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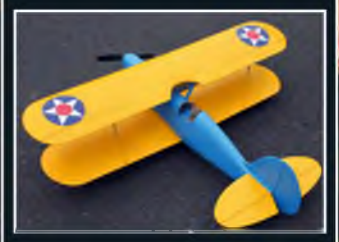

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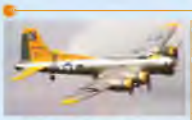

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Contents

FEBRUARY 2017 • ISSUE #397

FRONT COVER
Frank Skilbeck's recently built aero-naut Bergfalke vintage glider soaks up the last rays of sun on a still summer's evening. Turn to page 28 to read his review of this well engineered laser cut kit

REGULARS

REVIEWS

FEATURES

Pre-flight

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Welcome to the February issue of RC Model World. When reading Andrew James' piece about the X-Pilot 3-axis stabilisation system in the last issue (see Gadgets & Gear) I was inspired to have another look at an ARTF model that I have been flying that came with a gyro stabilised control system built into its receiver. Like Andrew, I have come to appreciate the benefits of flying a gyro stabilised aeroplane on blustery winter days to help soak up any wild deviations whilst landing. I reasoned that this relatively compact aerobat would make an ideal hack model for nipping out and having a few flights on those windy days that would otherwise have seen me stay at home – and dangerously near the wife, who has a knack of waving a paintbrush in my direction!

I am still in the habit of flying this particular model on occasion but had effectively turned off the stabilisation it offered on the ailerons, elevator and rudder. Whilst I have flown several gyro stabilised aircraft over the past few years, which normally results in a 'locked in' feeling on the controls, this model never seemed 100% happy to have both the gyros and yours truly trying to tell it what to do. There was something not quite right with it, although the gyro set up was fine. Hence my decision to turn the stabilisation off.

This particular model is a couple of years old now and so plenty of time has elapsed for other users to make their feelings known about it on the internet. Basically they fall into two camps – those, like me, who have had a bit of trouble with it and an equal number who raved about it. This convinced me that it was worth having another look at my set up.

The first thing to do was to download a copy of the manual for both the plane and the receiver. I carefully read the instructions and decided to make a clean sweep of things by resetting everything to the manufacturer's simple recommended set up. I also transferred the model to my newest transmitter. In hindsight this was not the brightest of things to have done as, to cut a long story short, the receiver and its gyros behaved perfectly this time, so I have no idea if I did something wrong the first time around or if the older Tx had something to do with it. When fault finding it's always best to only do one thing at a time so you know what caused the problem and can learn from it, rather than taking a scatter-gun approach as I had just done. Tsk, tsk...

Test flying coincided with another blustery day, so conditions were perfect for testing the set up of the gyros. Needless to say it all went well and apart from having to wind in a bit of up elevator using the clevis (manual adjustments being the norm with this gyro set up) the model flew a treat, and much better than it had ever done before.

Just one problem... First, I had a small lock out, which lasted momentarily, and left me questioning if it was just me being a fusspot. But then, nearing the end of the flight, it happened once more, resulting in a definite fail-safe for a second or so, causing the aeroplane to hold a gentle descent and shut off its motor, before everything sprang back into life again. It was time to land and to check things out further. This came as a bit of a surprise as in all the years I have used 2.4 GHz radios I have only experienced a lock out of the radio once before (and, interestingly, none at all when using 35 MHz!).

So now it was time to try some fault finding once again – one item at a time this time! I'll let you know if I find anything, but I'm hoping a re-bind of the system will fix it.

Time now to look at what's in this issue. Scale model enthusiasts have been a bit spoilt this time around with the start of two new scale building series, plus the continuation of the Dalotel articles that we kicked off in the January issue. Our latest articles cover various aspects of assembling a 38 cc powered Druine Turbulent and an innovative twin-electric Cri-Cri. There's also an informative article on how to draw up scale instrument panels on your computer.

Alternatively, you may fancy building your own scale electric twin from this month's Feature Plan for a Scottish Aviation Twin Pioneer, as detailed in the second part of an article by Chris Golds. If this big beauty is a bit too large for your building board then our free pull-out plan for a 40 inch Mini Super Bistormer biplane may be just the thing as a New Year building project.

On review, and shown on this month's cover, is aero-naut's lovely Bergfalke scale glider – a real model builder's delight. Plus we take a look at a new twin output battery charger, the Power Pal Touch Duo, which offers an easy set-up workflow for charging LiPo's and other popular battery types.

All this, plus a selection of regular columns covering scale gliders, thermal soaring, small models and sport and retro topics, means that you'll have plenty to read as you work off any excesses from the Christmas and New Year holidays!

Until next time...

Happy flying!

Kevin

CHECK OUT PAGE 14 FOR OUR LATEST SUBSCRIPTION DEALS

RC MODEL WORLD

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Take Off R/C News and Views

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

Arrow Foam Pack

Designed by Donatas Pauzuolis, the Arrow Pylon Racer was our free plan in the November 2016 issue of RC Model World. Traplet Plans Service are pleased to announce that a laser cut Foam Pack, order code WP3802, is now available for this model priced at just £17.99 ($22.99). Additional carbon reinforcement will need to be purchased separately.

You can order your Arrow Pylon Racer foam pack from:

Traplet Publications Ltd (Plans Service)
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Shop Window & Diary Dates

Following the Editor's appeal in the January issue for better use to be made of our free Shop Window and Diary Dates listings, we are pleased to report that there has been a noticeable increase in submissions for both of these regular features.

Bob Davis is just one of the event organisers who responded in a positive fashion. Bob writes:

"Hello Kevin

Please don't cancel your Diary Dates events page. Attached is a listing for the Hobby Corner April Fool Fly-In on 1st and 2nd April, 2017. (See Diary Dates on page 93 for full details of this event – KC)

It's a bit wordy but, as you can see, we have particular good intent to convey. (We aim to give novice Fly-In pilots the confidence to go to other Fly-Ins during the 2017 season.) I would say that is an original focus for a Fly-In.

However, on the general subject of Fly-Ins (and I have visited over 20 around the country in both 2015 and 2016), I would contend that they are a major factor in expanding the hobby. Take, for example, the Don Valley Fly-In in August. In 2015 there was one guest flyer – me! In 2016 there were 10 guest flyers. It's the army of newly retired returnees to the hobby that are driving it, and driving it in Traplet's direction as far as I can see (for plans) because a lot of these guys served traditional apprenticeships and have good craft skills.

Footnote: Hobby Corner was a model shop in Wrexham. Sadly it no longer exists. The name of our Fly-In honours its memory.

Keep up the good work."

Many thanks for your listing, Bob, and your thoughts on the popularity of Fly-Ins.

Jim's Jets

Besides event organisers sending in their Diary Dates entries we've also had a pleasing response from the UK model trade, with several traders taking the opportunity to send us details of their latest products to include in Shop Window.

Pete Taylor from Jim's Jets was one of the hobby suppliers who contacted us, and whose main listing will appear next month in Shop Window:

"Dear Kevin

Further to your appeal in the latest edition of RCMW, please find attached information regarding the Canberra PR9 from Jim's Jets. JJ are a typical 'cottage' industry manufacturer that have adapted up to date processes to produce unusual subjects for the dedicated R/C modeller.

The Canberra PR9 featured here is one of a series of Cold War jets that are available. The range also includes a 60" Avro Vulcan and a Gloster Meteor, both designed for twin 64-70 mm fans. They are available to order now, with approximately a 2-3 week lead time for each.

An English Electric Lightning F6 for a 90 mm fan is at the second prototype stage, and in the pipeline is a 120" wingspan Lockheed U-2, along with its stable-mate, the SR-71 for 2 x 90 mm fans at 96" long, no less!"

Thank you for taking the time to contact us, Pete. Readers who are interested in JJ kits can learn more by visiting their website at: www.jimsjets.com

The JJ website is under development but it does give you an idea of their range of kits, plus contact details.

The fuselage, fin, rudder and engine nacelles of the 1.8 m span English Electric Canberra PR9 by Jim's Jets are produced from CNC milled Styrofoam, while the wings are wire cut from the same. The tailplane, elevators and undercarriage/hatch covers are laser cut from Depron

Great Britain F3A World Cup

The Great Britain Radio Control Aerobatic Association (GBR/CAA), in collaboration with the British Model Flying Association (BMFA), is proud to announce that the Great Britain F3A World Cup event will be back for 2017.

It will be held on the 23rd, 24th and 25th June at the event's previous location on a private airfield close to Ashford in Kent. It promises to be a fantastic weekend of competition aerobatic flying, with some of the top names from Europe in attendance. Spectators are very welcome to attend and entry is free. For more details please visit: ***www.gbrcaa.org/WorldCup***

For more information about this and other international F3A World Cup events please visit: ***www.f3aworldcup.com***

Terry Westrop

Terry Westrop was a staunch supporter of the Classic Aerobatic movement and he had recently started contributing articles on the subject to RC Model World. His latest report was featured in our last issue (Aerobatics As It Once Was, pages 71-73). So we were shocked and saddened to learn of his death, following a motorcycle accident, on 4th December, 2016.

Brian Ball, who enjoyed many flying sessions flying retro aerobatic models with Terry, has written to tell us a bit more about the GB Nationals Champion pilot:

"Terry was a friend for over 25 years.
He was well known for his Loaded Dice aerobatic models and was GB National Aerobatic Champion three times, and a team member representing Great Britain.
His flying skills were exceptional and in recent years he developed the Loaded Dice EP electric series, of which I played a small part.
Terry inspired many to take up F3A flying, myself included. We spent many hours together flying and fishing.
My thoughts are with his son, Andrew and family."

Terry's well honed approach to aerobatic model design lives on in the Traplet Plans range, where his Loaded Dice 30 EP plan will soon be joined by the Upset II classic aerobatic design, seen here being held by Terry.

Plus, we hope to bring you his Loaded Dice 50 EP in the near future too.

Drone Assist

The problem of drones being flown near to airports by members of the general public without any prior model flying experience and no understanding of CAA rules (or just lacking common sense!) is addressed by a new smartphone app called Drone Assist, just released by the UK's air traffic control provider, NATS.

In a recent study by the CAA 90% of people agreed that obeying the CAA's Drone Code is important but, shockingly, only 40% of drone owners were aware of it!

Drone Assist, powered by Altitude Angel and available for free on Android and iOS devices, presents drone pilots with an interactive map of areas of airspace used by commercial air traffic. Drone operators planning to fly near these areas, usually around airports and airfields, can then avoid them and fly their drones without fear of causing any unforeseen problems, especially those caused by flying too close to full size aircraft.

Pilots of traditional R/C aircraft who fly close to known airfields would do well to download the app too, to check that they are in no danger of coming into unintended range of full size aircraft.

The app also includes a 'Fly Now' feature that shares your drone's flight location with other app users, helping to reduce the risk of a drone related incident in UK airspace.

Drone Assist has been developed in partnership with Altitude Angel, a leading UK based company working on innovative and future drone traffic management solutions. It also includes the location of ground based hazards that might pose a safety or privacy risk, such as power lines, schools or sports venues.

You can read more about the free Drone Assist app at:

dronesafe.uk/drone-assist

dronesafe.uk is a new website launched by NATS and the CAA, and it is also accessible directly from within the Drone Assist app. The website provides information on the rules governing drone flying in the UK, including the CAA's Drone Code and information on CAA approved drone training courses

Tiny Tyro

Regular Portuguese correspondent Arnaldo Correia writes with information about his latest indoor model:

"Please find attached a few photos of my latest model. 50 years ago, David Boddington's Tyro was published as a free magazine plan. That model sired a lineage, including the Tyro Major and the Mini Tyro. I learned to fly on that model aeons ago and then used it to train others – it was that easy to fly!

To commemorate 'going 50', I built this, the Micro-Tyro, a 50% 'scale' model made entirely from Depron, with a few balsa parts at stressed points.

The wing is my usual 'Depron moulded' one, this time not bothering with a thin TE; I just rounded it out. It flies wonderfully, as you might expect from a scale model of a single channel aircraft. One modeller was kind enough to say that he really never had an interest in indoor flying – until he flew my model! I am looking forward to get better photos after I have painted it..."

Many thanks for sending pictures of your Micro-Tyro, Arnaldo. Making small, micro size versions of your favourite model designs from the past is a great idea and I'm sure your little Tyro will inspire some of our readers to have a go too.

If you are interested in seeing more of David Boddington's designs then please pay a visit to the My Hobby Store website. Here you will find lots more of DB's plans that are now available from Traplet Publications. Simply enter Boddington in the search box to bring up a whole host of David's designs. At the time of writing there was even an offer at the top for the Mini-Tyro plan and woodpack sets!

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The latest offering from Pirotti Models is the all new Rebel PRO. With an impressive wingspan of 8.5 feet (2.6m) and an overall length of 9.5' feet (2.9m) this is one HUGE sport jet, but don't let its size fool you, this airplane was designed to break down for transport if needed thanks to its two-piece fuselage design. If you are looking for the biggest, smoothest flying sport jet yet, the Rebel PRO is for you!

Specifications: Weight 15-16Kg (33Lb-35Lb) Turbine Range (160n-210n)

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Torus Boomerang Jets Elan

Wingspan 2286mm

The Boomerang Torus is similar in size to the Elan but is built for much higher performance flying. Built for bigger turbines of around 100-160N thrust the Torus has an extremely strong internal structure. The fuselage/centre section and booms are moulded from composite, the wings and tailplane are built from balsa and ply with an emphasis on strength. The huge flaps and wing area help slow you down for landing and allow flying from grass fields. Built for speed and aerobatics the Torus really stands out down any flying field.

- Fibreglass fuselage & booms
- Precision built wooden wings and tail
- Suitable for grass fields
- Multiple colour schemes available
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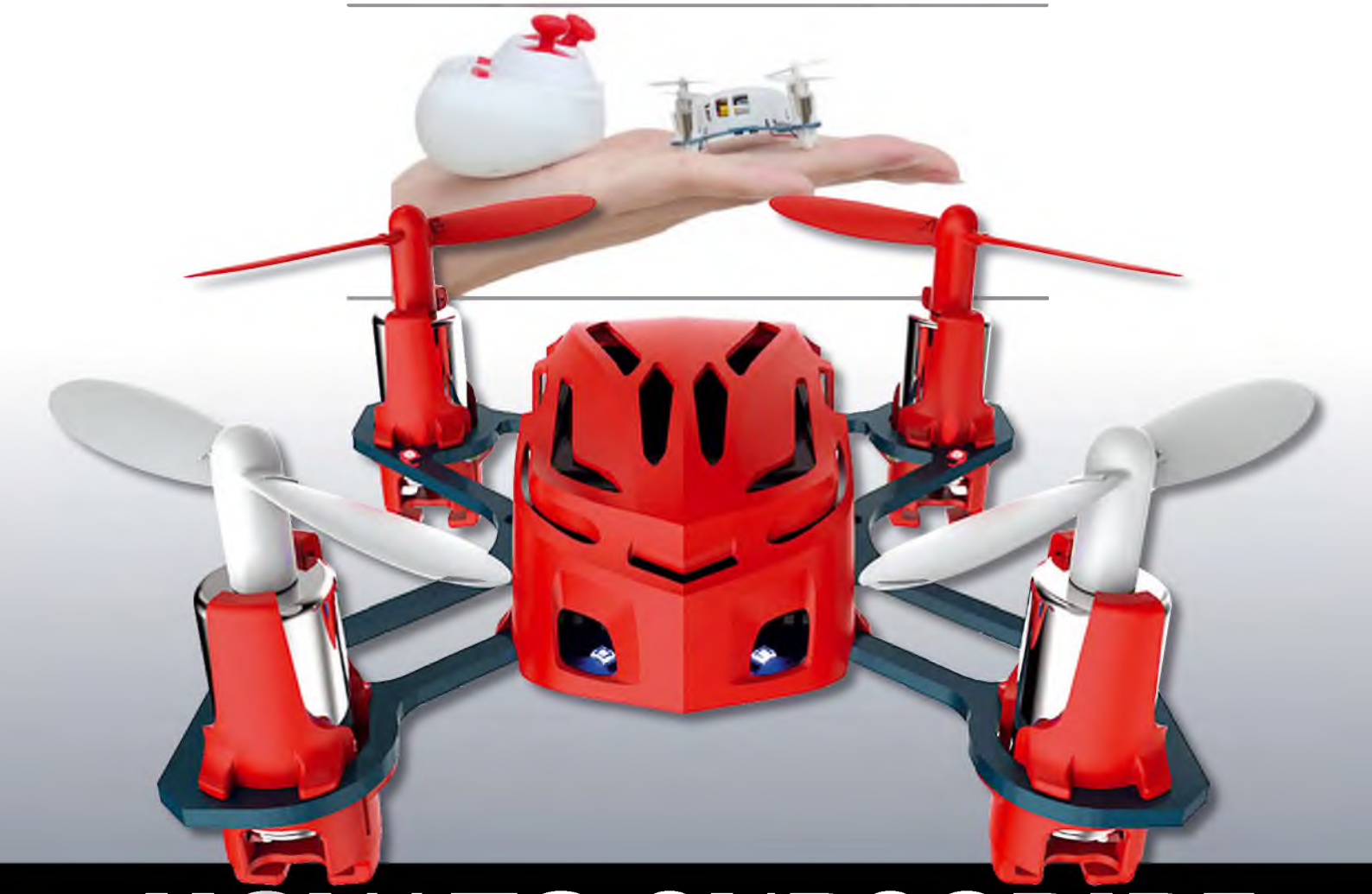

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Dalotel DM-165

In the second part of his Dalotel mini-build series Peter Maw gets creative with the plan

Some parts of every drawing are the result of the designer's preferences. These may not be exactly the way you like building models; no problem, as long as you are happy with the integrity of your preferred method then use it. However, whatever modification you make should be easier and quicker to build, lighter or stronger or preferably all of them.

For example, the plan shows partially sheeted open structure wings with cap strips across the ribs. The full size had a fully sheeted wing. There is no problem substituting this type of construction with fully sheeted wings. This is quicker to do and will hold the washout in place more effectively than an open structure. It will also be safe to only fit webbing to ribs 1-4 if sheeting is used. This is stronger and quicker than shown on the plan but probably not lighter, but 2 out of 3 ain't bad.

At The Front

The full size Dalotel actually looks like a model at the front. The cowl for the engine is attached to the fuselage without any attempt to fair it into the fuselage shape. The plan lacks detail for the cowl cheeks so some interpretation is needed from photographs of the original to make an accurate shape. There are lots of cooling holes in the cowl area on the full size which is excellent from the point of view of a modeller. As we are using an electric power plant on this model we don't need it to be detachable from the fuselage, making things very easy.

To ensure the front of the cowl is in the correct position fit the motor and attach a spinner backplate with a couple of glued on pieces of scrap balsa to the motor. I keep a ready glued spinner backplate from a previously deceased model especially for this purpose. This will create a gap between the spinner and the front of the cowl. The front plate of the cowl will then be positioned to take account of any side and down thrust.

The cowl sides are 150 mm long and extend back past the F1 former. Push the front cowling former up against the spinner backplate and then butt the two side panels up against it and leave to dry. Once dry the former can be accurately positioned to be horizontal by aligning it with the top of the cowl sides as shown.

A few extra components are needed for the lightweight cowl version

The plan suggests the cooling cheeks should be made with three full length laminations of 1/2" balsa. There is a less dusty, lighter and more efficient way to create the cheeks. The very back of the cooling tunnels should be made with scrap block balsa, but the rest can be made with scrap 1/8" or 1/4" balsa; and as an added bonus the cooling tunnels can be used to do the job they are designed to do. The hole in the rear of the cooling cheeks is scale. It allows cold air to pass from the front to the back of the cowl. Cut a hole in the cowl side and this creates a pressure differential between the hot air surrounding the motor and the cold air in the tunnel. The hot air is sucked out of the cowl centre, allowing it to be replaced with cold air to keep the motor cool.

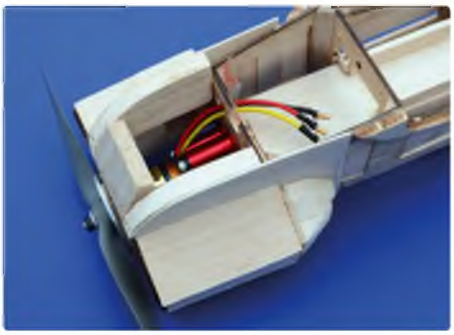
The cowl sides need gluing in place with cross pieces to keep them positioned properly

Use scrap balsa temporarily glued to the spinner backplate to create a gap with the cowl front

The cowl front can be lined up with the cowl framework once it has been allowed to dry

The rear of the cooling tunnel needs to be made from scrap block balsa. The hole mimics the full size aeroplane's construction and allows the tunnel to be used effectively

A cut out in the cowl side will create a pressure differential, which will remove hot air from around the motor



The interior frame of the cowl is made from 9 mm (3/8") balsa to allow for curving of the cowl shape later on

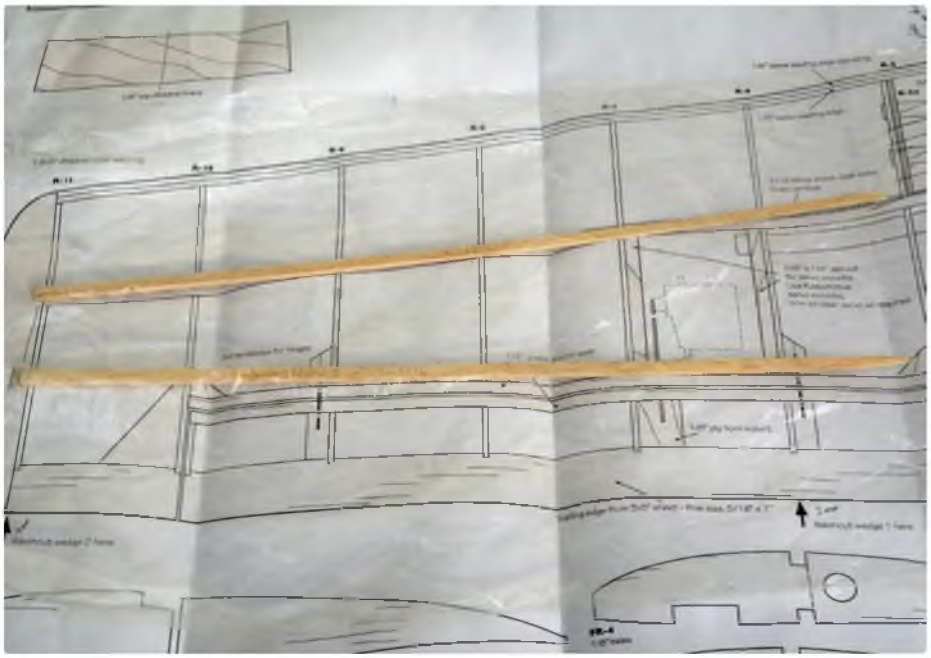
Hollow cowl cheeks can be made with scrap 1/8" or 1/4" balsa. As an added bonus the cooling tunnels can be used to do the job they are designed to do!

Wing Warping And Washout

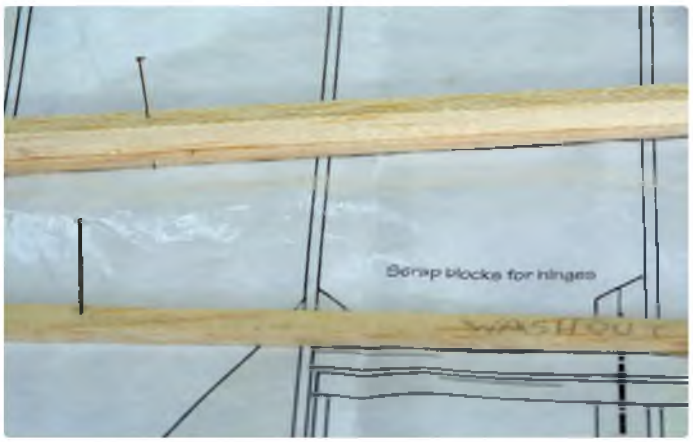
Fixed wing warping is called washout and is used to provide extra stability in the roll plane on a model. The swept back leading edge of the Dalotel wing plan allows the full size to roll faster than a plane with a constant chord and, in theory, allows the plane to fly faster than a constant chord wing. In practise this is not noticeable on a scale low winger where speed is irrelevant.

On the negative side there is much less lift at the wingtip on a swept wing design. That means the aeroplane is more susceptible to stalling at low speed, especially in a manoeuvre or when the wing is at a high angle of attack, such as on landing. On a landing circuit the wingtip on the inside of the turn is moving more slowly than the tip on the outside and is most likely to stall, and then the plane literally falls out of the sky.

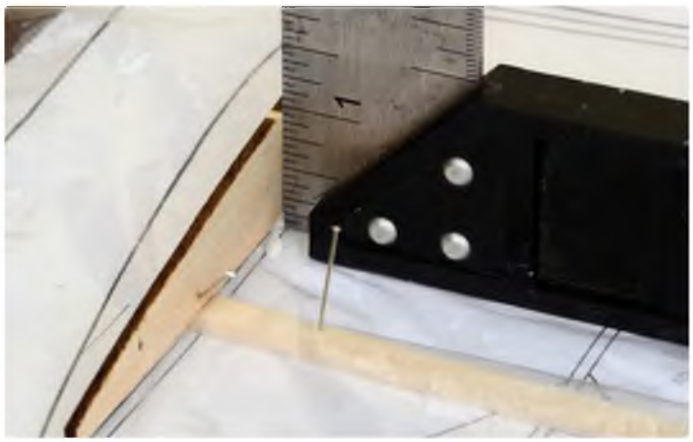
Washout reduces the angle of incidence of the wing at the tip by lifting the trailing edge up and pushing the leading edge of the wing down. That can allow the wingtip to stall at the same time or after the wing root; this helps keep aileron control and delays or prevents the horrible spin of death into terra firma.



Running washout jigs lengthways gives a smoother transition



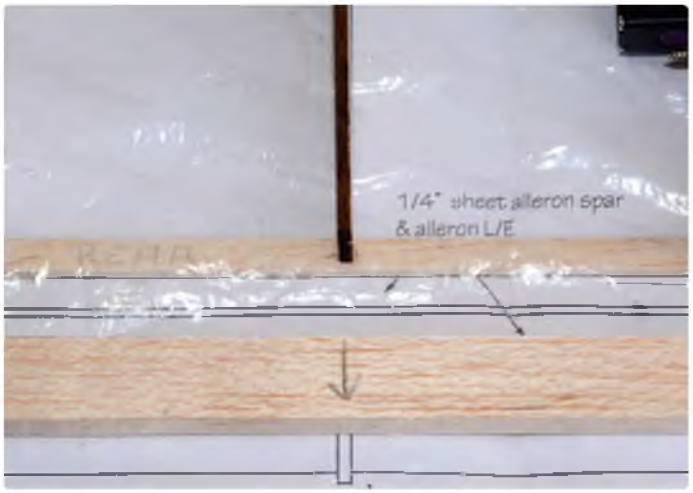
Pin the lower spar to the washout jig. They are separated by plastic sheeting to make sure nothing sticks



Accurate building makes for easy flying

The ribs behind the spar are flat, making accurate building easy

Position the jigs so that the wing spar follows the washout line



The wing spar is cut to be flush with the rib top and bottom, as the ribs will be covered in sheeting

Ribs 1-5 are built flat on the building board; the rest are lifted for washout

Build the wing to this stage and leave it to dry completely before removing from the building board. The washout is now locked into the build

The Dalotel has several degrees of washout built-in to the wing and washout jigs are provided in the wood pack, which are used to change the angle of the mid and end ribs. A neater solution to creating a smooth change in angle is to support the lower spar and rib trailing edges along the length of the wing, as shown in the photograph.

The ribs behind the spar are flat bottomed so are easy to build flat onto the building board. Ribs 1-5 will be flat and it will be easy to see the trailing edges of ribs 6-10 lifting off the board as the washout develops. Once the top spar, leading edge and top sheeting have been glued in place and left to dry completely the washout will be locked into the wing structure.

Less Work, Better Structure

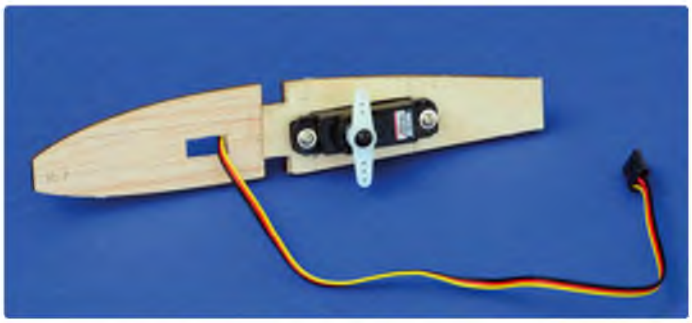
The designer has drawn up the plan with the leading edge shape created from a pair of 3 mm lengths of balsa. But one 6 mm piece of balsa does the job just as well. I specified the balsa I bought for this aeroplane with Blackburn Models and they supplied beautiful rock-hard cross grain balsa sheet for the leading edge.

Like many of us I live miles from a decent model shop but it is worth travelling and supporting a good model shop to get the sort of service we need. Budget packs of balsa may contain random bits of balsa, which can quite easily ruin the build of a model. If you have to buy by mail order the smaller companies will hand pick wood for you from their stock. The few pence extra per sheet is well worth the price to end up with a model of the right strength and weight.

Lots of models are designed with trailing edge balsa just stuck onto the ribs and glued to the wing sheeting. However, as a way of producing a long lasting wing with a nice constant thickness finish to the trailing edge there are better alternatives. The strongest way is to fit the trailing edge stock as shown on the plan but sand it down to be flush with the ribs. Then continue the wing sheeting to cover the trailing edge stock. That gives a solid trailing edge with a constant thickness. The washout is locked in by the top sheeting and when it comes to building the ailerons they will automatically follow the washout of the main wing structure.

