the USA and, probably with more than a little help from Carl Goldberg, succeeded in convincing the management of the then Comet Model Airplane and Supply Company (later, Comet Model Hobbycraft Corporation) to release it as a kit.

I believe that kit was continuously in production till the late 1980s, although they might have produced it until Comet was bought out by Guillow's in 1998. Anyway, that long production run might be some sort of record! Much like Mr Hatfull's Ajax and Achilles from Keil Kraft, in fact.

I understand a plan version was also released, which had many of the 'whistles and bells' of a good competition model of that era. On the 1941 version these were the retractable mono-leg 'take-off gear', sliced ribs for the wing and the horizontal stab, a raised tail dethermaliser and a folding propeller. If you want to take a look you can get the plans for both versions, as well as an article, written by Ed Lidgard himself in 1981, at that wonderful site: http://outerzone.co.uk/

The kit version was far simpler, with conventional ribs and a fixed two-legged U/C. And, when I bought it, a nice P-30 type plastic propeller replaced the usual 'balsa saw-cut blank' issued with the earlier kits.

By the way, if you are wondering what it might be, P-30 is a low key, no frills, rubber powered competition class where a plastic propeller is mandatory, as carving a balsa one is generally a stumbling block for any would-be aspiring rubber power competitor.

A 'bare bones' photo showing the new Depron flying surfaces mated to the 30+ year old balsa airframe

The elegant lines of the model can easily be seen

Flying Friend

I managed to buy one such kit at a local hobby shop in the early 1980s, which in itself was almost amazing as imports from 'across the pond' were not that plentiful then. With a four-strand 3 mm x 1 mm (1/8" x 1/32") Pirelli motor, properly lubricated, it was a nice model, being easy to trim and fly, that provided many happy hours of entertainment. It was so good, in fact, that a dear friend and flying buddy of mine decided to buy one too and to enjoy all that vintage modelling had to offer.

Unfortunately my flying buddy died in the late 1990s. His son, who used to joke that I was the aeromodelling son his father never had, very kindly gave me all his father's aeromodelling stuff, from aircraft and engines, down to old magazines – a real gold mine for 'aeronuts' like myself! Thanks, José! I doubt you'll ever fully understand what that gesture meant to me. It was the gift of a lifetime, believe me!

As time went by I would occasionally play with the idea of refurbishing either my model or Elias' (that was the Christian name of my late flying buddy). And when micro models came along we finally had the affordable kind of gear necessary to convert old rubber models into the New Age.

First the Kyosho Minium bricks, then the Spektrum ones, were a godsend. These, together with small, affordable (again, that word) electric motors and LiPo batteries finally allowed us to fly and control our small models. We could only have dreamed of doing this before, either outdoors in calm conditions or, even better, indoors when the weather outside was too harsh to fly.

This year I finally took the plunge. As a tribute to my friend I decided to convert his model rather than mine. The airframe itself was in good condition, the 30+ year old tissue covering less so, being quite brittle in fact. So the first thing was to carefully remove the covering and those hardwood wheels, which Comet issued with every kit (at least, the ones I bought in the late 70s and early 80s).

At the same time I decided I first wanted it to be an indoor model, not only so I would be able to fly it more often, but also because most of chaps I fly indoor with had, quite certainly, never seen such a model before.

If the old tissue was fixed to the airframe with dope one way to remove it is to apply cellulose thinners liberally over the tissue with a brush, then put the structure inside a large plastic bag, close it and wait. The fumes in the saturated atmosphere inside the bag will dissolve the dope and release the tissue. Be careful though if the model was built using balsa cement as cellulose thinners can dissolve that too! So test the tissue every ten minutes or so to check if the dope has softened yet, and take the structure out of the bag as soon as the tissue can be released from it. With a little care the tissue will be free long before the fumes have had a chance to attack the cement. If, for any reason, the odd glued joint does fail a drop of thin cyano will soon fix it.

Flying indoors means, for me, to use a nice undercambered wing. Although some of my friends do not quite agree, I believe – and the tests I performed have shown – that an undercambered, rolled Depron wing allows me to fly slower than a 'Clark Y-style' flat undersurface wing section (as provided in the kit) does.

Also, the Depron wing is faster to make and is probably lighter than building a new balsa wing with an undercambered section. The original balsa wing won't go to waste though as I plan to re-cover that one too at a later date. Then I will be able to fly it outdoors too. (More about this later – see Test Flying at the end of the article.)

On the other hand, I did not fancy 'butchering' those nice balsa tail surfaces, so I cut some from 3 mm (1/8") Depron, which more easily accommodated the control surfaces, especially the elevator.

The new indoor wings were 'carved' from 6 mm Depron. The method I used was developed by my friend Paulo 'Sparks' Faustino, running the resulting wing section through the XFLR5 software, 'just to be sure it worked'. Thanks, Paulo!

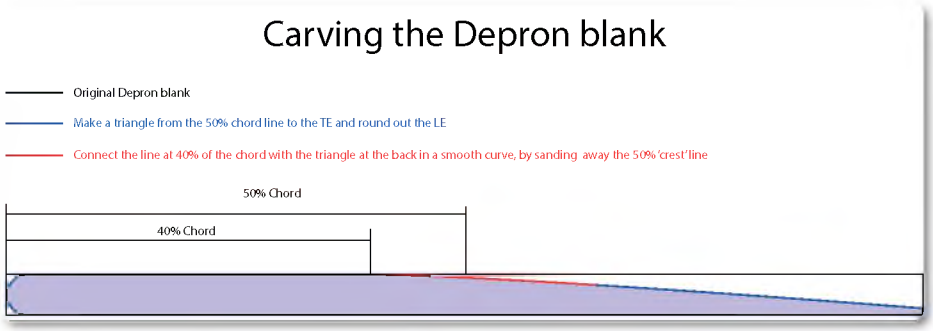
One starts by drawing two lines along a Depron blank, one at 40% chord, the other at 50% chord. Then the Depron is sanded down, with a 240-grit 'wet & dry' sanding block, using plenty of water to lubricate the 'wet & dry' and to prevent it from clogging, from the trailing edge (TE) to the 50% line. The objective is to create a triangle, but leaving a 1 mm (approx. 1/32" thick) TE.

When the 50% line has been reached all along the wing, the time has come to flatten the 50% 'crest' by gently sanding it away, making a smooth curve to the 40% line. For the final sanding I like to use a 400-grit block, again using plenty of water. I finish it by rounding off the leading edge (LE), aiming to get a section similar to half a circumference. The blank is now ready to be moulded.

By the way, the use of water has two main advantages:

A) It helps prevent the 'wet & dry' from clogging, which will make deep gouges that will mar the Depron surface.

B) There is no dust! This is very important, as anyone who has sanded expanded or extruded polystyrene will be (painfully!) aware…



Thermo Formed Depron Wings

When using heat guns to mould Depron the main problem is to control the temperature, as one can actually melt the Depron. Also, in the methods I tried, like rolling a tube over the Depron sheet, the curvature is difficult to judge or reproduce accurately. One can mould the Depron over a wooden jig inside the kitchen oven but to able to do that one needs to either live alone or to have a far more understanding wife than my own! Oh – and to have a reasonably large electric oven…

So I decided to use hot (near boiling) water as the heat source and a 8"/20 cm diameter thin-walled aluminium tube, the kind used for air conditioning ducting, as the jig. The best part is that one can mould 1/4" (6 mm) wings this way, as I did for Sparky, something that is nearly impossible with a heat gun. Naturally, the thinner the Depron the easier it is to mould it.

The prepared Depron piece, as described above, is fixed to the jig using a few bits of sticking tape, just to keep the blank in place initially, followed by a gauze bandage wrapped all around the cylinder, to really fix the Depron piece to the jig. I use bandages, as the hot water does not affect them and they do not mark the surface. The bandages should be really tight around the Depron, but not so much that they crush the surface.

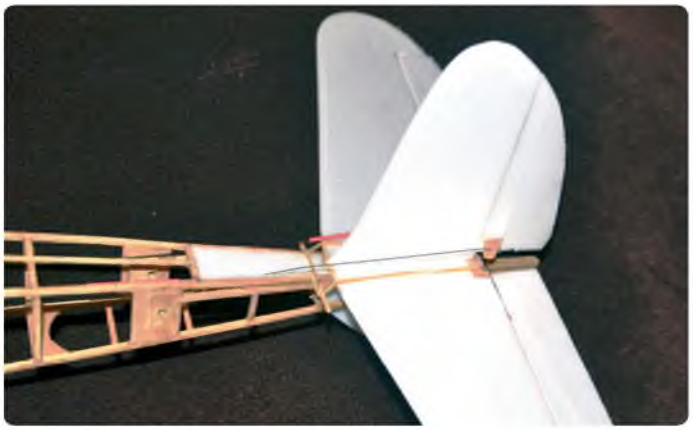
When ready I put the jig in the bathtub (plug the drain, ok?) with the Depron uppermost. You may need to use something to prevent the tube from rolling over as it stands on the bottom of the bathtub. I use a bottle of washing up liquid as a support strut to one side, filled with cold water so the hot water will not affect it.

A pair of wings (in this case 3 mm Depron ones for an indoor Tiger Moth) already wrapped up and ready for hot water moulding

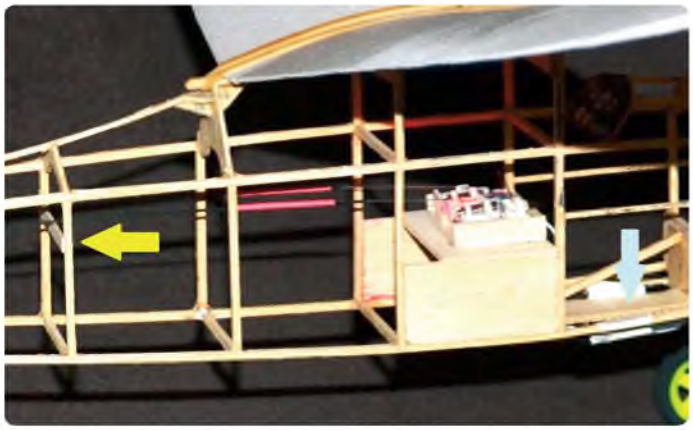
A ready to use moulded 6 mm Depron wing panel

Wings are reinforced in the middle by a small dihedral shaped piece of thin plywood. All flying surfaces are fixed with rubber bands, as per the original

The Rx tray is simplicity itself, made out of a few pieces of scrap balsa. The letters on the cog-wheels are there to remind me of the function of each servo, D standing for Direction (or rudder)

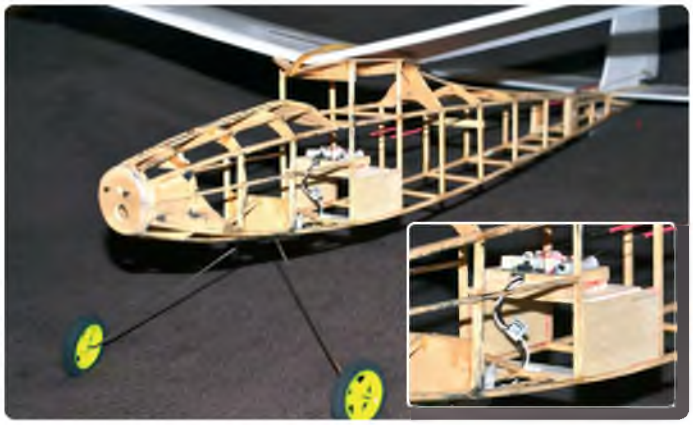


Depron tail surfaces. Note the rubber band fixing, ply horns and Magic Tape hinging. I added a Depron panel at the top of the fuselage to make an easier to cover exit for the elongated Z rudder pushrod



The receiver 'brick' on its balsa tray. I added a small piece of balsa to support the pushrods and prevent flexing (yellow arrow). The friction is negligible. Notice also the battery tray at the front (light blue arrow)

The new motor firewall, incorporating down and side thrust



The battery connector comes out through a hole in a Depron panel – light and easy to make! The LiPo is lightly taped to the underbelly

Before you proceed, please remember that carrying a pan of boiling water in your hand is dangerous, so please be careful! But it can be done – our grandmothers did it all the time!

I boil about 5 to 6 litres (about a gallon and a quarter or two) of water in a pot or a pan. When the water is boiling, I take the pan and pour the boiling water slowly and as evenly as possible – to and fro a few times – over the Depron piece(s). I try to warm the whole of the Depron piece so hopefully it is all at the same temperature. The water is applied to one side only – the future upper-surface, so to speak – but it is enough.

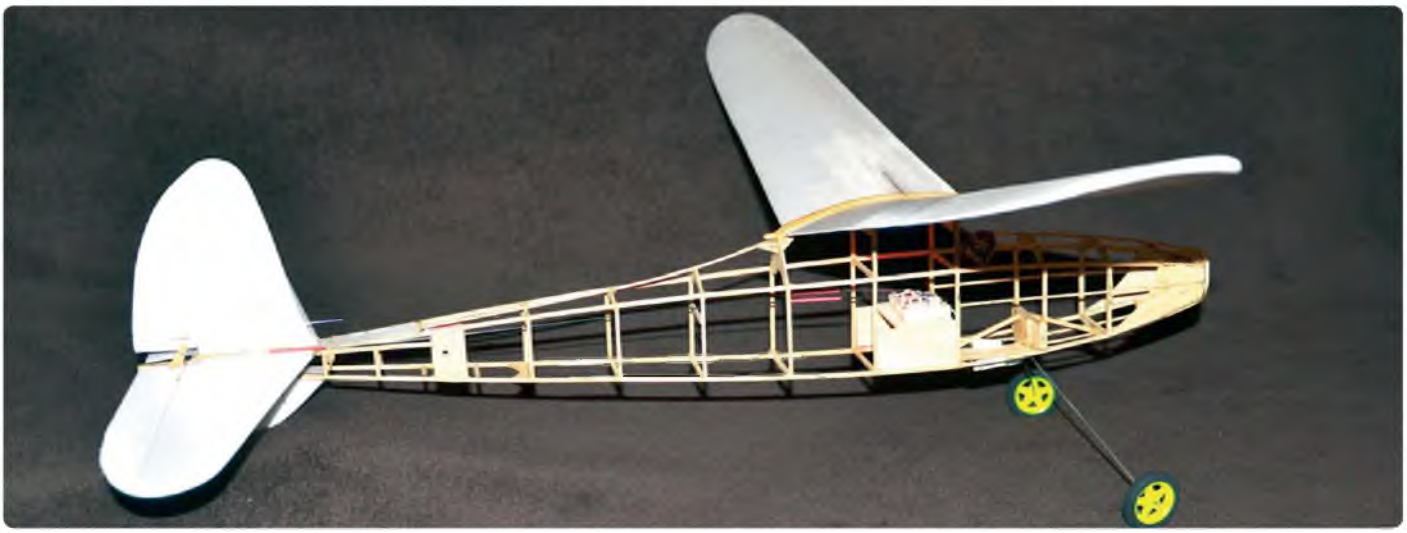
Then, the cylinder is rotated so the Depron piece lies in the hot water that has accumulated at the bottom of the bathtub and we let it cool there. When the water is lukewarm it is time to take it away, and the panel is ready for use. The 6 mm ones might need a second dose of the 'hot water treatment' though to really fix the curvature. Take the panel off the jig, gently rub the surfaces with a dry cloth to remove the water droplets, let it dry for a while and – hey, presto! – you've made a fully functional wing panel!

The wing panels were joined together at the correct dihedral angle, as shown on the plan. I then added a thin 0.8 mm (1/32") plywood dihedral brace, about 13 cm (5") long at the point of maximum camber, just to be safe. Two tricks I learned with Kyosho and ParkZone models regarding the use of Depron are:

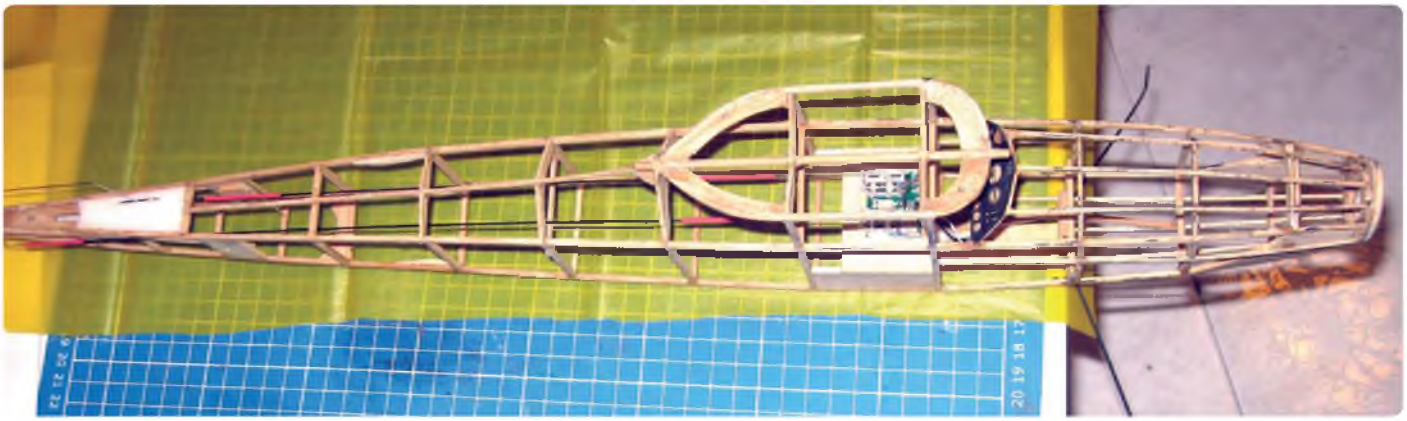
A) Cover the LE with tape, as it increases its resistance to shocks without much fuss or adding too much weight. I use 3M Magic Tape but you should clean the surface of the Depron first with rubbing alcohol to remove any trace of grease; if you do the bond between the tape will then be very good and will last a long time.

