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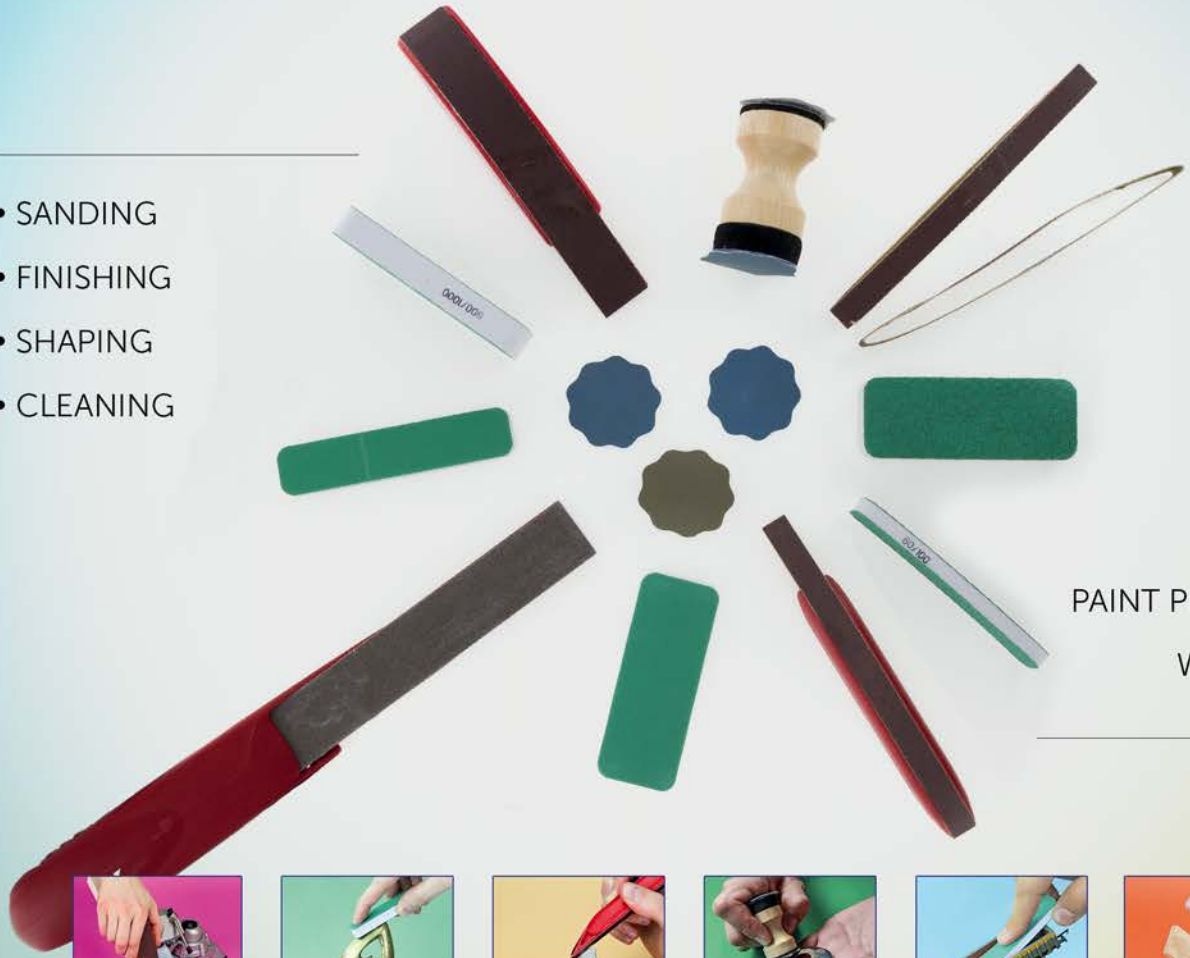

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Doolittle Mill, Doolittle Lane, Totternhoe, Bedfordshire LU6 1QX, England

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Website: www.aeromodeller.com

Nats Vintage Combat winner Tony Frost centre, with pit crew Richard Evans & Karl Severne.

Heard at the Hangar Doors

Back in the Hot Seat

After a break for a few months I'm back editing AeroModeller. Starting with a day at the Power Nationals it has been a gradual easing back into the routine of running a monthly magazine. I can't pretend it has been easy over the summer, but I have been helped by the numerous aeromodellers who have explicitly or implicitly given me their support and condolences during a difficult time in my and my family's life. I thank you all.

Particular thanks must go to Ken Sheppard who gamely stepped in to take over the editor's role. I know there is nobody else I could have trusted to run this ship at such short notice with the dedication and care it deserves. It was a joy to read the magazine as an outsider for a change! It is ironic that as I write this Ken is not well having apparently picked up some virus which has laid him low – Ken get well soon.

So keep your ideas, plaudits and brick-bats coming to keep AeroModeller your magazine of choice as a builder and flyer of model aircraft.

Regards, Andrew Boddington
editor@aeromodeller.com

IMPINGTON VILLAGE COLLEGE, CAMBRIDGE - INDOOR FLYING, 29TH OCTOBER

Impington Village College MAC was founded post-WWII by AeroModeller designer and cartoonist the late Ray Malmström, and Ray's spirit continues to enthuse this popular event at the beginning of the indoor season. The large sports hall (100 x 50 x 28 ft) is given over to FF models , while a smaller hall features Round The Pole on 4.5m lines (using 4605 connectors available from The RTP Hut www.thertphut.co.uk) and small RC models - no IC or rocket anywhere! Low key flying competitions and a rubber powered car race are run through the day including Peanut Scale and Bostonian, and Andrew Hewitt will give a seminar on 'Getting Challenging FF Scale models to fly.' SAMS Models will be in attendance for all your indoor modelling needs.

Impington Village College is near Cambridge, post code CB24 9LX. Leave the A14 at the first junction East of M11 J14 signed Cambridge B1049. At the roundabout take B1049 to North signed Cottenham, Histon. Indoor Flyers Adults £6.00, under 18s £1.50, Spectators £3.00.

More details at www.impmac.co.uk or contact Chris Strachan on tel: 01223 860498, email: chris.strachan@btinternet.com

Plenty of variety to be seen at Impington from this RTP Gloster Javelin to a rubber powered Peanut 'Goupy' Triplane.

GILDINGS MODEL AERO ENGINE AUCTION, 4TH NOVEMBER

Gildings sale is on Saturday 4th November starting at 10:30. Viewing is available on Friday 3rd November from 10:00 until 16:00, and from 9:00 before the sale. There is expected to be over 500 items with a higher proportion of engines than other recent sales, including around 200 lots from the collection of the late Arni Ohlsson of Sweden plus a similar quantity from a UK collector David Price, and some from Dick Roberts the curator of recent sales who is down-sizing his collection following a break to his left hip. (AM wishes Dick a speedy recovery).

As ever an interesting selection of collectable and everyday 'cooking' engines, single and multi-cylinder, diesels, glows and sparkies.

Gildings Auctioneers, The Mill, Great Bowden Road, Market Harborough LE16 7DE

tel: 01858 410 414, www.gildings.co.uk

Gildings sale on 4th November includes this Technopower 5 Cylinder Radial, 4 stroke glow engine.

Plenty of diesels in the auction including this British 5cc K Vulture.

Another early British diesel, the BMP 3.5cc.

CONGRATULATIONS TO THE BMFA ON THE NATIONAL CENTRE

Chris Ottewell writes about his impression of the new Buckminster facility.

"When I bumped into Jim Wright doing his usual duty of showing the great and the good of Lincolnshire around the Nats he suggested that I go home via Buckminster House and see how the BMFA is doing with the new National Flying Site. They already have a smart new entrance in place and I was delighted to be greeted by Manny Williamson who gave me a conducted tour of the whole place as well as describing their plans for the future.

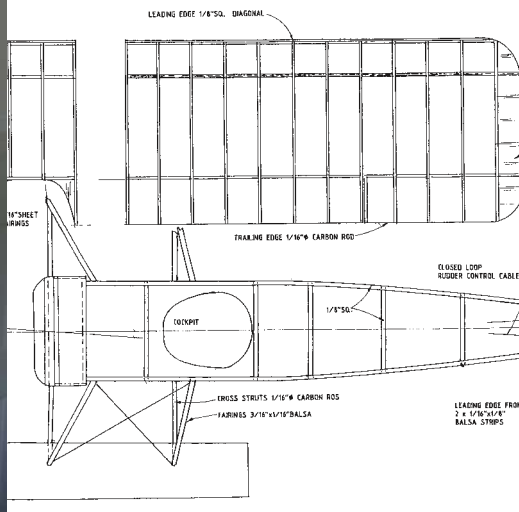
They've already achieved a lot whilst being very careful with members' money; for example Manny proudly showed me the reception desk which Jim Wright had found in a used furniture dealers at a bargain price along with some comfy chairs.

I was delighted to see what an excellent job they've done in a very short time. The facilities are already first class. Whilst Buckminster will never be big enough to host the Nats, it is already becoming a site we should all be proud of and events already seem to be taking place there on a weekly basis. After years of badgering the BMFA via this magazine I am delighted to be able to congratulate them on what they have achieved."

One non-flying event at the National Centre to put in your diary is the 29 October BMFA Buckminster Autumn Swapmeet. The post code for the venue in Sewstern near Grantham is NG33 5RW. Set up from 08:00, entry from 10:00. More details from manny@bmfa.org www.nationalcentre.bmfa.org

SOPWITH BABY FREE PLAN

Just a quick clarification on one of last month's free plans. The Sopwith Baby plan was not full size as can be seen by the inch scale under the fuselage side view. To build it the same size as Ken's original you will need to enlarge it by 145% on a photo-copier. The model could probably be enlarged a little more for outdoors with electric or even small diesel power if due consideration is given to the wood sizes and bracing.



FURTHER APPROVAL OF DELUXE MATERIALS POWERMODEL 2T-S OIL

RCGF, the major manufacturer of 2-stroke petrol (gasoline) model engines, has announced the approval of PowerModel 2T-S engine oil for all its engines. This manufacturer joins the list of engine makers who also approve PowerModel 2T-S, including DLE, Saito, NGH, Evolution and Airpower for petrol engines, and PAW for diesels.

PowerModel 2T-S is a unique, fully synthetic, 2 stroke oil specially designed to provide high temperature protection required for extreme conditions of sustained high power/rpm in restricted airflow conditions common in model aircraft, cars & boats.

500ml of the oil is priced around £14.99 and distributed to all good hobby shops from Deluxe Materials' UK base through their international network of distributors.

www.deluxematerials.co.uk

THE 2017 FREE FLIGHT FORUM

The thirty-third BMFA Free-Flight Forum will start at 10 a.m. on Nov. 19th, the day after the AGM, at the Hinckley Island Hotel, A5 Watling Street, Hinckley, LE10 3JA. As usual there is a wide range of presentations on free-flight, so come along to find out what makes this branch of our sport so enjoyable and spend a day with these knowledgeable speakers:

Why FAI? - Stuart Darmon, Designing for Scale Competition - Andy Sephton, Experience with Making Carbon/Foam "Moulded" Wings - Alan Jack, Generating Youngsters' Interest in Aeromodelling - John Jacomb, EDF Power Eggs – John Emmett, Small Field Contests - Brian Lever, Project Swansong – a Last Hurrah for the Outsize Open Glider - Stuart Darmon, A Simplified Description of Electric Drives for Free Flight Models - Alan Jack.

Lunch will be available and the finish will be at around 5 p.m. The cost for the session will be just £10, with proceeds going towards the expenses of the teams that represent us at World and European FF Championships. Pre-booking will ensure that you get a seat, so send your cheque, payable to 'BMFA F/F Team Support', to the BMFA office at 31, St. Andrews Road, Leicester LE2 8RE.

INTERNATIONAL EUROCOMBAT AND STUNT COMPETITION, GRAN CANARIA, 15-17TH DECEMBER

For those CL flyers living in Northern Europe what could be more appealing than a few days in the sun pre-Christmas (average temperatures 20C) with EuroCombat (F2E+) and Old Time Stunt competitions while the rest of the family makes for the beach? This is the 17th time that Club Tamaran have put on this event in the Canary Islands, and it is a popular jaunt for many UK Combat flyers once the Vintage season is over.

There are full details on the Club Tamaran website, but for the Old Time and Beginner's Stunt silencers are obligatory (90 db to 3 meters), but diesel engines can be run without silencers. Maximum length of lines will be 20 meters (66 ft) and they recommend two piece models are best for transporting.