Lots of cut-outs were needed to accommodate the retracts

Holes for the electric retract unit, oleo legs and cabling significantly reduce support for the undercarriage mounts



Hitec HS82MG servo mounted on rib R7 with plywood support

Sheeting needs to extend past the back of the rear wing spar for the shrouded aileron system

Position the aileron leading edge against the rear spar and butt up against the overhanging sheet

Next stage is to add end ribs with spacers to ensure easy movement

The aileron trailing edge can be aligned to the wing trailing edge and that creates an aileron following the wing washout

Intermediate ribs stiffen up the aileron before sheeting is applied

Talking About Ailerons

We are building a scale-ish model so it would be nice to build ailerons that look like they are on a full size aeroplane. The Dalotel had what are known as Frise ailerons, which have offset hinge lines set below the horizontal centre of the control surface and there is very little gap with the flying surface whatever the deflection of the aileron. The hinge line is also behind the leading edge of the aileron; the photographs show the build sequence.

The aileron leading edge follows the rear spar of the wing, which means it automatically follows the washout built into the wing. Carve its leading edge into a 'C' shape and cut recesses to allow the Robart hinge lines to sit snugly behind the front of the ailerons. Although not exactly like Frise ailerons the build sequence gives a very good approximation to scale.

As a result of the tiny gap between the wing and the aileron this type of control surface hinging is very efficient. Therefore, they should be set up with differential for the initial flights to help prevent adverse yaw in turns. Simply, this means setting the downward movement of the ailerons at about 50% of the upward movement. Excess drag and turbulence caused by the downward moving aileron is reduced, which then stops the fuselage from trying to turn the opposite way to the wings – a highly desirable outcome.

The exact percentage of down can be determined during flight trials. In a tight turn the tail should not drop and the machine will be more stable. It is also possible to sort out the adverse yaw problem with combined rudder and aileron movement, which can normally be programmed in through the transmitter.

If you go to the effort of making nice aileron joiners then it also makes sense to hide the servos as well. This size model can be fitted with mini servos, such as the Hitec HS85MG with a 3 kg cm torque rating for the ailerons. They can be fitted to the wing rib so long as the rib is reinforced with 2 mm ply (not the horrid lite-ply stuff). All that you will see under the wing then is the control arm poking through the covering.

More Up And Down Stuff

This time we are talking about the undercarriage. As a result of a lucky search on the BMFA classified section I became the proud owner of a set of electric retracts for models up to 7 kg weight. If this Dalotel gets anywhere over 3 kg, let alone 7 kg, it will not fly anywhere, which gives plenty of safety margin.

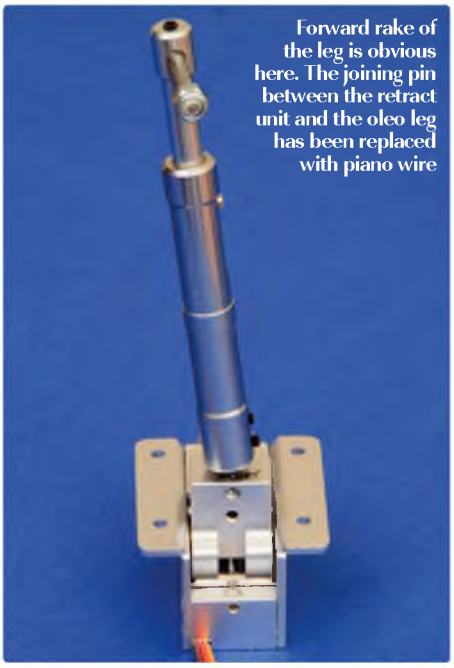
A search of the part number on the box identified the source of the retracts. While looking on their website I noticed they also supply sprung oleo legs. An order was placed for a 100 mm pair of legs as bounce-ability is an essential characteristic for retracting undercarriages. Tapping the joining pins on the retract units and the axles on the legs revealed they are made from a metal slightly more brittle than raw spaghetti and will snap under virtually any bending force. As the retract unit geometry requires the legs to be bent forward the pins will need replacing with 4 mm piano wire.

Accompanying pictures show the angle the legs need to achieve in the down position. The units have plenty of grub screws to hold everything in place; remember to file flat surfaces onto all the pin areas that are adjacent to the grub screws. If you don't do this the legs will either rotate or drop out of their holders – or both if you are really unlucky.

The wing ribs for the retracting undercarriage version of the plane have cut outs for the retract unit mounting beams. However, it will be necessary to make additional cuts for the legs to be able to tuck away and part of the mounting beams will need cutting away for the same reason.

There is a lot of wood cut away from the ribs, which makes it important to mount the retract bearers securely with epoxy, as well as learning to land gently. The angle of the retracted legs is almost parallel with the wing leading edge and this brings the wheels well forward of the C of G to improve ground handling.

All the components have been built and shaped now. All that's left is to cover it, put it together and take-off into the wide blue yonder. ***RCMW***

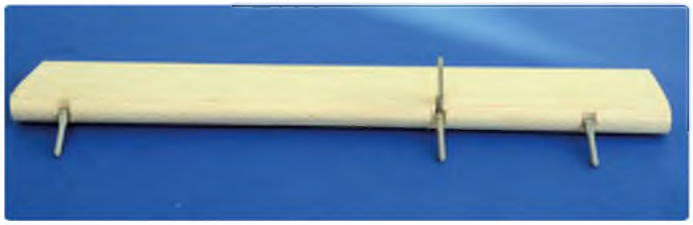


Forward rake of the leg is obvious here. The joining pin between the retract unit and the oleo leg has been replaced with piano wire

Flat spots on the piano wire give the grub screws that hold it in place something to grip onto and also prevent the wire rotating and falling out of the holders

This is how the leg needs to sit in the wing. Note how the forward mounting bearer has had to be cut away to allow the leg to retract

Completed aileron with curved nose section and recessed Robart hinge



Robart hinges are also available with a moulded in control horn to make life simpler

If the aileron housing isn't covered before fitting the aileron it will never be possible to do the job properly

Gorilla glue is very sticky but quite runny when first applied

Four hours later Gorilla glue is rock-hard and everything near it is glued solidly in place

Final fitting of the aileron should be virtually gap free

All that's left to do is to cover the Dalotel, put it together and take-off into the wide blue yonder!

CONTACTS

AXI MOTORS/BATTERIES/ESC:
www.electricwingman.com

PURPLE POWER BATTERIES/MOTORS/ESC:
www.4-max.co.uk

BALSA AND OTHER WOOD SUPPLIES:
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RC MODEL WORLD

MODEL SPECIFICATIONS

NAME:	DM-165 Dalotel
MANUFACTURER:	Traplet Publications
MODEL TYPE:	Low wing near scale monoplane
WING SPAN:	54"
WING AREA:	513 sq in (0.33 sq m)
WING LOADING:	24 oz/sq ft (7.2 kg/sq m)
ENGINE:	0.32 cu in two-stroke or equivalent electric motor (Axi 2826/12 used with 12 x 6 prop, 60 amp 4-Max ESC and 4S-3700 LiPo)
CONSTRUCTION:	Balsa and ply
WEIGHT:	5 lb 4 oz (2.38 kg), inc. 4S LiPo

R/C FUNCTIONS

1:	Throttle
2:	Rudder
3:	Elevator
4:	Aileron (two servos)
5:	Retracts

PLAN DETAILS

PLAN NAME:	DM-165 Dalotel
BUILD CATEGORY:	Intermediate
PLAN NUMBER:	MW3541
PLAN PRICE:	£17.55
***LASER WOOD PACK:**	WP3541
WOOD PACK PRICE:	£86.44
OR BUY AS A SET, WITH 10% OFF:	SET3541
SET PRICE:	£99.44

Plans and parts are subject to Postage & Packing charges at standard rates.
*NOTE: All Laser Wood Packs are intricate shaped parts only. No strip wood or sheet wood is included.
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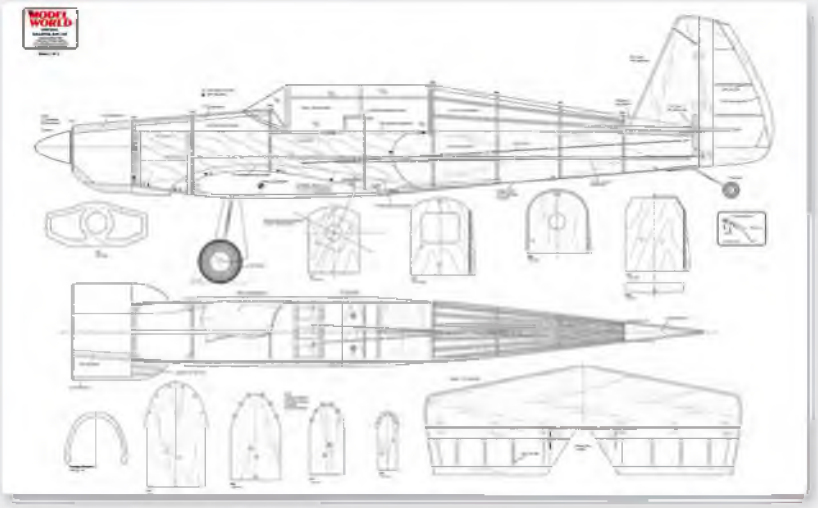

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CONTINOUS CURRENT	100A (12S), 130A (6S)
PEAK CURRENT (15s)	130A (12S), 150A (6S)
BEC SPEC.	N/A, OPTO

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WEIGHT	198G
CONTINOUS CURRENT	130A (12S), 150A (6S)
PEAK CURRENT (15s)	150A (12S), 180A (6S)
BEC SPEC.	N/A, OPTO

Drawing Instrument Panels
For Scale Model Aircraft

Greg Thompson shows how to make the most of modern technology to add a bit of realism to a bare cockpit

The 'office' of scale models, especially ARTF's like this Citabria Decathlon, can be greatly improved by the addition of a re-drawn instrument panel (Picture: Micki Bowne)

Scale models of all sorts are flying at club airfields all around the world in varying quality, finish and detail. They form a colourful and eye-catching segment of the modelling world and, in many ways, are the foundation of the aeromodelling hobby that we now enjoy.

Since the early days of human flight, man (and woman) has striven to produce a scale model of his/her aircraft, sometimes before the full size version has even flown. These models serve many purposes, from graphically detailing a flying machine, to proving that it indeed will fly – and everything in between! And whether or not the model is intended to fly the level of detailing often demands at least some attention is paid to the cockpit and its fittings.

The amount of detail that is to be included in a flying model is, of course, determined by the builder by considering their modelling skills, time available, desired level of scale detail, availability of kits and parts etc. In past years there have been various cockpit kits and graphics available from the model trade, again in varying degrees of scale fidelity and cost, but there is also the DIY method that can be pursued. And that is the reason for this article.

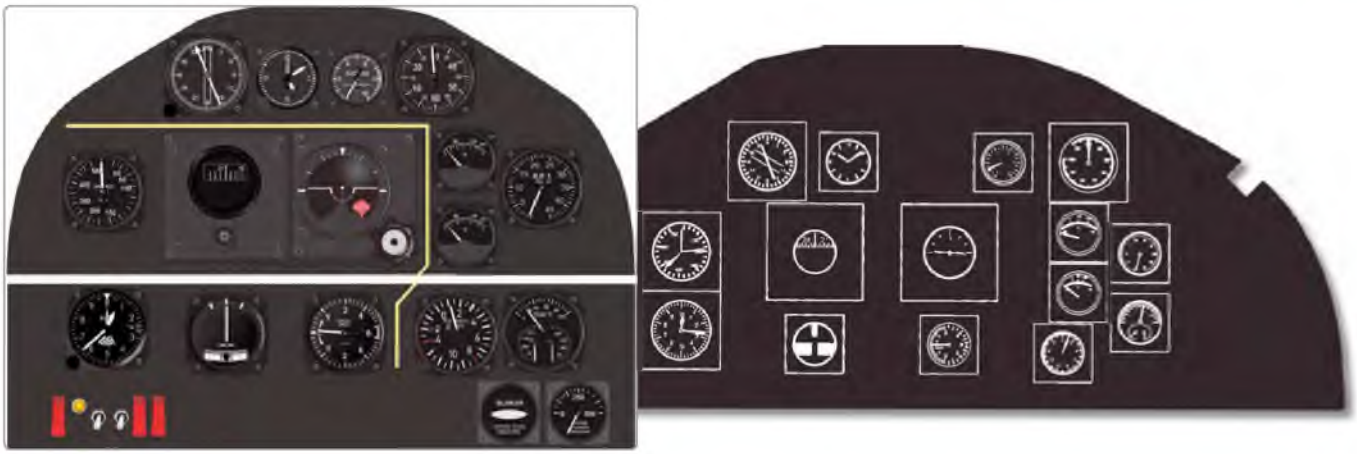
A couple of years ago a friend purchased an expensive and otherwise excellent ARTF of the P-51 Mustang but he was disappointed to see that it had a very basic and highly inaccurate instrument panel graphic to be used in the cockpit. He asked me if I could do something about it, so I got to and drew one for him in CorelDraw.

After a short while on the computer I had produced a still inaccurate but much better panel graphic for him. It was the same size as the supplied decal and still a 2D drawing, but when printed on good quality sticker paper it worked very well indeed.

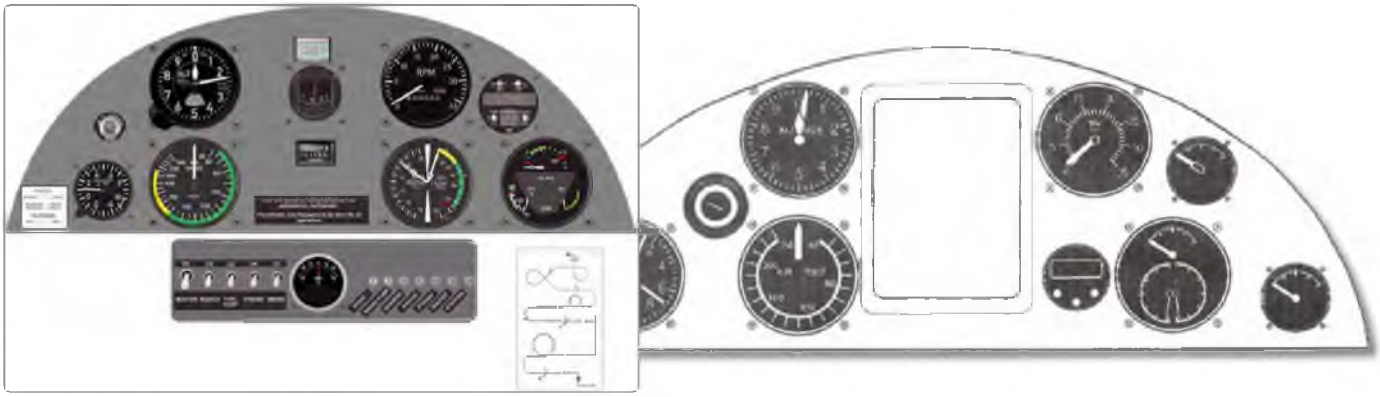
Later, I found another ARTF with a poor panel and although this one at least had a little more shape and accuracy to it there was still a great deal to be fixed.

Finally, a large ARTF of the Pitts Special came my way and its panel also needed some work, although it was commendably accurate in basic layout and scaling. However, having flown the full size Pitts, I knew with certainty that I could not possibly use the kit graphic, and so produced another to be substituted. At the same time, I made up an Aresti schedule to be added to the panel as an accessory. Why not? There are many opportunities for improving the scale detail, even on an ARTF!

Simple, redrawn Mustang panel



After a bit of practice and a few minutes work a much improved panel can be drawn on a computer compared to the original graphic shown behind



Before and after images of the Pitts Special instrument cluster

Research

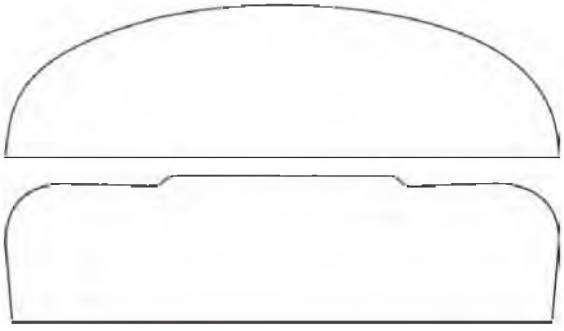
So where do we start? Really, the best source of information is the actual aircraft you wish to represent and for modern aircraft, or even some museum examples, this is quite feasible. However, you may be stuck with books, photos and Internet searches and still not get all the detail that you would prefer. Having said that, there are many ways you can 'fudge' an instrument or panel in your model and it is only in the more dedicated projects that you need 100% accuracy anyway.

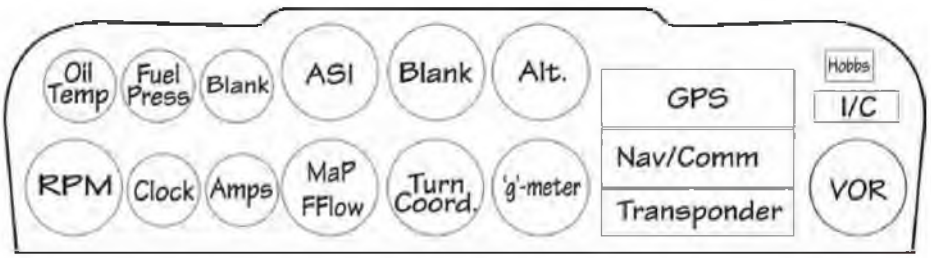
There are plenty of images of instruments in books and on-line but it's even better if you can get inside the cockpit of the subject aircraft to take your own pictures

Scale And Fit

Your new instrument panel will naturally need to fit in your model. If you have an ARTF sticker sheet, or perhaps a drawing on the plan, you can simply trace over the panel and use that to develop your masterpiece. Keep in mind that most manufacturers and designers tend to take liberties with the smaller details, so they are often of no real use in designing your replacement panel. I've seen commercial instrument panels that contain modern electronic instruments when they are supposed to be representing much older aircraft – even WW1 fighters! Sometimes, I think the artist is just having a laugh and wondering if we will notice...

Once you have the outline to size it is time to begin populating the panel with your instruments. Let's make certain that they will all fit in the available space and desired arrangement, if at all possible.





Above: Start by drawing an accurate outline of the panel and make sure it will fit. Kit panels are often simplified in shape as well as detail, as shown by this simple curved outline compared to the more accurate rectangular console of a Decathlon

Left: Populate the panel with its instruments

Drawing The Instruments

Now comes the exciting part! For those who are interested in drawing the instruments using their computer there are several ways you can go.

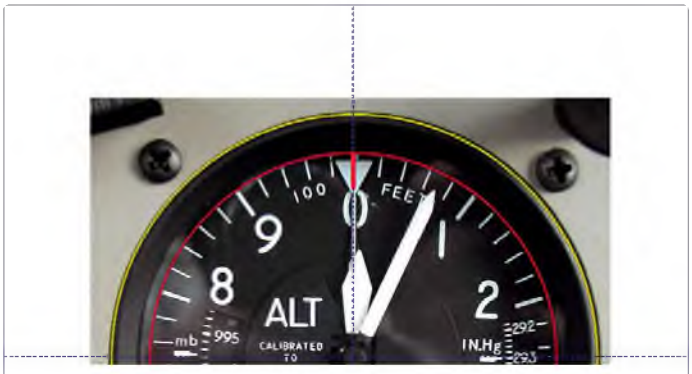
Adobe Illustrator or CorelDraw are the best as they are vector-drawing packages and your resultant drawings can be scaled down or up without changing the quality of the final result. If you choose to use a raster based programme, such as MS paint, Photoshop or CorelPaint, then the images will be much less flexible in their output scaling. I will use CorelDraw for these examples but the techniques are transferable to Illustrator if you have that available.

A note also on versions. You don't need to have the latest and greatest version for this work. Go ahead and find an older version on eBay or somewhere similar and you will find that even a superseded version will do far more than you need. As long as your computer can run it, go ahead and use it.

Luckily, our instruments are basically circles with components generally drawn using more circles, squares and rectangles, so no great skill is needed. However, you will find it useful to work in layers, so a working knowledge of them will be useful, although not totally needed.

Let's start by opening a new page and importing the desired photo of the instrument, in this case an altimeter. We will also set up guidelines that intersect in the centre of the instrument and set 'snap to guidelines' in the 'view' menu. Now, using the ellipse tool and holding down the SHIFT+CTRL keys, we click at the guideline intersection and hold the left button down while we drag the circle to the outside of the instrument. We now have the outline, in this case shown as yellow.

Now draw another, smaller and thinner rectangle at the top position, again centred on the guideline. This will be one of the smaller markers. Double-click on it to bring up the rotate menu, drag the rotation centre marker down to the guideline intersection, select a rotation angle of -7.2 degrees and rotate it. While it is still selected, rotate it again by the same 7.2 degrees, but this time select 3 copies. You should now have four green rectangles, equally spaced and rotated, and generally conforming with the photograph behind.



Now, repeat the process, this time stopping when the circle touches the outside of the instrument markings, as shown in the figure. Make the outline a different colour. In this case I've chosen red. Note that we don't colour it at this stage; we simply want it there to form the basis of our drawing and a tool for what comes next.

Now, select the rectangle tool and draw a tall, thin rectangle at the top position and ensure that it is centred on the vertical guideline and just touches the red outline. This rectangle can be coloured but needs no outline.

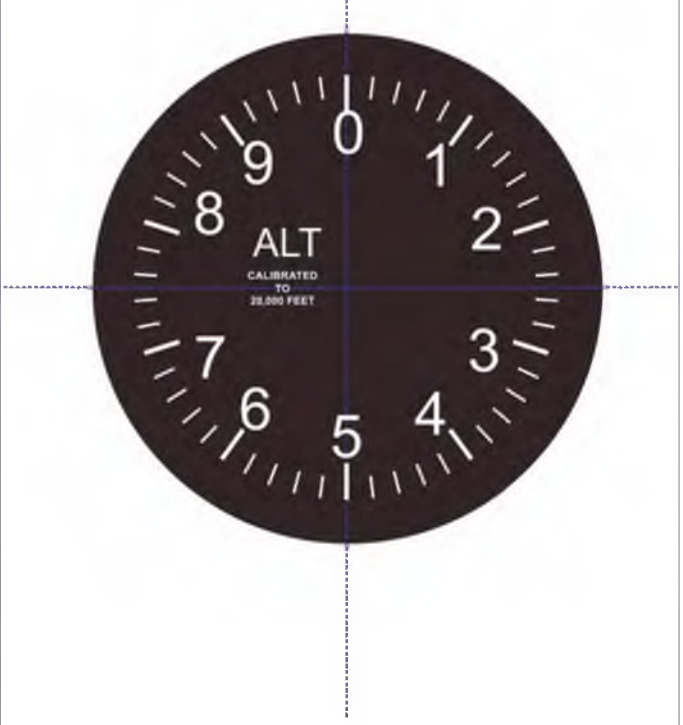
Now comes the magic of computers – select the large (red) marker and all four smaller (green) ones and group them. Double-click on the group to bring up the rotation menu, drag the rotation centre to the guideline intersection and then select a rotation angle of -36 degrees and 9 copies. When you select APPLY, you can see the instrument face suddenly completed.

Select all the groups while holding down the SHIFT key and group them all together. Delete the red circle and admire your handy-work. It should look like the figure here.

Now you can go ahead and add the numbers and any text you see on the actual instrument face. In this case, I've made them yellow and you will note that the font is not precisely the same. I've used 'Arial' as it was very close and, in the size I'm expecting to print this instrument, nobody will notice the difference.

Note also that in this image there is text printed on a sticker on the instrument glass, so we wouldn't add this text until later. It is also interesting to note that on this particular altimeter the 7 and 8 are not directly next to their respective indications, as there are a series of numbers and indications for the 'Kollsman Window' that is used to indicate the barometric datum.

Of course, it is not necessary to understand how this works as we are only drawing a close representation. You may even prefer to leave this feature off the instrument altogether. It is your choice, after all.



Now, go ahead and colour the rear circle black, and the numbers and indications white. At this point your altimeter face is ready to print and use. If you want, make needles to put on top of the face and behind clear plastic. However, we will assume that you will have the needles printed on the instrument so it is complete in 2D. That's next.

Needles And Pointers

A needle is basically a modified rectangle, so let's begin by drawing a rectangle of the required size and proportion. Convert it to curves (ARRANGE menu). Select the SHAPE tool on the sidebar and use it to double-click in the middle of the right-hand vertical line. You now have an additional point (or node) that you can drag out to the right and form a point. Basically, this is your pointer completed.

If you wish to be more accurate, add a black circle to the other end and group it with the pointer. Drag the combination to the centre of the instrument face and repeat the exercise for the other, shorter needle.

The altimeter face is now basically completed. You can leave it there, if you wish, or continue to add further detail as you see necessary.

Add it to your panel outline and you have the first instrument finished. Now, I probably didn't mention it earlier but this process is somewhat time-consuming at first, but with practice it becomes much faster and the finished results are always very satisfying.

RCMW

Needles and pointers are easy to draw

Finished panel drawing for a Citabria Decathlon ARTF compared to the full size

Bergfalke

Frank Skilbeck keeps his building board busy with another built up glider kit from aero-naut. This time he builds their majestic 3.5 metre Mü13e (Bergfalke)

Are kits making a comeback? Well, I don't ever think they've been away, but it's refreshing that the recent models I've been offered for review are kits. There's nothing wrong with a quick build foamie or ARTF for that quick flying fix, but building your own has its own satisfaction. So being offered the aero-naut Luxx (see my review in the November 2016 issue of RCMW) and their Bergfalke for review just as I was just completing my 1/4 scale ASK11 from the Traplet plan pack was timely.

As kits go the aero-naut Mü13e Bergfalke scale glider is an impressive offering, spanning some 3.5 metres at just over 1/5th scale, making it ideal for aerotowing at a regular club site and a nice handy size for slope soaring.

The full size went into production as the Mü13d before World War 2 in the late 1930s, with the Mü13e produced post-war as a tandem two seater, which was later developed into the Scheibe Bergfalke series of trainers. These were produced in plentiful quantities and in numerous versions so there is plenty of choice in finding a full size colour scheme that appeals to you.

Bergfalke is supplied in a colourful box, which clearly shows the model's construction

Kit contents are several sheets of laser-cut ply and balsa parts, accessories and foam building jigs

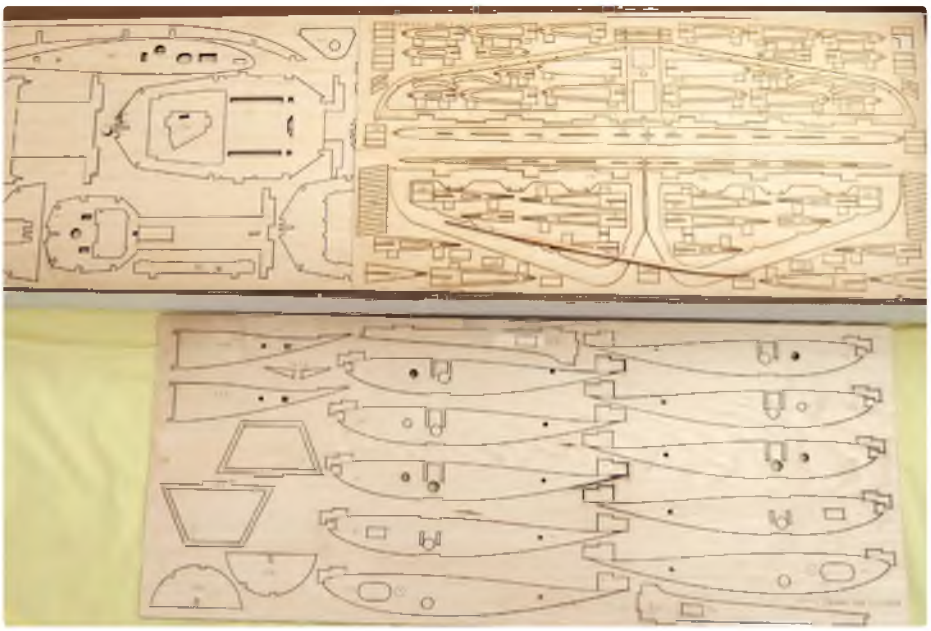
There's A Lot Of Wood Here!

Opening the nicely presented, colourful and rather heavy box reveals multiple sheets of laser cut ply, balsa and veneer sheets, together with an accessories pack, some foam building templates and a moulded canopy, all stopped from moving around by another couple of foam sheets. Although the instruction manual, with very clear assembly drawings, was in German, an English PDF version is available from the Internet. And unlike some of the manuals from the Far East the translation was perfect and the instructions were very clear.

For most of the build using diagrams from the printed German manual is sufficient but there are a couple of areas that benefit from the written instructions too. So I would recommend you either read the English version for the section you are about to assemble or use a tablet or laptop with the instructions on screen during the build.

The wooden parts are all clearly labelled and very well cut, although on some of the thicker ply pieces a knife is needed to cut through the sections that have been only partially cut to keep the pieces in the sheets for shipping. Once freed from the sheets the fit of all the parts was very good and the only sanding needed was to remove the laser burn residue to ensure a good glue joint. aero-naut recommend white glue for all the joints and this is what I used, along with some Deluxe Super 'Phatic where I wanted a quicker set time.

Construction starts with the fuselage nose and tail sections, which are built from interlocking ply parts. Once built these are slotted into the foam building templates,



All parts are clearly identified, it's just that there are a lot of them! Note the building tabs on the ribs and fuselage formers, which slot into the foam building templates

Building starts by assembling the fuselage nose and tail sections with interlocking parts. The printed manual is in German but a very good English version is available for download from aero-naut's website

which then positions all the other fuselage formers. They then lock into the keel spine to keep everything fixed together and in position – very neat. The remaining longerons are then added, together with the wing root facing ribs, before the inverted fuselage can be removed from the templates and the support tabs cut off the formers. A small razor saw helps here.