B) Embed and glue a carbon rod across the horizontal stabiliser to increase its rigidity. Both tricks are very useful to help the model last longer.

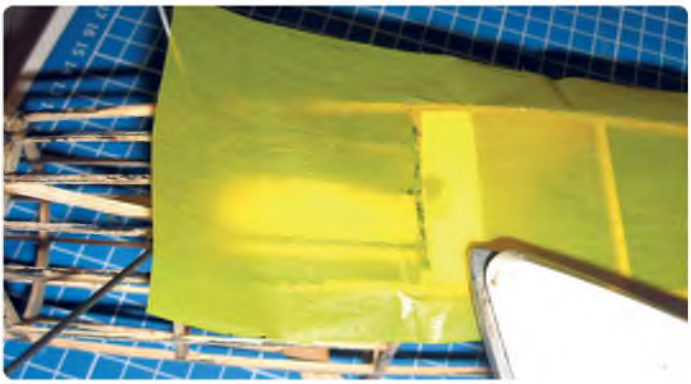
Having made a 45° bevel at their leading edges the control surfaces were hinged, once again using 3M Magic tape after degreasing the surfaces. For small, slow models I prefer to apply the tape to one side only – the side opposite the bevel.



Ready to cover – the modern way!



Measuring the LiteSpan tissue before covering the undersurface of the fuselage



After you apply the glue to both airframe and LiteSpan, and let it dry out, it irons down like any other iron-on covering. And there are no dope fumes throughout the house!

A new blade (in this case, a time-honoured razor blade!) is highly recommended for trimming the iron-on tissue. Or you can use a new No. 11 blade. The top of the fuselage has a concave 'double curvature' so I opted to cover it in small sections to prevent wrinkles

Just check the movement is free and adequate (plus some more…) in both directions before you gently press the tape down. In my case I connected both sides of the elevator using a 0.8 mm (1/32") carbon rod glued with cyano, but you could connect them using a thin ply piece or any other method you prefer.

Both the wing and the tail surfaces were painted using acrylic spray paint. Test on a spare piece of Depron first though! The solvents on some acrylic paints can still attack Depron, especially if sprayed too heavily, giving a 'wet' look.

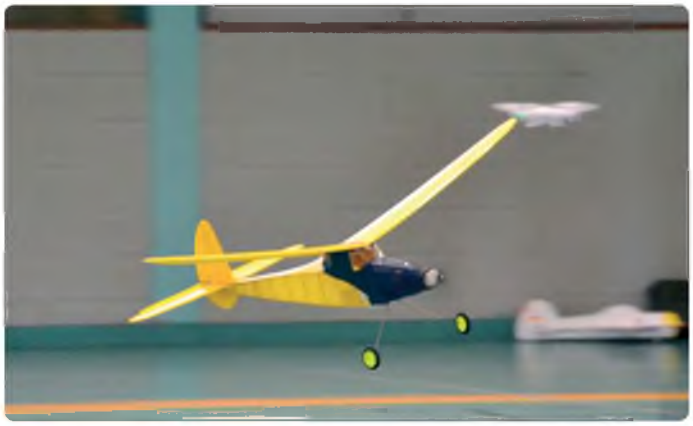
To keep to the spirit of the model I fixed the tail surfaces using rubber bands. To prevent them digging in to the leading and trailing edges I inserted a small piece of 3 mm (1/8") balsa at the LE and a small piece of 0.6 mm (0.024") plywood, with two notches for the rubber bands, at the back. Through its long production run balsa pieces for the under fin disappeared from the Comet kit, although the plan still showed it. As it looks good, and contributes to that 1930s-40s look, I decided to add it, cutting a small slot at the end to let the horizontal tail rubber bands to pass through. It also doubles as a tailskid when taking-off from the ground.

Guidance And Power

The receiver 'brick' was recovered from a ParkZone model, which really had seen better days. The motor was the GPS-8 from HobbyKing, although using a 5" x 3" propeller instead of the recommended 6" x 3" to 'tame' it down a bit. I mounted it on a ply/balsa former, in turn lightly glued to Former 1 on the fuselage. The back of this 'firewall' was filed to give 2° – 3° degrees right and down thrust. The reduction gear was bolted to the firewall using two small self-tapping screws. The test flights showed that these thrust adjustments are correct, at least for the 5" x 3" propeller.

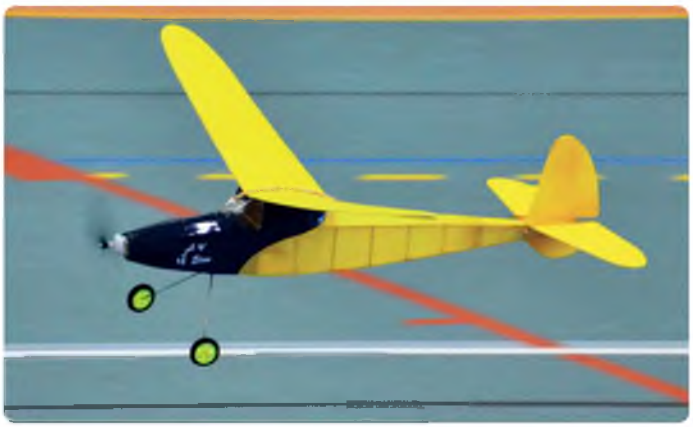
To mount the Rx 'brick' I built a balsa tray, as shown in the photos, to which the brick is glued with double-sided servo tape or similar. On a side note, I just wished these chaps followed Walkera's lead, in that at least some of their 'bricks' are designed to be fixed to the structure by four small screws, one at each corner of the circuit board. Much more secure and no wobbling!

The Depron wing allows Sparky to fly slowly and without risking a stall, even in tight circles



Banking away from a quadcopter. After contact with one of those there probably wouldn't be a lot left!

As my confidence grew I trimmed it to fly in circles and at a constant height at half throttle



Coming in for landing

Before committing aviation outdoors! Sparky at rest near its larger, much heavier Old Timer colleagues

Ready to hand-launch – just like the old days!

The servos were connected to the control surfaces using 0.8 mm (1/32") carbon rod pushrods, with thin piano wire at both ends and thin heat shrinking tube keeping it all together. The control horns were made from 0.6 mm (0.024") plywood, pierced with a pin to get a nice, no slop, fit for the piano wire. The horns were then glued to slots in the control surfaces. Do try to get the holes in line with the hinge line when the surfaces are at neutral, to prevent 'differential movement'. As the plywood horns are quite thin to fit them you just need to open a small slot with a pass of a No.11 blade and then glue the horn in, either with cyano or fresh UHU Por.

The best time to check for the correct length of the pushrods is when you have got everything (radio, horns and pushrods) in place but the fuselage is still (at least, partially) uncovered, so please do it now. The pushrods can easily be adjusted to the correct length by gently pulling or pushing the wire ends against the carbon rod inside the heat shrink tubes.

Just to be on the safe side I added a 'U' on the elevator pushrod, although it is really not needed for trimming purposes, provided one uses a heat shrink tube that is tight enough to hold things together, but still allows some movement between the rod and the piano wire. Using needle-nosed pliers through the top of the 'cabin', left uncovered, it can be done – just be careful!

At the other end, sealed inside the fuselage, I prefer to lock the piano wire and the carbon rod together. If you choose your tube correctly the heat shrinking action will give you plenty of friction to lock it in place, so there's no need to add glue. However, if you like the 'belt and braces' approach just wick a small drop of thin cyano inside the tube after heat shrinking it, and they will be locked in place forever.

To cover the model I used LiteSpan from Solarfilm for most of the fuselage. This is one of those covering materials that looks like doped tissue and that is thermo-retractable, but comes without glue on the back so you must apply the glue to the structure, as well as to the areas of the film/tissue touching it. Solarfilm advise you to use their BALSALOC to glue the covering to the structure. Just follow the instructions to the letter, test it on an old balsa model (or some scrap balsa) first if this is a technique new to you, and it should be all right.

Sparky catches a thermal – how high can one get?

Underside view showing the 1S LiPo taped on just aft of the undercarriage

Sparky's graceful lines look good over the green turf

Arnaldo holds the refurbished model, which is named in honour of its erstwhile builder and former owner. A great chap, sorely missed

The blue nose trim was made using Solarfilm Solite, which is a 'conventional' iron-on film (i.e. with thermo-activated glue on the back) but much lighter than the normal Solarfilm/Oracover stuff.

Test Flying

The first flights were made indoors at our usual 'one handball court, plus something more' gym (or 'three basketball courts' if you prefer!). The flying surfaces had not been painted yet, but such is the advantage of electric models! I confess I was a bit nervous, not for my sake, but because of the model – it was my friend's model after all! I did not need to be...

I connected a freshly charged 1S 200 mAh Nano-Tech battery and gently pushed the throttle until it was at full speed and then launched the model with what we used to call a 'following throw'. It left my hand, dipped a bit first, but then started to climb. It was flying – and it was under my control!

I had to reduce the motor or it would have hit the ceiling! Circuits and figures-of-eight were easily done, the Depron wing allowing it to fly slowly and without risking a stall, even in tight circles. As my confidence grew I trimmed it to fly in circles and at a constant height at half throttle.

One of the advantages of flying indoors is that you do not have wind drift to contend with, so Sparky just circled and circled within the confines of half a handball court! The pilot left the sticks alone and just watched – and relaxed! The model was flying great in a way and environment that Mr. Lidgard had never foreseen.

Where I live, we usually get a wonderful Indian summer around the 11th November. Based on that, one nearby club decided to organize a 'Rally' on the following Saturday and it was blessed with some very nice weather, with sunny skies and light winds. They specifically asked us to bring along any Old Timer models we might have, as they wanted to increase aeromodellers' awareness to that class of models. To be honest, to fly outdoors, I would have preferred to use the original 'Clark Y-style' flat undersurface balsa wing, rather than the undercambered one I had made for indoor flying. But since I had not re-covered the balsa wing yet, I had to 'make do' with the Depron undercambered one as it was too good an opportunity to show it off to other modellers to miss.

Luckily the wind was quite light during part of the day, although the model still struggled a bit to make headway against the light blow. On the other hand, during one of the lighter wind periods it caught a thermal! I have no idea how high it went but it certainly was high, especially for such a small and light model.

The funny thing is that the now almost complete model weighs, ready to fly (including one of the new 200 mAh 1S HK Nano-Tech), one gram less than my original Modelspan covered model used to (without the rubber motor, which would have added about 10 g more!).

One last thing. As mentioned before, Elias was the name of my flying buddy who originally built the model, hence the model's name. I hope, wherever he might be in that Wide Blue Yonder we all, eventually, go to, he is smiling benevolently over my antics and approves of this conversion. One thing I can tell you – indoors or outdoors – it felt great to see it flying again and under my control! Now, I just have to refurbish and re-cover that original 30+ year old balsa wing...

So, there you have it. We can recreate the models we used to fly in our youth and hopefully with the same (if not greater) success than we did in the days of yore. Or we can build them again, from new. Whatever way you go I promise you'll have a great time and you can recycle the good bits from all those small R/C models that you have played with during the last few years.

At a pinch, one can even use the Rx/control board of a four channel micro helicopter. It has been done, you know! **RCMW**

NGH CARBURETTOR REPAIR

Chris Bowler applies some well proven workshop techniques to save a damaged petrol engine carburettor - after a good rummage in his spares box!

The normal plastic filler on a standard Walbro carburettor

The plastic filler is moulded over and retained by the teeth of this brass insert

It's a sad tale but one that can be recounted by even the best stick twiddler in the business. At some point our pride and joy (well at least one of 'em) will, apparently of its own volition, plunge earthwards and have a losing battle with terra firma. My SV Stampe, shown in the header picture, had such a demise and was rendered into a much smaller kit of pieces than I started with!

Pride was dented as much as the ground but the servos, except one, were okay, as was the engine and tank. All equipment was removed to storage and the remnants, way beyond repair, were carted off to the tip!

Later

Therapy followed by building an electric sport flyer and a spell playing with aero tugging a docile glider. But as always the building pangs struck and a new project demanded a petrol engine. So the trusty NGH 35 rear exhaust conversion was hauled out of retirement and subjected to the usual inspection. It had been stored, soaked in oil, in a plastic bag and was in good nick. That is except for the exhaust that had been destroyed and, unbeknown to me, damage to the carburettor. I had already earmarked a spare trumpet for the inlet and was happily fitting that when I noticed the filler on the carby was broken. It looked like a simple job of unscrewing and replacing it with a spare – wrong!

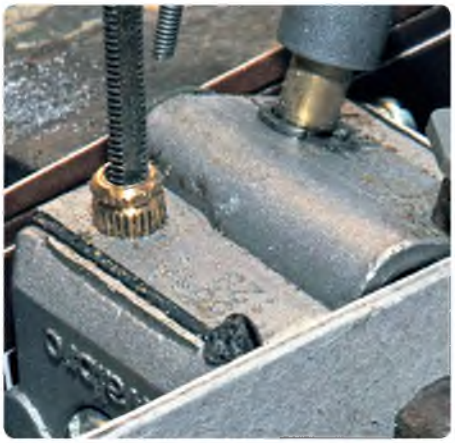
I called those nice folk at Just Engines and enquired about a new exhaust and that was all fine and available. But the filler was not a screw in fitting. It was permanent and replacement carburettor was suggested as the answer. Now, as I have confessed in the past, I had another severe dose of the parsimony effect. A solution must be found. This throw away age could be thwarted, perhaps?

Rummage Round

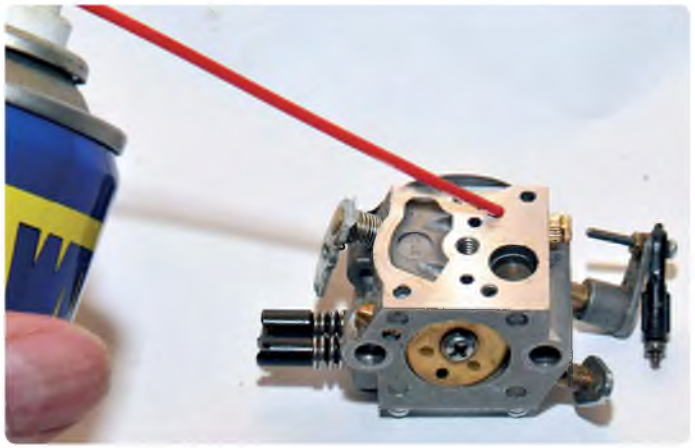
Now, I have been in this modelling lark for many years, with boats, cars, yachts, etc. And in the course of things I have accrued several trays and boxes of stuff that may be

Replacement filler nipple from the spares box with re-cut thread and lock nut

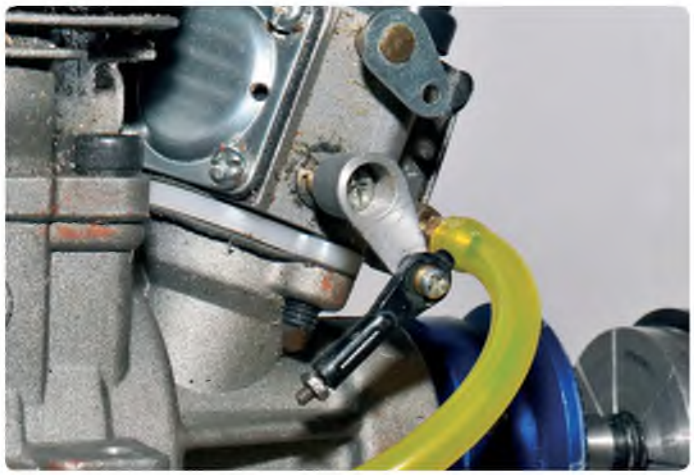
The die used to cut the new thread. Experts will note the missing grub screw. It was lost years ago



After drilling carefully the thread is cut into the brass insert. Cardboard was used in the vice jaws to prevent damage to the carburettor faces



It is essential to remove all swarf from any of the jets. I blew through the newly made hole and then flushed it with WD40



In place with the lock nut, looking very neat and in the second picture with the petrol fuel pipe attached. In the model it will probably be routed a slightly different way

useful one day. Muddles, as my wife says!