For EuroCombat there is one model per round, engine capacity 2.5cc (.15ci) diesel or glow. You can use your Vintage/Oliver combat model with 2.5cc engine or F2E Combat model (limited speed with streamer is 3.5 sec/lap). Obligatory nylon or wood propeller, line length 15.92 m. and .038 mm minimum diameter.

www.clubtamaran.com/intl-vv-gran-canaria.html

Up & Coming

Please note that the events listed are compiled weeks in advance of publication, and you should check before travelling in case of change. For future inclusion of your events, please send an email with date and details of the event in a format similar to those shown below to editor@aeromodeller.com

OCTOBER

14 October
Delyn MFC Swapmeet 2, St. Winefride's Primary School, Holywell CH8 7NJ. 09.00 to 13.00. Mike Parry 01352 710167 crashparry@gmail.com

14 October
Indoor FF Fun Flying, Stalham School Sports Hall, Ingham Rd, Stalham, Norfolk NR12 9DG. 19:00 to 22:00. Informal FF, beginners welcome. Richard Crossley on 01692 407936, richardcrossley1967@gmail.com

14-15 October
Barton Club Speed Weekend, Barton, Manchester. All Open Classes, F2A, Barton Club Speed, 'Have a Go'.
Dick Hart 01387 820335 www.controlline.org.uk

15 October
Beverley & District MAC Autumn Swapmeet, Tickton Village Hall, near Beverley HU17 9RZ. 09.00 to 12:00. Tables £5.00 Brian Jenkins 2bee.jays@live.com 07970 959875 www.badmac.btck.co.uk

15 October
Vintage Combat, Darley Moor Raceway, Ashbourne, DE6 2ET. Mick Lewis 01453 542367 combatflyers@talktalk.net

21 October
Tonbridge Gassers & Rubber Fanciers Indoor, Sports Centre, 601 Maidstone Road, Rochester ME1 3QJ. 18:30 to 22:00. FF & LW RC. Eric 01622 737814 eric.przyjemski@btinternet.com or Steve 0208 942 5000

21 October
Alfreton Indoor, Leisure Centre, Alfreton, NE Derbyshire. FF and ultra-light RC.
Nigel Monk 07812 670935 nigel.bmonk@ntlworld.com

22 October
Barton Racing Day, Barton, Manchester. Classic 15 & Barton B CL TR. John Broadhead 01524 251592 www.controlline.org.uk

22 October
Kingís Lynn Aero Model Swap-Meet, West Winch Village Hall, Watering Lane, West Winch PE33 0JY. 09.00 to 12:00. Tables £6.00 each, helper £2.00. Stall Holders from 8.00. Entry £2.00. Andy 01553 841603 or Gerry 01945 582023 klamc.2009@btinternet.com

22 October
BMFA SW Area Indoor Flying, Saints Centre, St Austell PL26 7AG. 12:00 to 16:00. FF & micro RC. David Powis 01579 362951 dave_powis@hotmail.com

22 October
OFMAC Indoor Flying, Abbey Centre, Furlong Green, Berinsfield OX10 7NR. 09:00 to 16:00. FF, RC Fixed Wing, Scale.
Dave Dobson 01491 837789 ofmac1@talktalk.net

28 October
FF Midland Gala, N Luffenham. F1H, F1G, F1J, BMFA 1/2A, E36, P30, SLOP, Mini Vintage, HLG/CLG. Phil Ball 01332 665361 phil.ball@ntlworld.com

29 October
Impington Indoor Meeting at Impington Village College, Cambridge CB24 9LX. 9.00 to 17.00. Flyers £6.00. FF in main hall, RTP and small RC in separate hall. Competitions for Peanuts and Bostonians. Seminar by Andrew Hewitt - Getting challenging free flight scale models to fly. Also rubber powered car race.
Chris Strachan 01223 860498 www.impmac.co.uk

29 October
Peterborough MFC Indoor, Bushfield Leisure Centre, PE2 5RQ. 10:00 to 13:00. FF & micro RC (no shockies). Flyers £6, spectators £2. Informal contests. www.peterboroughmfc.org

29 October
BMFA Buckminster Autumn Swapmeet, National Centre, NG33 5RW. Set up from 08:00, entry from 10:00. manny@bmfa.org www.nationalcentre.bmfa.org

NOVEMBER

4 November
Gildings Model Aero-Engines Auction, Great Bowden Road, Market Harborough LE16 7DE. Viewing Friday 3rd November, auction from 10:30 Saturday. www.gildings.co.uk

5 November
Indoor Flying Bethesda, Plas Ffrancon leisure centre, Bethesda, North Wales, LL57 3DT. 13.00 to 16.00, FF & LW RC. £5 to fly, juniors and observers free.
Martin Pike: martin.pike.xray@btinternet.com 07831 141418 Facebook 'Indoor Model Flying Bethesda'

7 November
Waltham Chase Indoor FF, Community Centre, Mill Lane, Wickham, PO17 5AL. 19:00 to 22:00. FF only, flyers £5, spectators £1. www.wcaero.co.uk Alan Wallington 01489 895157

12 November
Flitehook Indoor FF Meeting, West Totton Centre, Hazel Farm Rd, Totton, Southampton SO40 8WU. 10:00 to 16:00. Flyers £8, Juniors & Spectators Free. flitehook@talktalk.net 02380 861541

12 November
Peterborough MFC Indoor, Bushfield Leisure Centre, PE2 5RQ. 10:00 to 13:00. FF & micro RC (no shockies). Flyers £6, spectators £2. Informal contests. www.peterboroughmfc.org

18 November
Tonbridge Gassers & Rubber Fanciers Indoor, Sports Centre, 601 Maidstone Road, Rochester ME1 3QJ. 18:30 to 22:00. FF & LW RC.
Eric 01622 737814 eric.przyjemski@btinternet.com or Steve 0208 942 5000

18 November
Indoor FF Fun Flying, Stalham School Sports Hall, Ingham Rd, Stalham, Norfolk NR12 9DG. 19:00 to 22:00. Informal FF, beginners welcome. Cafe. Richard Crossley on 01692 407936, richardcrossley1967@gmail.com

18 November
South Norfolk MFC Indoor, Leisure Centre, Old Norwich Road, Wymondham, Norfolk, NR18 0NT. 19:00 to 22:00. All model types, 100g max. www.snmfc.co.uk

18 November
BMFA SW Area Indoor Flying, Saints Centre, St Austell PL26 7AG. 12:00 to 16:00. FF & micro RC. David Powis 01579 362951 dave_powis@hotmail.com

19 November
BMFA Free Flight Forum 2017, Hinckley Island Hotel, A5 Watling Street, Hinckley, LE10 3JA. 10:00 to 17:00. £10.00 from BMFA office or pay on the day. Lunch available. Speakers: Why FAI? - Stuart Darmon, Designing for Scale Competition ñ Andy Sephton, Making Carbon/Foam "Moulded" Wings - Alan Jack, Generating Youngstersí Interest - John Jacomb, Outsize Open Glider - Stuart Darmon, Electric Drives for FF - Alan Jack. www.bmfa.org

19 November
OFMAC Indoor Flying, Abbey Centre, Furlong Green, Berinsfield OX10 7NR. 09:00 to 16:00. FF, RC Fixed Wing, Scale.
Dave Dobson 01491 837789 ofmac1@talktalk.net

DECEMBER

2 December
Peterborough MFC Indoor, Bushfield Leisure Centre, PE2 5RQ. 10:00 to 13:00. FF & micro RC (no shockies). Flyers £6, spectators £2. Informal contests. www.peterboroughmfc.org

3 December
FF Coupe de Brum, MOD North Luffenham. From 10:00. F1G for the AeroModeller Trophy, Pre í58 Vintage Coupe for the Bernard Boutillier Trophy. Gavin Manion at gavin.manion84@gmail.com 01543 422509 or Stuart Darmon stuartdarmonf1a@yahoo.com 01858 882057

3 December
Indoor Flying Bethesda, Plas Ffrancon leisure centre, Bethesda, North Wales, LL57 3DT. 13.00 to 16.00, FF & LW RC. £5 to fly, juniors and observers free.
Martin Pike: martin.pike.xray@btinternet.com 07831 141418 Facebook 'Indoor Model Flying Bethesda'

2018 JANUARY

19-21 January
LONDON MODEL ENGINEERING EXHIBITION 2018, Alexandra Palace, London. From 10:00. The south's largest model engineering & modelling exhibition. www.londonmodelengineering.co.uk or phone SEE Tickets 0871 3861118 calls cost 13p a minute plus network extras.

Full details of BMFA events can be found at: www.bmfa.org

MICROACES FOKKER D.VII

Balsa Basher does Depron... Paul Blakeborough tries one of the innovative Microaces RC models.

From time to time I find myself building small FF and RC scale models. With a multitude of miniature electronics available now-a-days, we can now control even our smallest models.

I'm a lover of balsa, and there's nothing like fashioning a flying machine from this material. So, on a trip to an Old Warden Scale meeting why did I get so attracted to the small colourful biplanes flying around the field? Well, maybe because they flew so well, looked just right, were light, durable etc. BUT they were made from depron foam! I've tried my hand at the foam thing before but except for minimal use of blue foam I've found myself staying away - it didn't float my boat! However, the more I watched them, the more I wanted one, and to-boot the wife thought they were cute! And so by the end of the weekend and after much deliberation I took in hand Mimmi.

Mimmi is a model at 1/24th scale of a Fokker D.VII flown in WWI by Willi Hippert. The Microaces models are mostly constructed from pre-coloured laser cut Depron Foam with a little reinforcement from carbon strip and polypropylene plastic. The kit retails at £40.00 and is designed to house the common micro RC motor and electronics from the likes of Parkzone and Spektrum.

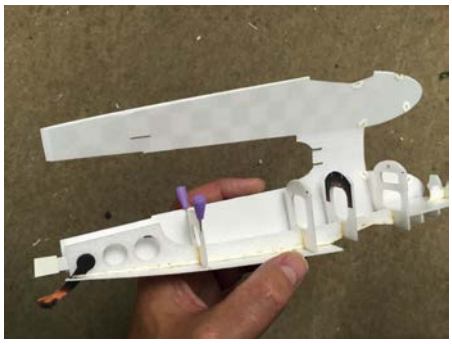
Kit Inspection

It's not often a kit is supplied in a large

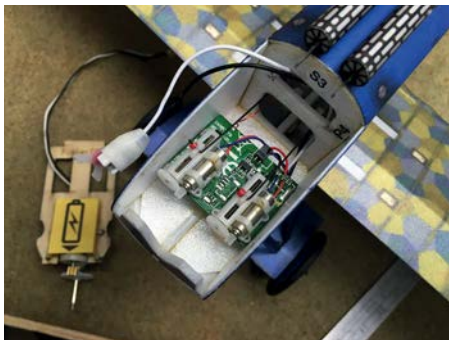
Like all the Microaces kits, the Fokker D.VII makes up in to a colourful small RC model capable of simple aerobatics even indoors.

The pre-printed laser-cut depron needs a sharp knife cut to release the parts as required for building.

Working at 1/24 scale is fiddly but you end up with a strong yet light undercarriage.



This modern method of wrapping the fuselage exterior around the central keel may take some getting used to for traditional balsa builders.



Readily available micro RC fits nicely in to the fuselage.

The well thought out but simple components add character to the model.

Nearing completion with all struts in place on the top wing.

cardboard envelope! But when opened, out came some lovely looking sheets of various thickness depron, with finished colours on some, together with an accessory pack and a thick printed base. This base sheet obviously provides strength for posted kits and serves as a nice display base for the finished model. Build instructions are downloaded from the Web.

Build Notes

I'm usually quite good at following the recommended build sequence, but due to apprehension I attacked the small section of the undercarriage first. This is constructed using a mixture of depron and plastic, with the legs reinforced with carbon strip, fishing line and small pieces of self-adhesive vinyl sheet. A piece of carbon rod is used for the axle, and the wheels are built up from small discs stuck together with Uhu Por and a neoprene tyre finishes. A little fiddly at times but tweaking by sanding here and there resulted a reasonable UC unit.

Fairly happy with my first exploits, I decided to start at the beginning of the instructions, and try the fuselage. Looking at the diagrams I first used a sharp knife to release all the parts for the crutch of the fuselage. A little sanding levelled any "nibs" left from the laser cutting. Formers from 2mm depron are placed onto a lower fuselage keel firstly, and once squared up I used super-aliphatic glue to secure. All looking good was the result… but it's so flexible! I struggled with this flexible thing constantly through the build, with balsa the fabrication is a little more "Solid", if you get my drift?

The shell of the fuselage is wrapped around the formers and keel, in the order of lower, port, top and finally the starboard side. The shell is in one piece and unusual compared with a traditional build with two balsa sides, but with uniform depron you don't have the problem of matching a natural material. I still found it tricky to get the same bend on each fuselage side, and wondered whether it would be better if I had separated the parts and built it setting the two sides in place first. This may have simply been my inexperience with depron and the building method; I reckon my fuselage was about 95% the right shape and the proof that it was OK was in the flying. The rear turtle deck finishes the basic fuselage.

All tailfeathers are from 1mm depron using vinyl hinges and carbon reinforcement. There was nothing difficult here, and once square it was attached with super-aliphatic.