Another nice touch is that aero-naut provide a stand so you can support the fuselage upright while you complete the upper side of the nose section and add the nose block, which is made by laminating pre-cut sections of thin balsa, I used the Super 'Phatic glue here as it sets a lot quicker than regular white glue but not as fast as cyano, so still giving time to align the pieces. The nose section is hollowed out so you can fit a tow release for aerotowing. At this time you also assemble a couple of ballast boxes, which are used for adding lead sheets to obtain the correct balance point later – another well thought out touch.

At this point the canopy frame is assembled and the instructions show the clear plastic canopy being glued in place. I opted to check the plastic canopy fit, sand the frame as required and then paint it before gluing the canopy in place. After fitting the rear diagonal stringers, which are supplied in one piece and fit into slots in the formers, the fuselage is put to one side and work started on the tail sections.

Tail And Wing Construction

Like the fuselage, foam templates are provided for the alignment of all parts, starting with the elevator halves, which have a preformed one-piece thin ply section. This forms the outline to which the front facing is added and the ribs are then slotted into place. Slots for the hinges are already cut out of the main ply former and these are covered with small sections of ply to give the hinges something to grip onto later. Pre-drilled blocks for the alloy control horns are made by laminating pieces together and then gluing them in place, the alloy horns being fitted after covering.

The main horizontal stabiliser is made in a similar fashion, with the trailing edge being made from two laminations of ply to provide some shape and strength. Once the horizontal stabiliser and elevator halves have been made the tabs used to align the ribs with the foam templates are broken off. The ribs can then be given a light sanding.

The large rudder is made the same way, the only significant difference being that the leading edge is made up of two pieces, angled to provide a wedge-shape so that the rudder can move sufficiently.

The main wings start with two slotted ply spars, which are each made from two pieces, running parallel down the wing. After the ribs have been slotted into place and aligned using the tabs that slot into the foam templates, a top capping section is added to the spars. Later, a similar capping section is added to the underside, making a very strong box section spar.

The trailing edges slot into the rear of the ribs, with a separate piece where the ailerons go. The ailerons, although separate, are built along with the wing. The leading edge is made up of several laminations of ply that are sanded to shape. The brass tubes for the wing joiners are also added and epoxied into place, and if you decide to fit the optional air brakes then these need to be installed into the wing at this point. I used servo operated mechanical airbrakes from

The fuselage is built inverted using the foam templates to position the fuselage formers. Note the building tabs and interlocking keel to ensure everything is aligned correctly. Apologies for the messy building board!

The basic fuselage assembly is complete and ready to be removed from the foam building jig

After the fuselage is removed from the foam building jig the building tabs on each former need to be cut off. A stand is thoughtfully provided to hold the fuselage in the upright position

Basic fuselage after the building tabs have been removed

Gliders Distribution and these fitted well, only needing some minor sanding to the slots in the wing ribs.

The wing is then ready for the sheeting and rib cap strips. For this aero-naut provide a fabric backed veneer that is pre-cut to provide the leading edge sheeting and rib cappings in just two pieces and which are joined where the ailerons start. All the surfaces and ribs needed to be coated with a thin film of white glue and the veneer is then stuck in place. It is then clamped and weighed down until the glue dries – very neat and quick to apply. The top surface of the ailerons is similarly covered. The wing is then turned over for the lower sheeting to be applied, after the support tabs have all been removed and the ribs given a light sanding.

To keep the wings true when doing this foam cradles are provided that slot into the foam templates to provide support and alignment for the wing while it is completed. First the lower ply capping is applied to complete the box section spar and at this point the servo wiring to the aileron and air brake servos needs to be run through, as the leads run in front of the box spar and will not be accessible once the forward section of the wing is sheeted.

Holes are drilled in the ribs and spars for running the wires, but the holes in the spars for the aileron servos are in the wrong rib bay and need to be drilled in the correct place. Once this is done the underside's fabric backed veneer is glued in place in a similar fashion to the top side. The wing construction is then completed by fitting the wingtips and sanding the leading edge and wingtips to profile.

The instructions now direct you back to the fuselage, firstly to install the elevator and rudder servos, and also to run and secure the control snakes. At this point I also installed a tow release servo and a tow release, which required the hole in the nose opening slightly to accommodate it. It's worth noting that although fitting a tow release isn't covered in the instructions, provision is made for installing the servo and the ballast boxes are situated either side where the release wire needs to run, so it is all well thought out.

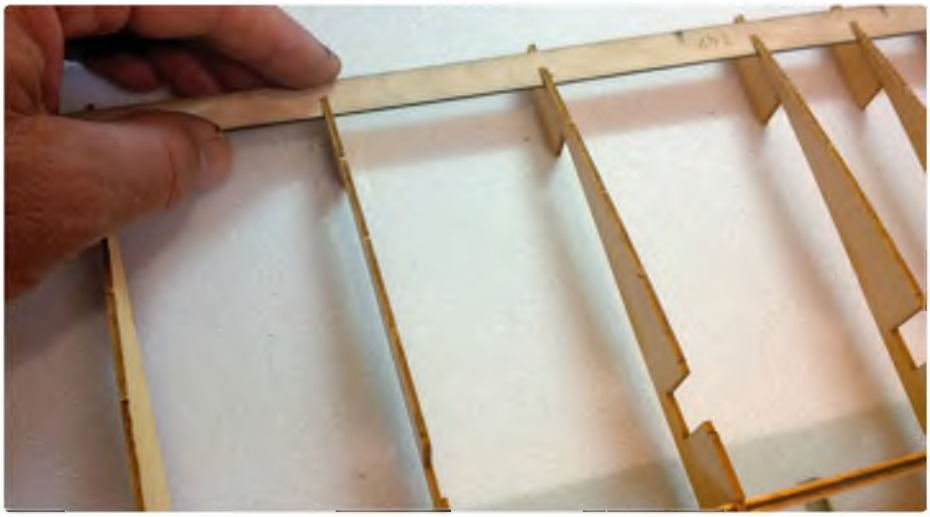
The forward area of the fuselage is sheeted with the same fabric backed veneer as used on the wings. This is all pre-cut to shape but some minor fettling is required to get a good fit. A nice touch is a couple of internal reinforcing plates situated where you would hold the model for hand launching on the slope.

After the rear top decking is then glued in position and all the rough edges are sanded off the model is ready for covering.

Your Choice Of Finish

One of the benefits of building your own scale model, rather than an ARTF, is that you can decide what colour scheme to base it on. After a little scouring on the Internet, I based my scheme on a full size, D-1167, although there are some minor differences between this aircraft and the one modelled by aero-naut. Part of the reason for choosing this was the bright yellow finish, with red wingtips and rudder. This is not only easy to replicate but is also highly visible – very useful when thermalling at height when launched off an aerotow, where white models can easily disappear in certain conditions. I used yellow Solartex to cover the model and sent pictures

Wing construction starts by fitting the ribs into two ply spars. Placing the tabs into slots in the foam building jig ensures an accurate build



The wing trailing edge fits into slots at the rear of each rib and rib tabs. Glue is applied to the upper side only so that the tabs can be removed easily later

of the registration and the name on the nose to a friend with a vinyl cutter, who then made up the necessary decals (thanks, Roger).

The elevator and rudder were then hinged in position using the supplied pin type hinges, which had to be cut down to fit in the hinge slots.

The control linkages were then fitted. The elevator halves are controlled with two wire pushrods running in snakes, which are secured to a single pushrod keeper on the servo arm. Rudder control is by a closed loop wire system. The instructions show the closed loop wires attached to the rudder servo arm using pushrod keepers but, as is my normal practise, I used threaded ends and regular clevises for this.

Once all was done a plate was made to sit the receiver on and ballast, in the form of lead sheets, was cut to fit the ballast boxes in the nose to achieve the required balance. The receiver battery sits on a removable shelf above the ballast boxes in the nose, keeping the weight as far forward as possible.

All control throws were set up as per the instructions and a coupled aileron-rudder mix was added, which becomes active when the tow release is activated. I use flight phase specific mixes that can be adjusted from the transmitter to fine-tune the co-ordination in turns. The air brakes are controlled by the throttle stick and are only active in the landing phase, with a mix added to the ailerons to reflex the ailerons up slightly to 'add' some washout as the model is slowed for landing.

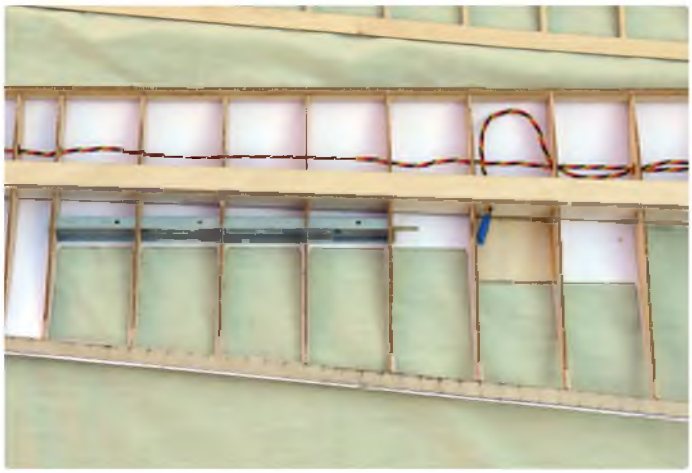
Lastly, the single wheel was fitted ready for the test flight.

No Pressure

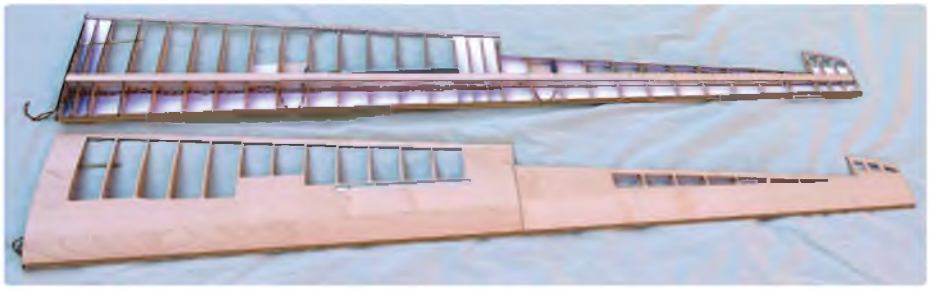
I decided to test fly the Bergfalke at a Ghost Squadron Middle Wallop aerotow, where I not only had the benefit of some very experienced tug pilots, but the largest grass airstrip in the UK to aim at if things went awry. The only downside was a much larger audience than normal for the test flight. No pressure then!

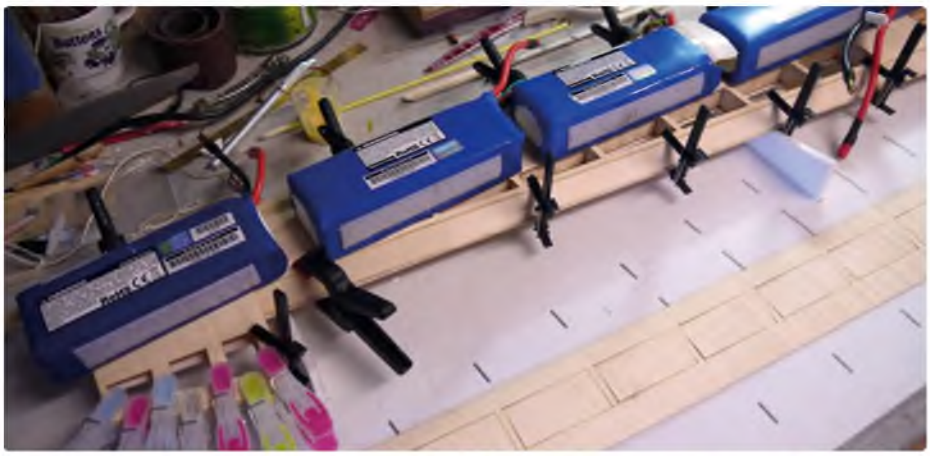
The Bergfalke was hitched up behind one of the tugs and with an 'all out', it was away. It towed up very nicely, needing very little action from the pilot. I came off the tow at around 200 metres height and the Mü13e was flying around fine, apart from an overly

The wing is sheeted using pre-cut fabric backed veneer sheets, which provide a lightweight, strong and flexible surface. Note the upper ply capping strip applied to the vertical spars, which builds up into a very strong box section



Once the wing is removed from the foam building jig, and the rib and spar tabs have been removed, the wing is supported inverted in foam cradles. The lower ply capping strip is added to the spars and the servo cables are run through before applying the fabric backed veneer to the underside. The air brake is fitted before the upper sheeting is glued in place





sensitive elevator. The model had been balanced using the finger method and my suspicion is that it was a couple of millimetres behind the recommended balance point.

For the next flight an extra sheet of lead was added into one of the ballast boxes and this did the trick. The Bergfalke was very easy to fly although, like all vintage gliders, it benefits from co-ordinated rudder and aileron turns. Even though I had programmed an aileron-rudder mix, I switched this out and found that it was pretty easy to get a smooth turn by manually balancing the rudder and aileron controls.

On the day there was some thermal activity and the Bergfalke showed that it could hold a thermal well. The airbrakes proved effective on landing and unless you have a very large site I'd recommend fitting them so you can modulate your approach for a precision landing; the Bergfalke has a very flat glide and it does scoot along.

Top left: Wings ready for fitting the lower sheeting. The air brakes and servo cables are installed at this point

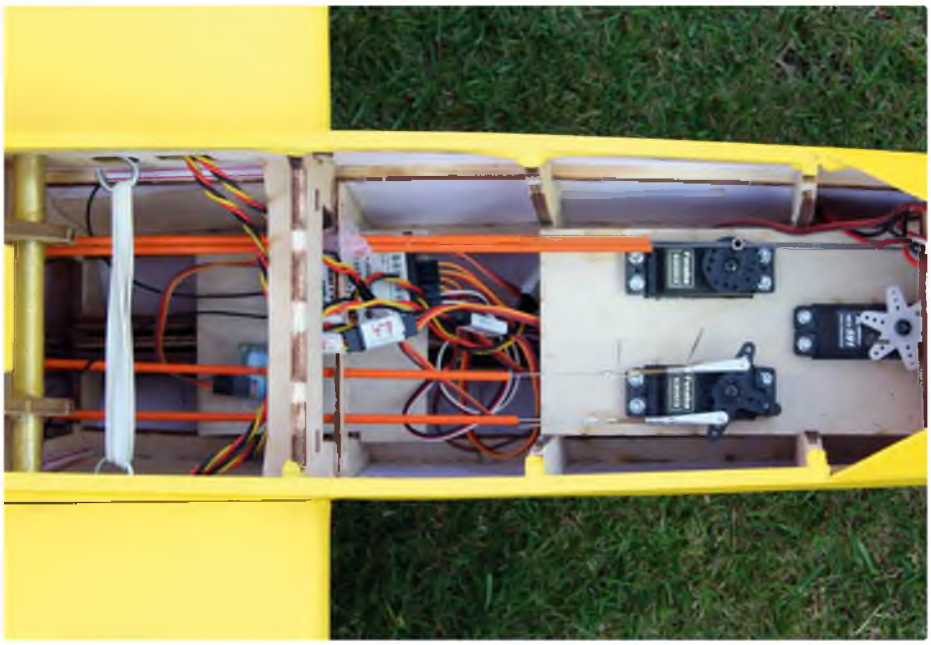
Left: It's important to ensure that the fabric backed veneers are well clamped and weighed down while the glue sets. LiPo batteries are used as weights in this instance

The nose section is made up of laminated parts sanded to shape. The hole allows for fitment of a tow-release for aerotowing

Pin type hinges are provided for the rudder and elevator. These require cutting down to fit, as shown

Trail assembly of fuselage and wings before covering. In this state it would make a very nice display model

Left: Horizontal stabiliser and elevator halves are made up from lightweight ply surrounds and ribs, again built up using foam building jigs



Elevator, rudder and tow release servos are fitted into a pre-cut ply plate that suits standard size servos. A plate was made to support the receiver and vario sensor. Note also the rubber bands retaining the wings

Rudder control is by closed loop and elevators by wire pushrods running in tubes. Metal horns are glued into position after covering

Just visible are the ballast boxes in the nose for adding weight to obtain the required Centre of Gravity. A removable plate above the ballast boxes houses the receiver battery

Wings are supported by a strong steel wing joiner, which slides into brass tubing in the wings and fuselage. The thin wire joiner at the rear of the wings provides alignment

The tailplane is fitted with a single plastic bolt, with a pin between the tailplane and rudder ensuring alignment

D-1167 takes its place at the Middle Wallop aerotow, ready for the maiden flight

A couple of weeks after the aerotow meeting I checked out the Bergfalke from our local slope. As expected it flew very well, proving easy to launch. With the benefit of some slope lift I could check out its aerobatic repertoire and I can report that loops and wingovers etc. not only look good but are pretty effortless.

Summary

The Bergfalke has been a joy to build and a pleasure to fly. The design and quality of all the parts makes building it pretty straightforward, the hardest task being locating all the parts in the numerous sheets of wood! Thanks to the jigged assembly the finished model is true and flies really well. And as you finish it yourself you can pick your own colour scheme and be pretty sure that you won't see another like it.

In a closing note in the instructions, aeronaut wish you loads of fun and pleasure when building this extremely elegant model. I can't think of better sentiment with which to end this review. ***RCMW***

Continued overleaf

On tow on her maiden flight. A video of this first flight is available on the RCMW Facebook page (photo Barry Atkinson)

On finals with air brakes deployed (photo Barry Atkinson)

The Bergfalke flies equally as well on the slope as from an aerotow (photo Roger Spragg)

One of the best things about building a model is that you can choose your own colour scheme rather than being stuck with what you are given in an ARTF

CONTACTS

ENGLISH INSTRUCTIONS:
www.aero-naut.de/en/downloads/instructions

MAIDEN FLIGHT VIDEO:
www.facebook.com/RCModelWorldmag/videos/567363540114212/

The author shows off the handy size of the 3.5 metre Mü13e (Bergfalke) from aero-naut

RC MODEL WORLD

MODEL INFORMATION

NAME:	Bergfalke Mu13
MANUFACTURER:	aero-naut
WEBSITE:	www.aero-naut.com (search for Order Number 112400)
PRICE:	395.00 Euros
MODEL TYPE:	Scale Glider
CONSTRUCTION:	Built up balsa and ply
PARTS SUPPLIED:	Airframe components, hardware, Depron building jigs

R/C FUNCTIONS

1:	Ailerons
2:	Elevator
3:	Rudder
4:	Airbrakes
5:	Tow Release (optional)

SPECIFICATIONS

WINGSPAN:	3500 mm (138")
LENGTH:	1600 mm (63")
WING AREA:	72.7 sq dm (7.825 sq ft)
FLYING WEIGHT:	3.9 kg (8.6 lb)
WING LOADING:	54 g/sq dm 17.6 oz/sq ft)
AIRFOIL:	HQ3.5 – HQ Oldtimer blend

Dislikes

Holes in the spars for the aileron servo wires are in the wrong rib bay (now rectified)

Likes

Excellent English instructions can be downloaded • Builds quickly and accurately due to Depron jigs • Accuracy ensured by laser cut parts • A pleasure to fly either from the slope or by aerotow • Ability to choose your own colour scheme

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Scottish Aviation Twin Pioneer

In the last issue we read of the conception and construction of Chris Golds' 120 inch wingspan twin electric transport aircraft. In Part 2 he outlines the completion of this mammoth model build

RC MODEL WORLD

At A Glance

MODEL:	S.A. Twin Pioneer CC.Mk2
SCALE:	1:7.65
TYPE:	Twin electric
WINGSPAN:	120 in/3.05 m
LENGTH:	70 in/1780 mm
WEIGHT:	20 lb approx.
RADIO:	Five function (Ail, Ele, Rud, Thr, Flp)
MATERIALS:	Balsa, plywood, blue foam
MOTORS:	2 x JP EnErG C5030 brushless outrunners
ESCS:	2 x JP EnErG PRO 100A OPTO
BATTERY:	2 x 6S 3700 mAh LiPos (or 2 x 3S for each motor)
PROP:	2 x EMP black carbon-nylon 16" x 8" three blade

A very happy Twin Pin pilot

Finishing And Decorating

The list of jobs began to expand as soon as the Twin Pioneer was drawn up so I was not surprised when 'this had to be done before that' and 'those before these!' Once the outboard wing panels were completed, and fitted with outboard flaps and ailerons, they were skinned top and bottom with 1/16" soft balsa sheet, then finally tissued and doped to close the grain and add considerable skin strength.

The last major airframe task, before fitting out with the electrics, was the construction and fitting of the OB wing struts. These are about 30 inches long and made from 1/16" hard ply, then covered with 3/16" balsa in full-length strips both sides, carved and sanded to an aerofoil shape and wrapped with brown paper applied with PVAP (PVA paste) to again provide considerable skin-strength. The struts have thin (1 mm) aluminium plates attached to their ends, which are locked onto 3 mm bolts set in the wing structure and the ply ends of the winglets. The struts are held in place by 3 mm Nyloc nuts and they are 'handed', i.e. not transferable from left wing to right wing.

At long last I had come to the paint job. The whole underside was sprayed with Halfords matt black auto-acrylic spray paint and the sides and top surfaces with a camouflage of dark earth (Humbrol M29) and sand (Humbrol M63), to represent the Middle East Twin Pins of my memory.

Rather than make the decals I asked Nick Gaunt of the local Sign Shop to produce them from my full size drawings, to be printed on plastic sheeting. He did a splendid job with the numerous decals for the Fairey Gannet last year.

After the decals come the fuselage windows, again from self-adhesive plastic

but this time in gloss black. As ever, before sticking such material onto matt painted surfaces, the whole area will need to be firmly rubbed down with a clean cloth (handkerchiefs seem to work best) in order to increase the 'stick-ability' of the decal to a smoother surface.

I think that it is essential to break up the 'flatness' of the paint job by adding panel lines using fine tip permanent felt-tip pens in black and a small amount of white to enhance the panel edges.

Fitting Out

With the model complete externally it was time to fit it out with all the electric items. See the 'At A Glance' box for a list of the items I used.

With everything fitted it was time to carry out the weight and balance checks, then the bench-runs to determine the power available in watts-per-pound. For a prop driven model this needs to be a minimum of 50 watts per pound for an acceptable flight performance. The figures achieved were:

- All Up Weight: 20 lb (9.09 kg)
- Wing Loading: 24 oz/sq ft
- Gross Power: approx. 1350 watts
- Watts/Pound: approx. 64 W
- Balance Point: 5 in aft of root chord L.E, 30% of M.A.C.

The next thing was to wait patiently for good, flyable weather. Patience, patience, patience...!

Flying

In 2015, after a poor summer of rain and wind, September settled down to an 'Indian Summer' and on Saturday 19th I set out to test fly my 100th electric model design, the Scottish Aviation Twin Pioneer.

I re-stress the name because everyone who was at our club site said, "What on earth is that?" The weather was perfect, with a light westerly breeze and broken clouds and blue sky. The photography took a nerve wracking forty minutes to complete by Rob May (on stills) and Dave Brock (on video). Then, just as all was ready, our air-sea rescue helicopter was scrambled. So, we waited!

Eventually, I lined up and received the 'thumbs up' from the men with cameras. I eased the throttle on but before I reached full power she was off and climbing hard. Some nose down trim cured this tendency and I tried out the other controls to find plenty of control power from the single central rudder, which was a blessing as the ailerons were rather 'soft' in roll.

I flew some passes for Rob to take photographs, then I climbed up to about 150 feet and tried the flaps (bang-bang only, down to 35 degrees) without elevator trim compensation. She lifted her nose strongly but I had sufficient nose-down trim range to be able to regain level flight at cruising speed. I noted how much nose down trim was required so that I could set the compensation required when back in my workshop.

Using copious dollops of manual rudder to assist the ailerons I flew steep bank reversals to see how much rudder will be required in C.A.R. (Coupled Aileron and Rudder). The model was very stable and a delight to fly – ever so SLOWLY! The slats and flaps really did their job and I made a few low overshoot approaches, which proved the huge amount of power available to overcome the lift-drag and the model was able to overshoot easily and safely.

The final landing was no problem and I taxied back to dispersal with a wide grin on my now relaxed face. The real aeroplane could 'land and stop' in under 66 yards so my ten yards felt really scale.

Try a Twin Pin. I am sure you will enjoy her, especially as a toffee-bomber!

FLY SAFE!

RCMW

Continued overleaf

Flaps fully down. This model can fly ever so slowly

After only a short run the tail-wheel is off the ground

Lift off!

Twin Pioneer climbs away

A gentle turn to port

Long finals with full flap

Let's end with a close up nose view

CONTACTS

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Hideaway, Lower Loxhore, Barnstaple, N. Devon
EX31 4SX
Tel: 01271 850456
Email: chrisgolds@loxhore.org.uk

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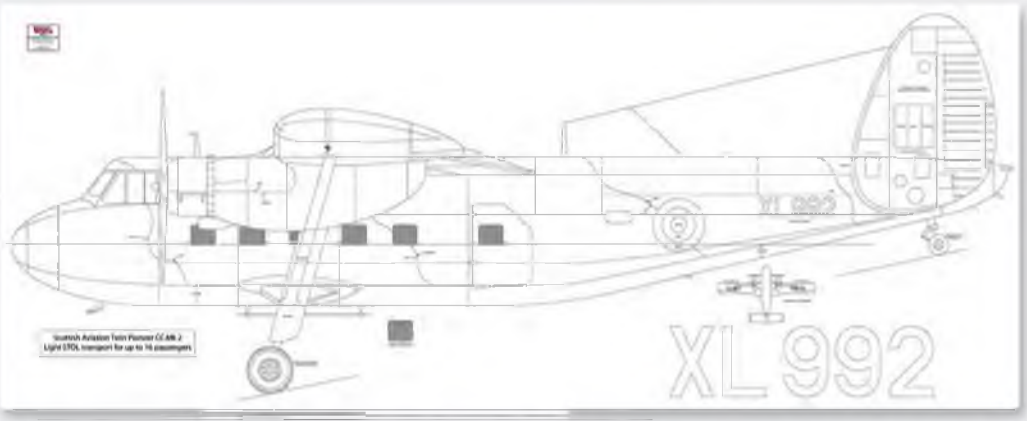

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Cri-Cri Capers

John Higgins strikes another scale project from his modelling wish-list. Additional pictures by Peter Cathrow

I have never met a modeller who did not have a wish-list. You know, that ethereal catalogue of aeroplanes that, one day, would be built and take to the skies and satisfy a deeply-embedded longing… I am a modeller and so I am not immune to this affliction!

My particular wish-list tends to have comparatively few members, and they tend to find themselves included only after much cogitation over a prolonged period. (Although I, as most of us these days, have fallen victim to sudden enthusiasms and the temptations served up by seductive ARTFs)

So what sort of model grabs my particular brand of attention? Well, my Evans VP1 Volksplane appealed because of its simplicity and the fact that the particular prototype that I chose to model had been built by an ex-Hurricane pilot who decided that, in later life, he still had a desire to 'enjoy the sky'. I also had an obsession with Zlin 526s, fuelled by the then emerging interest in scale aerobatics. Quarter scale glass gliders followed (I don't think big, beautiful gliders will ever be excluded from the list).

In the 1980s I saw a lovely third scale CAP 21 at one of the Old Warden scale days, so onto the wish-list it went! Over the years I accumulated three views, articles and photographs. I was fortunate in being able to travel to deepest Yorkshire to crawl over prototype number 12, then owned by Taff Smith. What a gentleman – not only did he fly the aeroplane for us, but he bought us lunch too! I finished my third scale model in 2009, having started it in 1998.

More recently, my third-scale Corby Starlet took to the skies, being completed in 2012. I started thinking about this one and accumulating data in 1985. Are you beginning to get the picture? When it comes to wish-list projects, I don't like to be rushed!

Enter The Cricket

It was about umpteen years ago that I stumbled across an aircraft that really tickled my fancy. Step forward the Cri-Cri. This aeroplane was designed in 1971 by Michel Colomban, his brief being to produce an aeroplane for home construction that would cost no more than $1000, including two engines (at 1970s prices). Yes, you did read that correctly – this aeroplane was a twin!

The Cri-Cri really is tiny. The wingspan is a meagre 4.9 metres and it is only 3.9 metres long, with a complete airframe weight of around 78 kg depending on the engines used. Construction is all-metal, plus structural foam. Once, during my full size flying days, I came across a Cri-Cri on the peri track whilst taxiing out to runway 26. My first thought was, "What's that model doing on the peri track?" Yes, the full size Cri-Cri could easily be mistaken for a model! The design is elegant in its simplicity and it has stood the test of time as, to date, approximately two hundred examples have been registered. The Cri-Cri has good performance too – maximum speed is well over 200 km/h, it is aerobatic and is stressed to +9 and -4.5 G.

Engines for the Cri-Cri are many and varied and even include choices that will be familiar to modellers – Zenoah, 3W and ZDZ all feature. There has even been a jet powered version using model size turbines. Up until recently the vast majority of full size examples were powered with tuned pipe equipped two-stroke engines of between ten and twenty HP.

The snag, from the modeller's point of view, was the fact that these engines were handed so that the exhausts were both on the fuselage side of the aircraft. I did a bit of research and concluded that it might be possible to modify a couple of small petrol engines to provide the required handed pair. But the phrases I kept on hearing were of the 'I'm sure it could be made to work' and 'Good luck with that!' type.

My enthusiasm may have been a little dampened at this point but, hey, much of the satisfaction that this hobby provides comes from solving problems and triumphing over adversity. With this in mind I promptly put the project on hold and ordered another soothing ARTF!

Gone Electric

Up until fairly recently all my larger models have been powered by petrol engines. These days, however, all my projects are carried aloft by the modern day miracles of LiPo batteries and brushless electric motors. The flexibility that these systems provide, plus the cleanliness, lack of vibration and ease of installation, tick all the right boxes. As a bonus, because of the lack of vibration, structures can be much lighter, leading to lighter and better performing models. What's not to like?