After a rummage in the said muddles I found a plastic bag full of brass filler nipples. 'Eureka!', or maybe not as I couldn't decide what threads they sported. But spurred on by the thought of saving a few quid I could spend on something else, I decide to 'customise' one.

The threads were just oversize to 4BA and proved conducive to being re-cut to that size. Well that was OK. But now attention turned to the actual inlet on the carburettor.

Plastic or nylon it was, but after the application of some brute force (I was going to say ignorance, but don't we all live in the latter?) I was hoping that it would unscrew. Well, to my surprise it didn't unscrew but broke away from a knurled brass fitting pressed into the body of the Walbro.

What Next?

Close examination revealed enough material to enable a drill to be used to open up the existing hole. Carefully, very carefully, I used a correct sized twist drill for a 4BA tap and with a hand brace slowly removed as much as I dare, without going too deep. All done by eye and touch, don't ask for dimensions, it was just a 'feel' thing.

Normally cutting a thread in a hole involves up to three taps of the same size: tapered, second and the last being a flat ended tap that can be used to reach to the bottom of a hole, which what we had here. As there wasn't much material I went straight for the last one and cut a thread by hand into the brass.

It worked and the nipple screwed in beautifully. Job done!

Then it was case of not so fast, as it occurred to me that vibration could well be the undoing of a good repair. So another rummage turned up a brass 4BA screw and this I used as lock nut, which with a touch of threadlock, making sure none was in the orifice, should keep things in place.

Time will tell, but the beast is now ready to install once the exhaust arrives. We may have more news on the project and the engine in later issues. **RCMW**

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LIGHT FLIGHT

With the indoor model flying season in full swing, John Stennard files his latest update on the small model scene

Peter Smart's amazing nano Tomboy

Friday night is flying night and is very popular

For Starters

In the November issue of RCMW, the 'Updating A Classic' article featured the iconic Vic Smeed Tomboy design. At a local venue I saw Peter Smart's amazing nano Tomboy. This model is free flight and powered by a tiny, tiny Gasparin CO^2 motor. Like all Peter's F/F and R/C models it's an absolute gem!

Electric Appeal

It's a fact that electric powered flying models, whether planes, helicopters or multi-rotor copters, are extremely popular. The extremely wide range of ARTF and RTF models and the wonderful possibilities of foam moulding make electric power very appealing. There are also plenty of opportunities to build models in the traditional way for electric power, including conversions from the original IC powered designs.

Of course part of the electric appeal is the ease with which one can fly now indoors. The difficult bit is finding the right venue. Over the years I have flown in ten different local venues and only three are still being used. Information about 'open' indoor flying sessions is listed in this magazine but these represent only a fraction of the regular indoor meetings.

In our area I know of five 'private' venues that are restricted to club members. These range from one badminton court size

There are some hazards though

village halls to a huge seven court sports hall. So it's definitely all going on out there, and maybe at a venue near you!

While on the indoor theme I'll give a brief mention to our local indoor show, the Bristol Model Engineering and Hobbies Exhibition. In addition to traders this three-day event is supported by local and not so local model clubs and societies. In addition to a static display the Beaufort Model Flying Club provides a flying display in the 10 x 12 metre netted arena. With a potential for twenty-one hours of flying time we have to be well organised and try to always have something in the air. Twenty-one hours needs some filling!

The event attracts a wide age range of visitors and we are keen to 'showcase' model flying and promote the BMFA. Different size hoops were well used by both Vapors and micro helicopters throughout the show and were also used with the 'Have-A-Go' Flyball helicopter. Although the Flyballs are fairly 'un-net-able', the Vapor, Extra 300s and micro helis are desperate to get caught. Over three days we only needed a tall, tall ladder 15 minutes before the show closed on the last day! According to the local paper around 6,500 people attended the exhibition.

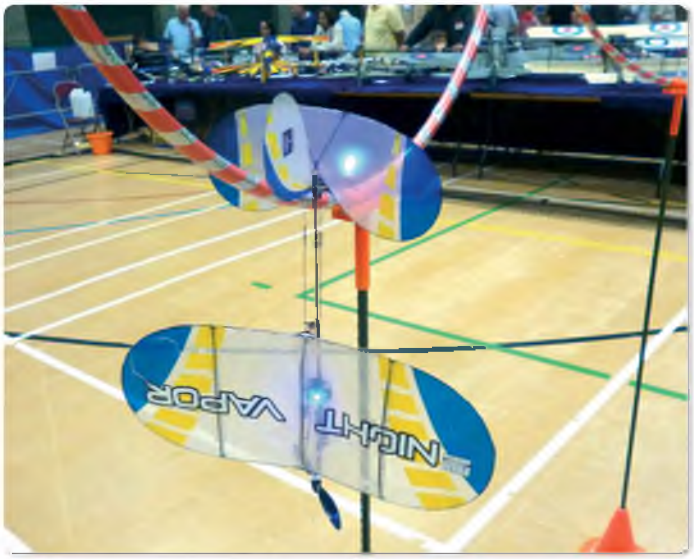
With 'the show must go on' ringing in our ears we now have a clear idea of what we will fly next year – multiple Vapors and micro helis all hoop navigating (not at the same time fortunately!), multiple micro/mini quads, solo Extra 300 and AR Drone spots, a few larger helis and that's about all you need. The flying space is too restricted for standard F3P size models and bigger helis so lots of small flying objects are suitable and excitingly risky.

Who mentioned a flying circus!

A view of the static display at the Bristol Model Engineering and Hobbies Exhibition with a 'have-a-go' session in progress

Some of the Beaufort MFC team with our home produced t-shirts; the club logo is on the back

More young flyers enjoying their Flyball experience



Whoops! If the nets don't get you a hoop will!

And the nets will get you sooner or later

Blade Inductrix is available as an RTF or BNF

My hand gives scale to this micro size quad

The coreless motors are used as the landing gear

Inductrix

As 'quads cannot be ignored' I offer you an insight into the Inductrix.

Interestingly the ubiquitous 'drone' name has been included with the Inductrix as it is listed as a 'Beginners EDF Drone'. The name Inductrix does hold some clues about this new quad member of the Horizon Hobby/E-flite Blade family. However with no Nano, Micro or Mini to give an idea about the size of this quad let's focus on the 'duct' part of the name.

The 'duct' is there because the four blade props are in a shroud, very similar to a small EDF unit. Indeed the possibility of using the shroud-motor-prop combo for micro EDF, 1-cell LiPo use has been noted. The four shrouds make for a really compact design and of course they act as prop guards. With a flying weight of just 16 g (0.56 oz) and an 83 mm (3.26 in) square size the Inductrix is definitely a micro size quad. The use of four blade props (impellers?) of 65 mm (2.56 in) diameter set in a shroud results in an extremely quiet quad in flight. A 1S 150 25C LiPo is recommended and a dedicated USB charger is included.

The Inductrix is available as BNF and RTF. I bought the BNF version and it worked immediately with my Spektrum DX6 Tx. The Inductrix has SAFE technology installed (Sensory Assisted Flight Envelope) and this uses sensors and software so the model knows its position relative to the horizon. As you would expect this provides an exceptionally stable hover. However the Inductrix can also be flown in quite a lively manner while taking advantage of the stable hover capability. The RTF Tx includes a dual rate function and if needed this could be incorporated into the programming of a standard Tx.

The Inductrix does not include any additional functions such as 'flips' but is a perfect quad for small space use and would make an ideal first quad. Its ability to fly in very small spaces virtually silently would allow plenty of essential stick time for the novice. The protected props might also be beneficial! Nicely different, the Inductrix is another example of the clever applied technology we have come to expect from Horizon Hobby/E-flite.

A standard 150/200 1S LiPo is used in the Inductrix

This 3S LiPo pack is not charging properly and the voltage is too low

Cell 1 is below the 3 V threshold

Cell 2 is a bit over but should be reading 4.2 V

The same applies to cell 3

Down, Out And Freaky!

Where would most of electric flight be today (cars and boats as well, of course) without Lithium Polymer cells? Would the ARTF electric plane, helicopter and quad models have been developed in the same profusion? When one remembers the hesitant early days of using LiPos with odd voltages, 5C rates and special chargers, could anyone really have foreseen how, when coupled with brushless motors, the electric power world would be transformed? (No pun intended!)

However, along with this wonderful LiPo source of power there is a need for special care and attention. Modern high tech chargers have reduced the danger of incorrect charging and the ability to monitor individual cells via the balance lead provides useful LiPo cell health information. A difficult realisation for some electric flyers is that a LiPo pack will not live forever! True, if used for a low/moderate current drain they can go on for years, but in high current applications I find some packs are starting to show signs of a reduced capacity after a season of use.

A modern charger will usually show you the voltage of the pack when you begin the charge and the charged voltage but I find that it's more useful to use a cell checker. I always check packs before flying and if they are showing less than 90% I get suspicious. I also always check packs after flying to see how close to 0% remaining power they are, I try to make sure I'm down with say 15% left. This helps with setting the flight timer, particularly with EDF models, if you want to allow for a 'go around' after a failed landing.

When I get a suspicious pack that is showing less than 90% full after charging my first action is to check the individual cell voltages and if there any noticeable variation I use a balancer to get all the cells to the same reading. If recharging does not bring the pack up to 95-100% I will put that pack aside to use in lower current draw applications.

Sometimes a suspicious pack reveals that one cell is reading less than 3 V and this pack will have to be discarded. The photos show the three readings from a 3S pack and as can be seen one cell has failed and is only showing 2.8 V. It's easy to lose or damage a model through a battery fading rapidly in flight so keeping an eye of the cells within flight packs makes sense.

Now for the freaky bit! In the early days of LiPos, and before powerful brushless motors were cheap and readily available, there was an emphasis on maximising the efficiency of the battery and ESC leads, and the connectors. At that time I switched from the standard red JST connector to the micro Deans type. The more robust solid pins and sockets of the Deans could handle higher currents than the relatively thin and small parts of the JST.

However, as I have found to my cost, the Deans design does allow you to connect two battery packs together and the result can be quite dramatic! The JST connector design will not let you do this. (Actually I have done it, but that's another story!)

After a recent flying session I was unpacking my batteries when I noticed a puffed up pack. On inspection I found that the positive pin on the battery connector had somehow lodged into a negative socket on the balance lead. The result was that a cell had discharged through the pin, melting the plastic holder and fusing itself to the metal socket.

This 3S 500 mAh LiPo was found like this in the flight box

A freak incident but it makes one think!

It's easy to forget that the balance lead connector is 'live'. In fact I use the balance lead connector to power LED displays on a number of models. This was definitely a freak occurrence but it just shows that the unexpected usually happens at some point. At least it is better if it happens on the ground!

Tail End

Information and photos are always welcome to:
john@stennard.orangehome.co.uk

I am available for talk/demos on indoor R/C within a 50 mile range of Bristol and, as the BMFA Western Area Education Coordinator, I am also happy to talk to school pupils and youth groups in the region. **RCMW**

BIG GREEN DREAM MACHINE

It was love at first sight for Paul Gosling when he first set eyes on this French model! Pictures and text by Mark Beacham

Owner Paul Gosling and his dream jet

Every year model air shows throughout the UK thrill the crowds with displays of the very best and most impressive scratch built models created by the most talented modellers from around the world. At this year's Weston Park show, however, it was an ARTF kit from France that made spectators stop in their tracks and stare open mouthed! This was the same reaction that Paul Gosling had when he saw the Aviation Design Diamond at the Jet Power trade show in Germany in 2013.

Looking like something out of a comic book or a superhero movie, the stunning shape brought back childhood memories of how Paul dreamed a future jet might look and from that moment he just had to have one.

The 3.35 m long jet is designed for turbines of around 180N thrust and Paul's example is amply powered by a lightweight Jets Munt 200XBL. A PowerBox smoke system has also been added to give displays with the model that final wow factor. Appropriately, given its futuristic style, a full serial bus system is used to control the Futaba S-bus servos, and electric retracts and brakes were chosen above a traditional pneumatic system.

I must admit that the first time I saw the Diamond I didn't expect that the model's flying characteristics would match its spectacular looks. According to Paul, however, nothing could be further from the truth. The proud owner explained that the model has a huge speed range, being predictable and easy to fly when crawling along with full flaps, but feeling crisp and accurate like a pattern ship when the throttle is opened. Many other experienced pilots who have had a chance to play with Paul's pride and joy have confirmed his findings.

So, has the model turned out to be the dream jet that Paul imagined? Well, he didn't quite do the full Victor Kiam and buy the company, but Paul has been so impressed that his business, Nexus Modelling Supplies, has become a UK distributor for Aviation Design models. In addition, Paul says that if the Diamond were a woman he would marry it! Hmmm, I think he likes it! RCMW

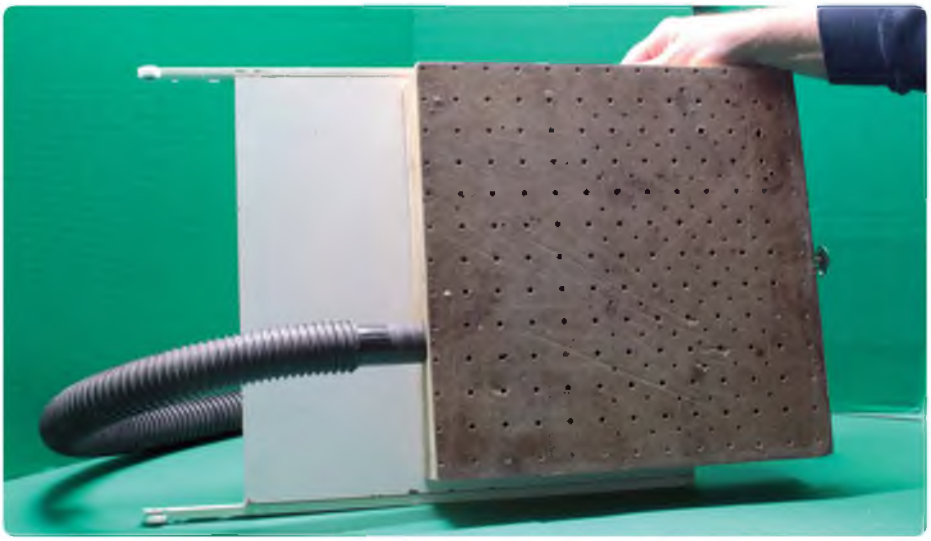
In the air the Diamond is a stunning sight

The surface finish and paintwork on the model are outstanding

The equipment installation is neat and minimalist. Access to the turbine is via a side hatch at the rear

BUILD A SIMPLE SANDBOX

Bill Bowne shows how to adapt a workshop drawer to make a balsa dust suction unit



The sides are made from leftover pine moulding. Scrap hardboard makes up the bottom, whilst scrap pegboard provides the top. Drawer slides keep the sandbox out of the way when not in use

Now you see it...

Now you don't!

Sanding balsa is a necessary but unpleasant chore. The results are worth the effort but it's still usually tedious and messy. Well, I can't help you with the tedious part but I can show you how to minimise the mess. (Especially important to those of us whose workshops are in Her realm!)

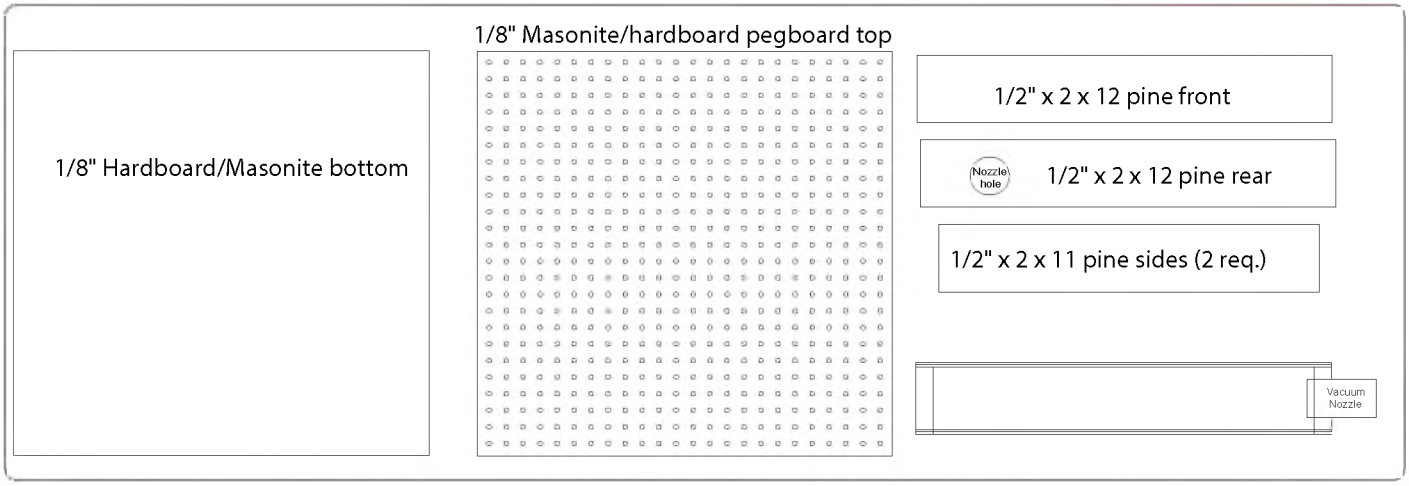
The answer is to build a 'sandbox', that's how.