A nice touch with the wings is that the kit includes a jig for building and setting up the lower wing dihedral. The aerofoil and undercamber is formed by a simply creased wing at around a third of the chord, this also serves to stiffen up the wing. The lower wing was then attached to the fuselage making sure it was square to the tailplane, and then the lower fuselage front is formed, attached, and the UC unit added.

Before adding the upper wing, the lower cowl front is formed from sanded depron "chunks" glued together. A pair of Spandau's and a pilot are also formed and fitted in place. The instruction rightly say to add the receiver block, motor plate and controls at this point, as the upper wing would make things a little more difficult.

The upper wing is built flat, again with the creased chord. 2mm depron ribs serve to keep the shape and aids fixing points for the interplane struts. Cabane struts are constructed in a similar vain to the UC struts, and adhered to the unit with interplane units before setting in position on the fuselage. With so many strut ends to place in the correct slots on the model, I must admit to doubting

that they would all fit correctly, but I can confirm they did with minor tweaks here and there, again secured with super-aliphatic.

The final section to construct was the upper cowl, this serving as a covering to the radio bay and using magnets to secure the housing for the battery. I found this unit the most difficult to form, (counting to 10 helped on occasion) and a reasonable form resulted from this perseverance.

Flying

The model hung for quite a few months from my sanctuary ceiling until I gained access to a nice size hangar to do the maiden flight. As I rolled the model forward the power seamed capable and on lift off proved so, but my rates were way off an ideal setting. As I was flying without a Spektrum AS3X stability module, I landed fairly promptly and dialled in much more limited movement and a stack of exponential. This made flying the little foamie a much more pleasant experience. Quite satisfied with how things were going I handed over the TX to friends who were all similarly impressed, I even pushed it to a loop or two.

This is a very different approach to producing a small flying machine. The kit presentation is wonderful and builds to finish a nicely coloured and flying miniature scale model. The complex colour schemes would scare many a modeller away from building a balsa version where they would have to paint the model themselves! The foam approach makes the model durable and light (Specification is 34.5g – Mine 36g) and the machine has found a slot in my flying squadron. As a devout "Balsa Basher" I'm still kicking and screaming as modern building techniques try to drag me away from the balsa I know and love!

www.microaces.myshopify.com ●

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Flightline at Szentes Hungary with FAI flag.

F1 WORLD CHAMPIONSHIPS

CHRIS EDGE REPORTS FROM THE LEADING FF DURATION COMPETITION HELD DURING HEATWAVE 'LUCIFER' IN HUNGARY

The weather warning was unequivocal; 'Potential disruption due to extreme high temperatures for Southern Hungary. Avoid outside physical activities'. To this backdrop over 250 competitors from 42 nations, including for the first time a team from Indonesia, flew at Szentes Hungary during mid-August in some of the most extreme temperatures seen at a World Championships. The contest was not without incident, intrigue, argument and much discussion on the way forward but most importantly produced three very worthy individual and team champions who showed that the thermal is king and all you need to do is find one at the right time!

Hungary has a long history of championships back to 1990, all flown on different parts of the huge pusta (traditional Hungarian landscape) that snakes around the major rivers south of Budapest. The flying field was criss-crossed with small dry ditches that drained in to two larger canals, one of which closely surrounded the site to the west and north and which could only be crossed by a limited number of bridges. A long dirt entrance road ran north-south and guided all to an area of pasture that is clearly flooded in winter and had many large cracks in places, otherwise the site was extensive, particularly to the north where there is a protected national park for crane migration (resplendent with deer, hare and kestrels chasing voles), and which was expected to be the prevailing wind direction.

Teams were housed in many towns but the Brits lucked out by staying with the organisers in air-conditioned comfort albeit 30 minutes drive away from the field; this site also acted as registration, processing and the opening ceremony venue.

Early practice included the open international 'Budapest Cup' for the main FAI classes and a 'HEC' event for F1H gliders which saw a good representation of juniors flying in breezy conditions. The Budapest Cup was different, strong winds from the north and a long first max took models into very difficult terrain including an area of swamp and 12' reeds which reduced those flying in later rounds by a considerable margin. Particularly affected were the Mongolians, hosts in 2015, who lost 6 models that day.

Practice flying was also seriously affected by thunder storms that luckily missed the opening ceremony but caused trees to be uprooted in the town hosting the Israelis. The following morning the field entrance road was impassable as confirmed by the driver of the first car to try; he got stuck and had to be pulled out by a passing local tractor. The next day the road was still poor but a number of flyers managed to get on and practice in the increasing heat, up to 41oC in the afternoon. Those who had new models to trim were the most disadvantaged as the wind was not benign, and quick to change direction; some saw their new creations or purchases sidelined after crashes. But the contest must go on with a schedule of F1C (power) followed by B (rubber) and finally A (glider).

To the winner the spoils. The trophies tempting all in the processing room.

First time competitors from Indonesia seemed to enjoy themselves. (Photo by Zdravko Todoroski)

Ken Faux (GBR) about to sling his Verbitsky flapper.

F1C Day August 9th

The contest started 7am with a button being pressed and a engine crackling to life. 4 seconds later silence as the model's surfaces and geometry are adjusted to optimal glide performance for the required 4 minute flight time. For the retrievers, binoculars are trained and radio transmissions monitored to pick up a 2.7m span model at 1.3kms distance. Was the air OK? Yes, so others go in waves smoothly transitioning from vertical rocket to gliding bird with the cacophony of interspersed engine and gearbox noise.

Early problems befell Shvedenkov (CAN) who splashed down his #1 model in the nearby canal, the model left semi-submerged for many hours. His compatriot, the experienced F1B flyer Mathews, flew one of his old models to make up a full team, his first 'C' contest for 30 years; he made the first max but was timed OOS behind trees on the 2nd round. The Brits of Dixon, Jack and Faux did a good job, all maxes before their one unfortunate dropped flight in round 2.

Models continued to crash including a very close call for the Brit pole when a model came in vertically between Peers and Benns. Later a folder flew a perfect rolling arc across the whole site before impacting near the canal, the engine not shutting off for some reason and the mandatory safety requirement of radio DT (RCDT) not operating either.

Of course folders, often from the Babaenko stable, were in the majority but there was a good representation of open-structure designs, both flapper and fixed, than in past years; only one 'squid' (combined folder-flapper) was obvious, that of Sychov (SLO).

In round 3 Carroll (USA) had a double over-run to score a zero. A few others including Faux were also timed long, usually when other engines were running as well, and timekeepers were not giving the benefit of doubt to the competitors as they perhaps should.

At the end of the scheduled 5 rounds, 29 out of 79 flyers had made all maxes including Brits Jack and Faux. Not so Truppe (AUT) who despite restricted movement these days had four maxes and was lined up for a 5th when his model flew through a streamer which pulled the model left for a sub max.

There was now a well-received break of almost 4 hours before the flyoffs scheduled for 5pm onwards. Some took the opportunity to trim but many went back to their hotels to recover from the oppressive heat, in fact this break allowed the heat and wind to reduce somewhat and thus reduce thermal activity for the longer flights.

The flyoffs followed the split-group approach introduced for 2016 and was almost universally derided by the competitors. To clarify, the competitors are drawn in to two similarly sized groups who flyoff separately. All maxes go through to the next stage but the numbers from each group are equalised, if appropriate, by those with the highest scores who made at least 75% of the max time. It sounds complex but isn't in practice but critically it is highly susceptible to differences in thermal activity between the two groups. This was amply demonstrated here as group 1 had poor air and only two maxes whilst group 2 had better air and 7 maxes. In principle an additional 5 flyers from group 1 could progress if they make 75% of the score but in fact only three did. Unluckiest was Jack (GBR) who missed the 75% mark by just 1 second; 2015 champion Aleksandrov (UKR) also missed the max from group 1.

And so it was that 12 lined up for an 8 minute max at 8pm in cooling, calmer conditions. As the hooter went Aringer (AUT) flying his own-designed flapper with distinctive egg-box structure and underfin flew from the right-hand and downwind end of the line. The climb wasn't that high but the air was seductively twitching the gliding model that no one else could reach - would it be enough? Shen (CHN) launched his folder in a gaggle to a perfect transition but no wing unfold, the model crashing a scant 15 seconds later with no RCDT. Much shouting ensued, no spare model available! It transpired that the bands holding the wings folded for transport hadn't been removed prior to launch...

In the last minute two models were launched in obvious good air, one was the distinctive yellow-striped Babenko folder of Shvedenkov. The long wait for results was punctuated by rumour of good flights but no maxes, so we had a winner but who was it? A cheer goes up from the Canadians as Yuri Shvedenkov's thermal flight of over 6 1/2 minutes is confirmed the winning score by over 1/2 minute. By dint of better flyoff results the Chinese team came out top but with a superb 3rd place and bronze medal for the Brits - well done boys!

F1B Day August 10th

The day started with a more significant southerly wind component and immediate issues for some teams including GBR. The poles had been positioned such that nearby bushes were in the timekeeper's view but despite representations for the jury the contest started with a 4 minute max at 7am. Early flights by some were seen, others clocked off OOS when clearly visible while others disappeared behind the nearby bushes; Woolner (GBR) was timed for a little over 3:15 when it was a clear max. Whilst the team manager made representations Peers (GBR) was next up with a wound motor, ready to fly, but at that point an announcement was made that the round would be held. What followed was huddles of managers, the jury and organisers discussing the problems and potential solutions. Downwind the rumour-mill was in full flow until it was decided to cancel, yes cancel, all the scores from the first round - unprecedented!

The line was moved to the better position as initially proposed by the jury and round 1 restarted to a 3 minute max due to retrieval distances in the strengthening wind. Note that a condition of the site was no motorised retrieval so teams had to follow models the 'old' way on foot or by bicycle so this decision at least was appreciated. You can imagine what happened next, some who had done 4 minutes on the aborted round now dropped (eg Mathews CAN and Kristensen DEN) and others who had dropped now maxed. There was a resigned acceptance of the results but it left a bad taste, especially as it was predicted and thus avoidable.

With the wind almost parallel to the line for the latter rounds, those on lower pole numbers were at a distinct advantage. Launching as the in-fill came through seemed to work well and you could practically 'see' the thermal approach as models were successively launched from adjacent poles in to the lift.

The last round was again to a 4 minute max. Now the air was harder, the wind dropped and models were struggling. The Brit camp was buoyant as all had maxed to this stage but it sadly didn't continue. Both Brown and Woolner dropped, the latter by a scant 2 seconds in to the dip surrounding the canal where the timekeepers couldn't see; his altimeter suggested a max but this data isn't currently allowed. Peers did a high max to take a Brit representation along with just 39 others (from an huge entry of 110) to another split group flyoff.

By 5pm the poles were moved well upwind to a better position but aligned assuming a southerly wind. Although at low level there was a component in this direction, when the first flights went away they were closer to the east and flying near and over a tree line parallel to the entrance road. Beyond that was a known swamp never mind the potential timekeeping problems that this direction would give. For group 1, the 10 minute period again had little lift with just 6 reaching the 6 minute max. Anastasov (MKD) had two models ready and wound but managed to break both motors applying hand turns, thus receiving a zero; the same score befell glider flyer Danier replacing, at the last minute, the absent Ackerly to make a full Canadian team.

Group 2 flew off at 5:30 with better air. 7 minutes in and most flew, but in the rush to get away Erdenedavaa (MGN) power stalled and Rigault (FRA) launched left; neither made the max.

This time 5 from group 1 and 7 from group 2 maxed and so the two highest non-maxing flights (75% rule again) were allowed to continue including the delighted Peers. There was then a hold as the wind direction would be taking models towards the sun with risks to timekeepers with binoculars, but at 7:35 the 8 minute flyoff started with the breeze still over the tree line and much cooler than before; it would be a thermal flight again.

Most flew in the first 4 minutes, many with long carbon-skinned models (affectionately known as 'Slinky Black Things' or SBTs). It was hard to see who had done what but Peers' extra-wide glide was lost behind the tress for a less than ideal result. The winner proved to be Stefanchuk (UKR) who remarkably had been World Champion in 2003 in Hungary, "It is a lucky country for me" he said later. In the past few years Stepan has developed his models to consistently eclipse those of the Andriukov/ Kulakovsky collective and his win proved very popular. But what of Andriukov (USA) who won the preceding Budapest Cup so decisively? Well he barely made the top 100 after a nervous last flight flying, unusually, a 6-panel winged model in very poor air and making less than two minutes.

F1A Day August 11th

The last day of the event and arguably the most exciting. By now many glider flyers had endured two days of retrieving for their team mates but were perhaps more acclimatised to the heat and with a better idea of the air conditions. Surely it would be simple doing 5 maxes with models able to launch to 100m+? Oh how wrong we were!

The forecast indicated stronger wind speeds than all previous days, but on arrival it was quite calm and so the SBTs became the preferred option for round 1. The poles were positioned behind a raised ditch and further to the south on rougher ground, not an issue for B & Cs launched from the pole but an issue

Typical implementation of iCare GPS system. Aringer F1C.

Yury Shvedenkovs (CDN) F1C splashed down in the canal, but he flew a spare to win F1C.