My original intention was to build my model for electric power with the motors easily hidden in the nose-mounted engine pods, with the two-stroke engines and tuned pipes of the prototype represented by dummies fabricated from traditional modelling materials and foam. The problem of a 'handed pair' of engines was thus no longer a problem.

It was at this point in the cogitation process that I was handed a rare gift, courtesy of evolving technology; there were now Cri-Cri being pioneered with real-life, full - sized electric power! The Internet (where would we be without it?) provided me with my ideal prototype; not only was this Cri-Cri devoid of any difficult-to-represent two-strokes and tuned pipes but it had an attractive colour scheme and the distinction of being the world's fastest electric aeroplane into the bargain. The record was set in September 2010 at 262 km/h – that's 163 mph or 153 knots!

Mondeo Scale

A couple of years ago I was at a scale event when a chap arrived in the car park with a large WW1 biplane in the back of his estate car. I remember talking to this modeller and asking him to what scale he had constructed his scratch-built masterpiece. His reply was "Mondeo scale, mate. If it won't go in the back of a Mondeo then there's no point in building it"! I have always remembered this maxim so before rolling out a sheet of paper and sharpening my pencil it was out with the tape measure to measure up the available space in the back of my estate car!

The original intention had been to build the Cri-Cri to half-scale but this was just – and I mean just – a little too big. At 47% scale, however, the fit would be, as Goldilocks would say, 'Just right!' Armed with a Cri-Cri three-view, photographs of my particular prototype, calculator, spreadsheet and pencil I was good to go and in no time at all I had the fuselage drawn out and most of the construction methods thought through.

Wherever possible I intended to follow the same construction philosophy as Monsieur Colomban did all those years ago. I could not hope to replicate the riveted and bonded metal skin construction of the original but I could employ the same ideas of structural foam components and stiffeners linked to a thin stressed skin covering. The fuselage was to be constructed on a lightweight frame, whilst the wings and tail would employ foam ribs and sturdy hardwood spars.

All components were to be skinned with Pro-skin. Pro-skin is a thin, hard epoxy/fibreglass laminate which, when used in such applications as this, is not only very strong but is ready to be painted! Anyone who has spent many hours 'glassing' and rubbing down a large model ready for painting will appreciate the appeal of Pro-skin! The weight of this material, allegedly, is comparable with glass-skinned, primed and painted balsa too.

Estate car scale! At 47% scale it just about fits

Bits & Pieces

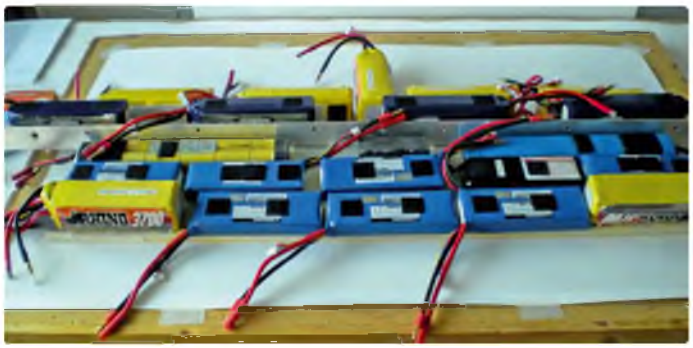
As fuselage construction got under way I diverted my attention to ordering the sorts of bits and pieces that would prove useful to have to hand as the structure developed. I estimated the weight of the finished model to be in the region of 16 lb, so with this figure in mind I drew up the main undercarriage and emailed it off to be manufactured from fibreglass (just as the full size). Wing joiner material was ordered and the power system finalised. Each motor, running from a 6S LiPo, would produce at least 1.2 kW – a healthy 150 watts per pound would mean that the model would not be under-powered! As a bonus I would be able to follow the prototype's use of counter rotating propellers and promptly ordered a pair of props – one tractor and one pusher.

Christmas 2013 saw the first of the Pro-skin/foam components, the tailplane, completed. The ribs were cut from 6 mm Depron and the assembly framed up with thin spruce spars with balsa shear webs. A balsa false leading edge and tips completed the structure. In this condition, especially as there was no trailing edge, the structure looked flimsy in the extreme, especially so since the ribs were at only 10% thickness!

The top skin was applied, using thin epoxy thickened with a little 'microballoons' as adhesive, and with the frame sitting in its jig the whole assembly was then secured with weights and left to set overnight.

Next, the second skin was taped to the top skin along the trailing edge on a flat surface so that the tape formed a hinge. Adhesive was applied to the LE, ribs and along the TE line, then the second skin was folded over and the assembly put back in the jig and weighted down using long, metal angle-sections courtesy of B&Q and the gravitational assistance provided by five hundred pounds worth of LiPo's! I was amazed at the finished result. The floppy frame was transformed into a totally rigid structure that was straight and true, and with a TE that could do secondary duty as a bread knife.

Once the balsa tips and LE were added and glassed, the completed tailplane weighed in at a very pleasing 165 grams, ready to paint. Having trialled this construction method on the tailplane I felt confident about using the same method when the time came to build the wings.



Bonding the first of the tailplane's skins using LiPo's as improvised weights

Bread knife? The tailplane in a secondary role

Tailplane pivots bonded to fin spars – note the holes for the alignment pins

Tailplane pivot points

Ding-proofing the rudder. Carbon fibre being laid between the balsa skins at the TE

T-tail Terrors

If I am ever again tempted to build a model with an all-flying 'T' tail, I think that I will have a long lie down until the temptation wears off! What a nightmare this bit of the construction process turned out to be! Deciding on the mechanics of the tail's pivot was bad enough but getting everything to align – with the fin vertical, tailplane horizontal and square to the fuselage datum – had me tearing my hair out! Adjusting the fin pivot members to achieve alignment in one plane affected the alignment in another.

The process was not helped by the fact that the fin, at this stage, was not totally rigid, being without its skins. All problems have a solution, however, and the day eventually dawned when alignment in all directions was a reality. The fin pivot members were, at this stage, firmly clamped to the fin spars with sturdy clamps. I drilled a couple of fine holes through the spars and the pivot members and inserted removable, fine steel pins.

The clamps could now be removed and the members epoxied to the spars, the location pins keeping everything in register until the glue set. Once the epoxy had hardened the pins were removed and further reinforcement added.

I was having kittens when I refitted the fin and tailplane to the fuselage as a final check on the alignment. Luckily, everything was just fine. Am I becoming paranoid with the passing years or do I just think that everything is out to get me?

Cheered at having solved a major problem I quickly built the rudder and spent a few happy hours constructing the knuckle hinges and the rudder hinge shrouds on the fin. The fin and rudder are skinned in 1/16" balsa, which will be glassed, as the fin has a compound curve and Pro-skin will not accommodate compound curves.

As I sat back to admire the finished result a dreadful thought began to take root… You see, in the normal course of events, the fin would be fixed to the fuselage. Then, after painting the model, the rudder would be assembled onto the fin, the hinge points sliding smoothly into place on a film of epoxy – I've done it dozens of times. The sticking point (no pun intended!) this time was the fact that the Cri-Cri has a swept-back rudder hinge line, so the rear of the fuselage will not allow the rudder to be slid into place if the fin is fixed to the fuselage.

The rudder leading edge fits into a neat shroud at the back of the fin

Had I spotted this (obvious) snag in time, I would have opted for a different hinge system using a wire pin inserted from the top of the rudder. Isn't hindsight wonderful? My original thought was to finish the fin/rudder completely, paint it, hinge the rudder and then fix the ensemble to the fuselage and then complete the construction of the fuselage. But I really didn't fancy doing this.

Sleep On It!

The next morning, in the pre-dawn darkness, I was roused from slumber by the rain lashing against the bedroom windows and, just as in divine revelation, the solution was clear before me; the rear of the fuselage was the obstacle, so if I made the rear of the fuselage removable… Over breakfast my wife commented that I seemed more than usually cheerful!

With the fuselage largely complete I turned my attention to the motor pods. These are circular in cross-section so I decided to build them on a horizontal crutch to which half-formers could be added. The assembly could then be planked with half inch strips of 1/8" balsa. Planking is a very therapeutic occupation and, believe you me, by the time I had finished planking the pair of motor pods I really felt as if I had been through some kind of therapy! The end result, however, was worth the effort and I now had a pristine pair of pods which, when trial-fitted onto the motor pylons, looked rather nice. The pods were then glassed to protect them from the curse that is hangar rash!

The rear of the fuselage had to be made removable to fit the rudder after finishing

Motor pods are circular in cross-section, built on a horizontal crutch to which half-formers were added. Each assembly was then planked with half inch strips of 1/8″ balsa

Motor fitted to one of the pristine pods

My original intention had been to house all the motor services – LiPo, ESC and switches – within each motor pod. Indeed, the pods are large enough to contain the motor, a 6S, 4000 mAh LiPo and the ESC with room to spare. In the end I decided against this: the pods would have had to be made much sturdier (and thus heavier).

I was also concerned that a pod, with all its contents, weighing at least 1 kg, would impose serious inertial stresses on the motor pylons and their mountings. Plan 'B' swung into operation. The LiPo's would now live in the front fuselage with the ESC's. Always have a 'plan B' as it is invariably much better than 'plan A'!

Right:
Ready for a blow dry? Both pods were glassed to protect them from hangar rash

I'm A Wing Man!

When it comes to model construction most modellers have parts that they like building more than others. Some prefer fuselage construction to tailplanes, whilst others relish getting their teeth into a really challenging undercarriage. Me, I'm a wing man! The Cri-Cri wings have a mixture of balsa and depron ribs with hardwood spars. Junkers style flaperons are hung from the rear of the wing.

To produce a true structure hardwood jigging strips were fixed over the plan ready to support the ribs. The lower spar was then fixed to the building board by a cunning method: 1 mm holes were drilled through the spars at each end and, at a couple of well-spaced points along its length, fine panel pins were then tapped through the holes until they just made contact with the building board. Now, the next bit is very important. The heads of the panel pins were snipped off, leaving about 3 mm of pin showing above the spar. The pins were then hammered flush with the spar. The wing was then built over the plan in the traditional way and was not removed until after the top wing skin had been fitted. The wing was then turned over, re-positioned in the jig and the top skin fitted. If you ever use this method yourself, do not, under any circumstances, forget to snip the heads off the panel pins – if you do forget, you will have a challenging job ahead of you in removing the semi-completed wing from the board! You could even invite your mates round and hold a modelling version of King Arthur drawing Excalibur from the stone! The fun you could have…

Spar Fixing Sequence

Pin just touching the building board

Then the pin is hammered flush

The head is snipped off

After the wing is built it can be lifted from the building board – provided that you have remembered to snip the heads off the pins!

Foaming Adhesive

The tailplane skins were fixed with thickened epoxy but I had been told that the stuff to use for fixing the wing skins was a polyurethane glue endowed with slight foaming properties. Ever the one to try out new innovations, I purchased some. To my utter shame and embarrassment I couldn't figure out how to take the top off! I pulled and tugged at it and attempted to unscrew it, all to no avail. Finally, a phone call to the supplier (and a hefty shove with a screwdriver) saved the day and glue access was granted.

Now, this stuff has the colour and consistency of honey, and only a very thin layer is needed because of the foaming characteristic. The snag is that the working time is only five minutes so applying the glue to all twenty ribs, spars and the leading edge strip and then getting everything positioned was going to take a bit of forward planning.

Following a suggestion from a knowledgeable friend (thanks, Harold) I got stuck in. The top skin was laid on the wing and two 1 mm holes were drilled through the skin at each end of the spar. By inserting a pair of steel pins the skin could be removed and replaced in exactly the same position.

The position of all ribs, the spar and LE were then marked on the top of the wing skin in felt-tip pen. The skin was removed, laid flat and the glue applied to the other side with a small brush at the marked positions; the skin material is translucent so the pen marks are clearly visible. (Note: since the glue cures by contact with moisture in the air and in the material it is preferable to apply the glue to the Pro-skin, which has no moisture content, rather than to the wing which has!)

By the time I had finished brushing on the glue at one end of the wing skin the glue at the other end had started to foam – I was fast running out of time! Stress levels were comparable to those of the soldier selected to test throw the first atomic hand grenade! The skin was quickly (very quickly) positioned on the frame, the alignment pins inserted and the skin rolled down with a length of metal tube. The whole lot was then covered with a thick piece of carpet, to spread the load provided by half a dozen house bricks and a couple of old 12 V batteries. If I were a nail-biter the next few hours would have seen my digits reduced to stumps as I waited for the glue to cure.

The waiting over, it was time to take a peek. Result! One perfectly attached skin. The other three skins quickly followed suit. Lightweight balsa wingtips were added, shaped and glassed and in the twinkling of an eye a pair of completed wings lay on the bench.

DIY Undercarriage

The 2014 flying season was, by this time, fast approaching when a bit of grit appeared in my oyster; the chap who had previously made composite undercarriages for me fell by the wayside and was unable to fulfil my order. An alternative had to be found. I don't normally do any proper building during the flying season but the prospect of a DIY, carbon undercarriage fired my latent enthusiasm.

I did many hours of Internet research on mould making, lay-up techniques, health and safety issues, different grades and patterns of carbon, pot life of resins… The list went on and on. Eventually, I felt sufficiently clued-up to order materials and, whilst waiting for them to arrive, I made a start on making the moulds. The moulds are made from pink foam lined with Pro-skin. I made female and male moulds and prepared them for the lay-up with the application of brown packing tape and release agent (packing tape makes an ideal release film as resin, of all sorts, just refuses to stick to it).

The undercarriage itself is constructed using unidirectional carbon fibre tape, with a thin glass cloth skin on the outside surfaces (to improve torsional stiffness) and thin fibreglass sheet at the position of the axles (to resist splitting). Incidentally, if you are thinking of having a go at an undercarriage of your own, do not use woven carbon fibre as 50% of the fibres will be in a direction that contributes nothing to the bending strength of the legs.

At this stage I was beginning to have doubts with regard to my original intention of using male/female moulds, with the lay-up sandwiched between the two. I could not be sure that the gap in the sandwich would be the right size and I would not know for sure until I had completed the lay-up in one half of the mould.

The undercarriage mould

Table top test! Putting it all together for the first time – always a satisfying moment

I chickened out and decided to do the moulding onto the male mould only. Fourteen layers of glass and carbon were applied and packing tape, coated with release agent, was applied over the top. Once this was pulled tight and fixed in place it was put into the airing cupboard for 24 hours while the chemistry performed its miracle of polymerisation. Warning – do not try this at home unless you have a very understanding wife!

I was on tenterhooks when it came to de-moulding time, I can tell you. Would I have a space-age wonder or a nasty, sticky mess? The result was a very serviceable undercarriage. Not perfect mind you, but perfectly serviceable and very stiff, very strong and very light.

Now that I've got a bit of a feel for composite moulding I'm sure that I'll be doing more of it in the future. After all, I've got plenty of resin left - and another forty-nine pairs of nitrile gloves!

With the days lengthening, the sun shining and the birds singing, it was time for the Cri-Cri to go into summer hibernation as the flying field exerted an ever-strengthening pull and my existing model fleet started to stir, expectantly, in the hangar… ***RCMW***

TO BE CONTINUED

The resultant undercarriage is not perfect but it is perfectly serviceable and is very stiff, very strong and very light. Spat details next time

Be sure to check out the March issue of RC Model World as John Higgins continues his Cri-Cri Capers

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Mini Super Bistormer

The Bistormer was a biplane version of David Boddington's classic design, the Barnstormer. Phillip Kent pays tribute to Dave's biplane with his new 40 inch wingspan version, aptly named the Mini Super Bistormer

Free Plan

Above & below: The blue and yellow Mini Super Bistormer in US colours is Phillip's own model, which is electric powered

RCM MODEL WORLD At A Glance

WINGSPAN:	40" top, 38" bottom (1016 and 965 mm)
LENGTH:	33" (838 mm)
WEIGHT:	2.75 lb (1247 g)
RADIO FUNCTIONS:	Throttle, Ailerons, Elevator, Rudder
SERVOS:	Hitec HS 81MG 19 g (2.6 kg cm at 4.8 volt)
BASIC CONSTRUCTION MATERIALS:	Balsa, Ply
COVERING MATERIAL:	Solarfim or Solartex
CENTRE OF GRAVITY:	2.5/8" (67 mm) from Leading Edge
CONTROL THROWS:	
AILERONS:	10 mm up, 5mm down
ELEVATOR:	20 mm up and down
RUDDER:	20 mm right and left
IC ENGINE RANGE:	.30 - .40 cu in four-stroke
ELECTRIC MOTOR:	Airtek Apex Brushless AXP/3536/1100
PROP:	10" x 6" Master GF C Series
ESC:	Synergy 40 A
BATTERY:	3S 2200 mAh

In 2002 I had a plan published for my Super Bistormer sport biplane. This has been a very popular model with members of the Brighouse Model Flying Club, with at least half a dozen models being built. In recent years there have been significant advances made in electric motors, batteries and speed controllers and as a result of this a smaller model has been designed to take advantage of this situation.

Although originally conceived as an electric model the drawing gives details for powering it with a small four-stroke motor.

Colin Terry holds his glow powered version, which is also seen in the header shot at the start of this article

The tailplane is from medium soft 3/16" balsa sheet. Transfer the shape to the balsa and rough cut to shape

The fin and rudder are built up using 1/16" sheet balsa cores. Spars and ribs are then added to each side

Wing panels are built one at a time directly over the drawing on a flat board. Pin the trailing edge down over the plan and then the two lower spars using 1/16" sheet packing pieces to lift them to the same height as the trailing edge

A glow powered version has been built by fellow club member Colin Terry and it is proving to be very enjoyable to fly.

The origins of this design come from a model that I built in 1986. The inspiration came from Dave Boddington's Bistormer design. I had built many of Dave's designs and had found that they all flew very well. They also used what I considered to be first class construction techniques and structures. The Bistormer was a biplane version of the classic Barnstormer and I used Dave's design as a basis for the Super and the new Mini Super Bistormer designs.

The basic box for the fuselage and the cabane structure is more or less the same, as is the wing section, but the rest is all new. The original 1986 model was powered by an OS 40 FSR two-stroke and was finished in a US Navy colour scheme of grey fuselage with yellow wings with US national insignia. The model looked good, almost like a scale model, and it flew very well indeed.

In 2001 I was looking for a fun model that I could fly out of our small, rough, sloping flying field and I remembered the model. The old drawings were modified to use an inverted four-stroke engine and other improvements were made to tidy up the design.

When electric powered models became a more practical proposition I had a reduced size drawing of the Super Bistormer made for fellow Brighouse club member, Percy Powell. The small version, which is the version described here, has a wingspan of 40 inches and uses a very similar structure to the original larger model, the only differences are the ailerons and undercarriage. The prototype electric model used a sheet aluminium undercarriage but a wire torsion bar type, as used on the bigger machine, would still be fine. Four ailerons have been used on later models and these have proved to be much better but the choice is yours.

My own model has been flying for a few weeks now and is performing very well indeed. I have again used a colour scheme that gives the model a military flavour, with yellow wings and tail, with a blue fuselage and with the US insignia on the upper wings.

Construction

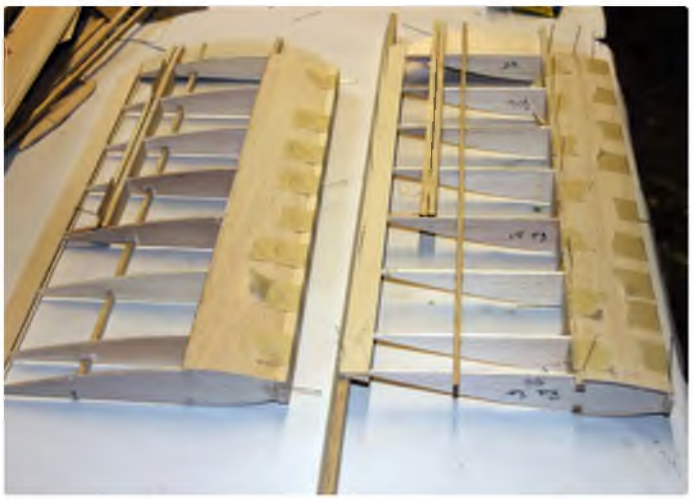
The model uses an all built up construction with well proven construction techniques. The wings use a 'D' box leading edge with a 'V' sheet trailing edge and capping strips on the ribs. The fuselage is a simple box constructed from hard strip balsa with a rounded top decking and stringers. The box is filled out with balsa stringers along its length, giving it a pleasing rounded shape. The tail unit was originally built using a sheet balsa core with ribs and spars each side. For ease of building the tailplane and elevator are shown made from light 3/16" balsa sheet.

I would think that prospective builders who have two or three built up models under their belts will have few difficulties with this little machine. The first two prototype models were covered with film but I have covered my own model with Solartex. Try to keep the model light, particularly if you are using electric power.

I always like to get all the parts for a model cut out before starting the build. The technique I use is perhaps old fashioned but I find it easy. I trace out the parts and then pin prick through the tracing paper onto the balsa or ply. In this instance the wing has a parallel chord and the easiest way to cut out the ribs is by making a plywood template. The ribs are cut out using the template. The different shaped ribs were made by cutting down the standard ones.

(Alternatively, why not treat yourself to a laser cut Wood Pack for this model? Details in the plan box at the end of the article – KC)

I am in the fortunate position of owning a Proxxon circular saw and this enables me to cut all my own strip balsa. Although I sometimes use non-standard strip sizes on some of my models the strip wood for this model should be easy to obtain. It is important to bend the cabane struts accurately and to set the upper wing at the correct incidence using a jig.



Decide how many ailerons you are going to use before starting to construct the wings

Sheeting the top wing centre section

Wingtips are made from balsa sheet capped with 1/16" laminations

Final neat effect after blending in the laminates

Lower wing panels propped up to the correct dihedral for joining with ply braces

Finished top wing

Finished bottom wing

Tail Unit

I like to start with the tail unit. In this instance the tailplane is from medium soft 3/16" balsa sheet. Transfer the shape to the balsa and cut to shape. The leading edge should be rounded – see drawing. The elevator is shaped to a triangular section, again see the drawing. I usually make my own elevator joiners but commercial items are available. If you want to make your own use 16 swg piano wire, with a 16 swg brass horn silver soldered in place.

The fin and rudder are built up using the core method of construction. Balsa cores are cut from 1/16" sheet and spars and ribs are added to each side. When dry the units are sanded to the section shown on the drawing. The rudder horn was made from GRP sheet and glued in place with epoxy.

Wings

The wing panels are built one at a time directly over the drawing on a flat board. Cover the drawing with the clear polythene backing from Solartex or Solarfilm before starting. There is a separate centre section for the bottom wing that joins the two panels. Early models used ailerons on the bottom wing only but the latest ones have them on both upper and lower wings.

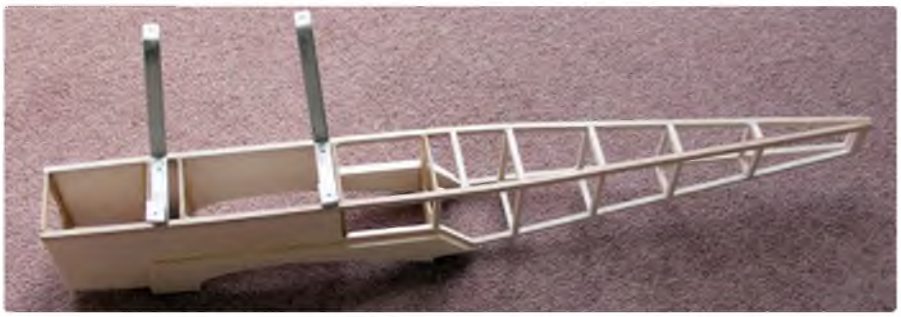
Decide what you are going to use before starting to construct the wings. Pin the bottom trailing edge down over the plan and then the two lower spars using 1/16" sheet packing pieces to lift them to the same height as the bottom trailing edge. Pin the aileron spars in place without packing pieces. Glue the ribs in place, cutting the ribs at the aileron position to suit and tilting the root ribs to accommodate the dihedral angle. Fit the top front spar and the false leading edge before constructing the wingtip from balsa sheet and 1/16" laminations. Fit the vertical webbing pieces between the top and bottom front spars.

The servos for the ailerons are fitted in the bottom wing and holes need to be cut in the ribs for the servo leads. Remove the part built panel from the board and shape the false leading edge and sand the bottom outer edge of the trailing edge to a triangular section. Fit the plywood mounts for the upper wing mounting bolts at this stage of the build on the upper wing. Return the panel to the building board, again using the packing pieces. Add the top sheet trailing edge, the sheet leading edge and the capping strips. Get all the wing panels to this stage before joining with the ply braces. Build the centre section for the lower wing and add the plywood braces before fitting the outer panels.

Pin the fuselage longerons down and fit the uprights and sheet balsa parts. When dry build the second side directly over the first

Fit formers, then use a try square to make sure that the sides are at 90 degrees to the building board

Pull in, glue and clamp the tail posts together, making sure the fuselage is straight before leaving to dry



Basic fuselage assembly with cabane struts trial fitted

Build up the front decking. Add the rear formers, spine and stringers, along with the block balsa tail mount

Finally, fit the leading edge capping pieces, shape and sand these to the shape shown on the drawing. Cut the ailerons away, shape the leading edge to accommodate the 'down' movement. The horns for my model were all made from GRP sheet and epoxied into the ailerons. Fit the peg for locating the bottom wing and remove the sheeting where the cabanes fit in the upper wing after building the fuselage.

Fuselage

Pin the fuselage longerons down over the drawing and fit the uprights and sheet balsa parts. When dry remove the pins and build another side directly over the first. I sometimes cover the first side with sheet polythene but that is up to you. Building one side directly on top of the other will ensure two accurate fuselage sides, a standard requirement for a true fuselage.

Pin the sides down over the plan view of the drawing and fit formers F3, 4 and 5. Use a try square to make sure that the sides are at 90 degrees to the building board. Fit the cross pieces and the remainder of the front formers. Remove from the board when dry and build up the rear decking with the formers F7 to F10. Add the spine and the stringers along with the block balsa tail mount.

Make a plywood jig to hold the upper wing in the correct position and then fit the aluminium cabane struts to the wing and fuselage. Screw and glue the bottom cabane mounting blocks to formers F3 and F5. Remove the wing and build the upper forward decking, finishing with the rolled sheet balsa covering. If a glow plug motor is to be used build as per plan but take into consideration the width between the engine bearers. The sheet doublers can be added now, along with the stringers. Note that the stringers taper to the rear of the fuselage. See the plan view

For the electric version make a suitable plywood former for the motor and fit it at the same angle as the one for the glow plug engine so that the thrust line is the same. Add a battery box for the electric version and a fuel tank box for the glow version.

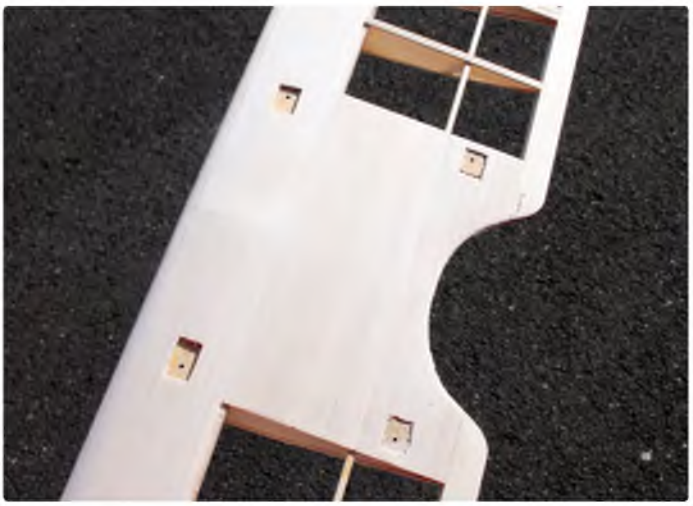
The undercarriage for my own model was a torsion bar piano wire type but I have shown an aluminium one on the drawing. It should be possible to obtain a commercial unit in either aluminium or GRP that will suit the model.

Radio

The aileron servos are fitted into the lower wing. Wire connecting rods are used for the upper and lower ailerons. Use a snap link at one end for adjustment.

For the electric version make a plywood mount for the motor and fit it at the same angle as the one for the glow plug engine so that the thrust line is the same. Add a battery box for the electric version or a fuel tank box for the glow version

Make a plywood jig to hold the upper wing in the correct position and then fit the aluminium cabane struts to the wing and fuselage



Recesses in the top wing bottom sheeting provide a flush fitting for the struts at the cabane mounting points

Another view of Colin Terry's neat model, which is powered by an OS 30 four-stroke

Aileron connecting rod on Colin's model

The inverted OS 30 is very neatly cowled

The core construction of the fin shows through the yellow covering

Closed loop rudder and steerable tail-wheel details

I use good quality small metal geared servos and build them into the wing with no access covers. Similar rudder and elevator servos should be positioned at the front of the fuselage. I used balsa pushrods driving bellcranks to operate the closed loop system on the rudder and a short wire pushrod for the elevator. The receiver was mounted well forward on Velcro. Access to the battery for the electric model is via a hatch at the front of the fuselage. At the moment a rubber band holds it in place but I do intend to fit small magnets at some stage.

Finishing

The model components need sanding down to the required shape before covering. Make sure that there are no unsightly bumps on the structure and that the wing and tail sections are to the correct shape. Fit the hinges at this stage but do not glue. For a small model like this Mylar hinges are most suitable and are what I used. Everyone has their own favourite type but keep it simple. I covered my own model with Solartex and tissue for the all sheet tailplane but the other two models were both done in film. I like to give the Tex a coat of clear shrinking dope before colouring.

I again chose to give my own model a military flavour and Colin Terry did the same. Both models look smart in their simple to apply US colour schemes. After clear doping my model was sprayed using cellulose. The decals were stock items from my local model shop in Leeds. Remember to fuel proof the model if you plan to use a glow engine. Fit a pilot and some edging round the cockpit and finally a windscreen. If you have ambitions to build a scale model in the future you could use this model to try out ideas such as rib tapes and a more complicated colour scheme.