I built my sandbox many years (and several workshops!) ago, primarily as a platform for vacuum forming canopies and the like. Shortly after fabricating it I found it also very useful for reducing the amount of balsa dust produced when sanding. So that became its primary function. After a few years (and more workshops), I mounted the sandbox to a scrap of shelf board and some DIY store drawer slides so it would be out of the way when not needed but easily available when wanted.

Particular wood sizes aren't important so long as the sides are tall enough to fit your vacuum's hose nozzle. Overall shape can be square or, if space permits, rectangular. Just don't make it too large for your vacuum's suction power (mine works fine with the smallest shop vacuum I could find at our local DIY store).

Construction is very easy. Use a hole saw to cut the nozzle port before assembling the scrap moulding stock outer frame. Glue and tack on the bottom and the top. Caulk any gaps in the sides – we want all the airflow to come in via the pegboard holes!

For mounting the sandbox as a drawer use wood screws to mount the box to the top of some scrap shelf board (or an old piece of cut-down kitchen unit) and mount the drawer slides as per their instructions. Make sure you offset your sandbox on its shelf to allow the whole sanding surface to be available. Finally, add a screw-on handle to the front of the box. **RCMW**



Simple sandbox is easy to make. Sizes aren't critical so you can adapt the design to fit your work area and your available supplies

Simple sandbox at work, sucking up balsa dust

Tools Required:

Mitre box and saw
Wood glue
Hammer and small nails
Hole saw
Screwdriver (to mount drawer rails)

Parts List:

Pegboard top
MDF/hardboard bottom
Pine or other scrap wood sides
Drawer base (optional)
Drawer slides (optional)
Drawer pull (optional)

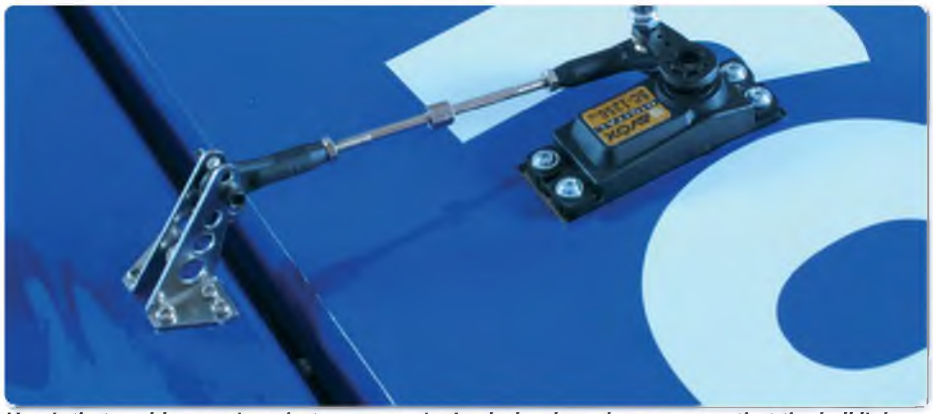
Picture courtesy of Aeroworks

Our short series on building the 30 cc Laser 200 ARF QB kit from Aeroworks continues as we finish off installing the aileron servos

LASER 200

Last time we left you with a teaser about a potential problem with the aileron pushrod connections if using standard length servo arms. So this month we will begin by repeating the picture and show you how to overcome the issue by fitting longer metal servo arms. ***RCMW***

A Potential Pitfall



Here's that problem posing photo once again. Look closely and you can see that the ball link that is fitted to the servo arm is very close to the servo case. There's a very good chance that at full throw the pushrod could foul against the side of the servo

Left:
Same problem, different view. At a push the ball link could be fitted on top of the servo arm but this would look a bit clunky and it's doubtful if the original Savöx plastic arm would provide enough control throw for the extreme 3-D style control movements that we intend to use on this agile model

The simple answer is to fit a longer servo arm. Most servo manufacturers can provide a 'super servo arm' to fit their premium servos. Here's a couple of examples of Savöx's high quality metal arms, with and without packaging. Besides the central servo output screw and anti-vibration lock washer (internal tooth type), each SH-82 arm comes with two additional socket head bolts. These are inserted each side side of the central split collar and when tightened they provide additional security and help the servo deal with the additional side loads that can result from using the longer arms

Open Up

The holes in the servo arms need opening up to fit the ball link retaining screws. You'll need to find a sturdy support to hold each arm whilst drilling them out. This handy ball-headed clamp proved to be ideal and it also has soft(ish) nylon jaws, so preventing damage to the anodised surface of the metal servo arms

With the arm held securely we used a Dremel miniature power tool to open up the mounting hole for the ball link screw. To help prevent elongating the hole it is worth starting with a drill bit that is only just a bit larger in diameter than the existing hole, then working your way up in small steps with increasingly large diameter bits until you get to the correct size. It's far better to stop when the hole is still a fraction under-size than just ploughing on and finding that your new hole is way too big and that the ball link bolt is a sloppy fit in the hole. Remember, as this is a North American kit the bolts supplied are of an Imperial size, so the metric drills that UK modellers most frequently use will only provide an approximate reaming out of the hole

Final reaming out can be done with a round needle file, whilst constantly checking to see if the mounting screw will fit snugly into the modified hole. We found that the needle nosed version from Perma-Grit was ideal for the job

Be sure to ream out the hole from both sides. If you just do it from the one side then the top of the hole will be slightly wider than the bottom (nearest the tip of the file) and this could lead to slop in the final linkage. Elf and safety note (well, we are writing this over Christmas!): be sure to use a handle when using needle files (a.k.a. rat tail files) otherwise the tang can easily dig into the palm of your hand

Other brands of needle files are available! We have just received review samples of some sanding tools from the USA and inside the package we found a set of diamond coated round micro files. These high quality tools are of finely incremental sizes so they can be used just like the drills we used to originally open up the hole, starting with the one that only just fits and progressively using larger sizes until the ball link screw only just drops through

Lock The Threads

The socket headed bolts supplied with the long servo arms will need cleaning and securing with a removeable strength threadlock. Car brake cleaner in an aerosol can is a convenient way of dispensing small amounts of degreaser onto a clean tissue, whilst the cotton bud provides a controlled way of dabbing small amounts of threadlock from the small tube onto the screw threads

Spray a short squirt of brake cleaner onto a clean tissue and rotate the screw by hand to clean the threads. Some of the black oxide coating may be removed too but for our purposes it is better to have a clean thread than worry about maintaining the corrosion resistance of the coating (provided by oil or wax based after-finishes). If you are especially concerned about this then you can buy specialist surface cleaners by companies like Loctite, but at about £12 per can compared to around £5 for a can of brake cleaner then a dose of aeromodeller's parsimony may kick in!

Alternatively you can give the bolts a good bath by squirting some cleaner into the lid of the aerosol can, then wiping them dry with a clean tissue

It's best to avoid applying the threadlock directly from the bottle as you are sure to get far too much on the screw threads. A thin wipe across a few threads at the end of the bolt is all that is required. A cotton bud soaked in threadlock allows for a more controlled application. A cocktail stick is another good alternative, allowing a small drop of the fluid to be applied just where it is needed. If the threads fill up with threadlock then you have used too much, but any excess can be dabbed away with a tissue until the threads just glisten

Nip Up Tight

It's time to fit the servo arm. Frustratingly, the long Savöx servo arms that we used all seem to have the same spline positions so we were unable to follow our usual practice of selecting the arms that provided the closest setting to neutral with zero sub trims. A certain amount of sub trim would therefore have to be accepted on each control surface. You can see the amount of offset at neutral in this picture. After fitting the central output screw, using a dab of threadlock and making sure that the teeth of the anti-vibration washer were pointing down, the two side collar bolts were dabbed with the threadlocker and inserted until they just tightened up

By using an Allen key on each side we were able to tighten up each side bolt by the same amount at the same time, thus ensuring that the collar was tightened in an even manner to avoid any distortion

A few blips of sub trim and the servo arm was taken back to its neutral position. In this shot you can also see that the pushrod is angled very slightly. The hole was carefully chosen to allow for this...

...The reason for the angled pushrod at neutral is now clear. At maximum control throws, up and down, the pushrod is able to run parallel to the servo, so maximising the servo's performance during extreme aerobatics (at least it would if we could fly that well!). The sturdy ball links at each end of the pushrods also help greatly in this regard as they eliminate any unwanted twisting motion in the linkages

We just love the turnbuckle style pushrods supplied with the Aeroworks Laser 200 kit. By simply turning the central hex shaped section using the spanner supplied the control surfaces can be finely tuned without having to pop off any of the ball links or un-clip clevises. A neat idea that is very popular with R/C car enthusiasts (to quickly alter toe-in/out settings), we are amazed that it hasn't been used more often for R/C model aircraft pushrods

The final aileron servo set up. Sturdy, easy to adjust and now with lots of potential control surface movements for those all-out, 3-D style aerobatic manoeuvres! Join us next time when we fit the Laser's tail

RC MODEL WORLD DETAILS

MODEL INFORMATION

NAME:	30 cc Laser 200 ARF QB
MANUFACTURER:	Aeroworks
DISTRIBUTOR:	Ladbroke Hobbies
WEBSITE:	www.ladbrokehobbies.co.uk/Aeroworks-Aircraft.aspx
MODEL TYPE:	Scale aerobatic
CONSTRUCTION:	Built up from laser cut parts
PARTS SUPPLIED:	Airframe and extensive accessories
PARTS REQUIRED:	Radio equipment and petrol engine

MODEL SPECIFICATIONS

WINGSPAN:	76" (1930 mm)
LENGTH:	64" (1626 mm)
WING AREA:	1121 sq in
WEIGHT:	11.5 – 12.5 lb (5216 g)
ENGINE:	30 cc – 35 cc petrol
RADIO:	6-channel minimum

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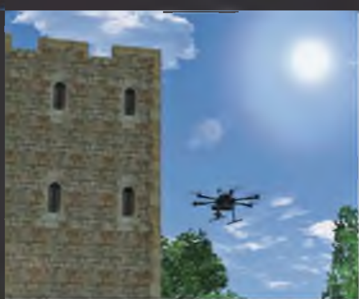

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SOARERS' SLOT

Accidents will happen, and not always to flying machines, as Mike Proctor relates

The scene at the start of a typical winch-launching. Note that the amount of ground based gear is not inconsiderable and its servicing needs are much the same as the models being flown from it

Team Haley at the last eSoaring event of 2015. Three generations of one family in the top four positions in a single competition could well be a world record. Unless anybody knows better?

Fit For Purpose

Having dealt last time with the problems of visibility when flying models, this time I shall look at problems of a different but no less dangerous nature.

Most people take great care to check their airborne equipment before each flight. Indeed electric models generally will not start if there is any radio related trouble; their gliding cousins can be launched by towline, even if the radio is not switched on, but these occasions are mercifully rare thanks to methodical pre-flight checking.

What about all the other paraphernalia that accompanies our flying operations?

Any winch-towed glider needs a fair bit of kit in addition to just a winch:

A 12 V battery, which can and has been known to 'bite' people when a spanner has been touched across both terminals!

Up to 400 metres of towline with a breaking strain in excess of 100 lb leading to the turn-round pulley and back to the winch drum, which can cause burns and even broken bones if not treated with caution.

Finally the turn-round pulley itself, usually a metal stake with an attached pulley, around which goes the towline from the winch before heading back to the towhook on the model. The stake itself is held down with strong 'guy ropes' and long hefty pegs, which need a lump hammer (at least) to drive them fully home! What could go wrong?

Well, obviously the pegs could be pulled out or there could be a mechanical failure under the force of the towline, resulting in the whole piece of equipment being propelled towards the winch, where stand the pilot and the launcher! Hang on though, the winch is between 150 and 200 m distant. Surely it can't 'fire' a turn-round that far, you may think?

In 2015 that did happen and the turn-round went even further than the winch line – mercifully nobody was in the way! Investigation showed that there was a design fault in the unit, which contributed to the problem, but a high level of maintenance could have improved matters. The offending item is long since junked and has been replaced with a sound unit.

The moral of this story is not to forget that all of your equipment, whether in the air or on the ground, needs to be fit for purpose and regularly serviced.

Steve Haley with BMFA Nats Open eSoaring trophy, which he won on his way to a maximum 100% in the 2015 UK eSoaring League

Colin Paddon (left) won the UK F5J League in 2015

Stalwart of electric soaring and a home-building exponent, Brian Austin decided to hang up his CD's scoreboard at the end of 2015 after a long tenure

BMFA eSoaring Leagues 2015

eSoaring Leagues include Open and 2 metre classes. In 2015 Steve Haley pulled off a remarkable win in Open class. Knowing that work and health problems would cut down his maximum possible contest entries to the minimum number needed to gain a full score (four) he was up against it from the start. But in typical style he came through to win with a maximum possible score of 100%. Chris Foss had 98.8 for second and Mike Raybone in third had 97.09. In total 25 people posted four or more scores and 66 flew in all.

The Scottish events were badly affected by the weather in the early part of the year, as were several on the south coast but they had more alternatives to choose from.

In 2 metre Gordon Brown was first, just over a percentage point ahead of Cliff Hannam, 27 flew in total.

F5J League winner was Colin Paddon with 96.6%, with Brian Austin on 95.28% in second and Pete Mitchell with 94.47% coming third. 14 flyers had four or more counting scores and 53 flew.

The various UK Soaring Leagues start again in spring and all the dates can be found on the BMFA website, the eSoaring website and the BARCS website.

October 4th 2015. The last competition of the year at Wetlands and probably the best weather, as this picture shows. It does not show that it was flat calm all day – again being only slightly better than the previous two events! An interesting array of models

Understand Your Limitations

Several 'old names' appeared on the eSoaring circuit at the end of 2015 and all seem raring to go in 2016. It would be good if more 'old' or 'new' ones fancy joining in too. They are always welcome.

Sometimes 'old hands' bring new problems and in one particular case solving this caused considerable head scratching. John Milner was one such returnee in mid 2015. Having spent quite some time designing and building a 2M model, he arrived at his first comp for some number of years and after a quick trimming flight he entered the competition.

The model flew well, proving that flying models is much like riding a bicycle – once learned never forgotten. John's problems started that day and persisted in an annoyingly spasmodic manner. His motor would occasionally cut out, not at the set 200 metres but at some other height of its own choosing. An intermittent fault – there's nothing worse to fix.

At first it was thought that moving the position of the Height Limiting Switch (HLS) in the fuselage might help. But so good was the installation of the equipment in the fuselage that doing so on the field that first day was not sensible. When it was tried next time out we were back to the same intermittent height problem.

Suspicion had fallen on the fact that this model was being flown on 35 MHz equipment and sometimes, in the early days of height limiting, some incompatibility between Rx's and HLS's was experienced. But this problem has been resolved over time with firmware upgrades, and anyway this was a new unit. There had also been problems with some ESC's used in combination with some HLS but that avenue drew a blank too!

So next time we tried another HLS and again thought we had cracked it. But no!

Next we did what we should have done sooner and John tried a different make of HLS, whilst I tested his 'intermittent' one in my AVA. Both performed perfectly, so some kind of incompatibility was present and the exact cause is still being determined.

The usual system of methodical checking, by changing one thing at once, eventually paid off but it took some time in this case!

Howard Smith launches his home built 2M model in perfect weather for his first eSoaring comp. John Milner assists. He had a trying day himself, encountering several problems with his height limiting device – see text

Trends In Models

During the last couple of years there has been a distinct move towards lighter and lighter models. Power-trains for electric launched models have been getting lighter, reducing the amount of payload needed for the launch phase. It is now quite possible to buy a motor or motor/gearbox combination weighing less than 100 g and power it with a battery of the same or even less weight. A 50 g ESC should handle all your power needs.

Towline gliders don't need anything other than a battery but they must have a wing strong enough to withstand a high 'g' launch. And that usually means the weight saved by not having a motor has been returned to the structure to maximise strength.

Meanwhile materials for structures, usually carbon/epoxy composites, have improved and afforded us further weight savings without sacrificing strength. Newer materials may well replace carbon in the near future.