Yury Shvedenkov (CDN) found the best thermal to win F1C. (Photo by Zdravko Todoroski)

for these honed athletes when running perhaps? At the hooter, many started to tow and launch quickly in the benign conditions. Carter (GBR) dropped his line for an attempt but started towing again after the other two Brits maxed. Manoeuvring downwind out of trouble and in to a better tactical position, John put his foot down one of the large cracks in the soil and was clearly injured. Unable to run fast to launch properly, he got the model off but it landed nearly 1/2 minute short. Many would have given up but John battled through, in clear pain from torn hip ligaments, to complete his fights.

At 7:30 the wind picked up and increased to ~20mph by round 4. By now it was a case of flying carefully with no heroics and careful air picking. The air was smooth so you could 'kite' a model but this often meant a wider circle turn and long sprint to save a model from crashing; many didn't manage it on both attempts (e.g. Williams GBR and McKeever USA) and so got a zero score. Elsewhere various mechanical or system problems caught others out, including Edge (GBR, line break), Allnutt (CAN, ditto), Krupa (POL, wing fold) and Malila (SUI, DT angle limiter catching on bunt arm causing instant DT on bunt). By round 3 flyers were towing 'up and off' with no circling while others seemed in total control. Particularly impressive was Budovas (LTU) who was flying 'dynamic circles', i.e. the model was set to tow a slight arc on straight tow and thus has to be circled continuously, it couldn't kite in the traditional sense.

Round 4 was windier still with some calmer patches with marked air after which the last round (3 minute max) was delayed by one hour to allow all models to be returned, an extension to the 10 minutes previously applied. This round saw less wind and long calm patches where the lift built to a maximum as the infill came through. Launching at this moment centred the model in the lift and took models to over 500m high and over 2kms downwind as measured with on-board GPS units. These systems were a god-send to some retrievers who hadn't seen models launched, only to be told they were passing overhead by the GPS receiver chirping the model's position to them!

A scant 28 out of 113 had maxed out in conditions rarely seen at a championships. There were comments about the wind speed being close to the limit but it was never over it and certainly not close to those often flown in by some European countries. Again two groups were used in the first flyoff which started on time at 5pm.

Group 1 and 30 seconds from start had Danier (CAN) launching to an impressive height but heading towards the far trees. After 4 minutes the main bunch went in good air. By this time Findahl (SWE) had moved downwind to the entrance road in prime position to take advantage of marked models. He pulled the model down and accelerated to launch but aborted for some reason. He tried again, and aborted, a third time, and aborted and finally launched with

Retrievers await F1B restart. Note National Park sign in foreground.

Paul Lagan (NZL) fiddles the prop in.

Superb paintings on Ladislav Horaks (CAN) F1B model box.

Stepan Stefanchuk (UKR) won F1B this year and at previous champs in Hungary, 2003.

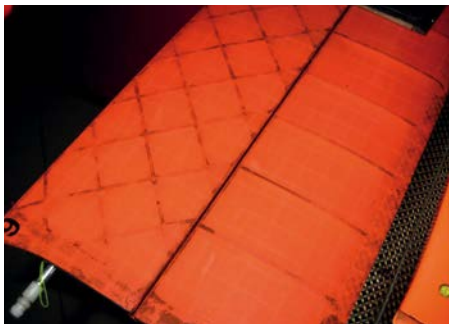
the model high on the line and with little speed on the fourth attempt. By now the good air had gone and the model sank to a poor flight. It later transpired that the line had caught around his feet and he couldn't release the line on launch, so decided to snap release assuming the air was still good.

Koglot (SLO, current European champion) then towed in but decided to fly the same model again. A good launch was ruined by a stall to the ground; maybe the model had damage? Finally at 6 minutes Lesko (CRO) flew THAT flapper, repaired after damage in 2015, to a nice max and a huge grin on his face.

Group 2 flew at 5:30. After 2 minutes Luca Aringer (AUT) DT'd at bunt and would have to fly again. The main group went away at 4 minutes including the remarkable Campbell (AUS) with a straight tow model; he maxed to much encouragement. Time was running out but Aringer had his 2nd attempt only to spin in and thus RCDT'd to save the model. Finally with a scant 30 seconds to go the final model launched and those still in the air were watched by the assembled crowd of supporters.

In the 8 minute flyoff we were now down to the last 12, five from Group 1 and six from Group 2, and also Limberger (USA) from group 1 who hadn't make the max. He lined up on the left of the line with his SBT, interestingly 'splatter turbulated' with small lacquer dimples on the wing upper surface. The air was cooling yet again and a max was unlikely, so this was it, all down to decisions made in the next ten minutes as to who would win. Lesko moved to the right, Van Wallene (NED) flying in the centre with a thermal model rather than his highly developed and self-built flappers (left circling of course!), Limberger stayed left, Budovas was 'encouraged' to move away from the line, the yellow and blue wing of Sion (ROU) in the mix as well. All the action took place between minutes 2 and 4, Lesko off early with a superb cruise heading towards the centre of the near tree line, then Fric (CZE, 1998 European Champion), Ragot (FRA, often winner of Stonehenge Cup), and then Bombek (CRO). Campbell flew under the latter,

Albert Bulatov (RUS) launches in style.



Gerhard Aringers (AUT) F1A flapped wing structure. F1C is similar.

Andra Moistus (EST) showed supreme competence in the difficult conditions. (Photo by Zdravko Todoroski)

GPS flight paths of F1A day. Note proximity of canal marked in blue.

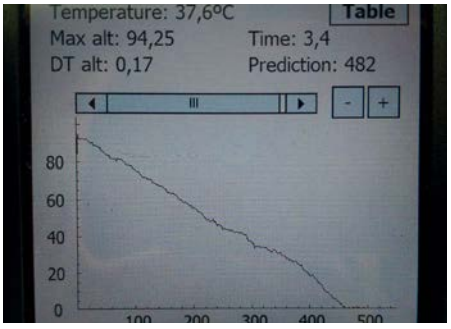
up and off, but the model stalled - it later transpired his battery voltage was too low and his timer 'browned out' on launch. As the hooter sounded the end of the period there were 5 sets of timekeepers still watching. Lesko had looked good enough to win but there was one model, LED strobe flashing above the distant trees, that looked better, holding height for some time afterwards.

The results came in to cheers from the Croatians with Bombek followed by Lesko, superb. Later on social media the altimeter trace from Igor's winning flight was published that confirmed his win by over a minute. By dint of a better third score France won the team prize and, to make things better, the overall championships (all nine scores to count); the Brits came a creditable 6th overall in front of major nations such as China, Russia and Ukraine.

The awards ceremony and banquet were held in a school hall in Szentes. After a short time the main lights and ventilation went off and many went outside to enjoy the first pattering of rain in many days. The awards presentations started and Bombek came to the stage just as the lights came on again, to huge cheers; he milked the occasion well. The last award to the overall French team was just rewards for their efforts over three hard days of competition. As well as the young members, there was Marrot (F1C) and Tedeschi (F1B) both over 80 years of age to show that age is not necessary a barrier to team success.

And so the flyers left the following day to reflect on success or what could have been, and to comment on what happens next. Social media is now the new communications method and there has been much discussion about the problems on the contest days. This report can only be a snapshot of what happened and is told as a celebration of worthy champions in Igor, Stepan and Yury but can't ignore the fact that elements of the organisation was flawed. As host nation for 2018's European Championships it is imperative that timekeeping is improved, more consideration to competitor welfare is applied (i.e. ample free water), and to be flexible and objective in making decisions to the benefit of the contest. By the same token, competitors and remote supporters need to provide constructive criticism, not negativity, to help facilitate the best competition possible. Whatever happens expect AeroModeller to be

F1A winner Igor Bombek (CRO) top of the list this time. (Photo by Zdravko Todoroski)



The winning flight data from Igor Bombek. Note temperature value of 37.6C!

Victorious French F1A Team of Ragot, Aberlenc and Trachez. (Photo by Emmanuel Ragot)

present and reporting on the action.

But what of model development you may ask? Well the SBT is the weapon of choice for most competitors, moving from F1A/C strongly to now include F1B. Perhaps surprisingly, there were more open-structure models flown across the board than in 2015, perhaps partly as a result of no early morning flyoffs which many would argue favour certain competitors. F1C saw none of the issues with low RPM as occurred in 2015 and the 4 second run is now accepted as making the max harder. The folder was king (again) but the top three included home-built examples which indicate that the technology is becoming more accessible, in the same way that early composite structures have become. In F1B some reported more motor breaks in the heat yet others, who used protection, didn't. It seems clear that these light models with long prop runs travel the furthest in lift and give the most challenge to retrievers. In F1A the winning model used a simple higher-cambered version of the Verbitsky VB50 section, ex-F1C and dating back maybe 30 years. Yes it is low drag but nothing exotic, hand built (as was the timer and hook) just well flown in a thermal to a winning position. That's what free flight has always been about, right? ●

Vive la France! Overall Team winners in 2017. (Photo by Gauthier Briere)

Unusual 'Disser' wing construction; narrow strips of UD carbon over glass cloth with foam core.

RESULTS

F1C Results - Individual

1	Yury Shvedenkov	CAN	1020	+360	+398
2	Edward Burek	POL	1020	+360	+365
3	Raimond Naaber	EST	1020	+360	+360
4	Volodymyr Sychov	SLO	1020	+360	+359
5	Virginijus Furmaniukas	LTU	1020	+360	+342
6	Briere Gauthier	FRA	1020	+360	+331
7	Gerhard Aringer	AUT	1020	+314	+322
8	Darijo Jermol	CRO	1020	+279	+315
9	Yuan Gao	CHN	1020	+360	+310
10	Michael Sondhauss	GER	1020	+360	+292
15	Alan Jack	GBR	1020	+269	
27	Kenneth Faux	GBR	1020	+174	
36	Simon Dixon	GBR	993		

F1C Results - Team

1	China	3060+38
2	France	3060+52
3	United Kingdom	3033

F1B Results - Individual

1	Stepan Stefanchuk	UKR	960	+360	+401
2	Gilad Mark	ISR	960	+360	+385
3	Rolandas Mackus	LTU	960	+360	+334
4	Ladislav Horak	CAN	960	+360	+317
5	Bojan Gostojic	SRB	960	+360	+313
6	Anatoly Rybchenkov	RUS	960	+360	+308
7	Richard Nouvian	FRA	960	+360	+305
8	Mario Kusterle	ITA	960	+360	+302
9	Alejandro Marchese	ARG	960	+360	+298
10	Stanislaw Skibicki	POL	960	+360	+295
12	Russell Peers	GBR	960	+308	+265
42	Michael Woolner	GBR	958		
70	Peter Brown	GBR	896		

F1B Results - Team

1	Serbia	2880+41
2	Israel	2880+47
3	Lithuania	2880+58
5	United Kingdom	2814

F1A Results - Individual

1	Igor Bombek	CRO	960	+360	+433
2	Robert Lesko	CRO	960	+360	+367
3	Julien Sion	ROU	960	+360	+315
4	Dusan Fric	CZE	960	+360	+304
5	Paulius Budovas	LTU	960	+360	+297
6	Allard Van Wallene	NED	960	+360	+290
7	Emmanuel Ragot	FRA	960	+360	+275
8	Dominik Andrist	SUI	960	+360	+251
9	Rene Limberger	USA	960	+360	+232
10	Vesa Varuskivi	FIN	960	+360	+220
46	John Carter	GBR	899		
58	Christopher Edge	GBR	855		
103	John Williams	GBR	631		

F1A Results - Team

1	France	2822
2	Sweden	2788
3	Slovenia	2783
28	United Kingdom	2385

Overall Team - Challenge France Trophy

1	France	8657
2	Lithuania	8601
3	Israel	8399
4	Slovenia	8264
5	USA	8238
6	United Kingdom	8232

PRODUCTS TEST – DELUXE MATERIALS

MIKE EVATT PUTS ADHESIVES AND OTHER PRODUCTS FROM DELUXE MATERIALS THROUGH THEIR PACES.

Deluxe Materials (www.deluxematerials.com) has an extensive range of products in their catalogue, and most can be used in a variety of ways. The following reviews should help you choose the right product for a particular job, and perhaps suggest some uses you haven't previously considered.

Super 'Phatic

The first Item I tested was Super 'Phatic. This is a thin, non-fuming alternative to CyanoAcrylate (CA) adhesives. It emits little odour and cleans up with water. Its low viscosity allows it to penetrate into cavities much further than other adhesives. This is a thin, white liquid emulsion. It will wick into joints and has a longer setting time than CA. It is claimed to provide non-brittle joints on balsa, ply, GRP, plastic hinges, foam and carbon fibre.

It works well when gluing up close fitting parts whether they be laser produced or hand cut. It is simply the case of assembling the components and retaining them with pins, weights or adhesive tape and applying the adhesive.