Flying

Make sure that the balance point is where indicated on the plan. If the model is tail heavy try using a heavy spinner or spinner nut; if this fails you should add lead. With an IC model you should be able to move the battery about to get the correct position. Colin used an OS 30 four-stroke in his model and it is fine. My own electric powered machine uses an Airtek Apex brushless outrunner (AXP/3536/1100), with a Synergie 40 A speed controller. The battery is an Overlander Sport 25C LiPo 2200 mAh 11.1 V 3S.

I think it best to wait for a calm day for test flying and if you are not confident get the help of one of the club 'stars' to check the model and get it sorted out in the air. The model is easy to fly and is very aerobatic in either guise. It will do all the manoeuvres that I can manage and I really enjoy flying it.

If you want some fun without too much expense try a Mini Super Bistormer. You'll enjoy it I am sure! ***RCMW***

If it looks right...

The Bistormer series has been a very popular design with members of the Brighouse Model Flying Club – here's another one!

Percy Powell's electric powered version flares for a well controlled landing

Percy looks very pleased with his mini sized biplane

A final look at the blue and yellow electric version built by the designer, Phillip Kent

PLAN DETAILS

PLAN NAME:	Mini Super Bistormer
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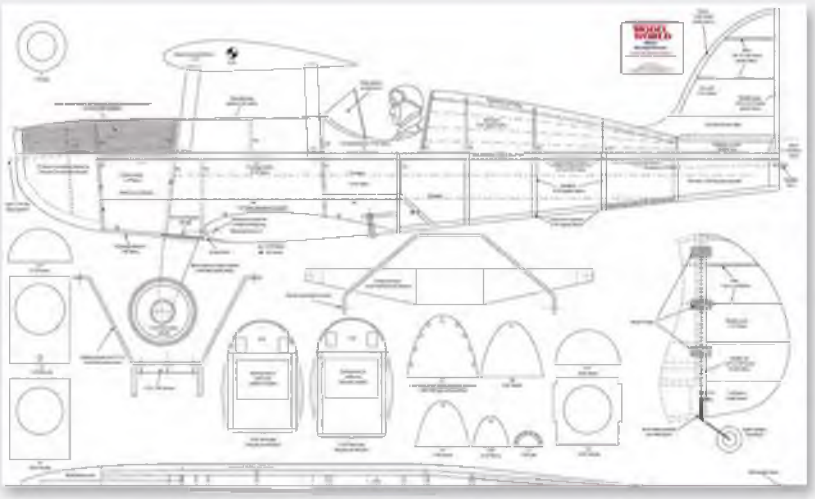

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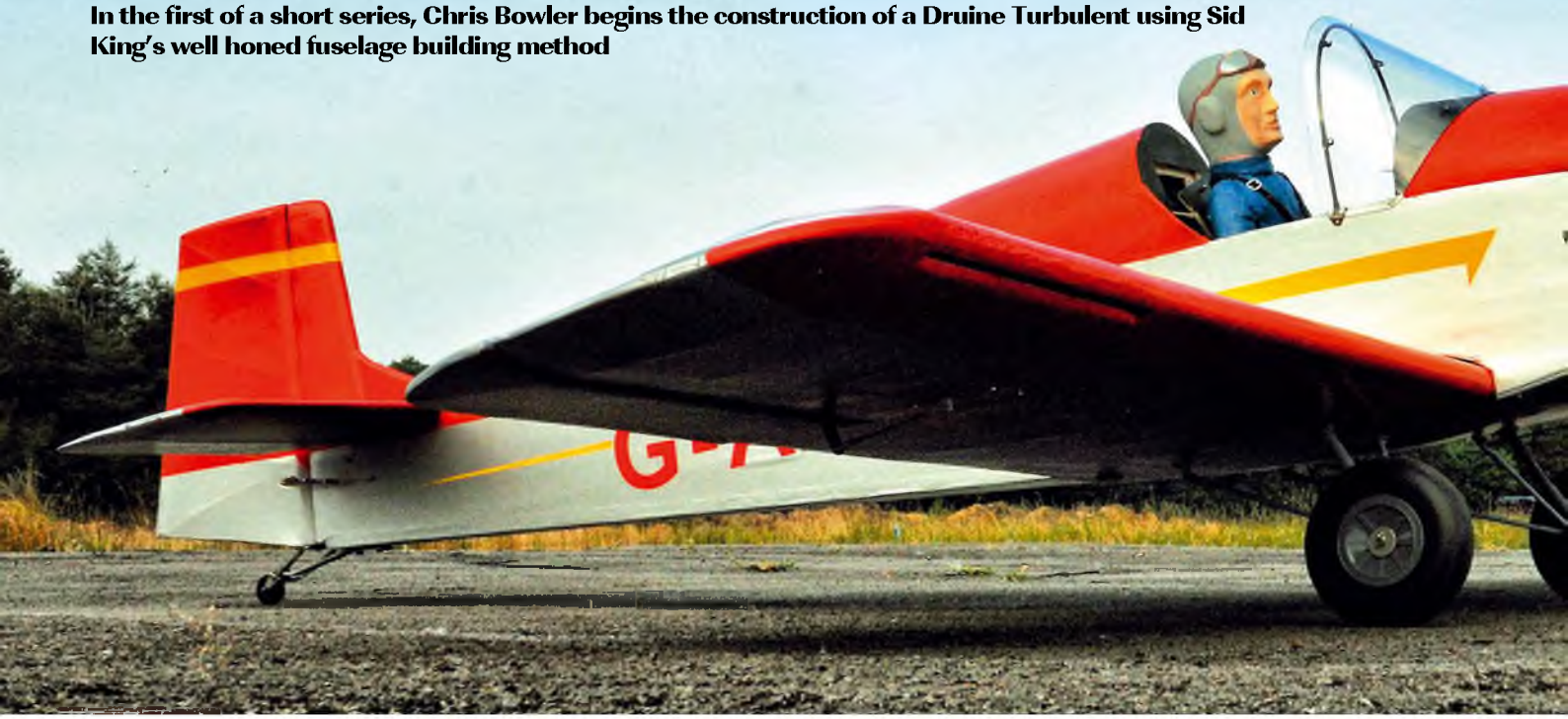
Druine Turbulent DR1

In the first of a short series, Chris Bowler begins the construction of a Druine Turbulent using Sid King's well honed fuselage building method



When a group of modellers get together an inevitable question arises in the form of "What's your next build?" Responses vary but it can sow the seed of an idea. In this case it was a chat with good friend Sid King, who knew I had taken a keen interest in the restoration of a Druine DR1 Turbulent not far from my home.

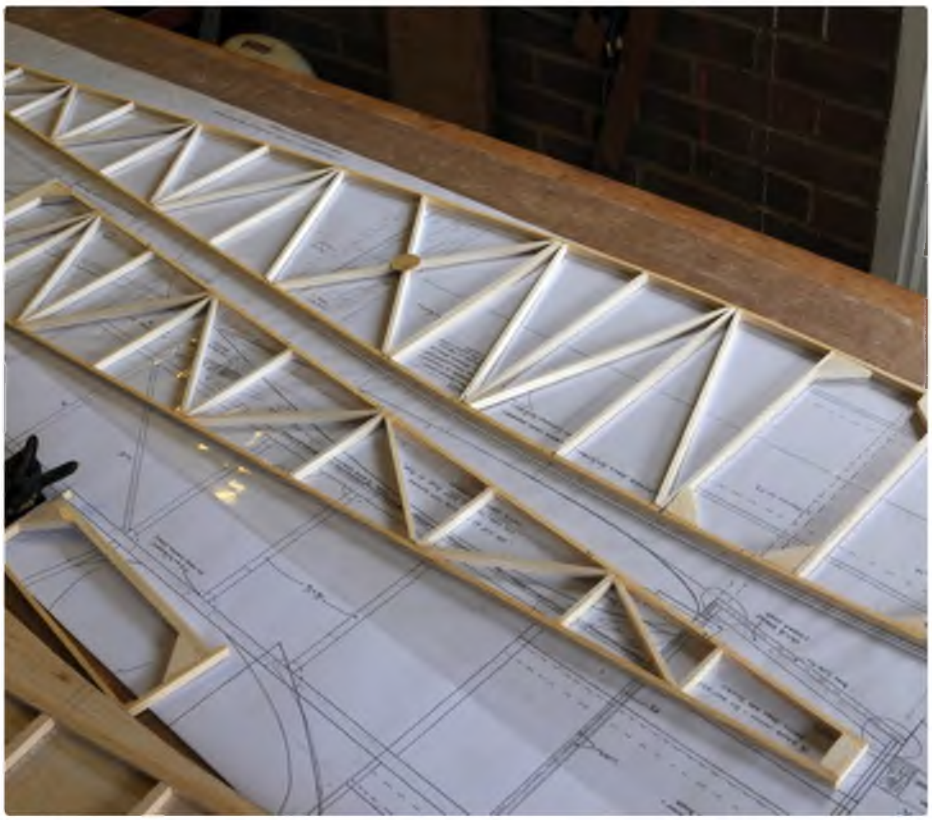
Sid had been involved in the building of one of these and indeed this one is his fourth version. Inevitably the subject of a build arose and Sid suggested we build two!

Why would that be? The answer lies in the form of G-ARRU, the airframe under restoration by fellow modeller David Huck, ably assisted by another modeller friend Nick Blackwell.

The demise of G-ARRU happened in July 1996 when a 'wingtip first' arrival skewed the machine into the landing strip. It was severely damaged and, to cut a long story short, David acquired the remains and decided to go for a rebuild. After several years of work the aircraft is nearing completion and it should fly within the next few months, but David is at pains to point out that no 'target date' had been set!

So two models! The new airframes will be in different colours to when 'Romeo Uniform' crashed, the idea being to render a version as it was and another as it will be when restored.

So far, so good. But where to start?



Fuselage top frames were built up over the plan

Beginnings

The first thing to decide was the scale and it was decided that as I had a 38 cc petrol engine it would be designed to suit that – and also for a far more practical reason that Sid King explains later! The starting point was reference to Ken Forty's original model from Sid's plan that was at one third scale.

Sid decided to revamp the plan and proceeded to put pencil to paper on the drawing board. He decided to retain the original measurements at the front bulkhead. This was forward planning as he had a mould for the cowl that he had produced for other modellers who built the earlier version.

The Druine looks like a simple build and in many ways it is. The only complications are the wing slots in the leading edge that form 12" of the wingspan at the tip.

Once the drawings were complete two sets were photocopied and it was decided that I would build the wings and undercarriages, and Sid the fuselages and tail sections.

From his drawings Sid produced a full set of wing ribs and wood for spars etc. In fact, a semi-kit to build from. Circumstances dictated that unfortunately Sid had to leave the project part way through. He did, however, complete one fuselage and a tailplane stabiliser unit that he passed on to me and so we reduced the build to a single model.

Here Sid describes the concept and construction:

Size Is Important

This is the fourth time that I have modelled the Turbulent at 16.7%, 25%, 37.5% and now 35% sizes, as well as playing with the full size occasionally.

Why 35% you may well ask? The answer is very mundane – 37.5% would not fit into either of our cars! *(Mondeo scale strikes again! – KC)*

The one inescapable fact that I have come to recognise is that being a very small aircraft for its day (circa 1950) and being designed for a relatively heavy motor (a VW Beetle 1600 cc air cooled flat four), the nose moment was of necessity very short, whilst, for stability, the tail moment is quite generous. So, great care is needed to keep the rear end as light as possible. In general we tend to build the back ends too strongly; aircraft don't suffer unduly from rear end shunts and after many a crash the rear of the fuselage remains intact.

With this in mind the tail feathers were built using the time honoured scale method of a medium/light 1/16" balsa central core with half ribs, spars, tips and 1/16" sheeting or cap strips added to top and bottom respectively to give a light but adequately strong tail unit.

Effective Method From A Salutary Tale

The fuselage posed a different set of problems. Previous experience of building large models has highlighted the difficulty of keeping the fuselage straight using the conventional 'build two sides over the plan' system without the aid of a large jig.

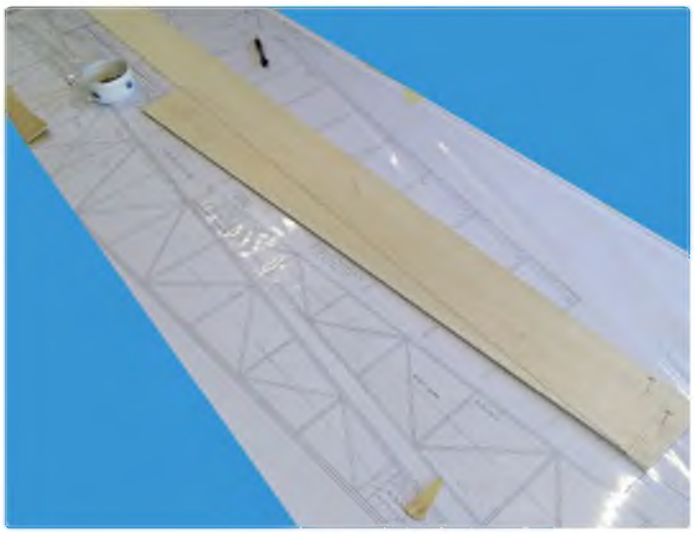
I found an effective method of countering this as a result of a beginner's mistake.

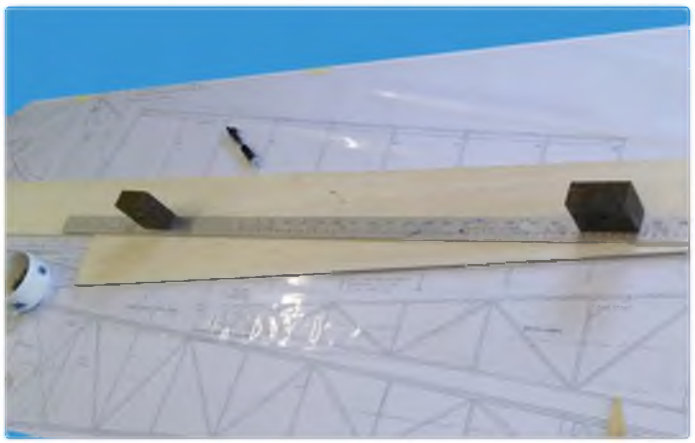
A newly retired Postmaster joined our local club. He wanted to build his own model and was directed towards a Junior 60. Two weeks later he came to me for some extra 1/4" x 1/4" strip as, "...there was not enough supplied in the kit!" Another week went by and he brought it to me for instruction in covering. The reason for the balsa shortage became apparent – he had not only built the sides over the plan but had also built the top and bottom views as well! However, the fuselage, despite the resulting 1/2" x 1/4" longerons, was very straight. The episode was not forgotten and it provided the inspiration for the 'Top and Bottom Ladder' system that I have used in various forms ever since.

The variation used here was developed for a lightweight version of the CAP 21 and is suitable for prototypes having flat, sheeted sides. I simply dispense with longerons on the sides altogether, cutting and assembling the sides using 3/32" sheet, adding vertical stiffening by means of 1/4" x 1/4" balsa, ending 1/4" short of the outline, with additional diagonals, doublers, hard points etc. as required. The formers are suitably recessed to accept the sides of the ladder when assembled.

Where possible I assemble my formers from strips of lite-ply, birch or balsa (sometimes a combination of all three) with overlapping corners, sometimes made up to double thickness all round if required. This not only saves material but also ensures that the principle grain direction is acting in the right direction. This is not so when formers are cut from a flat sheet.

Below & bottom: Side sheets were pinned and joined, then weighed down to maintain accuracy





Above & below: Wing rebate doubler prepared, and stringer and uprights added

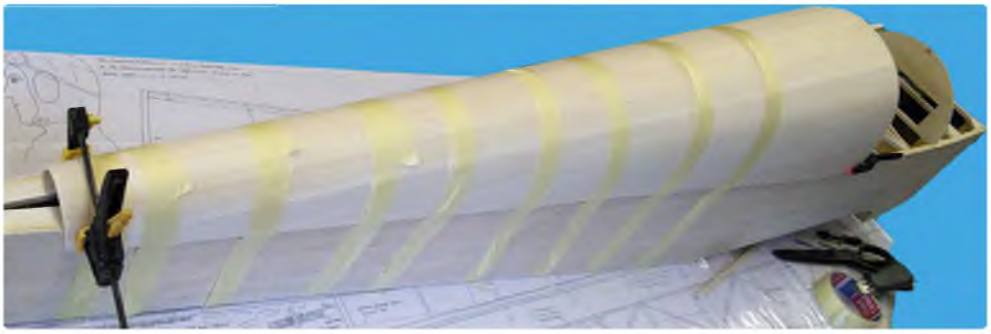
Sides glued and clamped in place to the top and bottom pre-fabricated frames

Test fitting the pre-formed front deck balsa skins

Completed side frames with uprights and stringers added

Clamping the tail stock and making sure all is square

Reinforcing pieces were fitted where the tailplane will sit and the formers added ready for the pre-formed rear decking to be fitted



Rear decking clamped in place, using copious amounts of tape to hold it in place

This is a good illustration of weight saving by good design – using as little material as possible but getting the best out of it.

Ladder Building

Construction of the ladders is easily understood from the photographs, bearing in mind that some of the cross members may be removed once the fuselage is assembled. There are three on the Turbulent: 'Top' running full length, 'Bottom' from wing T.E. to stern post and 'Front' from wing L.E. to the firewall. Final stiffness is achieved by adding the 3/32" cross-grained cockpit floor **after** the box has been assembled.

One of the prerequisites for the ladder system is that the fuselage side is drawn to exact length, allowing for the curvature when joined, unlike most model plans which do not allow for this so the box ends a few millimetres shorter, which is not normally critical.

Having the top ladder as one uninterrupted length enabled me to assemble the basic box inverted over the plan. So, having pinned both sides together, back to back and trimming them to give an identical pair, the top ladder was accurately pinned in place and the sides offered to it, aligned exactly at the stern post. I then glued them in place, as far forward as the front of the bottom ladder, ensuring that they remained vertical. Then I inserted the bottom ladder in place. The assembled rear end was then left to dry, ensuring that the sides remained straight.

Straight sides are important because the fuselage is going to receive a single curvature top decking.

The assembly was left for about twelve hours to make sure, before pulling in and clamping up against the front and top ladders and the front formers. Very positive clamping up was required – see photo.

Whilst it was drying, I copied and cut all the top deck formers and selected the wood for the turtle and front decks. I was then able to fit the formers and balsa spines and give them a final sanding with a very long sanding block.

Prefabricated Tops

Both top decks are prefabricated from medium/soft 1/8" balsa pre-assembled flat on the bench with a genuine **waterproof** adhesive; 'water resistant' adhesive is not always successful...

For this I normally use Cascamite or similar *(favoured by model boat builders – CB)*. I do a trial piece first if uncertain. I made the blanks 1/2" oversize all round, then sanded both sides before fitting. When the adhesive was well and truly dry I soaked them in a bath of tepid water for about an hour, then hung them up with a clothes peg and allowed them to drain.

With fingers crossed in case the glue failed I then draped a piece of polythene over the formers to keep them dry and firmly taped the decks in place with good quality masking tape.

I gave them a good twenty four hours before removing the tapes and was rewarded with a pre-curved decking that I was able to take my time trimming to size and gluing in place. I had deliberately used slightly thicker wood for the decks (1/8" butting up to 3/32") to make the final sanding easier.

At about this time my family commitments went into overdrive and I reluctantly turned the whole project over to Chris and the build reduced to a single aircraft.

Fuel tank box and engine firewall mount marked up. Care must be taken here to ensure accurate alignment

Engine box with 500 cc tank fitted

Rear exhaust NGH petrol engine fitted to stand-offs. The box is not glued yet and is free to slide in and out to make sure the cowl distance can be accurately set

Throttle servo on its custom made mount and ready for fitting

Radio bay showing the receiver, Powersaver, rudder and elevator servos

Cardboard template for making an accurate instrument panel

One piece elevator control arm silver soldered to control horn

Fitting Out The Fuselage

With the fuselage shell from Sid it was time to get back to work and finish it off.

He had built it with an engine 'trombone' sliding box to accommodate the engine and tank. This proved a problem as I decided to use an NGH35 petrol engine that had been converted for rear exhaust. Being 'in-line' it is ideal, as the cowl can be relatively hole free. It does mean that it fits fairly far forward on stand-offs so the engine box was shortened. This meant less room for a fuel tank so I compromised and fitted a half litre one.

Engine installation is straightforward if you measure from the plan and mark the bulkhead accurately. The thrust line is on the centre-line of the unit and corresponds exactly with the line of the cockpit sides. It was installed with captive nuts on the bulkhead and mounted on studs to the stand-offs. The ignition unit was placed in the forward space with the indicator light leading to the instrument panel. The exhaust was fitted with 'pepper pots' for less noise and extended beyond the airframe with silicone tube.

Interior

With an open cockpit it is essential to add instruments and with the Turbulent version being modelled this is simple. You will see full size versions with really snazzy set ups – but this one? No!

I photographed the full size and used Photoshop to adjust and print them to scale size, and made the panel from black plastic sheet. Suitably sized holes were cut and the printed instruments fitted in a clear plastic sandwich and glued in. A couple of gash switches from the junk box added a nice touch and the ignition light was sited between them. Additional instruments were made from PC board material and sandwiched between the display, as before. These were screwed into place as per full size.

A seat was made using sheet ply, which was lined with packing foam firm plastic and then covered with simulated leather and fixed to the cockpit floor with strong Velcro. The full size has a bulkhead behind the pilot's head, with a slot where the harness exits. A replica was fashioned and the radio switches housed within the bulkhead.

The model harness was made and anchored in the scale position, keeping the pilot in place. Magnets were let into the switch recess and the hatch cover to enable access to the switches.

Radio Installation

Spektrum radio was used and the servos installed behind the pilot bulkhead. A ply plate was made and the servos fitted before gluing into place in the fuselage. Several trial fits were made beforehand to ensure a good fit.

Leads to the battery packs are routed under a false floor in the cockpit and are unobtrusive but easily accessible if required. The rudder is operated via a closed loop system and the elevator via a stout pushrod operating a central lever and yolk connected to the elevators. Old technology, but efficient. The throttle servo is in the left cockpit side, mounted on a ply bracket.

Covering And Finishing

Silver Solartex was used for the fuselage side areas and underside, with white for the top surfaces.

Painting was done with an airbrush in Carnival Red on the upper surface, with a black anti-glare area in front of the cockpit. Much newspaper was used in the masking and I still managed to get a little over-spray! The cockpit interior is good old matt green, brushed on. The wings have the same colour top and bottom leading edge, as does the tail. The fuselage sports a Cub Yellow flash as does the fin and rudder.

It's a simple but effective scheme that has been approved by the restorer of the full size and hopefully his will match!

Basic construction of fin

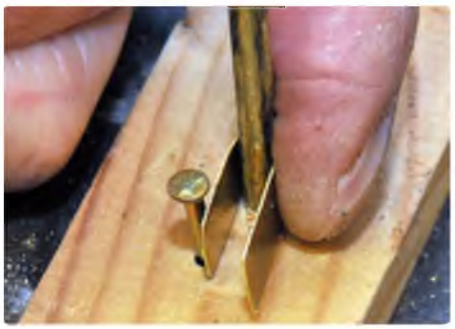
Test fit of fin and tailplane to check the hinge positions

Outer frame of rudder with half formers in place

Above & below: Cardboard template was made to ensure the correct size of rudder control horn, and the final Paxolin horn ready for finishing

Paxolin horn epoxied between two wedges and glued into place

The brass tube windscreen former is held in place with brass brackets



Bending sheet brass on a simple jig to form the windscreen fixing brackets. Much patience is required! They are then crimped to final shape before finessing and drilling for the retaining bolts

Windscreen

To look correct the model has to have a windscreen and this proved a little bit of a challenge. It is held in place on a hoop that is held to the fuselage by brackets each side. I replicated this with brass tube and brackets made from brass and silver soldered to the tube. Small brass screws hold it in place.

I purchased some 1.5 mm acetate sheet and made a card template before committing to any cutting. This looked fine and fitted well, but when the plastic was cut it didn't have quite the right look. The sides seemed out of place. So off to the workshop and the full size version where I managed to scrounge a copy of the screen template, drew it to scale and then I made another card version. After several 'trial and improvement' sessions it looked the part. Now the tricky bit was to fix it to the hoop. The full size uses clips secured with nuts and bolts, and I found some tiny nuts and bolts in the aforementioned junk box that were ideal.

I dreaded drilling the acetate but many years ago I remembered being told to use masking tape on the hole site, mark and drill through. If it worked at GAC (Gloucester Aircraft Co.) it might work for me! Much to my relief it did and, with the tiny clips fashioned from brass in a jig on the vice, it looks the part. Finishing touches were the wooden wedges that the lower edge of the windscreen screws to. The cowl was trimmed and painted and a 3D printed version of the VW Flat Four was installed and painted to give the model the Turbi character. (The 3D dummy engine was the subject of a feature in the June 2016 issue of RCMW.)

All scale detailing takes a while and it cannot be rushed if a half decent job is to be done. Indeed the whole project is way behind any sort of schedule that may have been envisaged. I decided a while ago to adopt the David Huck approach, and I quote: "It will all get done when it gets done. No target dates!"

If it suits the full size…

The final touch was a steerable tail-wheel from a long gone ARTF, operated by a sprung harness from the rudder.

Conclusions

It has been fun to see something progress from a discussion to reality, and working with Sid King. It took longer than either of us hoped and chunks of real life got in the way. But with patience and plenty of time for error and innovation, the end product looks fine – unlike the weather, which up to the time of writing has precluded any engine and flight tests.

Still, no target dates... And your Editor is a patient soul! ***RCMW***

To Be Continued

With the instrument panel shaped and temporarily fitted the card template for the clear screen can be made. It was a slightly modified shape to the full size, from which the template was made. It took several attempts to achieve the right 'look'

The full size has a panel behind the pilot. Replicated on the model, it houses the radio switches and is held in place by magnets

The seat is pretty basic – just a ply frame with foam taped in place and finished off with faux leather superglued in place!

The electronic ignition module was fitted in the bay behind the engine bulkhead

The instrument panel was made from washers and off-cuts of aluminium tube, with dials made from Photoshopped prints of the real thing. The switches are dummies, and the rev-counter and compass are cut from plasti-card

'Romeo Uniform' did eventually get into the air in model form. But first, in the next issue, Chris describes building the wings for his 35% scale Turbulent

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Printing your own 3D objects, parts and components is easier than you might think – if you can imagine it, chances are you can print it! Make your model as detailed as possible, without having to search for those elusive and expensive parts.
Replace those broken parts without having to send your item back to the manufacturer, or pay a fortune for components.

So versatile you will wonder how you managed without it!

Assembly
The Fisher Delta is supplied in kit form with component parts which are quick and easy to assemble by following the comprehensive online instructions, requiring only a few basic tools. All electronics are supplied ready to use with pre-made wiring harnesses – no soldering is required. Also available as a fully assembled unit at an extra cost.

The complete printer fits neatly into a corner of your desk or workbench, is quiet and odour free in operation and requires only a standard mains socket for power. An Ethernet port on the printer provides control via an easy to use website interface.

Parts
Parts printed from the supplied roll of PLA filament are very light and extremely strong, perfect for all modelling applications; whether structural or decorative.

3D printing is the perfect way to make bespoke scale details for all types of models. The builder of this big 1:3 scale RC model of a Druine D-31 Turbulent aircraft needed to represent the parts of the VW engine that protrude from the side of the cowling. He was able to supply reference photos and drawings of the full-size engine, so creating a 3D printable model was fairly straightforward. He'll need to do some sanding/filling/finishing before painting and detailing it, but it should look just right when installed in the model.

SPECIFICATIONS

Firmware
- Calibration: automatic bed levelling and machine calibration routine
- Layer resolution:0.3mm 0.05mm
- Build surface: Removable bed, uncooled Buildtak print surface (For printing with PLA). Heated aluminium plate available as an upgrade, (allows printing with ABS,PETG, PC, HIPS, and many more).
- Print speed: 0.4mm nozzle, up to 16mm3/s
- Motion: Up to 250mm/s, 4000mm/s2 acceleration, segmentation free real time delta movement
- Nozzle: 0.4mm diameter, maximum operating temperature 300°C, warm up time ~ 60secs.
- Power adapter: 100V/240V, 60W.
- Software:Machine control: On board web interface available via ethernet, USB control also available
- Standalone printing from onboard microSD card

Software
- 3D model processing:Slic3r open source software (free download - no license required) can generate G Codes for the Fisher Delta from .stl or .obj 3D model files.
- Supported platforms: Windows/Mac/Linux
- Prints G Code files generated by Slic3r and other open source slicing software

Materials
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Spektrum DX6e

Andrew James examines the latest in a long line of six-channel Spektrum radio sets

DX6e comes in a classic black Spektrum box

I've been lucky enough to own and use some pretty good radio control systems over the course of nearly forty years of R/C model flying. Starting out with a two-channel 27 MHz set, as my experience grew and the types of models I flew became more complex (especially helicopters), I felt the need to upgrade to more advanced radios, with more and more channels, culminating in a touch-screen, 10-channel 35 MHz set produced by one of the Japanese giants of the R/C industry.

Then came 2.4 GHz, spearheaded by Spektrum, into which I dipped my toes with a nice 9-channel set, again made by those same Japanese R/C experts. My next set was by Spektrum, a DX8, which was then followed the highly capable DX6 with spoken voice alerts.

The thing to note about all this is that while my need for more channels has peaked and waned, the capabilities of all these sets has steadily improved and looking through the programming menus of even the most basic of six-channel computer radios these days, like the DX6e reviewed here, will reveal a whole host of options that would knock the socks off even the most expensive R/C transmitter of just a few years ago, at least for general club flying.