The result of all this is that models of 3.5 to 4 metre span can be ready to fly at almost unbelievable weights, 1300 g being no longer unusual. Before you rush off to buy one it is well worth asking yourself what value you might get out of a super lightweight in our normal UK conditions.

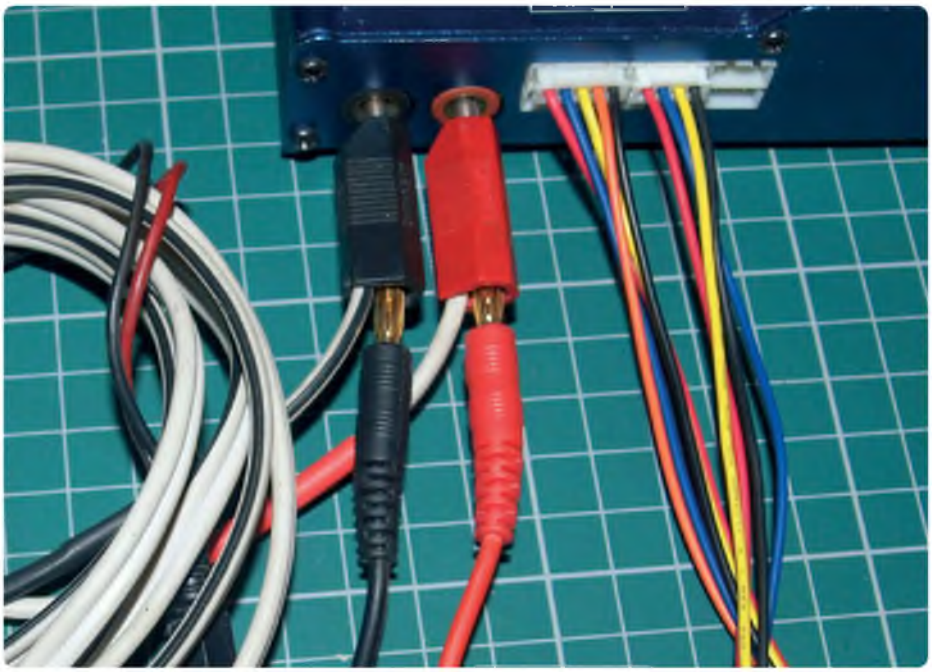
Firstly, you can only fly it in calm conditions and generally these know when and where you are going flying and stay away!

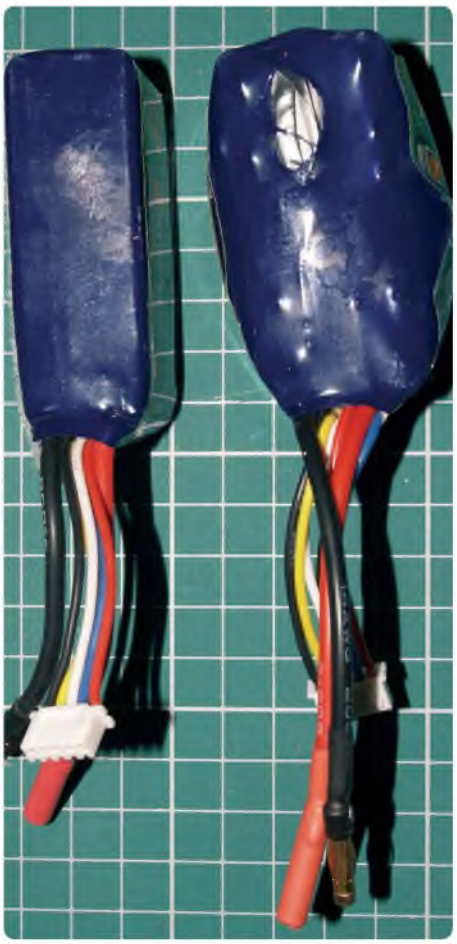
In central Europe, where summer conditions tend to be calm and hot, with small weak thermals, lightweights have a place in the scheme of things. True, in the UK you can add ballast in wind but you now have a rather vulnerable model, which generally needs landing with greater than usual care. And on a slightly bumpy day it needs extra careful handling.

Mending these beasts is very difficult, especially if you clobber the wing. So why didn't you buy a slightly heavier/stronger model in the first place?

It is interesting to observe that several top modellers who have been along the super-light route have quickly realised that durability and longevity are rarely worth trading for a tiny improvement in light air gliding time. Most UK eSoaring models, at the end of the 2015, were in the 1750 – 2000 g range and look like remaining at that weight through 2016.

My workshop charger with its array of connections is the same make and model as my car charger and is set up exactly the same to minimise confusion when charging. This system has worked safely for some time – until recently





Above: If you have two sets of leads in one output sooner or later you will forget that you didn't remove the flight battery that you charged just before you put the Tx on, fortunately for me only at a 1 amp rate. As you can see the 3S 850 mAh pack expanded to nearly twice its normal size but, mercifully, was barely warm

Left: Close-up detail of the output leads where they are plugged into the charger. The Tx charging lead is equipped with banana plugs and the battery leads plug into the back of them to avoid constant changing being necessary. But is this a good thing?

The Final Problem

I thought it appropriate to pinch one of Conan Doyle's story titles for this piece because a solution, if one is forthcoming, would be worthy of Holmes himself.

Andy Nelson is running out of serviceable models because he keeps losing important bits of them! Including a wingtip from his Euphoria, in a gentle mid-air, at the penultimate comp of 2015. But his latest loss will take some beating...

He was out flying his eF3B Airone, which has had relatively little airtime, when, on launch at maybe 30 metres, there was a thump and something flew off the top of the model. At first he thought it had thrown a prop and shaken the canopy off but it was not violent enough for that. The model landed OK, without any damage and the problem was revealed.

The motor was a Hacker B50, geared 6.7:1 and it had been installed on a conventional motor mount in the longish nose, making it normally invisible to view – but not now! The two pieces you see here are the gearbox and the motor can. (Not a brilliant shot but in a pub with a phone camera you do what you can!) In this particular motor the gearbox is not screwed through the flange onto the can but people say they are normally glued (Loctited?) in place; this one was perfectly clean. Remarkable but maybe not completely unusual, you might think.

However, if you look at the windings in the can you can see some at the front seem to have been pushed slightly to one side. How did that happen and where is the rotor? Well therein lies the problem because the rotor is what flew out of the hatch, taking the canopy with it!

Somehow the motor and gearbox came apart. The can was pushed backwards up the fuselage to the canopy opening, without even screwing-up the three ESC wires. Finally, the rotor ejected itself from the can and out of the model! It has resisted all attempts with a metal detector to find it, in the hope of rebuilding the motor and looking for clues to the manner of its bid for freedom.

If you are wondering how the rotor shaft was able to get out of the gearbox when the pinion gear would normally prevent that, this motor has the gear cut into the output shaft, not glued on to it, so it could just slide off the bearing.

So what forces can operate to separate a motor from its gearbox? How can the can 'reverse' up the fuselage by about 100 mm? And how could the rotor get clean out of the can, then out of the model without causing damage?

I'll leave you to ponder that conundrum until next time.

RCMW

In a conventional model these days the motor is enclosed within the nose area and is nigh on invisible. But somehow Andy's motor managed to come apart, 'reverse' up the fuselage to the canopy area, then allow the rotor to fly out without any other damage being done!

All that was left after the 'happening' described here. Just a gearbox and the can of a Hacker B50

Andy Nelson launches his Supra at Wetlands. His fleet of available models is slowly reducing as they await spares – see text

MODEL AIRCRAFT MEMORIES

Denis Sharp takes us back to a time before reliable R/C and electric power, when most models were covered in tissue and powered by either rubber or a diesel engine

This picture shows me in 1958 (aged 16) holding a 'flying saucer'. This was a balsa disc with a small diesel engine mounted in the centre, probably an Allbon Dart (0.5 cc). The torque from the propeller would spin the disc in the opposite direction

I was born in 1942, about five hundred yards from an active military aerodrome, Croft in North Yorkshire. So I was familiar with the sight and sound of full size aircraft from an early age. Also, in March 1945, to the effect of a 4000 lb 'friendly bomb' exploding in the burning wreckage of a Halifax bomber on the aerodrome! The explosion blew in a lot of the windows where we lived. Then, in 1951, shortly before my ninth birthday, a Meteor jet crashed vertically into the ground one hundred and fifty yards from my school, where the spotted dick and custard had just been served. I think aircraft in one form or another were trying to get my attention!

My first introduction to model aircraft was by my uncle Alan, around 1952. He decided to build a Frog Janus kit. He'd never built anything before and this was definitely not a beginner's model, with complex curves and never using one piece of wood when you could use several. He did finish it but it wasn't in a flyable condition and it sat on top of a wardrobe for a few years, until I got it down and with my newly acquired experience, I refurbished and flew it.

'Flying Saucer' Fun

Further to the introductory picture of me holding the Flying Saucer. This was meant to work on the principle of the milk bottle top. In case no one remembers how to do this, what you did was carefully remove the aluminium foil cap from the top of a bottle of milk so you had an aluminium disc with a downturned rim. Washing off any milk or cream stuck to the disc was a good idea. Then, with your hand vertical, you held the rim between your middle and index finger, and flicked your fingers so as to spin the disc. It would then fly for a short distance like a miniature Frisbee. I think it worked because the spinning disc dragged some air round with it and acted like a centrifugal fan. The downturned rim projected some of the air downwards and provided lift. The model I built didn't work very well and looking at the photo now I can see why. For some reason, now long forgotten, I seem to have built it with a rim on the top as well as the underside.

First Models

Sometime around 1953 I started building model aircraft. My very first was a Keil Kraft Grumman Panther 'Flying Scale' kit. As with my uncle's Frog Janus, the fuselage was all compound curves and rather complicated to build and cover. It was not an ideal beginner's kit but I didn't know that at the time. I built it exactly as per the instructions and ended up with a banana shaped fuselage!

The method of construction was to build the left half of the fuselage on the plan, then remove it and complete the other side. This was done by first assembling a central fuselage spine on the plan pinned to a building board. The spine consisted of a number of curved pieces of 1/16 inch balsa. Half formers were then secured to the central spine; these were basically semi-circular with notches for the 1/16 square balsa stringers that were be added after the balsa cement was dry.

The instructions told you to add all the stringers, starting with those nearest to the building board. Since the fuselage sides were curved this meant the stringers had to be bent to fit. When the half fuselage was removed from the plan the stringers tried to straighten out, and partially succeeded, resulting in a curved fuselage. That wasn't mentioned in the instructions! I then added the half formers and stringers to the right hand half of the fuselage, as instructed, hoping that bending the stringers to fit would straighten the fuselage. It didn't.

I completed the wings and tail and attached them to the bent fuselage, then I applied the tissue covering and steamed it over a boiling kettle to tighten the tissue. One was then supposed to apply clear dope but I didn't see any point in doing this as the tissue was already tight, and, anyway, I'd ran out of pocket money. The model was supposed to be powered by a Jetex 50 but I didn't have one so I tried it as a chuck glider. It didn't fly very well.

My next model was an Avro 707A. This used the same method of construction but I now ignored the instructions and built a straight fuselage. I started as before but only fitted the two stringers nearest the plan before removing the fuselage from the building board. It was extremely fragile at this point so it had to be handled carefully.

I then added the half formers to the right hand side of the fuselage, followed by the two stringers nearest the central spine, mirror images of the two I'd already added, taking care to keep the fuselage straight. I then added more stringers to alternate sides working outwards from the spine, again taking care to keep the fuselage straight. Wings and tail completed and fitted as before, then covering with tissue steamed to tighten. Still no Jetex 50 and the same poor result when tried as a chuck glider.

Then I built a Mercury Magpie towline glider. This was bigger, at 24 inches span and much easier to build because of the simpler structure. I covered it with tissue as before, steamed to make it tight. It did fly but not very well and no matter how fast I ran I couldn't get it to gain altitude on the towline.

A friend of mine had also started building models and we argued about the use of clear dope. He was all for trying it, I said there was no point because steaming tightened the tissue and didn't cost anything. Anyway we ended up buying a tin of clear dope between us. I applied it to my Mercury Magpie and it was transformed! The model flew brilliantly.

Of course, what I didn't realise at the time was that clear dope sealed the pores in the tissue. Previously I'd been trying to fly models where the wings were so porous that most of the air went through them rather than around! Hence, very little lift.

Later I built other models from the Keil Kraft range of Flying Scale kits. I can remember a Hawker Hunter, a DH110, ERCO Ercoupe, Fairy Gannet and Auster Arrow; there may have been others but memory fades. These all benefitted considerably from having clear dope applied to the tissue. The propeller ones were all flown successfully using rubber power.

Unusually, I built two Auster Arrows, and with the second one I went for maximum performance, building it as light as possible. I fitted a larger rubber motor, with minimal friction in the propeller hub bearing. It flew very well until a hard landing put a small crack in one of the four 1/16 square fuselage longerons. I thought it would be OK but the fuselage suddenly crumpled up when winding the oversize rubber motor.

There was still no Jetex 50 for the jet models but when I finally got one I used it on own design sheet balsa 'chuck glider' type models that generally flew very well and survived getting stuck in trees.

While writing this I checked online, not something that had even made it into science fiction in those days! You still can get some of the Keil Kraft models I mentioned, but they don't cost three shillings and sixpence anymore!

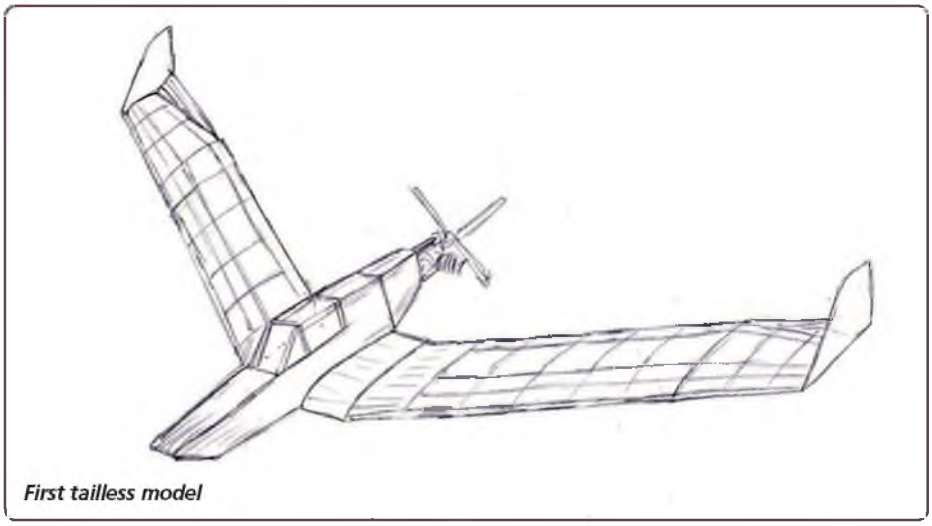
Progress

I discovered the 'Aeromodeller' magazine, which was very instructive! Then one Christmas I got a Keil Kraft C/L (control line) Champ and a 1 cc ED Bee. I learnt to fly it and built other C/L models, some from kits – Phantom Mite, Provost and Mercury Monarch (Allen Mercury 25, 2.5 cc diesel powered) – and some own designs as well.

The very first Aeromodeller magazine I got was the 1955 April edition, when I was 13. From this I got the plans for Snow White, a free flight model for my ED Bee. My fellow modeller and I decided to build one each. The plans called for 3/32" balsa for the fuselage but the model shop was out of stock of this size. My friend always tended to build for strength and went for the next thickness up, 1/8" balsa. I always tended to build for light weight and went for the next size down, 1/16" balsa.

His model ended up tail heavy and needed a lot of ballast in the nose; mine ended up nose heavy and only needed a small amount of ballast in the tail. The model in the magazine was white, hence the name, but I'd read somewhere that red and yellow were the best colours for visibility. Not so much when the model was in the air, but when it was on the ground, after you'd chased it across several fields! I covered the wings and tail with yellow tissue and the fuselage with red. I thought it looked good. My friend coloured his blue because he liked blue. Both models flew pretty well.

First Tailless Model



First tailless model

Also in the same edition of Aeromodeller was an article about free flight tailless aircraft. The idea fascinated me so I designed one. Unfortunately, I didn't take a photograph of it at the time so the accompanying sketch is from memory. There was no washout in the swept back wings; instead I had elevons at the wingtips permanently fixed at about ten degrees up. I designed it as a pusher, powered by an Albon Dart 0.5 cc diesel engine. The Dart would not run backwards so I made a five inch diameter four bladed pusher propeller. This was not really a safe thing to do but I didn't know it at the time, and fortunately I had no problems. It stayed in one piece and was used on a second model.