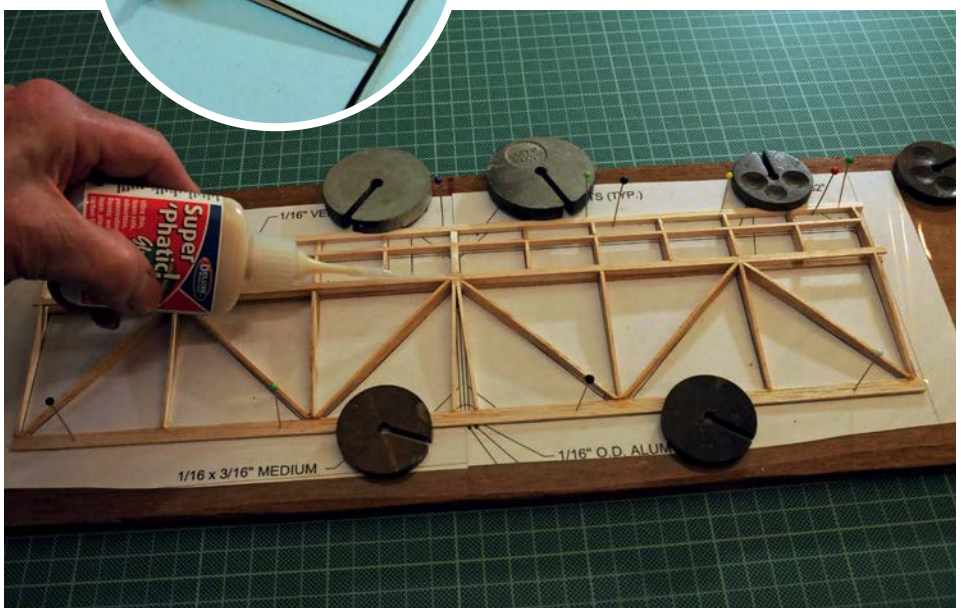
I made a couple of test pieces. A spar to rib joint and lamination of lime wood and epoxy/glass sheet. These worked well and produced joints that appear to be more robust than balsa cement, and they could be made in a more relaxed manner than CA because of the slower set time. In my tests, I found that the adhesive started to become more viscous quite quickly. At ten minutes, it was quite firm and at twenty minutes it was rigid. However, it is probably best to leave over night to develop full strength.

I also made a sample of a section of an F1B tailplane using carbon capped balsa ribs, a tubular carbon spar,

Epoxy/Glass to Lime and laser cut components joined with Super 'Phatic.

LEFT: F1B Tailplane, Carbon Tube and Balsa LE and ribs.

BELOW: Super Pearl Tailplane being constructed using Super 'Phatic.



a balsa leading edge and a carbon strip trailing edge. This worked well giving considerably more time to make minor adjustments than with CA and, although it is almost too close to call, perhaps a little lighter. Being water based it is also much easier to clean off unwanted blobs and spills without gluing your fingers to the model, kitchen paper and possibly the cat!

I completed my test of Super 'Phatic by constructing a Super Pearl E36 tailplane. This went together like a dream. OK if you have to build quickly then CA is perhaps for you but Super 'Phatic is more relaxing.

I used Deluxe Materials Rocket Glue Tips to dispense the adhesive. These are flexible appendages that can be cut short or stretched for your particular application.

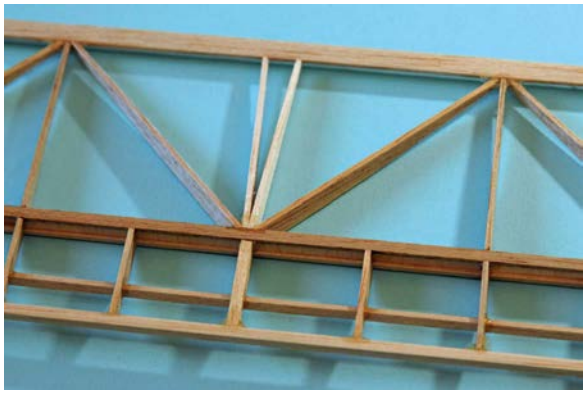
Aero Tech Epoxy

There are many Epoxy adhesives on the market but how do you choose? Sometimes the application is critical and only the best will do. I needed an adhesive that would stick an aluminium joiner to a Kevlar motor tube for an F1B. Deluxe Materials Aero Tech Epoxy fitted the bill perfectly. It comes in a linked dual syringe that makes it straightforward to measure equal quantities of adhesive and hardener.

OK it is slow - gels in 3 to 4 hours with 24 hours to a full cure! However, it is ideal for this application. The slow set allows checking and re-checking to ensure alignment. This material is non-drip and fills gaps and forms visible fillets for the highest possible joint strength. The slow set is probably the key to this epoxy's strength as quick sets are typically weaker.

Brush Magic

Like most of us, I guess, I found a



Super Pearl Tailplane constructed using Super 'Phatic.

Rocket Glue Tips useful for accuracy with Super 'Phatic and Cyano.

Aero Tech Epoxy is excellent for gluing Kevlar to Aluminium.

Precision jigging is essential.

Do ensure thorough mixing. Leave it to cure!

Fifteen rather weary brushes.

Brush Magic to the rescue!

Leave them to soak in Brush Magic.

10 from 15 is not too bad, and the others could be used for 'rough' applications.

number of almost extinct paint brushes, concealed and perhaps congealed, in jam jars and in the back of drawers and tool boxes. At random I picked out 15 examples to really test Brush Magic brush cleaner. Some of these I know were 30 years old and I had no idea what they had been use for.

After an hour or so several of the victims released their burden and could be cleansed by wiping with kitchen paper and then washing in water. I usually bind them in a strip of tissue to keep the bristles/hairs together whilst they dry. Brush Magic will also remove residues from un-polymerised epoxy/polyester resins.

Ten of the original candidates were quite restored. OK not perfect but close enough as the photograph shows. The other five I left in the Brush Magic for a while longer and these also are returned to the jam jar of salvaged brushes.

This is a good product that is environmentally friendly and virtually odour free. It is important to note that varnished brush handles may be eroded/damaged by this process, but kitchen paper will remove the mess and the brush will still be usable.

Cover Grip

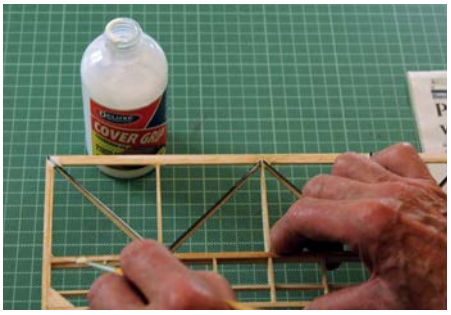
Cover Grip is a product that is similar to others on the market that are used to apply covering to model aircraft structures. Unlike many this is water based and non-flammable.

My requirement was to cover balsa/carbon structures with various cloths/plastic films. Previously I have always used contact adhesive thinned with toluene as the weapon of choice.

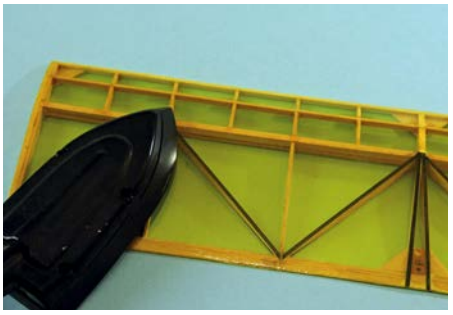
Deluxe Materials, Cover Grip appeared to be an eco-friendly alternative. At first I was a little sceptical about its ability to handle overlapping film edges but decided to give it a go. I set out to cover the E36 tailplane, mentioned earlier, with Oracover Air Indoor plastic film.

Covering proved to be quite straight forward although it was essential to make sure that the film, where it was to stick, was adequately covered with adhesive. Being water based the drying time is greater than solvent based solutions. I found I could use my normal covering iron set to a temperature of 150C just as I would for solvent based fixatives, and get a successful cover. ●

Oracover Air Indoor film, Cover Grip and Super Pearl tailplane.



Coating the structure with Cover Grip. Make sure it is fully dried before applying the film and heat.



Tensioning the film with a covering iron was no different to when using solvent based adhesive.

Valentin Aloshkin's

Maris Dislers finds that this small glow needs an up to date high speed, low pitch propeller t

Mention the name Valentin Aloshkin in conversation among aeromodellers and you'll probably get a blank state. But if you say he was the man who made the cornucopia of delightful small diesel engines (mini Mills, Elfins, Kalper, FROG Tadpole, etc.) sold by Dave Banks and Ian Russell, you get a different response. He also made short runs of replica K&B Infant 020's and McCoy 049 diesels for Messrs. Palmer, Acton and Langelius, trading as PAL Model Products of White Plains, New York. Fine performers all.

Valentin Aloshkin, an aerospace engineer in St. Petersburg, Russia took up new commercial opportunities in the immediate post-Soviet years by making model engines. It seems he was not alone, because from around 1995, a number of other innovative Half-A size engines (STELS, AME). also came out of the same region. Possibly with some common link to the St. Petersburg State University of Aerospace Instrumentation.

Valentin's first commercial offering to generate real interest was the innovative VA 049 glowplug engine aimed at ½ A Combat and FF duration contests in the USA. It featured a crankcase split along the crankshaft axis, with cast-in Schnuerle

Smaller sibling of the Mk 2 049's, Valentin Aloshkin's VA 020 was aimed at high speed performance. Mounting bolt spacing matches Cox TD 020 (when fitted with back plate mount.)

VA 020

o really shine… or a touch of ether!

Slight porosity in crankcase casting detracts slightly from an otherwise eye-catching and very well made engine.

transfer passages/ports and hard chromed cylinder bore surface, giving an AAC setup. No cylinder liner needed. Also, a threaded wrist pin carrier screwed into the piston and by adding shims between the two, piston height could be adjusted, to adjust exhaust/ transfer port duration.

In 2004 a completely revised VA 049 Mk 2 reverted to a conventional crankcase with Schnuerle-ported cylinder liner. It was regarded by many as the best performer among the Russian plain bearing 049's of the time, easily outperforming the venerable Cox TD 049. But only after switching from the original glow insert design to one with a Nelson Glow plug. More detail of the VA 049s is on Martin Gregorie's website www.gregorie.org/freeflight/f1j .

Around that time Neville Palmer had Valentin make a batch of 020 engines, hoping they would match the no longer made Cox TD 020's in AMA Payload and 1/4A Old Timer duration Classes. David Acton relates that when tried, their performance was disappointing and only a handful were sold 12 or more years ago. Evidently, Neville did not want to sell an inferior product, withholding the rest.

Normally we follow the editorial edict of only reviewing currently available engines. And the VA 020 glowplug engine almost complies. Except that the entire stock from Neville's estate of around 80 engines was sold through eBay recently, at a clear-out price reflecting no guarantee or spares backup. No more to come and nothing to do with PAL Model Products. Even so, we were curious to know why the VA 020 failed to impress. Here's what we found out with our example.

Construction

The VA 020 is essentially a miniature of the Mk 2 VA 049 engine, but with two-point firewall mounting. Valentin's usual high standard gives a positive first impression. The hefty crankshaft rides directly in a somewhat porous monobloc crankcase casting and there's a slip-in flanged brass cylinder liner with hard chrome bore. Angled slots in the liner double as transfer passages and ports, negating the need for tricky passages in the crankcase. The internally threaded aluminium piston accepts a mating wrist pin holder, as per the VA 049's.

A threaded clamp ring retains the special cylinder head insert with conventional vertical coil glow plug element and a shallow combustion chamber shape. This can be shimmed as desired to give a range of compression ratios and to compensate for piston height adjustments. The offset needle valve assembly offers a jet of fuel immediately below the threaded venturi restrictor. It comes with two restrictor inserts, for running with suction and pressure fuel feed. A generously proportioned intake tract and passages point towards high speed running. Our measurements of the various port durations back that up. Up front, a phenolic thrust washer behind the split collet and prop driver and a substantial M3 propeller mounting screw with conical spinner suggest that electric staring is envisaged. Note to self – the prop driver falls off when propeller and screw are removed. The earth-coloured anodizing would make it difficult to find, if dropped at the flying field.

On the bench

Piston to cylinder fit initially feels a little scratchy, owing to the fine-turned piston finish. Things settle in quickly and running in is essentially complete after a half dozen slightly rich two minute runs with a light propeller.

The smallest ABC piston cylinder setup we've seen. Beautifully crafted. Piston diameter is about the same as a pencil's. Innovative threaded assembly holds wrist pin captive. Shims can be added to alter piston height, adjusting cylinder port durations.

Big crankshaft intake window, 4.2mm dia. gas passage and hefty counterbalanced crankweb are designed for very high-speed running.

Threaded clamp ring retains head/glow plug insert. Cox 020 spanner fits. Also note locating pin for slot in cylinder flange. A lovely touch for such a tiny engine.

Top marks for this needle valve assembly. Fine adjustment, secure settings and easily manipulated by full size fingers.