A set like the DX6e, priced at just over £100 for the Tx only (or just under £130 with an AR610 receiver) is all you really need to fly most sport models and this new transmitter offers a truly remarkable array of functions for its price point. Here's just a few of the features that caught my eye.

250 Model Memory

Most of my older radios have (or had) 30 model memories at most but this set has enough storage for up to 250 models! Even the most prolific of modellers will not be able to fill that up, but if it ever did happen then there is an SD card reader built-in to the bottom of the set with which you can expand the model memories.

You are more likely to want to use the SD facility to transfer model memories between two DX6e transmitters, such as when sharing a model's set up with a club-mate. The other main use for the SD card function is to allow you to keep the transmitter updated with the very latest 'AirWare' software [sic*], which you can download from the Spektrum website.

You don't need a particularly fancy or high capacity SD card for this and I use an old card transferred from an abandoned digital camera to keep the software updated in my R/C sets.

(*Or should that be firmware, as this relates to the program already loaded into the Tx at the Spektrum factory? It's academic really as Spektrum call their AirWare software, so let's stick with their definition.)

The contents are well protected within an egg box style shell

Built-In Telemetry

The built-in telemetry feature is not new by a long shot but it is worthy of note on such a budget priced transmitter. With the relevant telemetry features enabled you can keep an eye on battery voltages, signal quality, motor temperature etc. And you can also set up alerts to warn you when selected values

As usual with Horizon products the DX6e comes with a decent manual. The cover is bleached, maybe for environmental reasons?

DX6e is available as Tx only or as a Tx/Rx combo complete with a Spektrum AR610 receiver

Back of the case showing the spring configuration switch and battery box. Four AA cells are provided so that you can use the DX6e straight out of the box

The patent-pending gimbal design lets you change spring configurations simply by moving this slider switch on the back of the Tx

have either fallen (such as voltage) or been exceeded (such as temperatures) over the values that you have defined.

You will need to buy additional telemetry modules and a telemetry enabled receiver to make use of this function. However, the AR610 supplied with the DX6e Tx/Rx combo includes a data port for use with Spektrum telemetry modules.

Wireless Trainer Link

It's been a while since I last taught anybody to fly an R/C model but if I was to do so today I would certainly encourage a newcomer to the hobby to invest in a transmitter such as the DX6e that offers a wireless trainer link.

This means that the DX6e can be wirelessly linked to a similarly equipped DSMX/DSM2 transmitter without the need for both transmitters to be connected by a physical 'buddy box' lead. Once bound to another transmitter Spektrum's 'ModelMatch' technology will allow the transmitters to automatically link without having to repeat the bind process again.

The chances of a buddy box lead coming unplugged is pretty remote but I have had it happen. More importantly, it's one less thing to worry about leaving behind when gathering everything together for a flying session. Believe me, there's nothing worse than having to tell a keen student that they cannot fly just because you (or they!) have forgotten to pack a buddy box lead.

Mode Configuration Switch

Besides offering a fantastic array of functions for such a budget priced transmitter the DX6e's stand-out feature has to be its patent-pending stick design that lets you change stick modes simply by moving a sliding switch on the back of the transmitter. Unlike other transmitters you don't have to take off the back of the set and then fiddle about with small springs and ratchets etc. You simply select the spring configuration that matches the stick mode that you use and the model type that you are flying. There are four spring configurations:

- Normal throttle for Modes 2 and 4 (Air, Heli and Sailplane)
- Spring centred throttle for Modes 2 and 4 (Multirotor)
- Spring centred throttle for Modes 1 and 3 (Multirotor)
- Normal throttle for Modes 1 and 3 (Air, Heli and Sailplane)

The slider switch is located under a hinged cover on the back of the transmitter. The cover prevents you from accidentally changing spring configurations in flight.

Multirotor Programming

Whilst the DX6e offers a comprehensive suite of programming options for Airplane [sic], Helicopter and Sailplane (glider) model

The shoulder mounted switches are of the same type as the older DX6. Switches and channels are assignable on this radio – remarkable at the price!

Menus are easily navigated on the clear LCD screen using the scroll bar (right) and push buttons (left)

The angular aerial moulding is mounted on an inverted Y shaped pivot

types, it also offers special features for Multirotor models too.

In the main the System Setup list (Model Select, Telemetry, Bind etc.) and Function List (Servo Setup, D/R & Expo, Pitch and Throttle Curves etc.) are pretty much the same as for the other model types but there are some Multirotor specific options too, such as:

Multirotor channel inputs – ALT (Altitude), ROL (Roll), PIT (Pitch), YAW
Multirotor checklists and warnings
Simplified multirotor flight mode set-up and switch assignment
Camera gimbal axis selection, from none up to 3 axes
Motor curve
Video transmitter (VTX) set-up
Lap timer

(Interestingly, the last two appear in the other model types' Function Lists too, paving the way for FPV racing with not just quadcopters...! FPV flying wings are already gaining in popularity.)

In The Hands

So, we've established that you get a whole lot of functionality for just over a hundred pounds (Tx only), but what does the Spektrum DX6e actually feel like to use? Here, my reference point is its slightly older sibling, the trusty DX6, which I have been using for the past year or so and which has become my default sports radio. The DX6e has a suggested retail price of £149.99 compared to £192.99 for the DX6 (as Tx/Rx combos with AR610 receivers), although street prices are somewhat lower than that.

The main difference for me between these two outwardly similar sets is that the DX6e does not have voice alerts. I thought these were a bit of a gimmick originally but I have come to like the soothing tones of the lady who tells me what Flight Mode I am using. It's hardly a deal breaker though and the DX6e works just fine without her on-board. What it does have though is a good selection of Warnings, so you can set it up to tell you if switches are not in their default positions when you power it up. I have mine set so that it warns me if either the Gear or Flight Mode switches are not in their fully back positions for take-off.

Styling wise the black plastic cases of both radios is similar, although the DX6e is much more 'waisted' at the bottom. The switch banks on the shoulders of the Tx are exactly the same and appear to use the same quality of switches, however the push-button bind switch does appear to be a little less robust, being of smaller diameter and without a chrome bezel.

The LCD screens are the same size and offer a bright, clear display when programming either radio. Menu selection is exactly the same using an easy to use scroll bar, plus two adjacent Clear and Back push buttons.

The DX6 has a fixed, stubby antennae, whilst that on the DX6e is a more angular affair. It can also be rotated to about 70 degrees upwards in relation to the front of the Tx to suit personal preference regarding antennae position. This doesn't rely on a weak knuckle joint, as per older style 2.4 GHz systems, but is supported on either side at its base by large round 'bearings' (for want of a better word!). This makes it much more robust and the coarse ratchet used means that when it is fixed at a certain angle it is much more likely to stay there during a flying session.

Out of the box the DX6e has quite firm springs on the main sticks but the tension can be adjusted to suit your preference, as can the length of the stick units. The stick ends are deeply serrated, which aids good grip, especially for pilots like me who fly with their thumbs on top. The trims are digital all round and are a fair bit smaller than those on the DX6, so this is one area where the savings in parts quality does start to show.

Another is the actual feel of the case, which features textured side grips. The texture is part of the plastic moulding, while on the DX6 (and my older DX8) these are rubber inserts and do actually act in an anti-slip fashion. On the cheaper DX6e, I'm not sure if the textured plastic actually helps with the grip levels and so I will make sure to use this

transmitter with a neck-strap (not supplied) to save me from dropping it.

The neck-strap loop is a prominent feature in the middle of the Tx and it is slightly lower than the loop on the DX6; in a direct comparison, with four AA NiMH cells in the battery boxes, it would appear that Spektrum have got the balance of the DX6e just about right, whilst the DX6 still droops a bit towards its base.

Talking about batteries, the DX6e can be powered with pretty much all the popular types of R/C Tx packs, from Alkaline or NiMH cells to the latest Lithium types. An optional Li-Ion pack is available.

Last, but not least, of the differences in the two transmitters is the power switch. On the DX6 this is a conventional slider but on the DX6e it is a new (to me) push button type. Initially, I thought this would be prone to being accidentally switched off but in practice you have to hold it in and wait a few seconds for the set to turn off. It's unlikely therefore that pressing it inadvertently for a short while, when, for instance, feeling for a trim switch, would actually switch it off.

Summary

Apart from a few cosmetic short-cuts, where the DX6e does perhaps hint at its low price, you certainly get a lot of transmitter for your money. It has oodles of functions that modellers could only dream of having on a set costing four of five times as much only a few short years ago. Plus, there's a whole host of new features, such as throttle stick activated timers, that we didn't know we wanted back then but which we would really miss if a modern set didn't offer them to us now.

The DX6e is an excellent beginners radio and it's not too shabby for general sport flying too. In fact, if you are new to the hobby and turn up with one of these at your local model club, chances are that your new R/C set will outshine a fair number of the much more expensive older sets being used by the old hands at the flying field. ***RCMW***

Close up showing the push button power switch and the low mounted neck-strap hook that offers near perfect balance

The transmitter has modern styling that narrows at the base. Who said that 'robot faced' radios would never catch on...?

MODEL WORLD

PRODUCT INFORMATION

NAME:	DX6e
MANUFACTURER:	Spektrum
DISTRIBUTOR:	Horizon Hobby UK
WEBSITE:	www.horizonhobby.co.uk/aeroonline (search dx6e)
PRICE:	£149.99
PRODUCT TYPE:	6-channel, 2.4 GHz radio control system
PARTS SUPPLIED:	Transmitter, AR610 receiver, 4 x AA dry cell batteries (not rechargeable), bind plug, Allen key (to adjust stick length), 180-page multi-lingual instruction book (46 pages in English)

SPECIFICATION

BAND:	2.4 GHz
MODEL MEMORY:	250
MODEL TYPES:	Airplane, Helicopter, Sailplane and Multirotor
MODES:	1, 2, 3 or 4 via rear switch
BATTERY TYPE:	4 x AA
MODULATION:	DSMX and DMS2
NUMBER OF CHANNELS:	6
RANGE:	Full
RECEIVER:	AR610 (in SPM6650EU combo)
TELEMETRY:	Yes

FEATURES

Airplane, Helicopter, Sailplane and Multirotor programming
Patent pending gimbal design with spring configuration switch
Wireless trainer link
7 aircraft wing types and 6 tail types
7 swashplate types
4 glider wing types and 3 tail types
Multirotor flight mode set up
7 point throttle curves for airplanes and helicopters
7 point pitch and tail curves for helicopters
Cross platform model sharing with other Spektrum transmitters

Light Flight

John Stennard builds a lightweight Sukhoi, tests a pair of new micro quadcopters and asks his optician to make a special pair of FPV glasses

Ripmax's VTOL Transition is very interesting to pilot

Welcome to the first Light Flight of 2017 and I hope Santa's sack overflowed with everything on your wish list. After writing the December Light Flight I managed to take in one more model show before the display season drew to a close. This was the new Festival of Flight event at Ragley Hall, near Alcester. The Saturday when I originally planned to go was a virtual washout weather wise while the Sunday was blessed with almost mid-summer (or better!) weather. The full size airstrip at Ragley Hall made a wonderful setting for this inaugural event and it was altogether a fantastic day. The organisers took advantage of the full size opportunities to include a number of excellent displays. This is one to definitely put in your diary for next year.

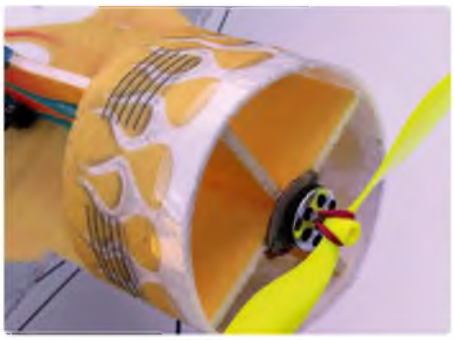
Meanwhile, I've been enjoying more outdoor flying than expected, plus the bonus of our regular indoor session. Outdoors has been quite exciting piloting the Ripmax VTOL Transition, while indoors a number of new quads have joined my fleet and some are real fun machines. I'm starting with a really nice model from the RC Factory that I've fitted with a Lemon RX/stabilising unit and it's flying beautifully.

SU-29 Indoors

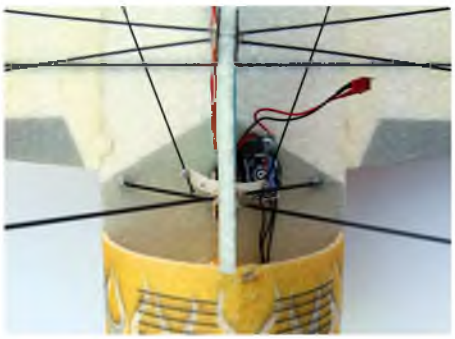
Now our club is firmly established in a four-court sports hall the need for a smaller size of aerobatic model is less important. One thing I have noticed is the smaller and more agile the model is, the less chance there seems to be in a mid-air. Our 'big foamy' sessions will have the MCX mini aerobatic type models, Nutballs, other 'oddballs' and standard size F3P size foamies all somehow trying to avoid contact. Realistically, you don't actually consciously try as you can really only concentrate on your own model.

The secret is having a sort of sixth sense, in addition to some skill, that enables you to take a last minute avoidance action. Unfortunately, some flyers still do not seem to appreciate that they could fly much more slowly and safely with a lighter model. My foam mini aerobatic models use a 2S 300 LiPo and the standard F3P size uses a 2S 400 LiPo. But we still have flyers with heavy models that require 2/3S 500/800 LiPos. These models fly faster, are less manoeuvrable and more damaging in the

SU-29 Extremelite from the RC Factory is an attractively different F3P type model



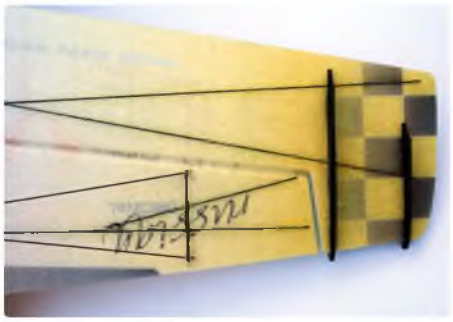
The cowling is an unusual feature of the SU-29



Good use of CF rod provides rigidity to the airframe

The extended aileron output arm requires a more powerful micro servo

It's essential to position the stabilisation Rx unit on the C of G



The CF strip edge on in the wings and ailerons makes for nicely stiff wings and ailerons

Indoors, the combination of light weight and stabilisation makes flying manoeuvres slowly very easy

SU-29 poses with a new Russian playmate, the E-flite Yak 54

event of a mid-air. They are also more easily damaged though the normal crashes and bashes that are part of the indoor flying scene.

Looking for a standard F3P size model to add to my collection, I came across the RC Factory SU-29 Extremelite model stocked by Andy at Robotbirds. This is a fairly standard size F3P model with a wingspan of 845 mm, a length of 870 mm and weight of 150 g. Incidentally, Robotbirds have an excellent revamped and easy to use website.

I was particularly attracted to this model by the scale-like appearance given by the cowl and the very high quality of RC Factory models. I was certainly not disappointed in any way by the quality of the kit and particularly the assembly sequence and accessories. As is often the case with this type of model the instructions have to be downloaded from the RC Factory website: www.rc-factory.eu

The instructions are absolutely amazing and run to 21 A4 pages, with 193 colour photos and diagrams. No black and white poor quality photos and indecipherable text here and it does make the assembly so easy.

The instructions suggest an extensive use of foam friendly CA and kicker but I prefer to stick to UHU POR, either as a slower adhesive or in 'contact' mode. One feature I particularly liked was the use of edge-on 3 x 1 mm CF strip inserted in a triangular layout to strengthen the wing and ailerons. This technique works really well.

I fitted digital 4.5 g servos for the rudder and elevator and a more powerful 6 g type for the ailerons; these are the suggested sizes. This design uses a single aileron servo with extended arms so the loads can be quite high. A 40/60 W motor was suggested. I fitted an XC 2803/38 Nicolas Pietu brushless motor with an 8 x 4 prop. This motor has an integral three hole mounting plate so I had to replace the provided mount/firewall with a 3 mm ply firewall. The instructions list a 10-12 A ESC but I fitted a 6 A Castle Creations ESC and anticipated using 2S 300/350/400 mAh LiPos. 240/350 mAh is suggested.

Having had very good results on another model using a Lemon RX with stabilisation, I fitted one of these on the C of G point. The listed weight is 150 g but this must be without the flight pack as my model, with no additional weight, came to 170 g without the flight pack. Even using UHU POR rather than CA I'm not sure where the addition 20 g came from? So with a 2S 350 LiPo my SU-29 ready to fly was around 200 g, somewhat heavier than I had hoped but I was encouraged when hover checks in the garage showed that it would easily maintain height on 50% throttle.

Test flights were made outdoors in a light wind and some adjustments were quickly needed to the stabilisation effects. With an aerobatic model that uses very large control surfaces the effects of stabilisation can be extreme if set to too high a value. The aileron response was far too fierce and produced quite wild gyrations. These were calmed down using the adjustment pot until they did not overreact to the model's position. The elevator and rudder were less extreme but also needed fine-tuning. The stabilisation can be switched on and off so it is interesting to fly in both modes and compare the flight characteristics. This type of model is of course quite stable anyway but the stabilisation assistance is particularly noticeable in the hover and knife-edge positions.

I flew the SU-29 outdoors in windier conditions and the effects of the stabiliser were far more noticeable. In a stronger wind the model could be held in a low to high alpha attitude in a perfect hover, even flying backwards and it would also do an impressive knife-edge hover. Once the indoor season arrived I was able to try the SU-29 indoors and the impressive performance was repeated in this environment. The Lemon RX/stabilising unit does a fantastic job and permits virtually hands off hovering and such a smooth flight pattern.

Calm and light wind conditions were ideal for test flying before the indoor season got underway. The stabilisation unit makes slow, precision flying very easy

Sharp New Blades

Horizon Hobby are certainly not being left behind in the mini/micro FPV quads race and I've enjoyed flying their two latest models. These are the Nano QX2 FPV, also referred to as the Micro FPV Racing BIGSHOT and the Inductrix FPV. The QX2 is just a little larger than the original Nano QX FPV, while the Inductrix FPV is the same size as the original Inductrix but now includes a camera and a different hull/body design.

The QX2 has a much longer flight time due to the flight pack being a 1S 500 LiPo and the Inductrix also uses a new larger 1S 200 LiPo. As far as the flying is concerned the QX2 is extremely stable and is much easier to hold at a constant height than the original Nano QX. I've found it to be the perfect small indoor FPV quad and I am really enjoying buzzing around, 'mock racing' through gates.

After quite a long wait some other flyers are now piloting their micro FPV quads in FPV mode at our indoor sessions. They are finding, like I did a year ago, that it's a steep learning curve and it takes a while to become really confident and at ease piloting indoors with the goggles on. Certainly quads like the QX2 make indoor FPV quad flying as easy as it possibly can be and once you gain confidence you want to do it all night! The 1S 500 LiPo gives 7-8 minutes of flying.

The Inductrix FPV is beautifully small and has the same amazingly stable hover as the original Inductrix. It is also very easy to pilot and you can fly it where no FPV quad has gone before. Seriously I have flown it quite happily around inside my garage workshop. Its micro size and stability also allows for living room flying without undue anxiety.

However, powering the quad and camera is hard work for the 1S LiPo, even with its increased capacity. The new 200 mAh cell that comes with this quad gives around three

QX2 FPV uses a 1S 500 LiPo, which gives a good duration

QX2 FPV is extremely stable and comfortable to fly

minutes of flying, which is quite good anyway for a micro size quad even without a camera. Certainly a club room obstacle course/ racing zone would be a practical for this size of FPV quad and be great fun. We are certainly getting to a 'quads for all occasions' situation and this provides new challenges and experiences, which has got to be a good thing.

Spec Specials

If you are an enthusiastic, glasses wearing, FPV flyer you may well have encountered the same problem that I have. I have quite a complex prescription for my glasses as both eyes differ considerably and I have an issue with FPV goggles and headsets. I have tried the dioptre lenses that can be slipped into some goggles but these do not improve the loss of focus which, while FPV is still possible, makes for a slightly fuzzy image. I had hoped that perhaps my normal glasses could be used with a headset but they were slightly too wide and as they are bifocals they proved useless anyway.

I tried a pair of cheap reading glasses and while they fitted okay in the headset the differences between my eyes meant that the image was not improved. If you think about it, you are asking your eyes to focus on a screen that is very, very close to your eyes and it's a tough job even with perfect eyesight.

As a Specsavers customer, I called in to ask if they could produce a pair of 'special purpose' glasses. They thought this would not be a problem so I returned, complete with an FPV headset and camera. A quick demonstration resulted in an appointment and again I turned up with the headset and camera.

The optician was not too fazed by my unusual request and another demonstration was followed by the usual tests, with the sole objective being to get my eyes to focus on a ridiculously close screen. With this done I chose a pair of cheap frames that would just fit in the headset. My 'special purpose' glasses cost £25 and this was really money well spent as the improvement in focus is quite remarkable. The image is much clearer and sharper and particularly when indoors the flying experience is hugely improved.

Unfortunately, my special glasses cannot be used with goggles but it might be possible to use a special pair of contact lenses for these. So Specsavers solutions came up trumps and my FPV experience is now even more enjoyable.

The PC board is visible under the quad. Plug-in motors make for easy replacement

Inductrix FPV needs the new 1S 200 LiPo for good results

My fingers give scale to this diminutive FPV quad. Motors provide the landing gear for this tiny 'small space FPV' flyer

Inductrix FPV is extremely stable and easy to fly in extremely small spaces

Pyrotechnics, RIAT style!

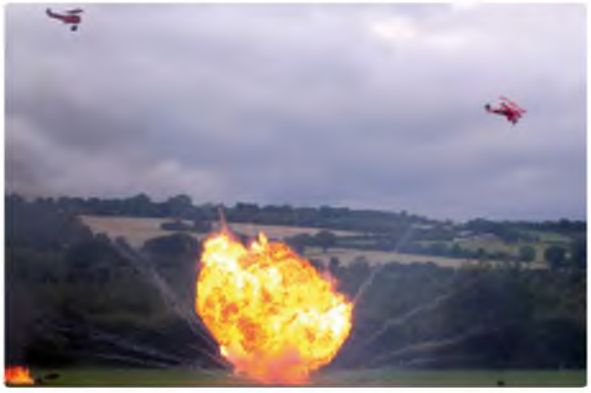
Tail End

The Western Front came to Much Marcle during their model show weekend and one could almost feel the heat, as well as feeling the ground shaking. Pyrotechnics always liven up any flying display and sadly their use in full size flying displays is now strictly limited, if used at all. However, model flying displays use them to very good effect more regularly. One of the displays at Much Marcle was livened up by the explosions of bombs allegedly dropped by attacking WWI aircraft. No aircraft or pilots suffered any damage and the spectators really loved the set-piece display. Well done to all who were involved!

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

I am available for talk/demos on model flight/indoor RC within my 50 mile range of Bristol and, as the BMFA Western Area Education Co-ordinator, I am also happy to talk to school pupils and youth groups in the region. ***RCMW***

Left: Much Marcle, alias the Western Front...



Right: Things are hotting up over the front line!

Power Pal Touch Duo

Andrew James gets his LiPos into tip top condition with a new dual charger from Etronix

For several years now I have enjoyed the benefits of all-electric flying sessions, the main ones being the cleanliness of the models post flight and also the ease of start up. This was brought home to me only a couple of days ago when I had to give morale encouragement to a club-mate who was trying to start a small four-stroke. It did sound lovely though when, quite a while later, he finally got it started after various permutations of needle twiddling, trying different glow clips and a suggestion from yours truly to start the inverted engine with the aircraft upside down so that fuel didn't flood the glow plug. But apart from that lovely sewing machine purr and the puff-puffing of the exhaust I don't really miss using my IC engines too much as electric models are so much easier to get into the air.

I reckon my flight rate has more than doubled since switching to electric and so it's not unusual for me to enjoy eight flights or more in a flying session using two or three different models, rather than just three or four sorties with a single glow powered plane, this being the maximum I was willing to clean down afterwards!

The only downside with an intensive session of electric flight is that you need to think ahead a bit to make sure that all your LiPos are properly charged. I don't subscribe to charging any of my packs at the flying field as I've long since stopped taking a leisure battery to the flying field as a power source after having one topple over in a car's footwell and ruining the carpet. And using the car's battery is a no-no as apart from draining it PDQ I'm pretty sure that doing so does a modern vehicle's complicated electronic systems no good at all. In a previous career I had a very nice luxury car start doing strange things after accidentally draining its battery whilst fast charging batteries for R/C car racing...

Power Pal Touch Duo comes well protected in a large, colourful box

So these days I do all my charging in the garden at home inside a storage unit that is situated away from the house. I use a heavy duty garden extension lead to run mains power into what is basically just a big plastic cupboard, which enables me to use either mains powered chargers, such as the Touch Duo reviewed here, or 12 V DC varieties when plugged into a power supply unit.

I don't use huge packs, mostly 3S or 4S, with a few 6S, and I only charge at 1C so as not to overload things. My favourite charger – until now – is a four output 'quattro' unit, which means that I can have at least eight packs ready for action in just a couple of hours before going flying. This old workhorse of a charger is starting to show its age now though, with one output often undercharging and it also uses an antiquated series of button pushes to set up each pack.

I was therefore very pleased when the editor sent me this impressive new charger from Etronix to test, with its modern efficient charging systems and updated set up work-flows.

Open The Box

The Touch Duo is presented in a large flip top box. Inside is found the dual charger unit, safely ensconced in firm foam inserts for safe transit, together with a cardboard sleeve that contains the following:

- 1 x AC lead with 3-pin plug
- 1 x DC lead with an XT connector to connect to the charger and lantern connectors to connect to the DC source
- 2 x charge leads with lantern connectors at the charger end and a Deans style connector to connect to the battery or an adapter lead (not supplied)
- 2 x balance boards with XH connectors for connecting the balance leads of up to 6S packs
- 1 x plastic stylus

Although I prefer to charge my packs at home using mains power and where I can keep an eye on them rather than be distracted by goings-on at the flying field, it is nice to know that this charger has the ability to support field charging from an 11-18 volt DC source should the need arise.

Regarding the choice of connectors on the balance boards and charging leads supplied, Etronix are never going to keep everyone happy. However, XH balance leads are probably the right choice for most users; for sure, most of my packs are fitted with XH sockets. As for the Deans style connectors on the charging leads you will find similar items packaged with most chargers of Chinese origin, so they must be popular over there. Personally, I'd prefer EC3 versions but you can't please everyone and supplementary leads are widely available, including Etronix's own versions (for EC3 leads search for ET0270 on the CML website). CML also distribute a wide range of alternative balance boards.

The last item, a thin, pencil style plastic stylus, should be kept close to hand when using the Touch Duo as some of the icons and fields that are displayed on the touch-screens are a bit on the small size for those of us with bigger fingers. Just about the only thing on my wish-list of improvements would be a long hole somewhere in the body of the charger in which to store the stylus.

Layout

In simple terms this product offers two matching chargers within one neat case, with separate outputs on each side, along with plugs to take the 6S balance leads, as well as optional temperature sensors, if you have them. The casing is largely made up of heatsink panels on the top, bottom, front and rear, with enlarged fins at the back to dissipate heat from cooling air pulled through the unit by a fan mounted to the right hand side panel. Construction and finish is to a high standard, with internal circuit boards being fixed to the chassis with flush mounted hex bolts.

To the rear of the right hand side panel, next to the fan, is the XT plug for connecting a DC input of 11 to 18 volts. And on the left is the 3-pin AC input with a 110-220 V selector switch directly above, which comes pre-selected at 220 volts for UK use.

Right: As well as the charger and power leads, two sets of balance boards and charging leads are supplied

Main Screen

When the unit is plugged in and switched on you are presented with the main screen, which allows you to scroll through the various battery types and set up menus, prompted by large arrows. The battery chemistries that this charger will deal with are: LiPo, Li-Ion, LiFe, LiHV, NiMH, NiCd and Pb (lead acid).

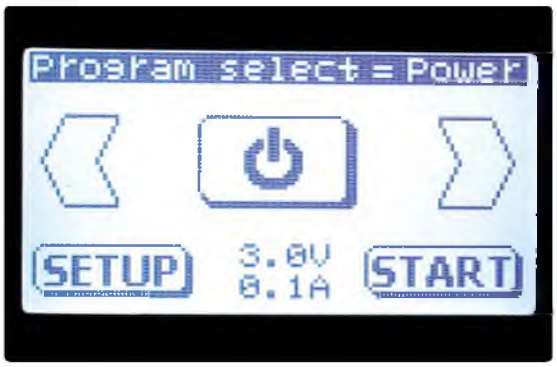
The Setup menu allows you to personalise the settings, such as swapping the displayed temperature from Centigrade to Fahrenheit, or changing the melody used for audible warnings. You can also change basic parameters such as the temperature cut-off and safety timer but unless you are very experienced I would recommend leaving them at the default settings for general use.

The Power menu allows you to set up the charger as a power supply unit (PSU) for powering other devices. In this mode it can output between 3 to 24 volts DC, with the ability to set maximum values for both current and power. This is useful if you don't have a separate PSU for powering things like mini-drills in your building area.

The View menu allows you to periodically check the total voltage of a battery pack, as well as the unit voltages of the individual cells. You can also it to check the internal resistance of the pack if you suspect that it is starting to degrade. By keeping a regular log of these parameters you will be able to detect any drop off in performance and take remedial steps, such as using the balancer function also found under this menu to even up a badly balanced pack. Ultimately it will allow you to decide when to consign a pack to ground based duties or eventual disposal.