The pusher configuration had several advantages. First the engine and propeller would not be the first to arrive at the accident, as is usual with the tractor arrangement, thus protecting them from damage. Secondly, the extremely messy diesel exhaust, with lots of unburnt castor oil, wouldn't end up all over the model. There was, however, a disadvantage, which didn't occur to me until just before I was going to fly it for the first time; how on earth was I going to launch it with the engine running?

It was a low wing design with hardly any fuselage between the trailing edge of the wing and the propeller. I hastily glued a short length of 1/2 inch by 1/4 inch balsa under the fuselage centre section to act as a hand hold. It was still tricky; when you launched it you had to pull your hand down pretty rapidly to avoid the propeller.

Came the fateful day, my friend and I went to our usual field to try it out. It seemed to glide OK from a hand launch so I started the engine and launched it. My friend and I watched it climbing away from us, steeper and steeper. "Oh no", I thought, "It's going to stall and dive in". It did stall but instead of the nose dropping it did a stall turn, turning round so it was pointing back the way it had just come. It retraced its path almost exactly! My friend and I dropped flat on the ground as it zoomed closely over our heads... Fortunately it then ran out of fuel, otherwise it might have repeated the performance.

For the next flight I added a bit of up thrust to the engine, which cured its tendency to stall and dive bomb the launcher. Later I added a fin on the nose with a pendulum rudder but I'm not sure how much use this was. It flew very well, climbing in circles until it was a dot in the sky. When the engine ran out of fuel it circled the opposite way when gliding.

One day one of the elevons got damaged slightly on the way to the flying field but I decided to fly it anyway. When I launched it I noticed it was circling the opposite way to normal; this did not bode well. When the engine stopped it went into a spiral dive and hit the ground at high speed. I ran across to inspect the wreckage, but it was completely undamaged!

The nose, made of 1/16 balsa and packed with Plasticene (modelling clay) to get the balance point right, was buried in the soft earth of the field it had crashed in. The wings, which were attached by the tongue and box method, had simply unplugged themselves and folded forwards. The engine and propeller, sat at the back, wondered what all the fuss was about. After repairs to the damaged elevon and a careful check of the trim, it flew again.

Control Line Stunt

Not so lucky was my Mercury Monarch stunt control line model. I had done loops and wingovers, so one day I thought I'd try a bunt. How hard can it be? With the model high up in the circle and the lines tight, I gave it full down elevator. The model nosed over, then with the model pointing vertically downwards and travelling at over sixty mph I lost my nerve and was afraid I hadn't got enough height to complete the bunt and decided to pull out.

I'd no sooner started to do this when I realised that with the symmetrical wing section on the Monarch and the equal control movements I knew it had it could pull out inverted just as easily as upright. I changed my mind again. And again… The net result was a sort of wiggly vertical dive right into the ground. The Allen Mercury 25 engine was OK but everything else was wrecked beyond repair. I never took a photo of it when it was in one piece, but opposite there's a photo of the wreckage.

Incidentally, the reason I knew how fast the model flew was because at age thirteen I'd passed an exam to go to leave the village school I was attending to go to a Technical School. There I learned all about pi and circles and was able to use my new found knowledge to calculate the models speed from the length of the control lines and the time it took to complete ten laps.

The school was too far to travel each day so I had to live in lodgings during the week, only going home on the weekend. This, and the homework I got, cut into the time I had available for building and flying model aircraft.

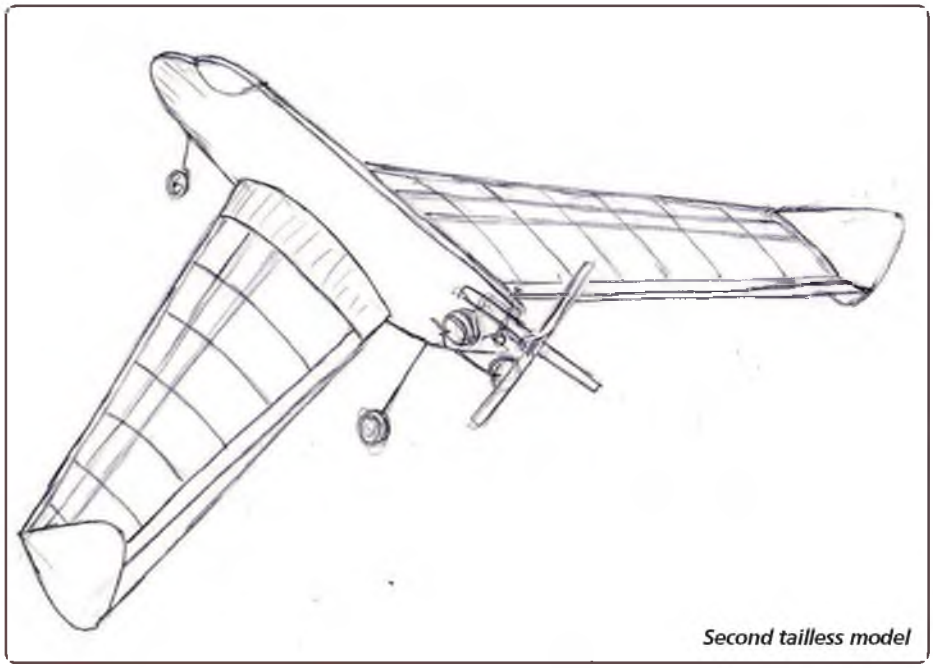
Wreckage of the hapless Mercury Monarch comes to a fiery end

Second Tailless

This was also a pusher with swept back wings, using the same propeller I'd made for the previous design, but was simpler to build because it had a profile fuselage; it was basically two sides of 1/8 inch thick balsa separated by 1/8 square strips around the edges. A piece of 1/8" ply was sandwiched between the fuselage sides at the rear to provide the engine mount. I'd read in the Aeromodeller that sweepback on a wing had a dihedral effect, so I built the wing flat without any dihedral.

Now, being a member of a model aircraft club based in Darlington, we were able to fly on the nearby, disused airfield of Croft. There were lots of hard surfaces to take-off from, with three runways and a perimeter track that were no longer used by the wartime Halifax bombers or Cold War Meteor jets, which had gone elsewhere. So I added a tricycle undercarriage. Again no photographs were taken but the accompanying sketch shows the general layout. This turned out to have a bizarre characteristic; it would always take-off into wind, even if you pointed it well out of wind initially. But I'm getting ahead of myself.

For this model I broke with my normal practice of covering it with coloured tissue and painted it bright orange instead. This was principally because one of the model shops in Darlington (there were three!) was selling this paint off cheap. When I used it I found out why – it took ages to dry. It was still slightly tacky when I lost patience and took it out to fly for the first time so it soon acquired odd bits of grass stuck to the wings.



Second tailless model

It glided OK from a hand launch, so I tried a hand launched powered flight. This was OK initially, climbing to a height of about fifty feet. It then became apparent that the dihedral effect of the swept back wing, while adequate for a hand launched glide, was not sufficient when under power. It started to turn to the right. The turn tightened up and became a dive and it hit the ground almost vertically with the engine still running.

Now there was an odd effect. Everyone there was familiar with a free flight model diving in with the engine running. And because of the great discrepancy between the speed of light and the speed of sound, the engine noise always carried on for a significant fraction of a second after the crash.

We expected this to happen but instead the engine noise carried on – and kept on carrying on! This raised a laugh at the time. I ran over to it; the nose was stuck in the relatively soft ground, leaving the unconcerned engine running at the rear. As before the plug in wings had simply unplugged and folded forward. I took it home and modified it so it had some dihedral.

Having got it to fly properly from a hand launch I thought I'd see how well it took off from the ground. No problem at all, it ran along a short distance, the nose lifted and it took off. One day I'd got a bit blasé about this and didn't point it directly into wind before releasing it. It ran forward a short distance, the upwind wing lifted first, causing the other wingtip to strike the ground and act as a brake. It virtually stopped then spun round in a tight circle until it faced into wind. Then, with both wingtips off the ground, it accelerated forward and took off normally. It was very reliable in doing this and it became a sort of party trick, causing much amusement to those watching.

Other Models

Following the success with Snow White, when I was thirteen I designed and built a high wing monoplane for the Albon Dart. The wing section was too thin, the fuselage too blunt and the wheels too big and heavy. It flew but its ceiling was about fifty feet above ground. No matter how long the engine ran it didn't climb any higher. It struck me that if I'd tried to fly it from the top of a small hill it wouldn't have climbed at all.

Then I built a Keil Kraft Southerner Mite from a kit, also powered by my Albon Dart. It flew very well to the extent that I lost it. I found it the next day in a field, no worse for being out all night. Later came a Keil Kraft Eaglet, which was supposed to be rubber powered but I modified it to use a Cox Pee Wee glow plug engine. This flew well, when I could get the engine started. One time it got stuck in the top of a tall tree. It was got down by shooting at it with an air rifle – not a procedure to be recommended! It was subsequently repaired and flown again.

A fairly large towline glider was successful but flights on anything but the calmest day involved chasing it across several fields. On what turned out to be its last flight it came down alongside a railway line and managed to insert one wing into the telephone wires that ran alongside railway lines in those days. We got it down by throwing stones at it. It suffered a bit...

Then there was various own design control line models, including one with twin engines. This was a bit of a compromise as I didn't have two identical engines, so I used my ED Bee and my Albon Dart. This model was not very successful. First was the difficulty of getting two mismatched engines running properly, with two needle valves and two compression screws to adjust.

Keil Kraft Eaglet rubber model modified to be powered by a Cox Pee Wee

The technique one was supposed to use was to get one engine running and adjusted properly, then you stopped it by cutting off the fuel or throwing a rag at the propeller. Then you started the second engine and got it running properly. Finally, you restarted the first engine again, which hopefully you could do without having to adjust anything. The snag with this was that if it took you a long time to get the second engine started the first would have cooled down and be difficult to start.

The next problem was getting them to stop together. This I hoped to do by using a single fuel tank feeding both engines via a 'T' piece. This would probably have worked better if the two engines had been the same size, but they weren't... I had to use the larger engine on the side nearest the centre of the circle, so its extra thrust would keep the lines tight. However, the larger engine used more fuel so that when the tank was empty the fuel in the inner engine fuel line tended to get used up faster than in the outer line.

It has just occurred to me, nearly sixty years too late, that I should have put a loop in the fuel line to the inner engine to ensure it would keep running slightly longer. It did fly, but on what turned out to be its last flight the inner engine stopped first and the model promptly turned left so rapidly that it ran into its own wire control lines, wrapping them round the propeller. That stopped it!

Later, I built an own design twin engine free flight model using a friend's engine, so it had two Albon Merlins. I used the same technique, a single central fuel tank feeding both via a 'T' piece. Even so one engine invariably stopped before the other, resulting in a spectacular spiral dive before the second engine cut. We couldn't use a short engine run, as we had to get it high enough to leave room for the spiral dive! This project was terminated one day when, with both engines running, I thought 'my' engine needed a little more compression. It didn't, resulting in a broken gudgeon pin.

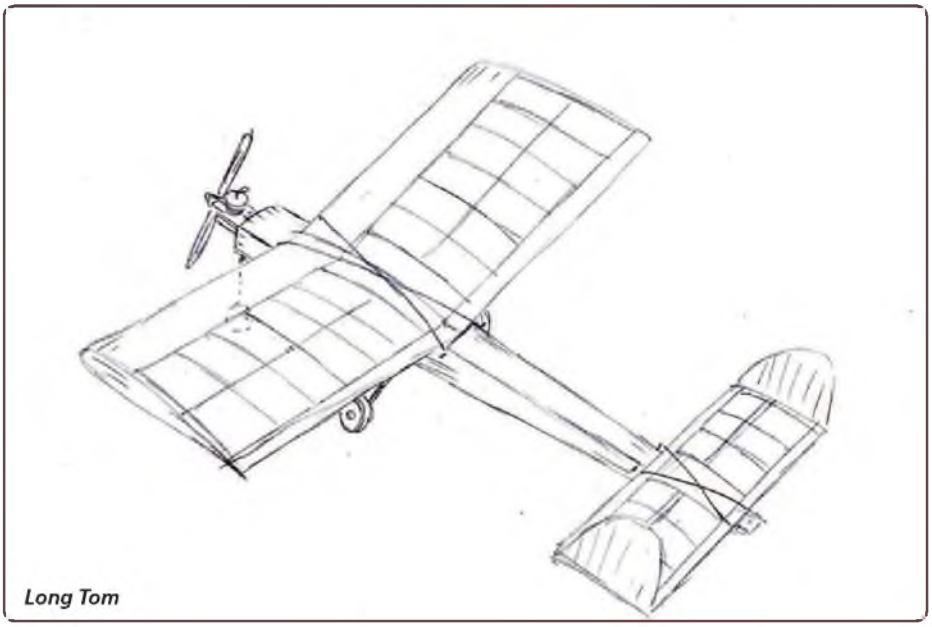
Vertical Climb

One thing I was always trying to do was to minimise costs. My own designs tended to have wingspans of thirty six inches because that was the standard length of sheet balsa and stringers. I decided to try and build the biggest model I could from the smallest amount of material, with the minimum amount of material leftover.

What I came up with was a model with a three foot span wing and with one foot chord. Similarly, the fuselage was three foot long and sized so it could be made from two sheets of thirty six by four inch 1/16" balsa. I can't remember what the tail was but it would have been as chunky as the wing. It was powered by my trusty ED Bee and I fitted it with a tricycle undercarriage, which gave it a slightly nose down attitude when it was sat on the ground. It looked rather strange and for some reason now forgotten I called it Long Tom, and is shown by another sketch. But it flew very well. Then I thought I'd try it taking-off from the runway.

It ran along the ground for much further than I expected. I'd got the main wheels of the undercarriage too far behind the C of G, so it had to build up quite a speed before the tail could generate enough downforce to raise the nose. When it was travelling much faster than its normal flying speed the nose suddenly came up and it leapt of the ground, going straight into a vertical climb. I knew my Bee couldn't sustain this; I expected it to stall and dive in, on a very hard and unforgiving runway. It didn't. It climbed vertically to a height of about ten feet, losing speed all the way. Then it mushed round into a horizontal attitude and carried on flying as normal.

What saved it were the extremely benign stall characteristics of its low aspect ratio wing, characteristics I was completely unaware of. I seemed to have a happy knack of designing desirable characteristics into models by accident. This knack didn't last! ***RCMW To be continued...***



Long Tom

TAKE OFF EXTRA! USA news update

The FAA's small unmanned aircraft (UAS) registration may help to identify wayward drone operators but unfortunately it also encompasses most traditional model aircraft too

Bill Bowne's design for the Bell XP-59 will appear as an RCMW plan soon. But the new FAA rules could mean that US model designers like Bill will need a commercial licence to design plans for magazine use

Model Aircraft Registration Begins In The USA

On December 21st, 2015 the US Department of Transportation's Federal Aviation Administration (FAA) announced a web-based aircraft registration process for owners of small unmanned aircraft (UAS) weighing more than 0.55 pounds (250 grams) and less than 55 pounds (approx. 25 kilograms) including payloads such as on-board cameras.

Registration is a statutory requirement that applies to all UAS aircraft in the USA. Under this rule any owner of a small UAS who has previously operated an unmanned aircraft exclusively as a model aircraft prior to December 21, 2015 must register no later than February 19th, 2016. Owners of any other UAS purchased for use as a model aircraft after December 21st, 2015 must register before the first flight outdoors. Upon completion of the registration process the web application will generate a Certificate of Aircraft Registration/Proof of Ownership that will include a unique identification number for the UAS owner, which must be marked on the aircraft. The number can be inside the aircraft, such as a battery hatch but should not require tools to access.

Owners using model aircraft for hobby or recreation will only have to register once and may use the same identification number for all of their model UAS. The registration is valid for three years.

The normal registration fee is $5, but in an effort to encourage as many people as possible to register quickly the FAA waived this fee for the first 30 days, until January 20th, 2016.

The full rule can be viewed at: www.faa.gov/news/updates/media/20151213_IFR.pdf

The Academy of Model Aeronautics Responds

The AMA (the US equivalent of the BMFA) was a member of the task force that helped develop recommendations for this registration rule and they had argued that registration made sense for those operating outside the guidance of a community-based organisation (typically a model club) or those flying for commercial purposes.

Unfortunately the new FAA registration rule does not include their advice. The AMA have stated that the registration process is an unnecessary burden for all of their members who have been operating safely for decades. However, they have provided their members with important information about how AMA members can comply with the new federal requirements.

How Does This Affect A Typical US Modeller?

We asked Bill Bowne, one of our regular contributors in the USA, for his first thoughts on how the new FAA rule would affect his model flying activities. Bill writes:

"As a little background, I've just celebrated my 44th year of flying R/C. I started (with little success!) with Galloping Ghost radio gear, then soloed on a Futaba radio in 1971. I did lose some time due to college and enlisting in the USAF, but since I got to my first base (1975) I've almost never missed flying at least once a month. I taught Micki to fly the next year, 1976, and she's been right there, my best flying buddy, ever since.