Hand starting was not so good, particularly with the smallest propellers giving almost no flywheel effect. Bringing an electric starter into play gives instant starts. Just three or four drops of fuel into the venturi and give it a spin.

Suction was understandably poor on the larger propeller sizes, owing to the generous choke area, resulting in vague needle adjustment response. It was much better with the lighter APC 4.2 x 2, and running consistency and needling were very good when spinning the tiny Cox 3 x 1.75 size. It's best to reduce propeller load and let that boy boogie-woogie!

The VA seemed to run hot with higher nitro methane content, despite compression ratio adjustments. Platinum element diameter and its cavity size appear identical to similar head inserts used in F2A speed engines, which require a hot temperature-rated plug to match the no nitro fuel. Jacking nitro up to 30% gave around 500 extra RPM with larger propellers, but at least 1,000 RPM less with the tiny Cox propeller. We settled on fuel containing 10% nitro methane, 20% castor oil and 70% methanol as a good overall choice for establishing the basic performance profile.

As delivered, it has two 0.1mm head shims, giving a geometric compression ratio a touch over 6:1. That's low by normal glow engine standards, especially one intended for high speed running, but it's about the same as the Cox 020's. Removing one shim (for a CR of 8:1) made little difference at lower speeds, but gained around 1,000 RPM at high end speed. With only one 0.05mm shim (CR 9.4:1), performance suffered.

That left experimenting with piston shims. Overall, the VA's torque level is poor, probably because of its large crankcase volume arising from generous gas passage and port sizes. However, reducing exhaust duration ought to bump up torque, perhaps at the expense of top end power. But first, the conrod has to come off the crankpin. When new, it won't easily slide off backwards, but can be gently eased off with an L-shaped lever made from a paper clip. We added two 0.1mm and two 0.05mm shims dropping exhaust timing to 140 degrees. This job requires a suitable piston holding tool. We simply drilled a piece of scrap wood 7.5mm diameter and ran a saw slot through the hole, so it could clamp the piston evenly when squeezed lightly in a vice. With the plain end of a 2mm drill through the conrod big end as a lever, the assembly can be unscrewed. Naturally, only the minimum clamping pressure should be applied to the piston and minimal torque when tightening the assembly. Spot checks showed a modest gain in RPM of a few hundred RPM. Hardly worth the effort as things stand otherwise.

Some VA 049 owners have had their assembly work loose in service and resorted to making it permanent with thread lock compound. We had no such trouble until we added those shims. Perhaps because sightly burred edges on those shims prevented truly secure tightening. No harm done.

Tech

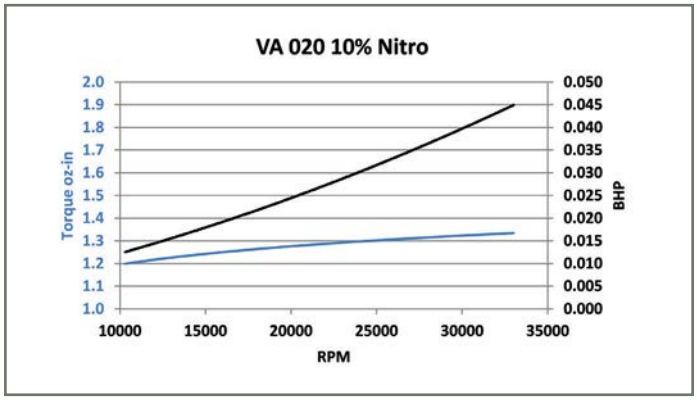
Bore	7.53 mm (.0296 in)
Stroke	7.34 mm (.289 in)
Swept volume	.324 cc (.0198 cu in)
Weight	25.4 g (.896 oz)
Mounting screw spacing	19.7 mm (39/64 in)
Height (crank centre line to clamp ring top)	29.9 mm (1.18 in)
Length (to prop mounting face)	35.4 mm (1.39 in)
Exhaust duration degrees	154
Transfers duration degrees	134
Boost duration degrees	130
Intake opens degrees ABDC	45
Intake closes degrees ATDC	57
Intake duration degrees	192
Sub-piston induction degrees	70
Suction venturi	2mm dia. 3.1 sq mm (.079 in)
Pressure venturi	3mm dia. 7.1 sq mm (.118 in)

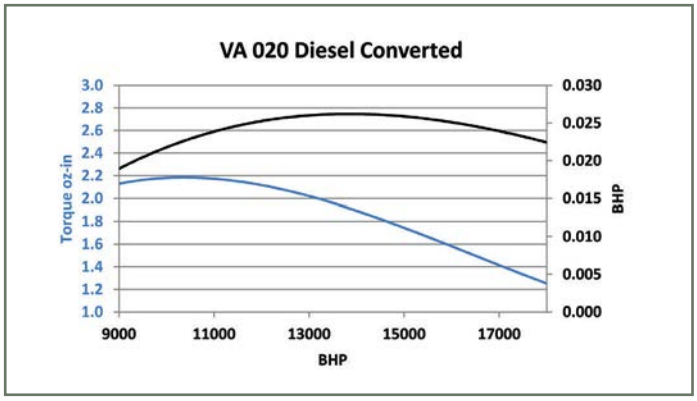
Propeller	RPM standard 10% nitro	RPM Cox head 40% nitro	RPM Dieselized
Cox 3 x 1.75	33,000	36,400	
APC 4.2x2	17,500	22,000	18,100
Cox 4.5x2	15,400	18,400	16,400
Graupner 5x2	12,500		15,200
APC 4.6x3	11,400		14,300
APC 5x3	10,300		13,300
APC 5.5 x 2	10,500		13,400
APC 5.5 x 2.5			11,200
APC 5.7x3			10,800
APC 6x3			10,000
Cox 6x3 grey			8,700

Performance Analysis

We retired after a solid day's testing, happy with how smoothly the engine ran when given its head, giving no cause to think we were pushing our luck. Preliminary data showed torque essentially constant around 1.25 oz-in but climbing a little at 33,000 RPM, suggesting that the VA's design elements were by then reaching a more harmonious operating range. Horsepower rose consistently across the tested range to an indicated maximum of .045 BHP. However, it's a long way between the 17,500 and 33,000 RPM data points. Lack of suitable test propellers leaves us unsure of what exactly happens at the VA's optimum RPM range. It apparently needs an up to date high speed, low pitch propeller to really shine.

Anyone steeped in Cox TD 020 behaviour would find the VA 020 a disappointing





functional substitute when fitted with regular "020 size" propellers. As it stands, we rate the VA 020 as a very well made decent first try in need of further development. In particular, the head/plug area could do with some good old American know-how, as that's probably the key to unlocking its true performance potential.

Further Experiments

There's not much choice of alternative plugs adaptable to such a tiny engine. Possibly a bespoke insert for one of the various Turbo glow plugs? Or the Nelson/Merlin Glo-Bee drop-in style with flat coil. Along the lines of Bob Mattes' rework of the Cox 020 engine, seen at www.flyfreeflight.com/Site/Cox_020_Rework.html . After also reworking the Cox's transfer ports, his results are impressive, reaching 27,000 RPM with APC 4.2 x 2 propeller on 40% nitro. That's a cool .075 BHP.

Sticking with conventional prop sizes, the VA 020 ought to be a reasonable runner with a better glow insert. Back in 2006, "Hopeso" on You Tube fitted a G-Mark throttle and what appears to be a Cox 049 head modified into the glow insert – you can find on www.youtube.com by searching for "Hopeso throttle 020".

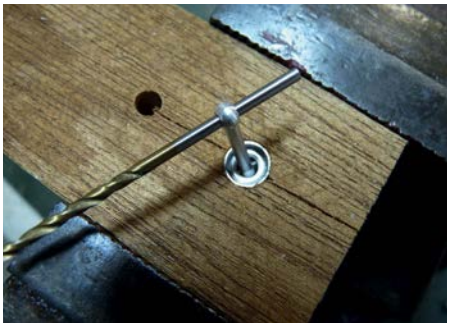
We experimented with a regular Cox 020 glow head #1032 (available from Cox International) machined down to match the external profile of the original VA button insert. In testing, the element seemed significantly colder than VA's, initially giving poorer results. After compression ratio and fuel changes, we began to see real improvement, but still with some misfire. So not yet optimum, but enough for .06 BHP, roughly on par with a stock Cox TD 020's power output. We were unsure that the tiny "010 propeller" could safely survive more than double the power originally envisaged by Cox, especially with further experiments, such as pressure feed and the larger venturi insert. So we halted experiments to extract more horsepower.

Also on You Tube "mylittlediesels" demonstrates his VA 020, converted to diesel by a previous owner (search "mylittlediesels VA 020". It runs acceptably despite the original suction venturi giving very indirect needle response. Encouraged, we made a diesel conversion insert with brass contra piston, in the manner described by Brian Winch in July 2017 AeroModeller. We also adjusted the smaller VA venturi insert by dropping a smidgeon of epoxy into the bottom & drilling that to only 1.3mm (.051 in) diameter, for acceptable suction in the target RPM range.

Wow. A complete character change. Really easy starts by hand and happy to run at slow speeds, with good needle and compression lever response. It's high speed credentials were still apparent from the droplets of fuel spitting out of the venturi (intake port closing too late), but so what. Unlike some micro diesels that need a very careful starting procedure, this one was very easy going. With needle opened up half a turn from optimum, two or three drops in the venturi (and after a turn over to suck it in) the VA would very often start first flick. Our fuel contained equal parts castor oil, ether and kerosene, plus 0.8% ignition improver.

In this form, our performance curves show 2.2 oz-in maximum torque at around 10,000 RPM and peak power of .026 BHP broadly around 14,000 RPM. Not up to a Cox Pee Wee 020 on 30% nitro, but so much more adjustable for sport model flying. Sadly, Valentin went on to pursue other professional avenues, ending further development and the VA line of model engines. Given that the irreplaceable glow plug remained unscathed through all our testing and seems bulletproof, lucky VA 020 owners should at least enjoy them for what they are. ●

Original head button (right) compared with our experimental type (left) machined from Cox 020 glow head (0.7mm taken off face and machined to required external shape). Note difference in chamber shapes, element size. Getting that right will realize the VA's true performance potential.



Our easily made wood jig allows for safe piston/conrod disassembly, without risking piston distortion.

Our diesel conversion yielded surprisingly good results. Note reduced venturi choke area for correct inlet air velocity at lower target operating speeds.

F2C TEAM RACING AT THE EURO CHAMPIONSHIPS 2017

MALCOLM ROSS WAS IN THE THICK OF THE ACTION AT GYULA IN HUNGARY.

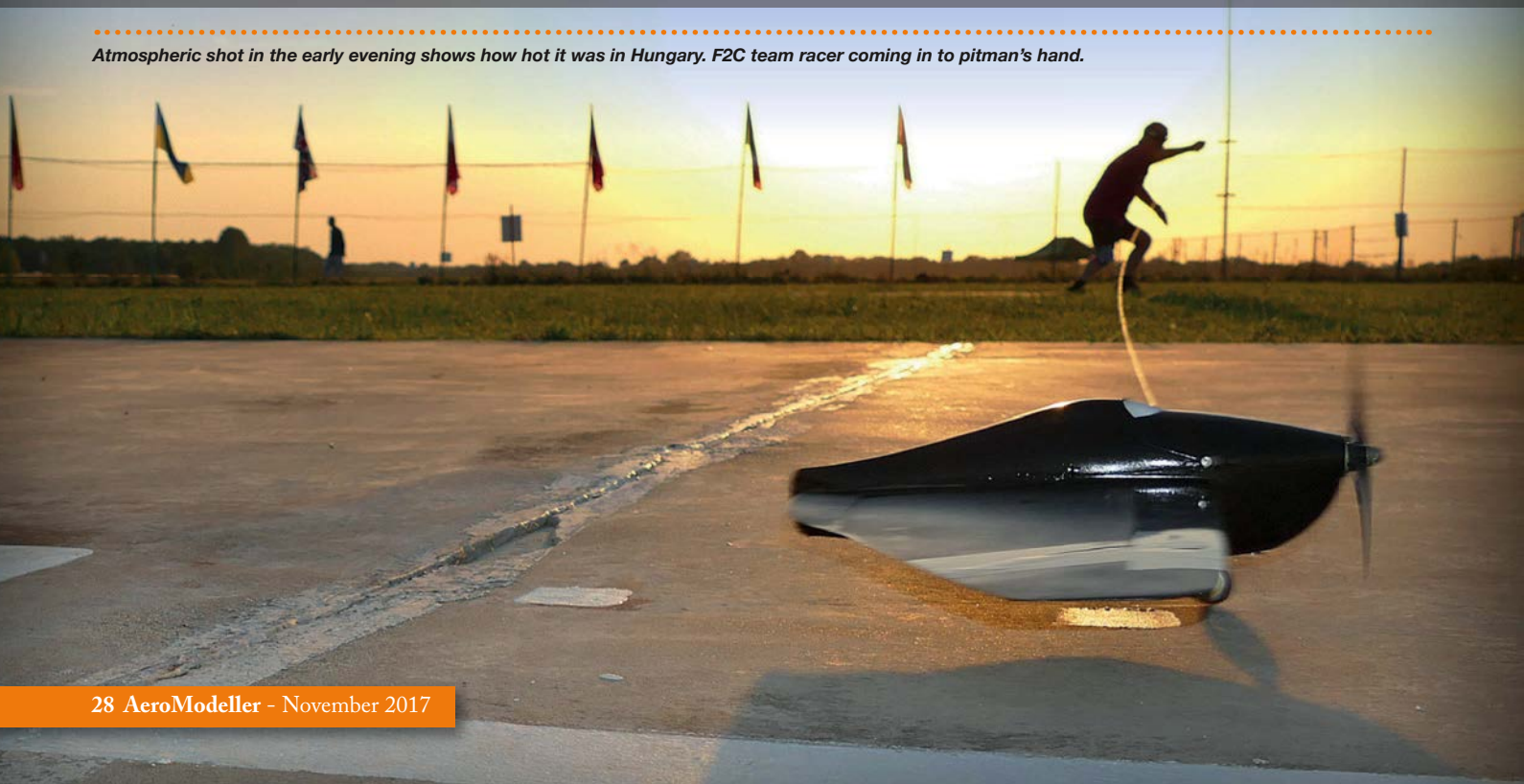
Preparations for attending this meeting began way back in January 2017 when the chosen British team received ratification from our parent body the B.M.F.A. Well, having been selected it is usual to look at one's equipment and decide which models to use and develop for the competition. That is the normal way of things, but this time a "small" rule change from the world governing body the FAI (Federation Aeronautic International) proved to alter the preparation and the whole way of doing things. F2C team racing was to have a minimum of 2 pit stops in a race. So what, just open the needle valve and make the model do less laps?!