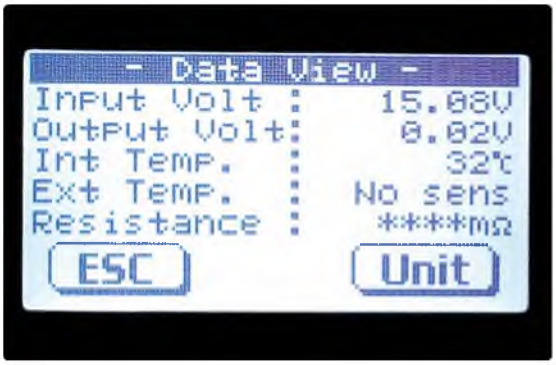
Right: Typical Main Screen page. This one is the starting point for charging LiHV packs

Left & Right: Scrolling round the arrows brings you to the Setup page where you can set up the charger to suit personal preference over three pages of different parameters. Other pages are accessed via the small arrow, top right

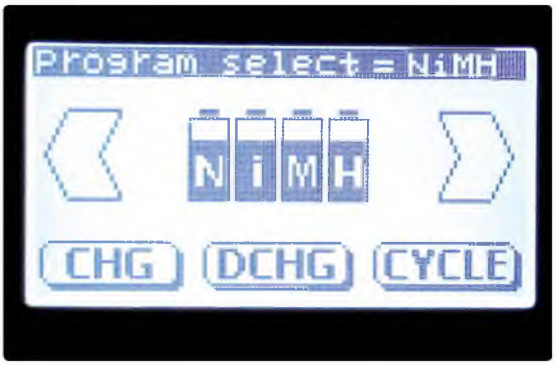


Left: Entry point for setting the Touch Duo up as a DC power supply

Right: Battery Type allows you to pause and confirm that you have selected the correct battery type



Left & Right: Data View allows you to balance your packs, as well as view the performance of your pack and its individual cells

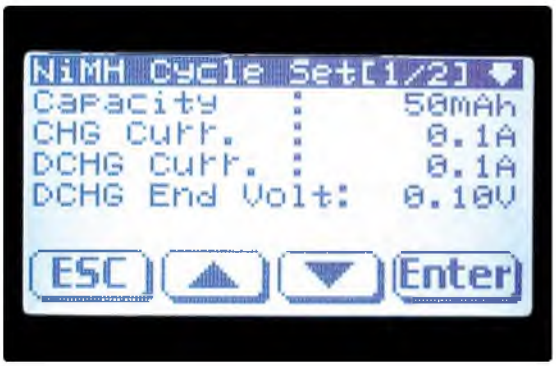


Left & Right: A modern charger like this one supports other popular battery types, including the NiMHs that you probably use in your transmitter

Nickel Packs

Although most R/C aeromodellers will mainly use this charger for charging Lithium Polymer (LiPo) flight packs the two outputs can be set up to charge, discharge and cycle Nickel Cadmium and Nickel Metal Hydride packs. I still use the NiMH facility quite a lot on my chargers to fast charge my transmitter packs in reasonable time before I go flying – long gone are the days of leaving them to trickle charge overnight, with no cut-off when they reached peak condition. Check the cell manufacturer's recommended charge/discharge rates and then you can set the Touch Duo accordingly.

The cycling facility is useful to restore packs that you haven't used for a long time, which could well benefit from several charge/discharge cycles. Up to five cycles can be programmed with this unit, or just use a single cycle or two to refresh a pack that you use on a regular basis.



Right: Nickel packs benefit from cycling to keep them in good condition. Up to five charge/discharge cycles can be set up on the second page (not shown)

Lithium Packs

After selecting the type of Lithium cells you want to charge (most likely LiPo) and connecting the pack using the main output leads and plugging the balance lead into the balance board, each charging unit should automatically recognise the cell count. But you still need to tell it the capacity of your pack by pressing the Capacity value and using the Up/Down arrows until it reaches the correct setting. The arrows are easily pressed using a fingertip but the stylus is the best way to select the values you want to change as the touch areas for these are quite narrow.

The charger will then automatically set a charge rate of 1C but this can be increased (or decreased) as you prefer. 1C suits me fine as I'm usually in no hurry when charging my batteries and I know that this rate will not stress my valuable LiPo packs over time or indeed the charger itself.

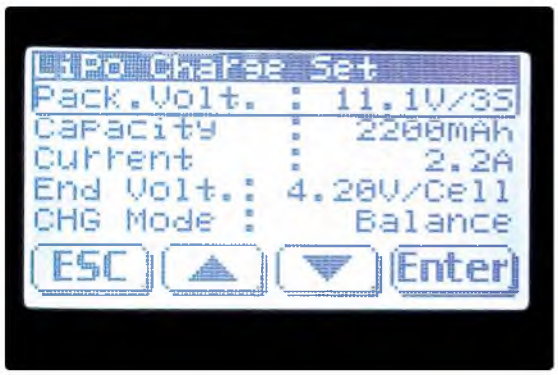
Pressing the Enter button will initiate a charge but before it does so a Confirm screen pops up to show you the number of cells that each charge unit has detected. If this matches the cell size you want to charge then you are good to go and you can then press the Start icon.

Although the Touch Duo offers lithium discharging on both outputs a lithium pack does not benefit from deep discharging or cycling in the way that a Nickel chemistry pack does, so you'll probably have limited use for any discharging below 50% of capacity, and definitely not below three volts per cell with a LiPo pack.

It is, however, good practice to discharge any unused LiPo packs following a flying session (I invariably have one or two) to around 3.8 volts per cell to stop imbalance from developing within the cells in series packs due to differences in each cell's self-discharge rate. Rather than using the discharge function to do this the Touch Duo

has a Storage option that does an excellent job of balancing each cell to 3.85 volts. You can use this to not only discharge any unused packs but also to boost the capacity of the packs you have flown with; the Touch Duo will automatically charge or discharge as required. It will also safely put a storage charge into the other types of Lithium cells: Li-Ion 3.75 V, LiHV 3.85 V and LiFe 3.3 V.

During a charge, discharge or storage process you can monitor progress via a two page display that shows elapsed time, capacity put in or taken out of the pack and other values too. You can also use the large Unit icon to view the state of charge of the individual cells as virtual, partially filled battery casings that fill up as the cells reach full charge; individual cell voltages are also shown. Alternatively, you can select the Graph icon and view the progress of the charge/discharge process plotted as voltage against time. It is interesting to see how the differing types of batteries react, with most filling up pretty quickly; then the graph plateaus and it takes a much longer time to put that last little bit of capacity into the cells. This is reassuring as it is easy to get into the mindset that you must see 99.9% per cell on your battery checker when checking each pack before each flight (a habit that is highly recommended to save you from trying to fly with a depleted pack!), when quite often the charger will have stopped things at 97% or 98%. That final couple of percent will not really matter too much, at least for sport flying.



Left & Right: Most users will want to use the Touch Duo to charge LiPo packs. It can do two, individually, at once, which is handy if you have a few packs to prepare before a flying session

Left: The two circuits can discharge LiPo packs too. The default End Voltage is wisely set to 3 V per cell

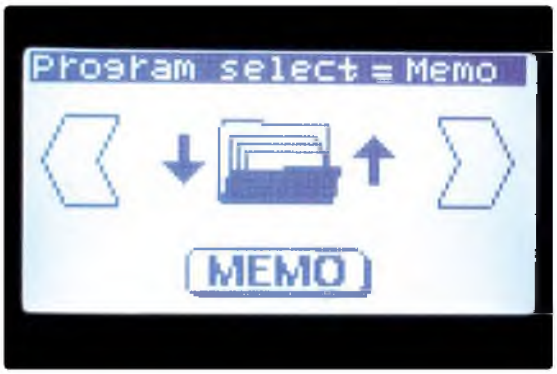
Right: Storage mode will automatically charge used packs or discharge unflown packs to a safe storage condition. Default 'End Voltage' is 3.85 volts per cell, but I've tweaked it a bit higher to suit the recommendation from the manufacturer of the pack I've been flying

Summary

The Etronix Power Pal Touch Duo ticks a lot of boxes for me. It allows multiple charging of my favourite 3 to 6S packs, two at a time, using bright, clear and easy to understand displays and the main powered option means that I can set up a charge knowing that the power source will not run out of puff before the packs are fully charged. On the other hand it's nice to have the option to use a DC source at the flying field, most likely a leisure battery, should the need arise.

I especially appreciate the Unit and Graph displays, which allow me to view the charge and storage processes in a most intuitive way.

This is a highly recommended charger for all the popular types of battery packs, especially LiPo's, that most club modellers are likely to want to use. ***RCMW***



Left & Right: Memory is accessed via the Charge or Discharge icons and can be used to save the parameters of up to 20 battery packs. This provides a quick way to set up the charger for your favourite packs

MODEL WORLD

PRODUCT INFORMATION

NAME:	Power Pal Touch Duo
MANUFACTURER:	Etronix
DISTRIBUTOR:	CML Distribution
WEBSITE:	www.cmldistribution.co.uk (search ET0212)
PRICE:	£114.99

PRODUCT SPECIFICATIONS

AC INPUT:	AC 100 V-240 V		
DC INPUT:	DC 11.0 V-18.0 V	**NICD/NIMH BATTERY**	
CHARGE CURRENT:	0.1 A-10.0 A	**CELL COUNT:**	1-16 cells
DISCHARGE CURRENT:	0.1 A-5.0 A	**LITHIUM BATTERY TYPES:**	LiPo, Li-Ion, Li-Fe
CHARGE POWER MAX:	100 W	**LITHIUM BATTERY**	
DISCHARGE POWER MAX:	12 W	**CELL COUNT:**	1-6 S
BALANCE CURRENT MAX:	350 mA	**PB BATTERY VOLTAGE:**	2 V-20 V
BALANCE TOLERANCE:	±0.01 V	**DIGITAL POWER:**	3 V-24 V

Soarers' Slot

Mike Proctor files a report from the F5B World Championships, held last year in Italy, and shows how to make a handy stand for thermal soarers

The GB team that competed at the 2016 F5B World Champs. From the left: Team Manager, Mark Haigh and pilots Greg Lewis, George Shering and Joseph Mouris

It is not often that F5B Multi-task Glider is reported on these pages and I am indebted to Mark Haigh, who was the Team Manager for the BMFA team at the 2016 World Championships, for this report. F5B class requires the model to be flown in two consecutive tasks, without intermediate landing, in each round. The first task is Distance, where 3 minutes and 20 seconds is allowed, to fly as many gliding 'legs' of a 150 metre course as possible, before going directly into the 10 minute Duration task, in which any motor run time is deducted. Each flight concludes with points being awarded for a precision landing.

"Every two years an F5B World Championships is held and this year's event was held in Italy at Aero Club Francesco Baracca near Lugo di Romagna, approximately 60 km east of Bologna. Francesco Baracca was Italy's top fighter ace of WW1 and his aeroplane sported a prancing black horse, which is said to have inspired a certain sports car manufacturer's emblem. Lugo, where the opening ceremony of the championship was held, is proud of this heritage and the town square has a monument to Baracca.

The GBR team consisted of two new members in Josef Mouris and Greg Lewis, the third pilot being George Shering, who has flown in every F5B World Championship since its inception in 1986.

The significant development at this year's Championship was the mandated use of an organiser supplied energy telemetry device, which provided the energy measurement for the competition scores, where a competitor is only allowed to expend up to 1750 watt minutes before penalty points are applied to their score. Typically this provides a pilot with approximately 6500 watts of peak power for 23 seconds to complete the entire 13 minute, 20 second flight. Therefore the

Just in case you thought that F5B models running 7 kW were only flown by youngsters, George Shering and Jaroslav Nezhyba from the Czech team were the two oldest F5B World Champs competitors at 76 years, each!

top pilots spend time tuning their set-ups to maximise the efficiency of the drive train, including radio programming to eke out the last bit of power delivered to the drive train.

This year there were no real 'unobtainiums' in terms of models, motors or propellers, with the top pilots choosing the latest ubiquitous Avionik airframe or the Czech Speedfire2. It is good to know that World Championship equipment is readily available and the limiting factor is the pilot!

The winning pilot and team were from Austria and from the opening flights it was easy to see that they were the team to beat. They obviously spent time practising and knew how to tune their models to get the maximum performance. Key to this is sharing information between pilots and pooling that set-up knowledge. In order to be in the top 10 a consistent 48 laps is required, with 50 needed to be top 5. Compare this to 2004 where 40 laps was considered to be a world level score – or a 25% improvement in 12 years!

Another improvement is the reliability of the equipment, especially motors and ESCs, which can regularly peak at 7 kW of power. Batteries used are also easily available, with brands such as OptiPower, Turnigy and Tattu being widely used, with 8S to 10S at 1800 mAh being the preferred configuration.

The GB Team performance was eventful, with three airframes being lost due to servo failures during practice. A quick rally round of spare models and some test flights saw the team processing two models each for the main championships, without any more failures or problems for the rest of the week.

Top finisher was Jos at 13th, matching the highest placing of any GBR pilot in previous events. Greg and George finished 35th and 41st respectively. Although as a team we were disappointed with our overall performance one positive comment made about the GBR teams flying from another team was how good we were at the thermal task, being quite good at recognising and flying out in low lift."

Left: Looking for a club or group project? First field trials of a Slot Timing screen, made from kits and bits by Jon Edison, were performed at the SF Nats. Running from the timing side of the ubiquitous Glider Score program this LED 4-digit display is 200 mm high and uses only 1 amp running on a 12 V battery. It can be seen at a good distance along a flight line and total cost was about £400. Component details are on the Gliderscore website

Right: Airborne sensor and telemetry unit carried on board in F5B to measure the energy used. 1750 watt minutes are allowed before penalty points are applied to scores. The ground unit displays the energy used in real-time and the pilot can have access to that information during the flight. Now you know why it is called Multi-Task Glider!

Time To Make A Stand

For once, I have managed to get certain things sorted for the next flying season. The first 'thing', an improvement to my model ground handling gear, is more or less done – remarkable! The problem was how to simplify the assembly and safe storage of several 4m models at the field.

Although last season was quite mild and generally very flyable for the most part, we did have to contend with some very heavy showers at times. Models are often 'parked' around the pit areas, where they are ready for the next slot. It is common practice to put a groundsheet on the floor before starting to assemble models. It keeps everything off the grass, therefore clean and dry, and is a big help when you drop that small 4 mm wing bolt, which even the shortest grass seems able to devour. If the big groundsheet you put on the floor is the only one you have, when unexpected rain showers arrive you have nothing to cover the models, unless you can do the magician's trick of whipping the sheet out from underneath everything!

Selection of models parked ready for their next flight at the 2016 UK F5J International. Those four models on the large rectangular groundsheet were difficult to accommodate in the Coleman shelter when the rain storm arrived suddenly

With just the first couple of models in the Coleman, space is rapidly vanishing but the Orange/Red Pike has yet to be positioned on its stand, over the Grey Pike. Proceeding around three sides in this manner will actually allow six models to be stored safely in times of pouring rain. Untangling the furthest ones afterwards can be tricky though!

The ultimate solution to storing several 4m models – nine in fact – in a 4m x 4m Coleman tent. This excellent piece of German engineering is by Andreas Freundl. OK for weekend events but maybe overkill on your normal one-day League comp!

Front elevation of the stool top model stand, described in the text. The 'U' shaped PVC foam is usually used for protecting furniture legs and edges. The round stuff is normal pipe lagging, with the outside diameter chosen to fit snugly inside the 'U' channel, for storage. The 'L' shaped pieces fit round the stool top rail

Stand in action, with a Pike Perfection part assembled. The width of the plywood top (575 mm) was chosen to allow a model to balance (just!) in this condition, while I reach for the other wing. The Pike wing is quite low mounted and the round foam is not needed, so is left in 'store'

Once assembled the model sits happily on the stand and with the flap hinge line just beyond the foam the full brake flap deflection can be checked. If the weather is breezy the stool frame can be pegged down for stability. This is more essential if using a taller stool

If using a model like this AVA, with a high mounted wing, the extra lagging is used to fill the gap to stop the wing waggling

Once set for a high wing model the wing can be conveniently balanced while connections are made, before dropping it in place to secure the fixing screws

This simple slot-together holder can be used for assembly and, as shown here, for double-decking models in gazebos when space is at a premium. Normally the model with the greater dihedral goes on the bottom

It is quite usual for people to put up some kind of awning – the Coleman Event Shelter has become ubiquitous over the last few years, in this respect. However, even though these things are around four metres square, getting a number of 4m models in can be tricky and getting them out – because you always need the bottom one! – can be even trickier. Just putting models on top of one another is bad news all round and can easily cause stripped servos during handling.

To solve this problem, some time ago I made a single model support that was capable of straddling a model on the floor. The fuselage was held in place using a piece of U-shaped PVC foam channel, which is used to protect furniture edges and legs from transport damage. It comes in various sizes but as buying small quantities might be tricky, you might try blagging it from furniture sellers.

The photographs show how this was attached to a piece of 50 x 25 softwood, which had 'legs' made from 4 mm ply, notched in place at an angle, to stop any flopping about! The legs can be pulled out of the slots, so the whole thing packs flat in the car.

The above support has been in use for some time and works well for holding fuselages whilst the wings and tail are screwed in place – so long as the wing centre is fixed from above or the side!

With more models being fixed from underneath, a better solution was needed and I occasionally resorted to using a fold-up chair, with the wings across the arms and the fuselage under the backrest – hardly a bespoke solution!

I had taken the caravan to the Silent Flight Nationals and, needing a spare seat for the table, I dug out a camping stool that has lived in there for ever. It occurred to me the next day that it might be a suitable basis for another collapsible holder, modelled on the larger music stand derived version, often seen.

The prototype was made in short order on my return home and the one shown here is a tidied-up version. The top is a piece of 10 mm ply, 575 mm long x 200 mm wide. Why not 600 mm long? I selected the length so that a fuselage, with one wing panel attached, would still just balance in place, while I reached for the other half!

Also, as I wanted to be able to check out the flaps and ailerons without shifting the model to the back of the stand, possibly over-balancing it, I needed to avoid the flap drive links. Two square strips of softwood, equal in size to the top bars on the stool, fixed as far apart as the opened stool, were screwed underneath and two strips of 4 mm ply, to act as retaining fingers, were screwed to them. The stool could now be opened into the 'L' shapes, trapping the top in place. For extra security in wind the stool could be pegged down.

The central piece of foam, for holding the fuselage, is 60 mm wide and 50 mm high, and obviously is fixed in the middle, using pan headed screws with a washer under the head to stop it pulling through. The outer foam pieces need to be taller to account for any dihedral and are 90 mm wide by 65 mm high. (Using one size of foam with packing underneath is an obvious alternative)

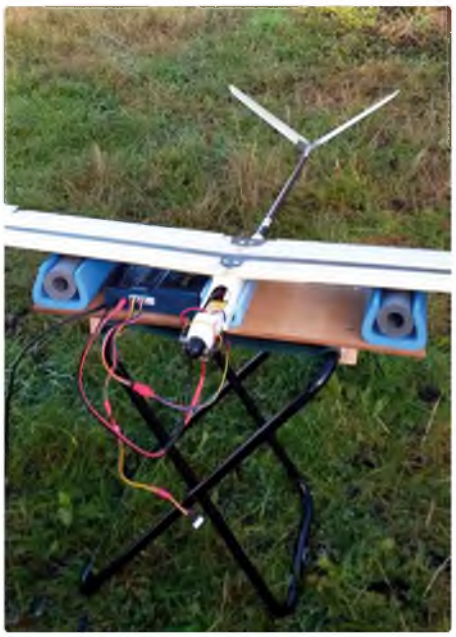
Since some models have a low pylon-mounted wing, AVA and Maxa for example, the end pieces occasionally need to be taller and pieces of pipe lagging foam, of a suitable diameter to just be retained inside the 'U', can be pushed in place when needed. Additionally, a charger can be placed in one of the underwing gaps. The pictures should make things clearer.

Two Metre With LDA

Several newcomers and returners have appeared this year on the eSoaring competition scene. Gary Peck is one who moved from free flight and in common with many others he has built his own model.

The tail and fin are from a Blaster DLG and are grafted onto a Q10 (Sapphire) fuselage. The wing is 225 g and self-made using a carbon D-box and carbon-capped spars, bound with Kevlar thread. The wing ribs are balsa with carbon caps. The section is interesting, having been originally developed for free flight gliders; it is a Low Drag Airfoil.

A look at the wing centre picture may be surprising for you, as this results in a very thin profile with much more under camber than electric thermal flyers are used to! However, it has performed better than many might have thought possible, especially in wind. The motor is an Overtech BM400 brushless inrunner, with a 6 x 3 prop. The whole model is just under 600 g. We look forward to seeing more interesting models from Gary's stable in 2017. ***RCMW***



Left: 2m model on the stand and the charger is in its home under the wing. The remaining space under the other wing will be used to house a magnetic 'dish' for holding wing bolts during assembly and dismantling stages

The Low Drag Airfoil on Gary Peck's home built 2m wing. Thin and cambered, it's not what eSoarers are used to! Maybe we will be, in time?

Gary Peck moved from free flight to eSoaring during 2016 and had a good season. His home built 2m model used up some LDA wing ribs he had lying around. See text

UK Drone Show 2016

James Crozier took a trip to the NEC in Birmingham to see the latest and greatest in drone tech and FPV racing. Additional pictures by Kevin Crozier

Powervision were displaying their Poweregg (above), as well as the more commercially oriented Powereye

Parrot had one of the larger stands at the show and were displaying most of their products, including a Bebop 2 'Dance'

The UK Drone show is the last big modelling show of the year. You may be wondering why an aeromodelling show is held indoors but it's for good reason.

The first and most obvious one is the weather! December isn't a great time to hold an outdoor event so the NEC serves perfectly and there is plenty of room in its huge halls to get lots of multirotor flying done.

The second reason is that the guys at the Drone Show have come together with UK drone racers to create the iSeries, which is a series of indoor racing events, the first, at the Insomnia Gaming Festival, having been previously covered in our sister magazine, RC Flight Camera Action. Held in relative darkness the iSeries courses are lit up with bright neon gates, racing lines and other lights. This turns drone racing into a great spectacle and is almost like watching something out of Tron!

Show Floor

On entry to the show, the first thing at the entrance was the Parrot stand. The most impressive part of this was a show that took place every half an hour or so, with 'dancing' Bebop 2's inside quite a large netted display area. If you haven't seen this before it's well worth looking up on YouTube. Multiple drones fly in sequence to music and there's even some synchronised flipping! Parrot were also showing off their Swing and Disco fixed-wing style models, as well as the FPV system for the Bebop and their Minidrone range.

Next door to the Parrot stand was a very nice looking Tesla, which I think was a Model S. On the other side was a large stand from Panasonic that featured a DJI Matrice with a Ronin gimbal.

Further on, past Parrot's stand, were fierce rivals DJI and Yuneec. The DJI stand was actually manned by First Person View, who had their own retail stand behind it. They did a good job of showing off the new DJI products to the public, such as the Mavic and the Inspire 2, and drew large crowds whenever they had a drone in the air.

Yuneec's stand was also crowded throughout the two days of the show and

Left: Fixed wing 'drones' are likely to be the next 'big thing' in drone technology.

Right: Panasonic's stand was large and open with a big emphasis on 4K shooting

The Panasonic stand featured a DJI Matrice fitted with a Lumix GH4 camera on a Ronin gimbal

Above & below: DJI were assisted by First Person View and showed off the new Mavic and Inspire 2, as well as favourites like the Phantom

Yuneec showed off their range, including the Typhoon and the Breeze

There was lots of interest in the thermal version of the Typhoon

there was a large amount of interest in the thermal version of the Typhoon. The Breeze was also on show (reviewed last month in RCMW), as was the rest of the Yuneec range. They did have a display area but chatting to a few of the guys they had told us that they were so busy they had barely had a chance to fly anything!

Further to the right was Powervision and Ehang. Powervision have some really innovative products, one of them being the fairly new Poweregg, which was being flown in their display area. It's quite literally egg-shaped and features fold up arms and legs for easy transportation. This was another model that commanded big crowds whenever it was shown off, be it at the stand or in the main display area.

Ehang were showing of their Ghost Drone, which is an aerial photography drone that we have covered in RCFCA. I was told that there is a new FPV setting available, which sounded great.

In the central area of the show were many retailers such as Kooltoyz, First Person View, UK Drone Store, Hobbymounts, UAVision, London Camera Exchange, Quadra-Box, Maplins, Game and Panzer Cases, as well as more manufacturers such as Overlander Batteries, UAV Graphics, Fossils Stuff, Connex (HD FPV Systems) and Menace RC. I must mention here that Traplet Publications also had a stand to promote RC Flight Camera Action, which is our drone magazine.

On Display

Behind the last row of stands was the main display area. This was comprised of an R/C car track that featured various launchpads. Throughout the day, all sorts of R/C car racing occurred, as well as specific challenges such as the BRCA versus BMFA challenge, which saw an F1 car pitted against an indoor fixed wing model. There were also demonstrations of drones such as Yuneec's Typhoon, the DJI Inspire 2 and the Powervision Poweregg.

The University of Bristol were also taking part in the BMFA's payload challenge with their own completely custom designed and manufactured quadcopter.

Integrated drone solution specialists Consortiq were in attendance. David Walters showed us this specialised, very lightweight (and very expensive!) octocopter

Consortiq also displayed this interesting fusion of fixed wing and quadcopter airframes

The BMFA brought along a few examples of their drones and their ever present R/C flight simulators

The Tiny Whoop course. Blade Inductrix quads fitted with FPV were flown around what looked like a typical living room at Christmas

Overlander are expanding into drone batteries and have just launched a line of racing packs

RC Flight Camera Action team photo. Issue 9 of Traplet's newest R/C magazine, which is all about drones, is out now!

Fossils Stuff and Ragg-E brought colour to the show with their bright frames

The Vanguard 'long range surveillance drone' from Airborne Drones is worth £30,000, complete with this rather large transmitter!

Connex were showing their Prosight HD systems

To the right of this was the main FPV retail area, which was also home to a Tiny Whoop (Blade Inductrix with FPV) course that was set up to look like a typical living room at Christmas. The BMFA were nestled in amongst the traders, offering the chance to have a go on their R/C flight simulators.

iSeries Racing

Last, but definitely not least was the iSeries FPV racing event in the adjacent hall. This was a similar format to the first iSeries event, which was at the Insomnia Gaming Festival. It was slightly disappointing to see the removal of the 'tunnel', which saw the drones bolt through a series of straight gates, but the track was exciting nonetheless and this time the public were allowed in to watch, which made for a much better experience when they reacted to big crashes!

Speaking to Matt Evans and James Bowles, who are two of the top pilots in the UK, they said that the track was more interesting and posed a greater challenge, which is perhaps why we saw some very fast wipe-outs! Brett Collis, who went on to win the event, was also a fan of the new layout.

The final podium was:

1st - Brett Collis, 2nd - Matt Evans and 3rd - Leo Whitfield

There was also a digital only event, which was also won by Brett, where the racers were required to use the Connex Prosight HD video transmission system. The difference in quality to analogue is quite stunning and it's clear that this is where the future of the sport lies.

All in all it was a fantastic two days of technology, innovation and awesome flying coming together to celebrate a new side to the R/C model flying hobby that is growing exponentially. I have no doubts that the show will be back bigger and better than ever before next year and it was great to see the drone community come together to put on what was a fantastic show. **RCMW**

An expensive drone deserves a good home! Hard cases by Panzer Cases were available at the show

A DJI Inspire 2 does the rounds in the main show arena

The Speaker Zone, where lots of informative talks were presented throughout both days

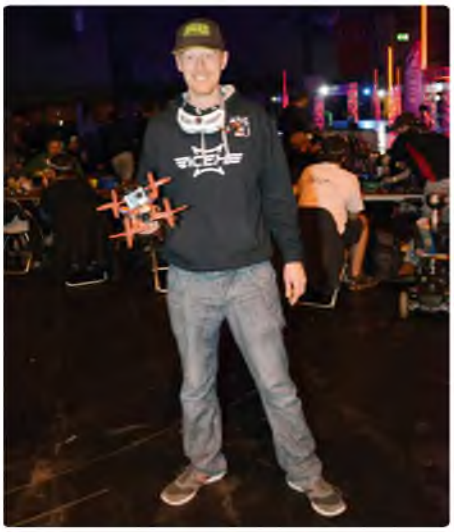
The Bristol University team took part in a BMFA challenge that saw them build their own quad from scratch

Left: A TBS Vendetta with an FrSky Taranis – the transmitter of choice for many of the top FPV racers

Right: As usual, multiple ground stations were set up for each pilot to use for diversity (receiving multiple signals for best quality), as well as Connex receivers for the digital race

The FPV course looked great

Pilots were deep in concentration during their races



James Bowles was back at the second iSeries event

Left: Live feeds from the quads were shown on a big screen. Yes, this is typically what you see when wearing goggles. However, digital video transmission systems, like the Connex Prosight HD units displayed at the show, offer a much improved display and are set to revolutionise FPV flying

Right: We saw lots of familiar faces from the FPV racing scene, including Matt Evans and Brett Gollis

All lit up and ready to go!

RC Flight Camera Action – Issue 9 Out Now!

RC Flight Camera Action is the latest R/C magazine from Traplet Publications. RCFCA aims to update and inform all users of multirotor aircraft and drones, whether they be professional aerial photographers or the hobbyist looking to try a new experience. From Quads to Octocopters, FPV to DSLR, RC Flight Camera Action keeps drone enthusiasts informed about the latest trends and equipment in the world of multirotors, FPV racing and aerial filming.

http://thehobbyhub.com/air/magazines/r-c-flight-camera-action/about#.WE_TD7KLSvE

www.facebook.com/RCFlightCameraAction/

In Print

Jet themed titles for your aviation library, reviewed by James Crozier

English Electric Lightning

By Martin Derry and Neil Robinson
Pen and Sword Aviation, 96 pages
ISBN: 9781473890558
Paperback, £16.99

One of the most prominent British interceptor fighters is, of course, the English Electric Lightning. With its 'cigar' shaped fuselage and swept back wings, this iconic aircraft is sure to be on many jet modellers 'to build' list. If it isn't, reading this book might just change your mind.