I'd like to lay the blame purely at the feet of the FPV folks who've flown irresponsibly and bragged about it on the Internet, but I'm getting the feeling there's more to it than that. Yes, there's been a lot of hype on the subject from overzealous, inaccurate media reporting, but there are also valid concerns. Among those are interference with full-scale aviation, invasion of privacy, criminal use (such as dropping contraband into prison yards), use by terrorists (both domestic and foreign) to deliver attacks on public figures, and the loss of employment by replacing full-scale pilots and aircraft.

Reading through the document (211 pages of legalese!) it's depressing to see how many organisations were happy to toss R/C modelling under the bus (quite a few appeared to be related to the threat quad-type drones pose to full-scale aviation jobs, such as aerial photography).

I'm not a fan of FPV as I like to watch planes, not be in them. I've also never been interested in racing, nor flying big gliders, but I'm not happy to see them be shut down by the FAA's planned restrictions of no FPV, no flying above 400 feet (or 500, depending on the source), and no flying over 100 mph.

On a more personal note (based on that document), any modelling done 'for profit' automatically disqualifies one from being a model aviator and requires licensure (at this time, I'm not sure if that means a full-scale pilot's license or a lesser one?). That will force factory teams to get licensed, and could even mean I need a licence to design, build and send my designs in to Traplet!

I guess the folks who kept insisting their models weren't 'toys' have won – now the FAA considers them the same as full-scale, man-carrying aircraft and must be treated likewise. I wonder when the FAA will want to approve my plans before they let me fly one of my own designs…

I don't intend to give up the hobby and will, reluctantly, comply with the demands of the FAA. There is still hope that their draconian demands will be scaled back and the hobby will survive. It'll never again be as free as it was – there are just too many R/C flyers out there and too little airspace."

The FAA registration rule is an example of what could happen here in the UK if drone flying is allowed to proceed unchecked, so it brings into even sharper focus the BMFA's collaboration with the Civil Aviation Authority (CAA) and the forthcoming Drone Awareness initiative, which we discussed earlier in Take Off (pages 8 and 9). Let's hope they have more success than the AMA so that we can continue to enjoy model flying relatively unrestricted, as it is now, for many years to come.

If you have any news or special interest announcements to make, or even a recently completed RCMW plan design, then why not drop RCMW a line or email RCMW@traplet.com

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Pride of the RAF, and considered to be one of the best looking biplanes of all times, the Fury is superbly drawn on 2 large sheets from the Dennis Bryant Elite Plans range, and features an all wood construction.

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Available in 2 sizes (see also MW3467). This is the 53" span version of the famous WW1 scout to 1:6 scale and on 2 highly-detailed plan sheets. Constructed from all wood from the Dennis Bryant Elite Plans range.

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WESTLAND WIDGEON III (72") PLAN MW3443

This 1:6 scale model is from the Dennis Bryant Elite Plans range of the 1927 2-seat tourer and is very stable in flight and makes another ideal first scale model. Constructed from the 2 large well-detailed plan sheets from all wood.

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COMPER C.L.A.7 SWIFT (63") PLAN MW3445

This quarter - scale model of the famous racing aeroplane of the early 1930s from Dennis Bryant, is constructed from the detailed 3 plan sheets from all wood. Not for beginners

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DCH-1 CHIPMUNK (68") PLAN MW3444

This 2-seat monoplane was the replacement for the well-established Tiger Moth as the basic trainer.

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AVRO 621 TUTOR PLAN MW3441

This famous RAF trainer is for experienced builders from these Dennis Bryant Elite Plans. The large 2-sheet plans are very highly detailed, and construction is from all wood and suits 10cc engines.

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MESSERSCHMITT MW163B KOMET (61") PLAN MW3454

The model of this WWII German jet is an absolute showstopper. The 2 well-detailed large plans from the Dennis Bryant Elite Plans range show the mechanical elevon servo tray and plenty of detail. Construction is all wood. A good .60 engine will give unlimited vertical performance.

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BRISTOL BULLDOG (63") PLAN MW3455

The RAF fighter of the 1930s, famous for its air displays is drawn to 1:6.4 scale on 2 well-detailed plan sheets from the Dennis Bryant Elite Plans range and is constructed from all wood. The model will suit a long-term building project, and is well worth the effort.

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AERONCA C-3 (81") PLAN MW3458

This classic vintage American aircraft was also built in Britain and makes an ideal first scale model at 1:6 scale from the Dennis Bryant Elite Plans range. The model is easy to build from the superbly detailed 2 large sheet plan drawings and construction is all wood. Easy to fly for experienced pilots.

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This well-known Ultralight is ideal for your first scale model being reasonably easy to build from these Dennis Bryant Elite Plans. The large 2-sheet plans are very highly detailed, and construction is from all wood. Not for beginners.

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THE SPORT CHANNEL

Gray reveals details of the special events planned for the North Cotswold MAC's Fly For Fun event, which is a popular draw for RCMW readers each August

Previously unpublished photo of the late, great Vic Smeed during his final visit to Old Warden, taken by your author. Just after taking this, I plucked up courage to speak to my modelling hero and he revealed that he read this column avidly! The NCMAC will be paying tribute to Vic and his designs in August. See text

"THE BEST FLYING SESSION WE'VE HAD ALL YEAR - ROLL ON NEXT AUGUST!" (GUEST FLYER'S MESSAGE, RECEIVED DEC '15)

This Month's Wise Words

One tiny bit of self-indulgence that this column affords its author is the opportunity each year to report on my local club's summer show. After our edition devoted to the North Cotswold MAC's Fly For Fun event in August 2015 we received a lot of positive feedback from readers who came along and flew with us, and from others who are eager to get over to our field in rural Gloucestershire next time.

As an experiment we've experimented during the last two shows with informal events alongside the two days' main flying dedicated to models from respected designers.

It's worked well, with designs by the late Dereck Woodward and David Boddington. Last time, we added a variation with a 'One Design' day and the astute choice by a committee member of Albert Hatfull's Keil Kraft Junior 60 attracted a good entry. So what does next season hold in store?

Get Building And Book Now!

Well, as this edition was being written we held our Annual General Meeting and we're pleased to report that our 2016 Fly For Fun event is set for August 13th and 14th at Far Heath Farm, Moreton-in-Marsh.

All our regular attractions will be available once more to make a weekend of

A gathering of Novices at Machrihanish airfield in Scotland, courtesy of Bryan Passey and friends. In August 2016, the North Cotswold MAC will be holding a one design event for Sid King's trainer/ sport design. All Novice fans are invited so start building and book early!

Early appearance of a Novice at last year's Fly For Fun. North Oxfordshire MAC member Steve Burns is a longtime fan. Seen here with his own electric version. Also note the 'Littlest Stik' in the background, tying in with our topic elsewhere. Neat, eh?

relaxed fun flying. We'll again be running two events in parallel with the regular programme and our committee, after some inspired discussion at the AGM, hit on two irresistible ideas.

On the Saturday we'll be honouring the modelling legacy of the late Vic Smeed. A true Brit, Vic left us a vast back catalogue of designs, which enjoy continuing popularity and they appear in all sizes and new guises with evolving technology.

Several clubs have run events for Vic's designs since his passing in 2011 and as some of our members owe a lot to his designs in their early modelling years it was time to try our hand.

So, our invitation goes out to any modeller with any Vic Smeed design to bring it along to fly at our patch in August. Models can be from plans or kits, in any size – enlarged or reduced – and with any power source. As Vic's output was so varied our invitation includes free flight and control line models.

No competition is involved but as usual there will be informal flying/static judging by the participants and spectators for the favourite model of the day and a prize will be presented.

A King Among Trainers

On the Sunday our event will again feature a single model design. The chosen subject this year has a local flavour, as its creator Sid King is a regular guest at our show.

The 'Novice', which appeared in the mid-1970's through Sid's own Cotswold Kits company, enjoys a deserved reputation as a favourite trainer and sport model, and is often quoted as the first ever built-up balsa R/C model of a surprising number of established flyers.

It's not difficult to see why. Every aspect of Sid's design, from its light, rugged construction to its reliable, forgiving flying qualities characterise the presence of pure aeromodelling skill through and through.

Popular equally with I/C or electric, the Novice is available as a kit from Ben Buckle Vintage Kits. And not so long ago Sid's latest version, the 'Novice-E' was published in RC Model World and became a welcome addition to the Traplet range (Plan No: MW3743).

You may also remember that we ran an item on reader Bryan Passey from Lochgilphead in Scotland and his group, who hold events for the Novice at Machrihanish airfield and enjoy some entertaining mass launch action.

We hope to do something similar at the NCMAC show next summer, so Novices of all kinds are hereby invited to take part. If you don't already own one, get building now! And yes, we'll round off the day with a mass launch too. Again, there will be informal judging by the participants and spectators. And if he comes along, maybe Sid could be persuaded to present the prize? How about it, Sid?

George Stringwell does it again with an enlarged 'Widgeon' from FROG's stylish 'Senior' rubber power range from the 1950's

George's interchangeable aileron wing for the Widgeon. Fabulous covering job as ever, which will no doubt bring in more fan mail!

FROG Fleet Flourishes

Our next item could almost be appearing 'by popular demand'. Over the past couple of years George Stringwell's approach to electrifying Vintage, Nostalgia and Classic designs, and his highly individual covering and finishing methods have been some of our most eagerly followed topics. The latest word from George arrived just as our item on Australian modeller Alistair Heathcote and his scale-up of George's KK 'Sportser' appeared and in turn brought in more inquiries.

George brings us up to date on his newest project:

"Here is what has been keeping me busy in the workshop. It's another one from the Frog Senior series, double size, the 'Widgeon', a stablemate for my Tom Tit and Mamba. This one is different in that I decided to build two wings for it, one for rudder/elevator (or ruddervator) flying and one with ailerons.

Thanks to the magic of modern transmitters changing from one wing to the other is simple. I have two mixers set up, one for rudder/elevator and a 100% one for rudder/aileron, which is enabled or disabled via a switch.

The fuselage servos are plugged into the rudder and elevator Rx outputs, whilst a 'Y' lead is permanently plugged into the aileron output. With the dihedral wing the rudder/aileron mix is switched on and the model flown with rudder/elevator on the right stick.

On changing to the aileron wing, the two wing servos are plugged into the already connected 'Y' lead and the rudder/aileron mix switched off. The model is then flown with aileron/elevator on the right stick and rudder/throttle on the left.

This all works fine – after a frustrating hour fiddling with the programming on the DX6 to get it set up. The model is equipped with a 160 watt BRC outrunner, propped to give 100 watts from an 850 2S LiPo. Radio is an Orange 6 Rx, four 9 gram servos and a 20 amp ESC.

My original target weight was 16 ounces, and after adding 10 grams of ballast to the tail end of the fuselage (I find that electric conversions of rubber designs often come out slightly nose heavy as they tend to have longer noses than your typical vintage power model) to get the C of G to 35%, the weight with the plain wing is 436 grams (15.4 ounces) and with the aileron wing it comes in at 475 grams (16.7 ounces). So needless to say I am very happy with these weights and expect a lively performance at 100 watts per pound.

In the unlikely event that test flights show the need for more grunt a prop change will easily provide this whilst staying well within the capabilities of motor and ESC.

In the few days since the model was finished the weather has refused to play ball and provide the conditions I prefer for first flights. But holding the model with the motor running it feels eager to go and I don't expect any problems, other than the probable need to adjust the rudder/elevator mix ratio to get the responses just right.

The covering is 38 micron semi-matt document laminating film with tissue over it (not Esaki but lightweight Modelspan, from a hoard tucked away in a box that I had completely forgotten about!), using nitrate dope. The red and blue trim are reversed on the underside of the flying surfaces."

Another fine job, George and again an unusual and attractive subject. I've seen many free flight versions of this little V-tail, pylon racer style model built for rubber power from repro kit plans. In fact, the last time I went to Old Warden, I saw one doing its best to disappear O.O.S!

The question now is, will we be seeing the plan for the Widgeon in print anytime soon?

When Is A Winter Project...

...not a Winter Project? I thought this one was rather amusing, after having asked readers to tell us about their ongoing or finished Winter Projects.

The first mail we received on the subject, of course, came from the other side of the world, where it is most definitely not winter! (We approve wholeheartedly as SC readers do this sort of thing so well.)

Steve Winnall of Melbourne, Australia caught up with us a couple of issues ago. You may remember that his return to the hobby after a long layoff was met with a bizarre attack by an enraged magpie on his tiny foamie Aeronca Champ. (If they ever remake 'The Birds', sign him up!)

Steve's is revisiting his Small Model Association roots with a 'Dep Stik', a micro Depron foamie that appeared in 'another UK publication' not too long ago. We definitely like this one, having seen the prototype in action online. I'm sure Steve will find his model a lot of fun, plus the local birdlife may have trouble keeping up with it!

The Dep Stick is the latest in a long line of derivations of the celebrated 'Ugly Stik', the game-changing 1960's sport/aerobatic design that is now fifty years old! Like so many great designs Stiks have been built in all shapes, sizes and variants. The Small Model movement adopted the design with fervour and during the 1970's .049 scale-downs with two-channel radio soon emerged.

In 1975 one of my all-time personal favourites was published in 'RC Modeler' in the USA. The 'Littlest Stik' was the smallest and cutest member of the family at just 19.5" span for a Cox TeeDee .010 and rudder only control via Ace pulse proportional gear, the smallest and lightest R/C then available.

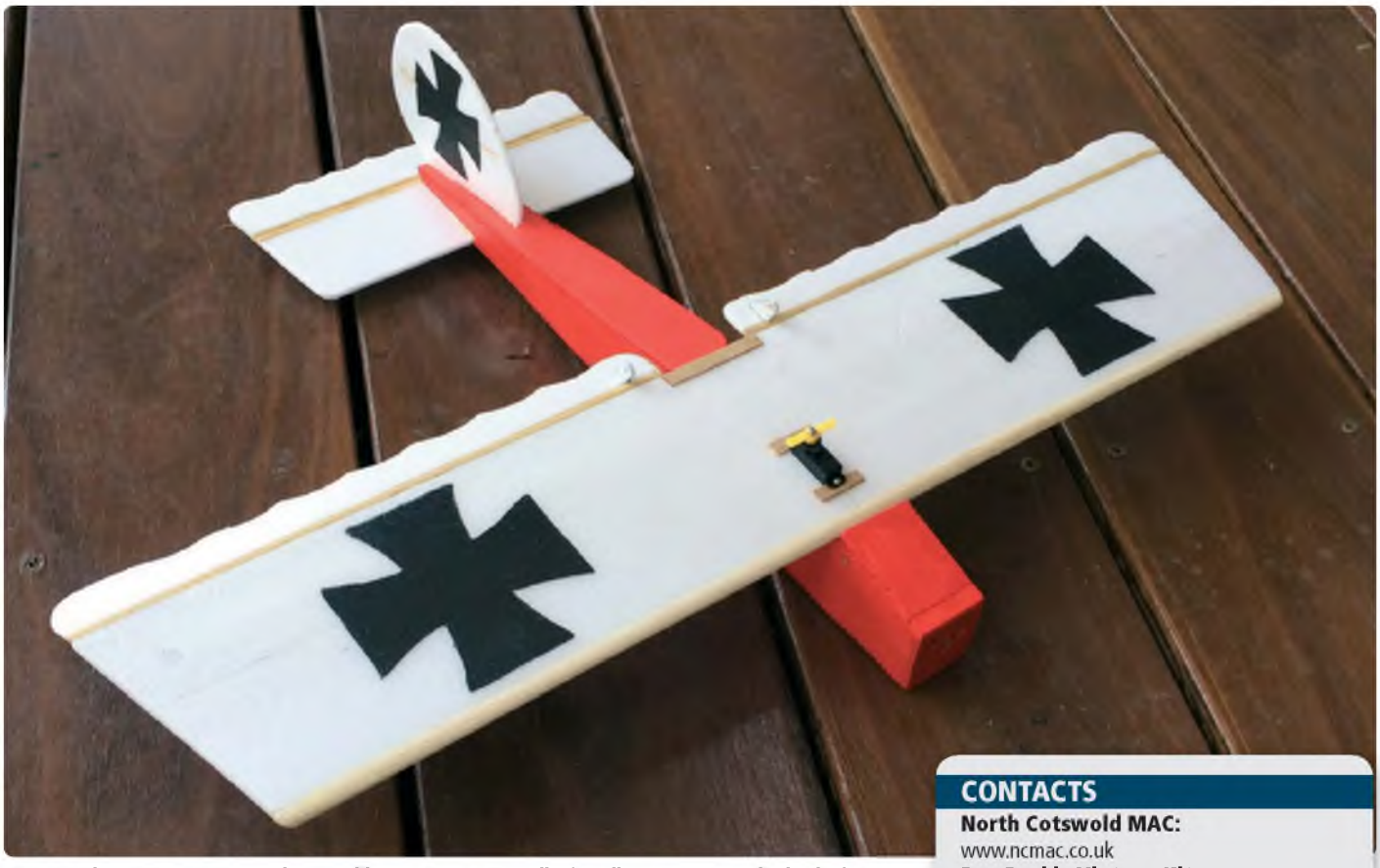
As I've mentioned over the years, I and several friends had a large fleet of Littlest Stiks in the 70's, 80's and 90's which took mini and later micro Rx's and servos. If you fancy a free download of the Littlest Stik plan, e-mail me at the address below.