Every competitor wished the solution was that simple. Unfortunately, the aircraft are running at peak performance and RPM, and doing just that ruins the whole set-up of the systems. We have in the past had 2 stops in a race, but that was when the carburation was allowed to be open and any diameter. Now with the regulation 3.00mm diameter choke tube, things are very different. It has almost meant a change of engines, and in some case models, to bring the performance back to an international level. Many teams have bought in complete new systems to make them competitive again. This, as we found out, was particularly so with the French representatives who were flying brand new Ukrainian gear to very good effect.

This rule change has altered the whole concept of F2C racing and now it has made the racing very like Goodyear, where tactical pit stops are the order of the day, because it is no longer a trade off between speed and range. Last championships everyone had to do 50+ laps to be on the pace, now it proved to be different. As often happens the same leaders tend to emerge, and did this time around again.

So to the contest in Hungary. The British team in all the CL disciplines made their own travel arrangements to the contest site. This time the majority were housed in the excellent hotel Erkel, adjacent to the magnificent aqua water spa/park in the centre of Gyula. Because of the high temperature this facility was more than welcome at the end of each day's competitions. The contest site was around 10km out of town, at the airport in Bekescsaba. This has been used before and is a superb site for the flying champs. Organisation was as ever in the hands of mainly one-man, Ferenc Orvos from

Atmospheric shot in the early evening shows how hot it was in Hungary. F2C team racer coming in to pitman's hand.



Tense moments in processing for Russian team Andreev/Vorobiev. Will their models pass scrutineering? Chief juryman, Rob Fitzgerald from Australia is not so sure!

Senior and junior F2C team racing teams from Poland by the main organising office at the airport in Gyula.

Past champions Bondrenko/Lerner just missed a place in the final. On right of them winners George and Pascal Surugue adjust the lines before the semi-final race.

3rd place finalists Vyacheslav Dukov prepare for the race. Note the "space-man" type fuel filling system used by the top teams.

Hungary, plus an international group of dedicated and willing group of modellers and helpers. Many thanks must go to Ferenc for all the work he put in prior and during the championships.

The British team were chaperoned by John and Val James, as team and assistant managers. Everyone was kept on their toes throughout the event, from the neat opening ceremony, right up to the final banquet.

Hungary being in the centre of a large land mass is subject to hot summers and cold winters. Well this summer was not just hot, it was scorching! As soon as we left the airport in Budapest to drive to Gyula the temperature was in the 40s Celsius and that was the early evening! 43C to 46C was the daily average for most of the week; gallons of water was drunk. Still, despite this the continental teams were used to heat and were on form. Our fastest team this time were Mike Fitzgerald and Mark Greenwood who managed to put in a 3:32 going very well compared with fellow Brits, but not in this company and heat.

By the end of the three rounds of heats, Russia, France, Ukraine, Italy and Poland contested the nine semi final slots. All these teams had put in times of between 3:05 - 3:15.2 minutes. Those on 3:15.4 minutes were in reserve spot! To the semi-final races; there were some surprises as the pressure for a good time to make the final took hold. Ukrainian engine makers Bondarenko/Lerner missed what appeared to be easy pit stop catches to put them out, as did the Russian Dozhidaev/Dukov and the second Ukraine team of Macarenko/Fulitka. However, the premier team in the world at present, Pascal and Georges Surugue of France, made no mistakes to lead the group at 3:05.8, also working well were Sergey Andreev and Oleg Vorobiev with 3:07. Come to the second round and teams were under real force to make the final; the ones who did were the Russians Sergey Dozhidaev and Vyacheslav Dukov. Missing out by tenths of a second were Bondarenko/Lerner and daddy Surugue!

The final race to decide the new European champions was a cracker. All three teams performed faultlessly throughout the 200 lap race, with only a few seconds separating the trio at the end. The French boys deserve all the plaudits for cool, calm and collected nerve. A super final and well done to all, and a great advert for one of the minority sports. To succeed at top level in any sport requires dedication, skill, thought, and competitiveness (and maybe middle age?)

FINAL INDIVIDUAL PLACINGS

	Name	Best Heat	Best Semi	Final
1	SURUGUE/SURUGUE FRA	3:05.8	3:06.0	6:15.3
2	ANDREEV/VOROBIEV RUS	3:07.4	3:07.7	6:23:2
3	DOZHIDAEV/DUKOV RUS	3:04.8	3:10.0	6:25.0

Team Results, Russia 1st, Ukraine 2nd, Poland 3rd.
Full results at www.bumacofly.hu

A Development Programme to Build Interest in Aeromodelling

Steve Midson explains his approach to working with young people.

We often hear about the need to encourage the young into our hobby of making and flying model aircraft. Herewith is my suggested Development Programme for schools, youth groups, clubs, and even Grandparents to follow based on years of experience working with young people as Midair Models www.midairmodels.co.uk (See my aeromodelling CV at the end). It is aimed at indoor flying in school or community halls where the weather can be predicted and tables set up for building.

Note, these are my thoughts, not those of editor although he may agree (I am all for us encouraging the young as I was as a child – Editor), similarly you may agree or adapt to your circumstances.

Guiding Principles

Rule 1 – In order to maintain interest, every model made Must Fly First Time! Failure will stop the interest chain, and may put them off for life.

Rule 2 – The models must be light and quickly made so enthusiasm is not lost because construction is taking too long.

I also think it important that the maker decorates their model to increase involvement and ownership – some of us spend more time decorating than building or flying!

Stage 1: From about 6 years old upwards, start with a simple glider made from expanded polystyrene or depron type material or pizza base. A typical design and suggestions are given here, alternatively the BMFA Aerojet or Midair Models Delta gliders are ideal.

Photo-copy enlarge the Delta diagram

Children get a real sense of achievement from building, decorating and flying a simple Delta. This is just the start!

Ideal Stage 7 model is the Gyminnie Cricket which will give an excellent introduction to indoor duration. Kits are available from the BMFA and other specialist model retailers.

to 16 to 18 cm span, cut out templates in card and then the pieces in foam. Help the child glue the pieces together and decorate. Depron type materials should be scratched with glasspaper to help the PVA glue adhere.

Though small, these are real aircraft and teach at least 3 of the basic lessons of aeromodelling and flying:

- To launch straight forward at flying speed like a catapult on an aircraft carrier, not throw!
- The need for balancing – too much weight at the back, it won't fly!
- The effects of the elevons and rudder to make it loop, roll, turn.

Oh and if you tread on it or treat it like a rugby ball, it breaks!

Stage 2: A more advanced solid balsa glider or lightweight foam Midair Models Spitfly and White Hawk, also West Wings simple gliders and many other designs, but remember to keep the model light, and paper/card will quickly bend or kink upsetting its flying qualities.

Simple solid balsa gliders tend to fly fast with potential damage to both model and what it hits!

Stage 3: A depron or similar, wing on a stick fuselage with push on propeller unit – some excellent flights can be obtained. Try 3/32 inch (2.4 mm) rubber instead of 1/8 inch (3.2 mm). The use of Tan rubber goes without saying, do not try using "rubber bands".

Stage 4: Having been successful at stage 3, something that looks more like an aeroplane is required, and the easiest way is to cut out two fuselage shapes, glue one to each side of the motor stick, glue the top edges together – then decorate.

To keep the model light the best material for this is 2mm thick expanded polystyrene "Wall Veneer" obtainable from DIY shops - a 9 metre roll will provide 100 plus fuselage sides! Use PVA to fix. 1mm or 2mm Depron can also be used.

The Stage 3 Stick and Stage 4 Texan and Spitfire are this month's Free Plans.

Stage 5: Something with a "block" fuselage using ceiling tiles or hotwire cut expanded polystyrene. Turn the motor stick on its side to give a 9mm thickness if using a push on propeller assembly.

Note I have intentionally bypassed the many printed sheet balsa kit models that are available as I consider these tend to be heavy for their size, liable to warp, and are overpowered for indoor flying.

Stage 6: It is time for a BMFA Dart model, which needs care and patience to build. It is a perfect introduction to "stick and tissue" construction, and with a 3/32 inch motor, rather than the one supplied in the kit, will produce fantastic flights.

Only one instruction - "Follow the Instructions"!

Stage 7: By this time they must nearly "be hooked" and the next step is a more advanced built up model of which the BMFA Gyminnie Cricket is an excellent design for indoor flying or very calm outdoors. Alternatively for outdoors a slab sided, high-wing, built up, tissue covered model – a West Wings Topaz for instance, or one of many other kits available. However, keep it simple, do not be tempted to make a complex Spitfire model just yet! The use of precut (traditionally diecut but increasingly lasered) parts is a good idea which takes away a lot of hassle!

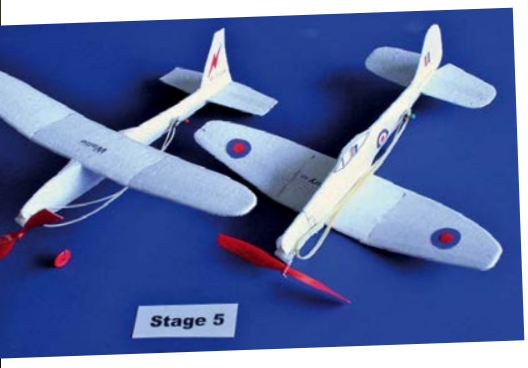
Having reached this stage and learnt all about balancing, trimming, launching etc. You can consider the next step to powered, competitive duration, or semi-scale models and encouraging the youngster to join a club etc.

What is most important is that both the teacher and students enjoy themselves!

Working with Children

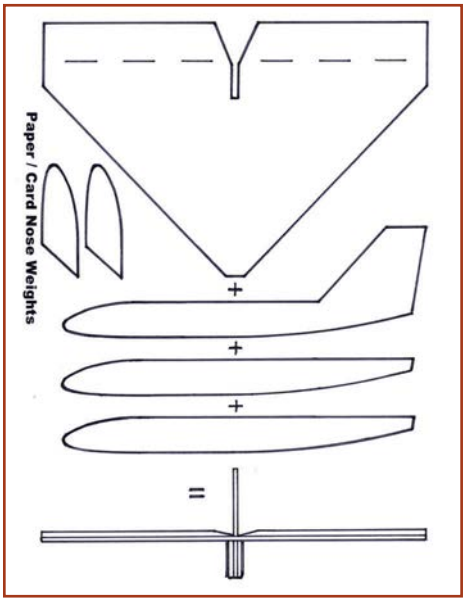
Teaching young people brings with it a variety of child safety and protection issues that you need to be aware of. In most cases you will organize your model building and flying activities through the teacher, youth leader or other adult responsible and be guided by them. For occasional working with children this responsible person(s) would always be present and you will normally not need to undergo an official vetting procedure, but for regular working with the young or vulnerable adults you will need a DBS (Disclosure & Barring Service) certificate (formerly CRB checking).