It begins with an extremely detailed and in-depth history about the Lightning's development, starting all the way back with the English Electric P1, that saw her maiden flight in the mid 1950s, right through to the Lightning F.6 and its use by the Saudi and Kuwaiti air forces in the 1980s.

Of most interest to modellers who already have a good grasp of the history of this fascinating subject is the camouflage and markings section – perfect for those who are planning, or are in the middle stages of a Lightning build. My favourite has to be the F.53, 53-692 'L', 13 Squadron camouflage scheme, which was flown by the Royal Saudi Air Force. It's a very distinctive desert scheme in a brown/sand finish, but of course, you may want to go for the classic natural metal look.

This is a great book for any aeromodeller's shelf, as well as a fantastic resource if you are planning a model build. Highly recommended!

He 162 Volksjäger Units

By Robert Forsyth
Osprey Publishing, 96 pages
ISBN: 978-1-4728-1457-9
Paperback, £13.99

If you are familiar with modern history, you will know that towards the end of World War Two there was a sense of desperation from the Third Reich, having gone from what seemed like assured victory to fighting on their own soil after being pushed back by the Allied Forces.

One of their desperate moves in this period was to develop the Volksjäger, which means 'The People's Fighter'. Heinkel's engineers knew that they did not have much time and so set to work developing a fighter that could be put together quickly and at a low cost, with the idea that children as young as fifteen (in the Hitler Youth) could be trained to fly them.

Powered by a BMW 003 turbojet that sat on top of the fuselage and with two 30 mm cannons and anhedral wingtips, this aeroplane is sure to fascinate any aeromodeller. Not only that, but this book also gives the reader a fantastic insight into the final months of World War Two and the Luftwaffe's attempts to appease an increasingly frustrated Adolf Hitler, as well as some insight into how the Allies organised their takeovers of the Third Reich's airfields.

This book is highly recommended for anyone looking to find out about lesser known military aircraft and also those who are interested in military aviation history.

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Parts available!

Albatros

Wingspan: 76.5"
Radio functions: 4
Scale: 1:6
Designer: Dave Hurrell
Plan code: MW3225
~~WAS £22.50~~
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Parts available!

Supermarine S.6B

Wingspan: 54"
Radio functions: 4
Designer: Tony Nijhuis
Plan code: MW3224
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POWER SLOPE SOARING (PSS) PLANS

Martin B-57D

Wingspan: 106"
Radio functions: 3-5
Scale: 1:12
Designer: Vic Steel
Plan code: MW2946
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DH108 Swallow

Wingspan: 86"
Radio functions: 2-3
Designer: Vic Steel
Plan code: MW2598
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Spitfire Mk.24

Wingspan: 45"
Radio function: 4
Designer: Paul Jannssens
Plan code: MW2813
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Shorts Tucano

Wingspan: 50"
Radio functions: 2
Designer: Nigel Hawes
Plan code: MW2547
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Me 1636 Mini

Wingspan: 29.5"
Radio functions: 2
Designer: Keith Humber
Plan code: MW2937
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YAK 9

Wingspan: 44"
Radio functions: 2-3
Designer: Paul Jannssens
Plan code: MW2574
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Horten Ho 229 V2

Wingspan: 63.75"
Radio function: 2
Designer: Giuseppe Ghisleri
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P-51D Mustang

Wingspan: 43"
Radio functions: 2-3
Designer: Paul Jannssens
Plan code: MW2559
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Lavochkin LA 5FN

Wingspan: 39.5"
Radio function: 2
Designer: Neil McHardy
Plan code: MW2458
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Fieldfare

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Radio function: 3
Designer: Sid King
Plan code: MW3511
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Radio function: 4
Designer: Brian Austin
Plan code: MW 3798
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Satori

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Radio function: 3
Designer: Steve Griffiths
Plan product code: MW2399
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Radio function: 2
Designer: Nigel Brewer
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Radio function: 4
Designer: Chris Ward
Plan code: MW3789
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Radio function: 2
Designer: Mark Kummerow
Plan code: MW2058
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George Cayley 1804

Wingspan: 35"
Radio function: 2
Designer: Steve Dorling
Plan code: MW3102
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ELECTRIC SPORT PLANS

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Wingspan: 35.5"
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Designer: John Rutter
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Wingspan: 30"
Radio function: 3
Designer: Alan Wooster
Plan code: MW3783
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Wingspan: 50.4"
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Designer: John Anthony Blakey
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Wingspan: 41"
Radio functions: 3
Designer: Graham Dorschell
Plan code: MW3753
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Marlin

Wingspan: 52"
Radio functions: 4
Designer: Roger Wheddon
Plan code: MW3752
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Senior Sassy

Wingspan: 48.5"
Radio functions: 4
Designer: Bill Bowne
Plan code: MW3744
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The Drone

Wingspan: 52"
Radio functions: 3
Designer: Traplet
Plan code: MW2838
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Chevvy III

Wingspan: 54"
Radio function: 3
Designer: Mike White
Plan code: MW3718
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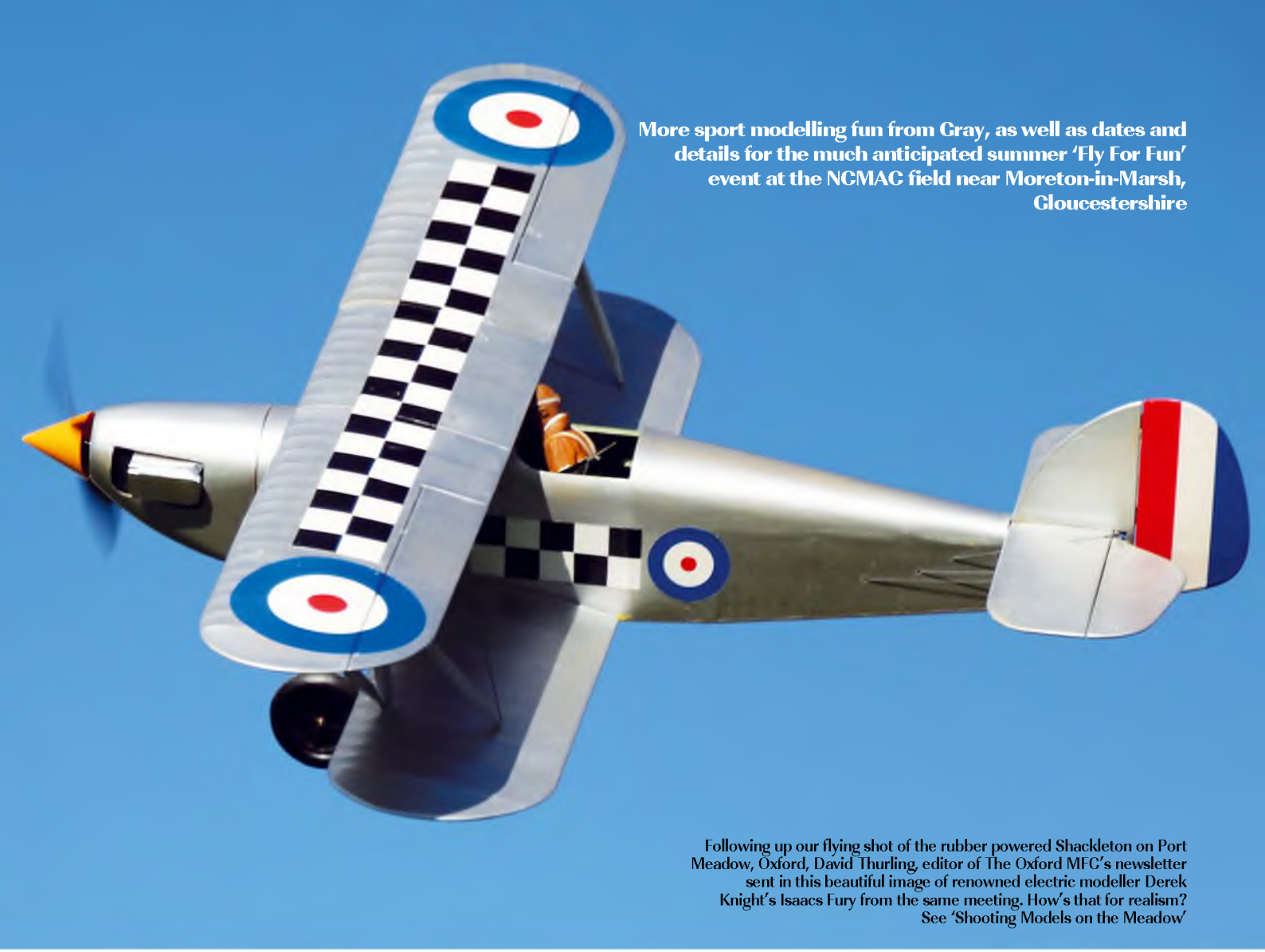


More sport modelling fun from Gray, as well as dates and details for the much anticipated summer 'Fly For Fun' event at the NCMAC field near Moreton-in-Marsh, Gloucestershire

Following up our flying shot of the rubber powered Shackleton on Port Meadow, Oxford, David Thurling, editor of The Oxford MFC's newsletter sent in this beautiful image of renowned electric modeller Derek Knight's Isaacs Fury from the same meeting. How's that for realism? See 'Shooting Models on the Meadow'

The Sport Channel

This Month's Wise Words

We didn't intentionally go searching for a dramatic header about the start of a New Year, but when we spotted the attribution to this one, we couldn't resist it. Plus, it seems that before we take on the coming year, we have to deal with a backlog of 'Any Other Business' from one just gone, simply due to a high level of response from readers.

It was a major surprise to inherit my late pal Dereck Woodward's personal plans collection, which included three unpublished designs by him. Many readers expressed their sorrow at the void left in our hobby by his passing and recalled the helpfulness and enthusiasm he freely gave to modellers building from his plans.

Malcolm Reid mailed in to describe Dereck as: *"A gentleman much missed – I had occasion to write to him several years ago when I was building his Longster Wimpey, a design which was a joy to build and to fly".*

It so happened that the collection I received actually contained the Wimpey and all of Dereck's scale reference material upon which he based his design. The manner in which he would interpret such documentation to create such great models is a measure of the man as a true aeromodeller and a rare insight into his talent, skills and thought processes.

Of course, everyone wanted to know about the unpublished plans and what we might expect of them. All I can say for now is that they will eventually appear in one form or another, but as we mentioned, re-drafting the drawings and working them into trial models will take time. Thanks for you all for your interest and please send in any reminiscences about Dereck or your experiences with his designs.

"Learn from yesterday, live for today, hope for tomorrow..." (Einstein)

The Truth Is Out There (Terms And Conditions Apply...)

To all readers who were concerned, no, I didn't get a visit from the Men In Black after our piece on UFO's and models inspired by the phenomenon. It was generally agreed that the Cox range of .049 torque reaction saucer range and some of the wilder creations of Messrs Malmström, Clough or Clutton could all provide a credible sighting, photo or even scare.

Naturally, the way a subject like aerial phenomena is interpreted is conditional on just how much reasoning, deductive power and common sense we find ourselves able to apply. I wonder if the poster of the epic 'camcorder' footage which recently appeared on YouTube showing a monstrous alien 'Mother Ship' arriving through a 'space-time portal' above a holiday beach in Spain had even considered that the majority of its viewers would probably have questioned why it hadn't been the lead story on the world's news channels!

I've no room to talk though, as I am including a photo here that's obviously clear evidence of alien technology operating in our atmosphere. There is also a preposterous theory that at certain angles it could resemble one of the Cox saucers, which incorporated a set of helicopter-type rotors, along with the slanderous suggestion that I took it on the free flight line at Old Warden. Keep watching the skies...

And speaking of video, the fleeting but historical images of the Keil Kraft factory in the 1960s and the late Ray Malmström (that man again) flying with his club in the 1990s, on YouTube that we recommended recently have undoubtedly captured the imagination of modellers across the world.

Your author's own recently declassified shot of a shape-shifting alien spacecraft that could disguise itself as a Cox .049 flying saucer with a set of independent torque-reaction rotors. Looks the part, don't you think?

Long-time correspondent Raymond Lefrancois from North Carolina, USA commented: *"Ray Malmström has always been an idol of mine from the first one of his designs that I saw in Aeromodeller in the mid-70s. But, y'know, I think the only models of his that I built were some control liners and Jetex F/F's.*

I just scanned the folder where I've stashed his plans over the years and there are bunches of 'em. Well, anyway, thanks to the video I have finally put an 'alive' face to the man. Thank you.

As for the KK factory video – wow! How much stuff they must have cranked out from that little place!"

Thanks, Raymond, sentiments that almost everyone who's watched those videos have expressed. We'd love to hear your own thoughts on them, and if you know of any other examples of rare aeromodelling footage online that ought to have a wider audience, please pass on your suggestions.

Shooting Models On The Meadow

No, not a contemporary antisocial outdoor pursuit, just an allusion to the wealth of photographic opportunities afforded by the Oxford MFC's 'Scale Fest' on Port Meadow that we attended last October.

Thanks in equal measure to all SC's readers who admired my lucky shot of the rubber powered Avro Shackleton in flight and to those who were genuinely surprised to learn that such complex and highly developed subjects abound in the world of competition scale free flight.

Many more cameras were present on the day and were pointed far more skilfully than mine. I had nice chat with David Thurling of the OMFC, who was covering the event for the club's newsletter, the 'Meadow Flyer', which he edits.

Amongst several of the very professional images he took, he showed me startlingly realistic shot of F/F electric pioneer and manufacturer Derek Knight's Isaacs Fury homebuilt in action. The attitude of the model captured in that fraction of a second, plus the pilot figure's posture in the cockpit, give it such authenticity.

David's photo illustrates the kind of extraordinary things that can be seen in the air on the famous Meadow site. I'll try and run some more pics from last year's meeting and will also pass on the dates of the Oxford MFC's F/F events for the coming season, so maybe you might care to come along and see for yourself.

Another striking shape in the air at Oxford was this large rubber powered Lysander, which spent a lot of time up with the thermals. Thankfully, it managed to stay within the Meadow!

Fun On The Farm – Latest

One final topic that has brought in mail literally every week since we reported on it to the present, is my club's summer 'Fly For Fun' event at our field near Moreton-in-Marsh, Gloucestershire.

Without a doubt, our good fortune in following up the previous year's success with yet another weekend of near perfect conditions must have played a part in our guests 'wanting to come back for more', but it's still gratifying to think that every aspect of our show just fell comfortably and naturally into place.

The mails and letters we've received over the past months have mostly requested the dates for 2017's event, to book holiday time early. I promised to bring you the dates as soon as the club had held our AGM and finalised the programme. I can now tell you that the meeting took place in early December and we've decided that the NCMAC's 'Fly For Fun 2017' event will be held on the weekend of August 12th and 13th. So now you know! Are you coming or what?

We'll be offering our usual attractions, including on-site camping, and once again we'll be holding our increasingly popular 'Designers' Events'. Last year's choice of Vic Smeed designs and the Cotswold 'Novice' enjoyed a good turnout and were further enhanced by the presence of one of the designers in person, none other than Sid King!

We debated long and hard about possible subjects for this year's events and finally picked on two whose names had previously been put forward, agreeing that this was their time. The designers for our events in 2017 are two British modellers who, in their very distinctive ways, have each exerted a huge influence over model flying in the UK and worldwide. Indeed, one is so influential that he's already had two mentions in this edition!

On the Saturday we will pleased to welcome any design by (that man, yet again!) Ray Malmström. Although Ray never designed a model for R/C (but did suggest the possibility of R/C conversion on some of his plans) our event will be open to radio conversions of any of Ray's back catalogue, including scale-ups, in any form and with any source of power. Designs built in their original F/F or C/L form will also be eligible.

As before, there will be informal judging and prizes for the favourite model of the day. Ray's plans range is vast and much of it is available to download online (I can supply some if you drop me a mail at the address shown at end). So choose one that appeals and get building. We'd like to see a mass launch and flypast of as many Malmströms as possible.

Our event on the Sunday will be for an iconic design by one of British modelling's true innovators. There can't be many clubs that have never had a Chris Foss Wot 4 on their field. From its first appearance in 1979/80 through a long process of evolution and many versions, leading to today's ARTF's and foamies, the Wot 4 has redefined the club sport aerobatic model.

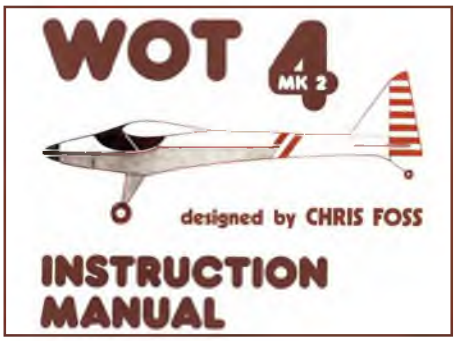
Some of our club can remember attending dedicated Wot 4 meetings in the 1980s and what great fun they were. Some even featured Chris Foss himself as guest of honour, flying his legendary Mk 2 demonstrators.

We thought it might be a nice idea to revisit something of the spirit of those meetings and figured that there might be enough Wot 4's around these days to field quite a varied collection.

Again, Wot 4's of any type – kit, scratchbuilt, ARTF, foamie, scaleup/scaledown, in any form and with any power source will be welcome. As with Saturday's event there will be informal judging and prizes, which will include a special one for the best customised ARTF or foamie model.

There's no telling what kind of gathering we can expect with a design like the Wot 4. We've already heard that at least one Mk 1 model will be present. If you've never heard of that one, it was the earliest version of the Wot 4, comprising just a foam wing and a plan! So, whatever you have, bring it along...

Contributions, please to The Sport Channel c/o the Traplet Publications address. All email correspondence to: gray_rcmag@hotmail.com **RCMW**



Ever owned one of these? Recent newcomers with the foamie electric version may not be aware that Chris Foss's Wot 4 has a long and eventful history. This instruction manual is from the first Mk 2 kit that your author built in the early 1980s. Anyone up for a Wot 4 get-together with the NCMAC in August? (Copyright & acknowledgement: Chris Foss Designs)

The North Cotswold MAC's time travel app looks back to last summer's Fly For Fun event at Moreton-in-Marsh. We're ready to do it all again in 2017. Are you coming to join us?

A small cross section of the late Ray Malmström's designs. Any of Ray's highly individual designs will be welcome at the North Cotswold MAC's first Designer's Event in August (Copyright & acknowledgement: IVCMAC)

CONTACTS

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Check our website for a full list of events
www.rcmodelworld.com

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INDOOR

21st Jan, 18th Feb, 18th Mar '17

Waltham Chase Aeromodellers Indoor R/C Meetings, at Fleming Park Leisure Centre, Passfield Avenue, Eastleigh, Hants SO50 9NL. Each event will run from 7 pm to 10 pm. The Main Hall at Fleming Park Leisure Centre is a ten badminton court size sports hall, with a very high and obstruction free ceiling, and is particularly suitable for lightweight indoor R/C models. Please note that free-flight models may not be flown at this meeting. Admission to each meeting will be £8 for flyers and £1 for spectators, whilst accompanied children will be admitted free. Junior flyers will be charged as adult 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

31st Jan, 28th Feb, 28th Mar, 25th Apr, 30th May, 27th Jun '17

Waltham Chase Aeromodellers Small Indoor R/C Model Meeting, at the Main Hall at Wickham Community Centre, Mill Lane, Wickham, Hants, PO17 5AL. All meetings will run from 7 pm to 9.30 pm. This is the venue at which we hold our popular indoor F/F meetings, the hall is not large enough for conventional shock flyers, but has proved suitable for smaller indoor R/C models.Models to be flown at these meetings are to be limited to a maximum weight of 95 g (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, whilst accompanied children will be admitted free. Junior flyers will be charged as adult 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

4th Feb, 4th Mar '17

Waltham Chase Aeromodellers Indoor Meetings, held in the Main Hall at Havant Leisure Centre, Civic Centre Road, Havant, Hants PO9 2AY. The events will run from 7 pm to 10 pm. Please note that free-flight models may not be flown at these meetings. Admission to each meeting will be £7 for flyers and £1 for spectators, whilst accompanied children will be admitted free. Junior flyers will be charged as adult 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

44th Feb, 4th Mar, 1st Apr, 6th May, 3rd Jun, 1st Jul, 7th Oct, 4th Nov, 2nd Dec '17

Indoor Flying at Furzefield, Furzefield Sports Centre, Mutton Lane, Potters Bar, Herts EN6 3BW. Times will be from 5 pm until 9 pm, flyers £9 and spectators £2. Rubber, free flight and small electric models only, wingspan will be limited to 20 inches. Enquiries to Mike Quille: 020 8500 3549. Email: mp.quille@live.co.uk

5th Feb '17

BMFA South Eastern Area, 42nd Crawley Indoor Meeting, at the K2 Leisure Centre, Pease Pottage, Crawley, Wst Sussex RH11 9BQ. Free Flight from 11 am until 6 pm. Competitions and plenty of fun flying time, comps include, 12" Catapult, Glider, HLG, PEANUT, Scale, Open Scale, EZB, Living Room, Stick, Gyminnie Cricket, Legal Eagle, Mass Launch of Butterfly and Hangar Rat. Further details contact Comp Secretary, John Dart on 01293 420830 or email: johndart17@aol.com or cadmac.org

GENERAL

12th Feb '17

Halton & District Model Flying Club Swapmeet, at The Gentlemen of Moore Rugby Club, Moss Lane, Warrington WA4 6UU. from 11 am-3 pm, admission £3 or to reserve a table £5. Refreshments available. For directions to the venue Google: Gentlemen of Moore Rugby Club. Contact Peter: sevenmil@hotmail.com for table reservation or for further information

19th Feb '17

Northwich Swapmeet, at Northwich Memorial Court, from 9.30 am. The swapmeet for both vintage and modern model aircraft engines, kits and accessories. After a time away this popular swapmeet is back at the original but redeveloped venue that includes a swimming pool, concert hall and restaurant. More than ample FREE parking – and a brand new £80 million shopping centre nearby for 'her indoors' as well! For full details on venue, including a booking form and map etc., please visit: www.northwichswapmeet.co.uk

4th Mar '17

Brightlingsea MFC Swapmeet, at St Osyth Village Hall, Clacton Road, St Osyth, Essex CO16 8PE, from 9.30-11.30 am. Entrance £2, Tables (set up from 9 am) Single £4, Double £6. Refreshments available, hot drinks and bacon sandwiches (have your breakfast with us!) For further information and pre-booking tables contact Bob Goodenough, telephone 01206 303749 or check out the website: www.forjac.co.uk

5th Mar '17

Bedworth & Burbage Aeromodellers Swap Meet, at Bulkington Working Mens Club, Chequer Street, Bulkington, Bedworth, Warwickshire CV12 9NH. 10.00 to 14.00. Entrance: £2. Under 16's Free. Table set up time 9.30 am. Cost £5 per table; tables must be booked in advance. Ample parking on site and hot food and tea/coffee available in Club. For more details contact Eric Heathcote on 07914 382930

11th Mar '17

Long Eaton Model Aero Club Swap Meet, at Trowell Parish Hall, Stapleford Road, Trowell, Notts. NG9 3QA. 9 am for sellers, 9.30 am for buyers until 12 noon. Tables cost £5, which includes one seller, additional helpers £2. General admission for buyers £2. For more information contact John Wright – telephone: 01159 394448, email: janwright27@btinternet.com, or Barry Parkinson, telephone: 01159 731954

17th Mar '17

DADMAC Auction, hosted by the Dumbarton and District Model Aircraft Club. This Bring & Buy Auction will take 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 and food available. Contact Maurice Irvine on 01475 689711 for more details. Auction forms available on website: www.dadmac.org.uk

19th Mar '17

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 website at hmfa.bmfa.org for more details

1st & 2nd Apr '17

Hobby Corner April Fool Fly-In, hosted by the Wrexham Model Aircraft Club, situated midway between Wrexham and Ruthin. (Nearest postcode: LL11 3BB. OS map reference: SJ167500, latitude 53.04155 and longitude 3.2434105). At what will probably be the first Fly-In of the year we aim to give the novice flyer the confidence to go to other Fly-Ins during the 2017 season. Slots will be arranged throughout the day for different ability levels. No A-cert? No problem as instructors on hand. Possible A tests on the day (strictly by appointment). Well kept grass strips and there is a portaloo, which will be clean at the start of the weekend and serviced throughout but there is no water or electricity. However, fresh (drinking) water will be available both days. There is no fee for the flying, though camping and caravan charges are £2 per night and £10 per night respectively. The Club strictly observes BMFA rules and recommendations. Good quality hot food both days. Please contact Bob Davis for further details and register for Go/No Go weather updates 5 days and 24 hours before the event: bob.davis.design@gmail.com or 01490 413276

16th to 18th Jun '17

Weston Park International Model Air show, organised by Wrekin MFC at Weston Park, Weston Under-lizard (M54 Junction 3 and 8 miles off M6 Junction 12). Helifest RC helicopter flight line all weekend, with commentary by Dave Bishop (D.B.Sound) and Nik Johnson. A host of top pilots and fantastic trade support with over 100 traders. Full size display all three days including the Swift Display Team. The show also includes: Quad Racing and Quad Fair, Off Road Buggy Racing, Model Boats and other family attractions. On site camping available, with Night Show spectacular on the Friday and Saturday night, plus evening entertainment. For more information contact Steve Bishop: 01952 587298, mobile: 07758 895068, email: stevenbishop@blueyonder.co.uk. Show website: www.westonparkmodelairshow.co.uk. Trade enquiries: Peter Whitehead 01952 684169

1st & 2nd Jul '17

Woodspring 2017, at Woodspring Wings model airfield, Claverham Drove, Yatton, North Somerset. Signposted from the M5 J20 and BS216TZ will get you close. 10 am to 5 pm both days. Our 25th Anniversary show and we're working on some very special attractions this year, in addition to our normal full flying programme from top teams and pilots, more traders than ever and a chance to eat and drink in the wonderful Somerset countryside. Camping available for the weekend. Watch Facebook and our website: www.woodspringshow.co.uk for updates

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MODEL WORLD

Next Issue

DON'T MISS OUR MARCH 2017 ISSUE!

Peter Miller's latest scale design for RCMW is an easy to build and fly model of a 1930s Polish trainer for .40 four-stroke engines. With a wingspan of 66 inches construction of the RWD5 is similar to many vintage models and it is therefore pretty simple to build. Those same vintage style attributes also endow it with docile flying characteristics. The ideal power unit is a .40 four-stroke, although an electric conversion should be possible. However, this is not detailed in Peter's article.

The RWD5 was a high wing, two seat cabin aircraft with no dihedral and no struts. It was powered by a four cylinder inverted Gypsy or Cirrus engine. Built in Poland in the 1930s it was used as a trainer and club aircraft. No RWD5s survived the war but in the 1990s a perfect replica was built, which is called the RWD5R and registered as SP-LOT.

Like most long time modellers, Peter Kraus has numerous kits and half built aeroplanes stored in his workshop, most dating from many years ago. Among these was an original, circa 1960, Jetco kit of a Navigator flying boat. Not only would building the Navigator give Peter a nice flying boat to fly but it would also be fun and reduce by one his collection of un-built kits! It would also serve to polish up his rusty building skills before embarking on some of the other cherished items on his bucket list.

The Navigator is a 52" span flying boat with an NACA long planing hull. It was kitted under the Jetco brand by the C.A. Zaic Company of Brooklyn, New York. So please join Peter as he undertakes a nice exercise in vintage nostalgia

MARCH 2017 ISSUE ON SALE THURSDAY 16TH FEBRUARY

If you have enjoyed the triple serving of scale model building features that we have dished up for you in this issue then you will be very pleased to learn that the adventures of Messr's. Higgins, Bowler and Maw continue as they all bring their various scale models to completion and, eventually, all three make it safely into the air.

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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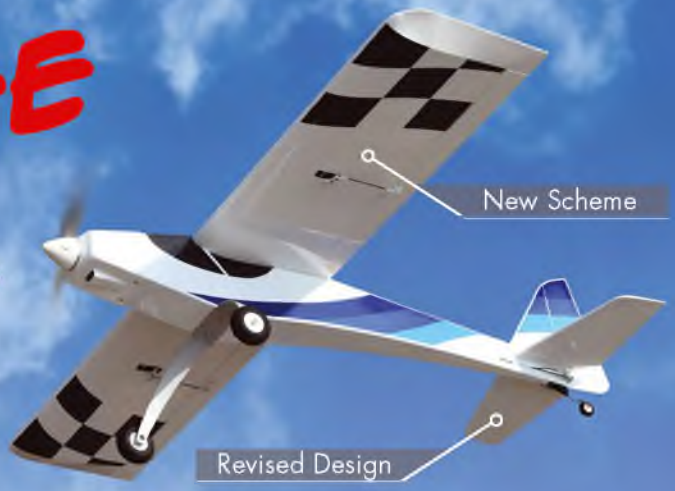
Ripmax

WOT4 Mk2 -E

BY CHRIS FOSS



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The overwhelming popularity of the original Wot4E meant that a new version was always on the cards, and through working closely with Chris Foss this new model has a revised lightweight structure plus a bright new colour scheme. Being an 80% scale example of the ubiquitous Wot4, the Wot4E is the perfect size to use commonplace 3 cell 2100-2500mAh LiPo batteries.

The Wot4-E is a brilliant all around model that is ideal for small field use, yet it is large enough to hold its own at the busiest of flying sites. The prebuilt balsa/ply structure is both strong and lightweight and covered in iron-on film. So only minimal assembly and installation of the motor and electronics is required.

With the same great flying characteristics as its larger brother this really is a superb performing sport aerobatic aircraft, with the thick wing section being very forgiving at low speed.

Specification:

Wingspan: 1199mm (47")
Length: 1055mm (41.5")
Weight: 1420g (50.5 oz)
Servos: 4 Mini (Required)
Radio System: 4-5 Channel (Required)
LiPo Battery: 3S1P 11.1V 2200mAh (Recommend)
Speed Controller: Quantum 40A Brushless (Recommend)
Electric Motor: Quantum II 36 Brushless (Recommend)