A later micro version, which I love to this day, was the 24" Matchstick from the 80's, just pre-SMA. Designed around genuinely micro gear, with Cox TeeDee .020 power, it was a real joy to fly.

I think the Dep Stik must be a close descendant of the old Matchstick, so a whole new audience should get the same thrills! If you're a Stik family fan, let us know what you fly.

Contributions, please to The Sport Channel c/o the Traplet Publications address.

All e-mail correspondence to: gray_rcmag@hotmail.com RCMW



Not strictly a 'Winter Project' but we like it! Steve Winnall of Melbourne, Australia built this 'Dep-Stik' from a recent British plan. Latest in a distinguished line of designs, which began fifty years ago with 'Das Ugly Stik'!

CONTACTS

North Cotswold MAC:
www.ncmac.co.uk
Ben Buckle Vintage Kits:
www.benbucklevintage.com

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Check our website for a full list of events
www.rcmodelworld.com

Diary Dates

INDOOR

23rd Jan '16, 20th Feb '16, 19th Mar '16
Indoor R/C Meets, in the Main Hall at Fleming Park Leisure Centre, Passfield Avenue, Eastleigh, Hants SO50 9NL. From 7 pm to 10 pm. No free-flight models. £8 for flyers, £1 for spectators, proof of insurance required. For further details please contact: Alan Wallington, 'Wrenbeck', Bull Lane, Waltham Chase, Southampton, Hants. (Tel. 01489 895157) or see our website: www.wcaero.co.uk

26th Jan '16, 23rd Feb, 29th Mar, 26th Apr, 31st May, 28th Jun
Indoor R/C Small Models Meets, in the Main Hall at Wickham Community Centre, Mill Lane, Wickham, Hants PO17 5AL. All meetings will run from 7.00 pm to 9.30 pm. Models to be flown at these meetings are to be limited to a maximum weight of 95 grams (3.5 ounces) for fixed wing aircraft, in flight trim, including battery (not to exceed a 2-cell LiPo pack). Helicopters are to be limited to a rotor diameter of 12" (305 mm). All models will be weighed before flight, and will be judged on their suitability for the venue on the evening. Admission to the meetings will be £4 for flyers and £1 for spectators. Flyers will be required to show proof of insurance. For further details please contact: Alan Wallington, 'Wrenbeck', Bull Lane, Waltham Chase, Southampton, Hants. (Tel. 01489 895157) or see our website: www.wcaero.co.uk

1st & 15th Feb '16
Yeovil RC Flyers Indoor Flying at Crewkerne Sports Centre (south west of Yeovil, Somerset), 7 pm to 9 pm, £10 per adult, juniors half price, insurance required. Flying takes place in a big, 4 court hall with some power points. Meets first and third Mondays each month, except Bank Holidays. For more details contact Jack Mitchell on 01935 445311 or Email: jack@home9999.plus.com or check out the website www.yeovilrcflyers.org.uk/index.php

6th Feb '16, 5th Mar, 2nd Apr, 7th May, 4th Jun, 2nd Jul, 1st Oct, 5th Nov, 3rd Dec '16
Fun Flying at Potters Bar, at Furzefield Sports Centre, Mutton Lane, Potters Bar, Herts. EN6 3BW. From 6 pm until 10 pm, flyers £9, spectators £2. Small rubber free flight and small electric models, wingspan will be limited to 20". All enquiries to Mike Quille, Tel: 020 8500 3549, Email: mp.quille@live.co.uk

6th Feb '16, 5th Mar '16
Indoor R/C Meets, in the Main Hall at Havant Leisure Centre, Civic Centre Road, Havant PO9 2AY. From 7 pm to 10 pm. No free-flight models. £7 for flyers, £1 for spectators, proof of insurance required. For further details please contact: Alan Wallington, 'Wrenbeck', Bull Lane, Waltham Chase, Southampton, Hants. (Tel. 01489 895157) or see our website: www.wcaero.co.uk

7th Feb '16
BMFA South Eastern Area 41st Crawley Indoor Meeting, at K2 Leisure Centre, Pease Pottage, Crawley, West Sussex RH11 9BQ. Free Flight 11 am until 5.30 pm, Indoor R/C 5.30 pm until 8 pm, competitions and plenty of fun flying time, including Comps 12" Catapult Glider, HLG Peanut Scale Open Scale, EZB Living Room Stick Gyminnie Cricket, Legal Eagle Mass launch of Butterfly and Hangar Rat. For more details contact Comp Secretary John Dart, 01293 420830, Email: johndart17@aol.com or check out www.cadmac.org

13th & 14th Feb '16
BMFA Electric Indoor Masters 2016, will again be taking place at the superb Metrodome Arena in Barnsley, and a full weekend of indoor entertainment is guaranteed. The competition will feature eight classes of competition, including four classes of F3P, Aeromusical, Freestyle and indoor pylon racing. The venue offers excellent facilities, including a large flying area and tiered seating for spectators, as well as full catering. There will be a raffle each day, with a generous prize pot thanks to the EIM's sponsors. Spectators are able to turn up on the day and pay at the door. Entry fees are £5 adults, £3 Under 12s. All competitors must pre enter using the online entry form at: www.eim.bmfa.org

13th Feb '16, 12th Mar, 9th Apr, 8th Oct, 12th Nov, 10th Dec
North London MFC Indoor R/C Meetings, at Furzefield Sports Centre, Potters Bar, Herts. EN6 3BW (Junction 24/M25), 6 pm-10 pm. All up weight limit for fixed wing 225 g, 36 inch span, Helicopters 400 g. BMFA insurance required. Admission: flyers £9, spectators £2.50. For more information contact Peter Elliott on 01707 336982

GENERAL

6th Feb '16
Home Counties Swapmeet, organised by the Chobham Common Model flying Association, 10 am until 1 pm at West End Village Hall, Benner Lane, West End, Surrey GU24 9JP. Space available for 45 trestle tables. (Tables are provided) Hall open to sellers from 9.30 pm. Entrance fee is £2 per person, the fee for the hire of a table is £6 and this includes entry for one person. Booking for tables must be done in advance. Get in touch, Email: ccmfa2015@hotmail.com Tel: 07401914341 www.ccmfa.moonfruit.com/

19th to 21st Feb '16
Brighton Modelworld, at the Brighton Exhibition Centre, Kings Road, Brighton, East Sussex BN1 2GR. General model show with boats, planes, cars, trains etc. Contact Exhibition Manager: Alex Tombling, Tel: 0845 2241823/07789 913584. Email: alex@brightonmodelworld.com

28th Feb '16
Beverley and District Model Aircraft Club Spring Swapmeet, 9 am till 12 noon at Tickton Village Hall, near Beverley, HU17 9RZ. Entry £1.00, Tables £5.00. Contact Brian Jenkins, Email: 2bee.jays@live.com, 07970 959875 or www.badmac.btck.co.uk

28th Feb '16
Bedworth Aeromodellers Swap Meet, at Bulkington Working Mens Club, Chequer Street, Bulkington, Bedworth, Warwickshire CV12 9NH, 10 am to 2 pm. Table set up time 9.30 am. Cost £5 per table, tables must be booked in advance. Entrance fee £2. Ample parking on site. Hot food, tea/coffee available in the Club. Contact: Eric Heathcote on 07914 382930

5th Mar '16
Brightlingsea MFC Swapmeet, at the Village Hall, Clacton Road, St Osyth, Essex CO16 8PE, from 9.30 – 11.30 am. Entrance £2, Tables (set up from 9 am): Small £3, Large £4. Have your breakfast with us! Contact Bob Goodenough for information and pre-booking tables (essential), Tel: 01206 303749, www.forjac.co.uk

6th Mar '16
The Great Southern Model Auction, at Mountbatten School, Romsey, Hampshire SO51 5SY. The doors open at 9 am, auction starts at 11 am. Entry £5, under 16s free. Refreshments available. Minimum lot £10. Pre-booking of auction lots is strongly recommended, contact Paul on 07500 175897. See www.hmfa.hampshire.org.uk for more details

12th Mar '16
Long Eaton Model Aero Club Swap Meet, at Trowell Parish Hall (postcode NG9 3QA) Note, new venue with large car park. Tables cost £5 for sellers which includes one seller, additional helpers £2. Doors open at 9 am for sellers and 9.30 am for buyers. Entry cost for buyers £2. Finish 12 noon. Contacts: John Wright 01159 394448, Email: janwright27@btinternet.com, Barry Parkinson 01159 731954

18th Mar '16
DADMAC Auction, the Dumbarton and District Model Aircraft Club Bring and Buy/Auction takes place in the Chivas Community Suite of Dumbarton Football Club, Castle Road, Dumbarton. Book in items from 5.30 pm, Auction kicks off at 8 pm. Entry fee, but no commission on sales. Bar/Snacks available. Auction forms available on website www.dadmac.org.uk Contact Maurice Irvine 01475 689711 for more information

23rd & 24th Apr '16
Spalding Model Engineering & Hobby Show, 9.30 am Saturday until Sunday 4.30pm, at the Springfield Centre, Camelgate, Spalding, Lincs. PE12 6ET 3. Halls exhibiting R/C trucks/plant in extensive working diorama, model boating pool, indoor flying area, alongside traditional engineering, Gauge 1 railway layout, 5" live steam railway rides, live steam outside, R/C tank demonstrations, trade stands, catering & much more. Fun for the R/C enthusiast and all the family. Show adjacent to large shopping outlet and acres of gardens to enjoy. Email: spaldingshow@gmail.com, Tel: 07443 524260 www.spaldingshow.com

17th to 19th Jun '16
Weston Park International Model Air Show, at Weston Park, Weston-under-Lizard, Nr. Shifnal, Shropshire TF11 8LE. Their 25th anniversary show starts at 10 am (gates open at 8 am), includes model aircraft displays, on road and circuit model car racing, full size displays, model boats, Quad Fair helifest. On-site camping available. Adults £12, Children £6, Family £28. For more information check out www.westonparkmodelairshow.co.uk Tel: 01952 587298, Mobile 07758 895068

25th & 26th Jun '16
30th Wings & Wheels Model Spectacular, at North Weald Airfield, Epping, Essex CM16 6AR. 9.30 am-5.30 pm. R/C displays of all kinds, trade, Bring & Buy, Boat Pool and lots more. Weekend camping. All enquiries: Email: admin@wingsnwheels.net or Tel: 01242 604126, www.wingsnwheels.net

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SPEKTRUM DX6i transmitter, 6 channel, 10 model memory, AR6200 receiver + external receiver with radio programming guide, bind plug switch harness, as new, never flown, £40. 01253 622013, Lancs.
KK Spectre, 41" control line kit, full kit, £50. Minimoa 100" glider, Replikit, full kit, cost £240, still in box, bargain £150. 01253 622013, Lancs.
MIGHTY Barnstormer, 88" wingspan, 4 Max 1400 motor, 4 Max 80H ESP, 4 x Spektrum servos, JFX 17 x 10 prop, weight 4 kg, 4" wheels, built to high standard, never flown, wing bags, £525. 01253 622013, Lancs.
FOR sale Multiplex cockpit, Tx, multi model memory, eight receivers and crystals, mainly 61, aluminium case, £50 + £10 p&p. 01624 628156, email kingb@manx.net Isle of Man.
TEN brushless model motors, mostly inrunners plus five speed controllers for sale, will split. 0191 5203239, Sunderland.
FOR sale inline geared Speed 400 brushed motor, £10. 0191 5203239, Sunderland.
JAMARA Stinson Reliant, ARTF, 1420 mm span, 840kv outrunner, 70 amp ESC, four servos, servo Y lead, two wooden props, Williams dummy radial, all untouched, £160. 07734 556194, Herts.

PRIVATE FOR SALE

AVICRAFT Moronic Fun Fly kit, 52" span, 35-46 2 stroke, 40-52 4 stroke, or electric, quick, easy build, £40 includes postage (£10 less if buyer collects). 01226 766636, S. Yorks.
FUNKEY Jet Ranger, 30 size version, one cabine top, front. 01493 308602, Norfolk.
WOTS Wot electric biplane, 2 batteries, £195. Hangar Nine, S.Bach, 120 Saito, new, £350. Galaxy Magician, big model, S. Tigre 75, £145. All planes RTF, less receivers. Mick Banks 07743 618928, W. Yorks.
E-SOARERS Topmodel Fantasy 3.2 m with MVVS glider motor and Hitec servos, £260. RCM Pelikan Pike v-tail 2.6 m with Hitec servos, £90. Both in very good condition. Call for details 01409 231151, Devon.
FOR sale Parkzone Radian Pro glider, well flown but good condition, original motor, ESC and six servos, plus synthesised 35 mhz Rx fitted, £75. Terry 01225 863464, Wiltshire.
MODELS for sale, Cessna 172, part built, £20. Herrera 3D with a Thunder Tiger 75 TS, £40. And a Piper Arrow, part built, no engine, £100. Giving up due to ill health. Contact Steve 07931 875584.
MOTOR glider, carbon body, balsa sheeted wing with aerilons, 78 inch span, 480 watt brushless motor and controller, never flown, buyer collects. Call 0191 5203239, Tyne and Wear.
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NEXT ISSUE

First flown in May 1939, the Short Sterling heralded a new era of British monoplane four engined bombers. Aircrews who flew in them were said to be proud of their new aircraft at the start of WW2 but the big bomber was soon overshadowed by the H.P. Halifax, which was introduced just a year later, and the even more superior Avro Lancaster, which came into service in 1942. Now you can build your own model of this somewhat overlooked bomber using Robin Fowler's 1:10 scale plans for a 118" span electric powered aircraft powered by four economy outrunner motors and flown using a six function R/C system

Franco Bugada relates the story of a model built in memory of 24 Italian flying boats that undertook a formation flight from Italy to the USA, and back, in 1933. Erick Marin was fascinated by the history and configuration of S.55 X flying boat so he decided to make a flying R/C replica of the twin hull seaplane. After finding the necessary drawings, photos and information about the aircraft, he then designed his model, arriving at an impressive 3.5 m span so that he could conceal the model engine cylinders and their big silencers in the nacelles

MARCH 2016 ISSUE ON SALE THURSDAY 18TH FEBRUARY

In the second part of Phil Cooke's plan feature for the A-4 Skyhawk he shows how to finish the jet style glider and take it for its first flights from the slope. Phil and his friend Matt Jones designed the 36" span A-4 especially for the 2016 mass build project by the Power Scale Soaring Association. A laser cut wood pack and moulded canopy are being developed to go with the plan for this two-channel PSS glider

PLUS...

More features, columns and reviews from across the complete spectrum of the R/C model-flying hobby

All contents are subject to change without notice

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1/5TH SCALE - 77" WINGSPAN
IC OR ELECTRIC ARF

Wingspan: 77in (1956mm)
Overall Length: 57in (1447mm)
Wing Area: 1,686 sq in

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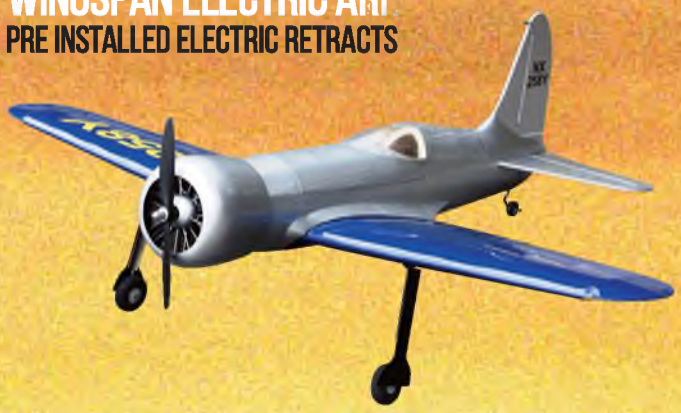

Wingspan: 50in / 1270mm
Overall Length: 41in / 1041mm
Wing Area: 490sq.inch

Curtiss PUSHER

1/9TH SCALE

50" WINGSPAN
ELECTRIC ARF

Wingspan: 50in (1270mm)
Overall Length: 48.5in (1232mm)
Wing Area: 788 sq in

Rumpler Taube

64" WINGSPAN
ELECTRIC ARF

1/9TH
SCALE

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Battery:	3S 2200mAh 30C Li-Po (Req.)

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