The BMFA (www.bmfa.org) have guidance for persons working with children and vulnerable adults and can assist you in obtaining a DBS certificate, as can other organisations working with young people such as Scouts, Boys Brigade, churches etc. ●

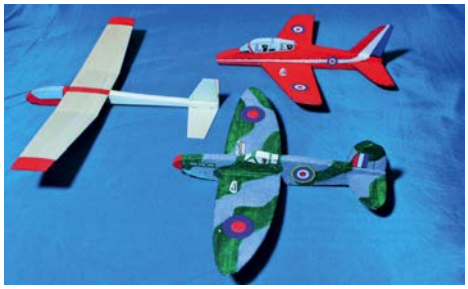


Stage 5 models have a "block" fuselage using ceiling tiles or hotwire cut expanded polystyrene.

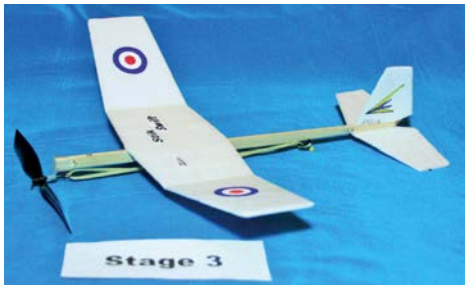
Models made from the Delta diagram, plus BMFA Aerojets and Midair Deltas - all good first gliders.

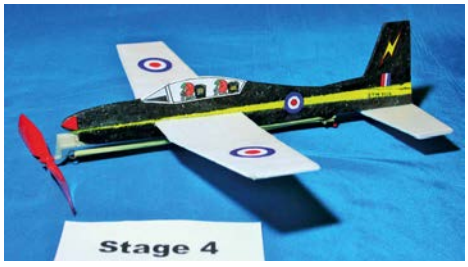


Enlarge this Delta on a photo copier so the wing span (width) is between 16 to 18 cm for a simple Stage 1 glider. File available at www.aeromodeller.com



Stage 2 gliders are a little more complex and include the Midair Spitfly.





Stage 3 introduces rubber power and a simple stick fuselage, while Stage 4 embellishes this to produce something that looks like a full size aircraft. Both are this month's Free Plans.

THE STICK, TEXAS AND SPITFIRE

Stage 3 and Stage 4 Models designed by Steve Midson.

So the early part of this article describes my Proposed Aeromodelling Development Programme, aimed at Youth Groups, Scouts, Guides, Schools etc.

If you know of someone who would benefit/could use these articles, please pass them on, OR even better, offer to go and help and pass on your own modelling experience.

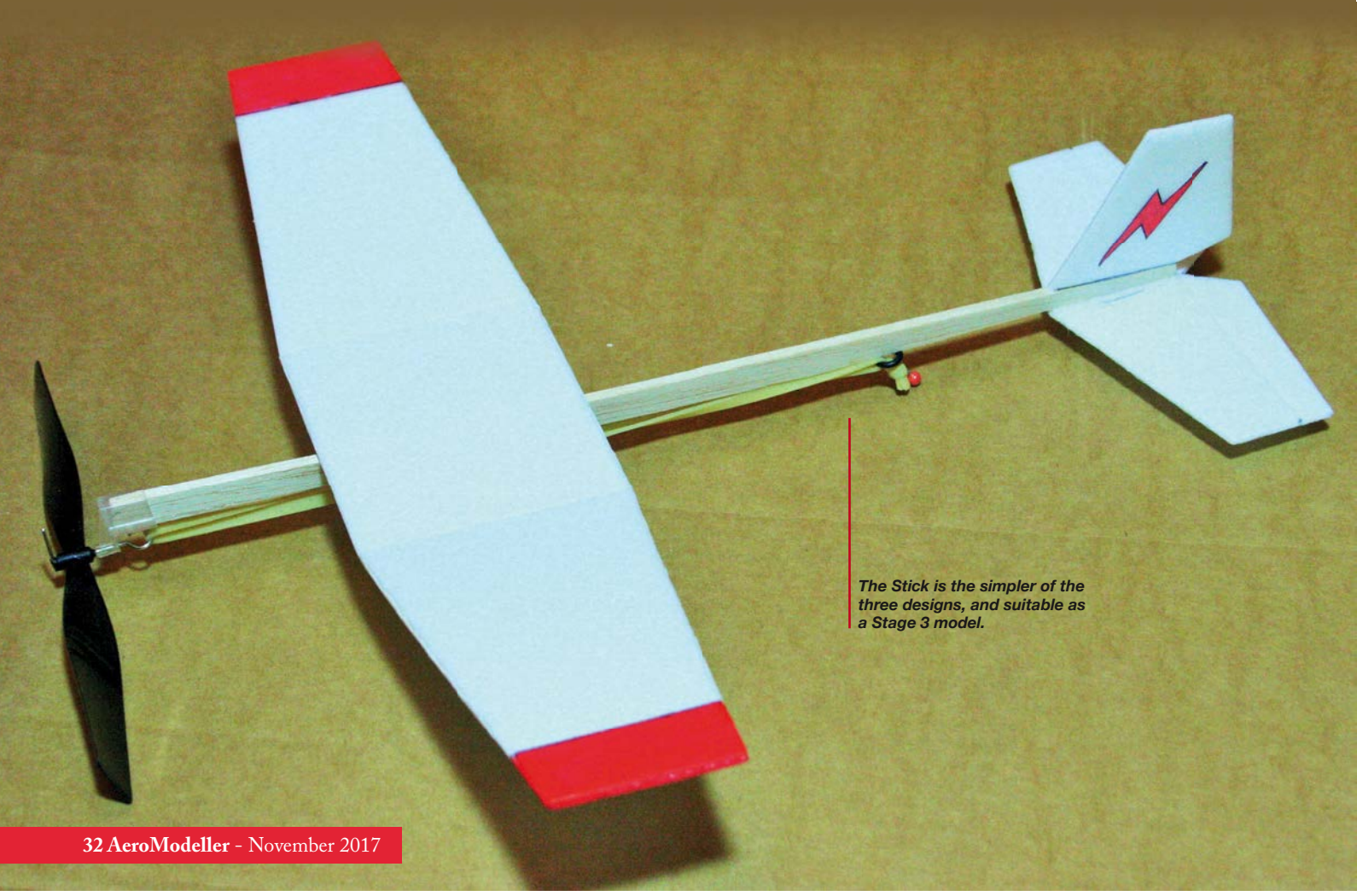
The Free Plan is a series of templates to make 3 different models:

- Stick, a Stage 3, simple stick bodied flyer.
- Texan, a Stage 4 model based on a Pilatus PC9 turbo prop trainer aircraft. This was built and flown in the USA and several other countries and called the "Texan II" (we called the Texan I the Harvard!) - hence US decorations are provided.
- Most youngsters today will "see" any propeller driven monoplane as a Spitfire, any biplane as a Tiger Moth, any Jet a Tornado (sometimes a Eurofighter). So the 3rd model is enough like the full-sized to be called a Spitfire!

All 3 models use the same balsa motor stick, and the Stick and Texan use the same wing.

As drawn the design assumes that the wings and tailplane will be 3mm Depron or similar, and the fuselage sides 2 mm thick polystyrene Wall Veneer, thin Depron could also be used. If you only have 2mm Wall Veneer it is possible to glue two layers together then add "Magic" tape over the edges to give the necessary strength. By "Magic" tape I mean 3M Scotch Magic Tape - it is the very thin, non-shiny sticky tape that is almost invisible when stuck down.

Just discovered in B&Q is another possible material, a 4mm thick Insulating



The Stick is the simpler of the three designs, and suitable as a Stage 3 model.

The Texan and Spitfire go a step further than the Stick to have the looks of real aircraft.

Lining Paper comprising a layer of foam with a paper backing. With care it is possible to pull off the paper leaving a 3.5 mm foam sheet very usable with these models and ideal for Stage 1 gliders. “Magic” tape bent over the leading and trailing edges gives adequate strength for flight and landing.

If your foam sheet is supplied from a roll, it is possible to flatten any curvature in the foam use a rolling pin on the convex side with the other side on a surface that “gives” e.g. a carpet.

The design also assumes the use of a 140 mm or 150mm, “push on” propeller assembly as supplied for BMFA Darts and other models. Check for propeller (prop) balance about the shaft, cutting off a little from the heavy end to correct.

Preparation then Building & Flying

If you are building the Free Plan models with a close family member you will probably merge the different steps together, but where planning to work with a school or youth group you will prepare the basic templates, materials and tools before going to the venue. Just to make it clear, I use a tool such as scalpel or sharp knife in my home workshop to cut-out the card templates, but I do not take this with me to the build and fly sessions. I have a stock of child ‘friendly’ scissors (both left and right handed) for the children to cut out markings (and foam sheet if I haven’t supplied precut pieces.)

Start by getting 2 full size copies of the plan, one mounted on thick paper or card for the templates, one on thin paper for the decorations. If making a batch of models, stick the templates to thicker card. You will also require a scalpel or equivalent which gives a square cut. Cut out the various “slots” on the templates so you can later mark through on to the foam to assist with alignment and balance.

You will also need some glasspaper (AKA sandpaper!) stuck to a square piece of wood, and a ramp typically 30 mm lift over 200mm (to assist in abrading the dihedral angle), and some masking tape.

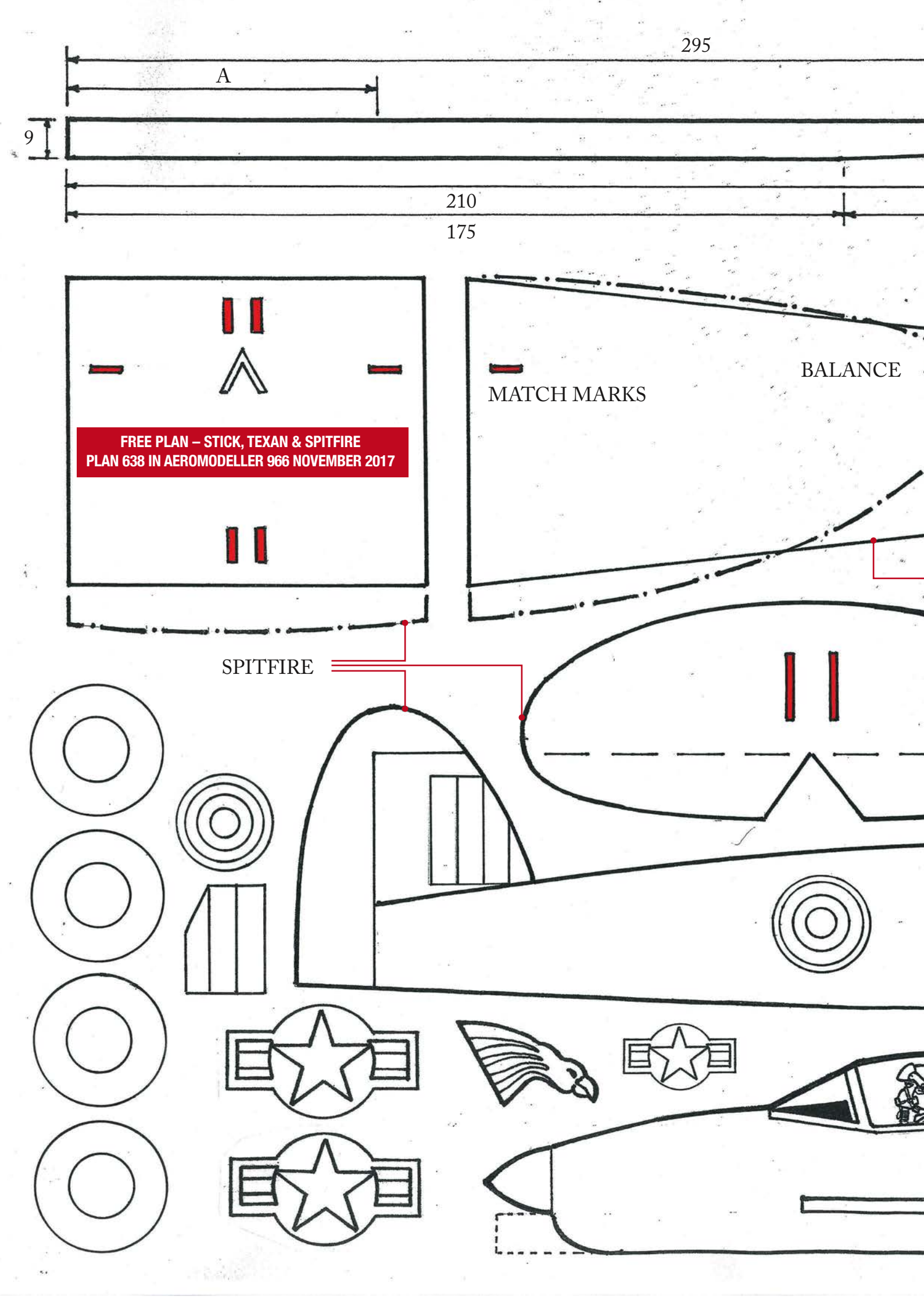
The templates are finished size. Mark round the outside of the templates with a ball point pen on to the foam then, when cutting out, cut off your marked line to leave a clean piece. Cutting the foam with scissors tends to give a rounded edge.

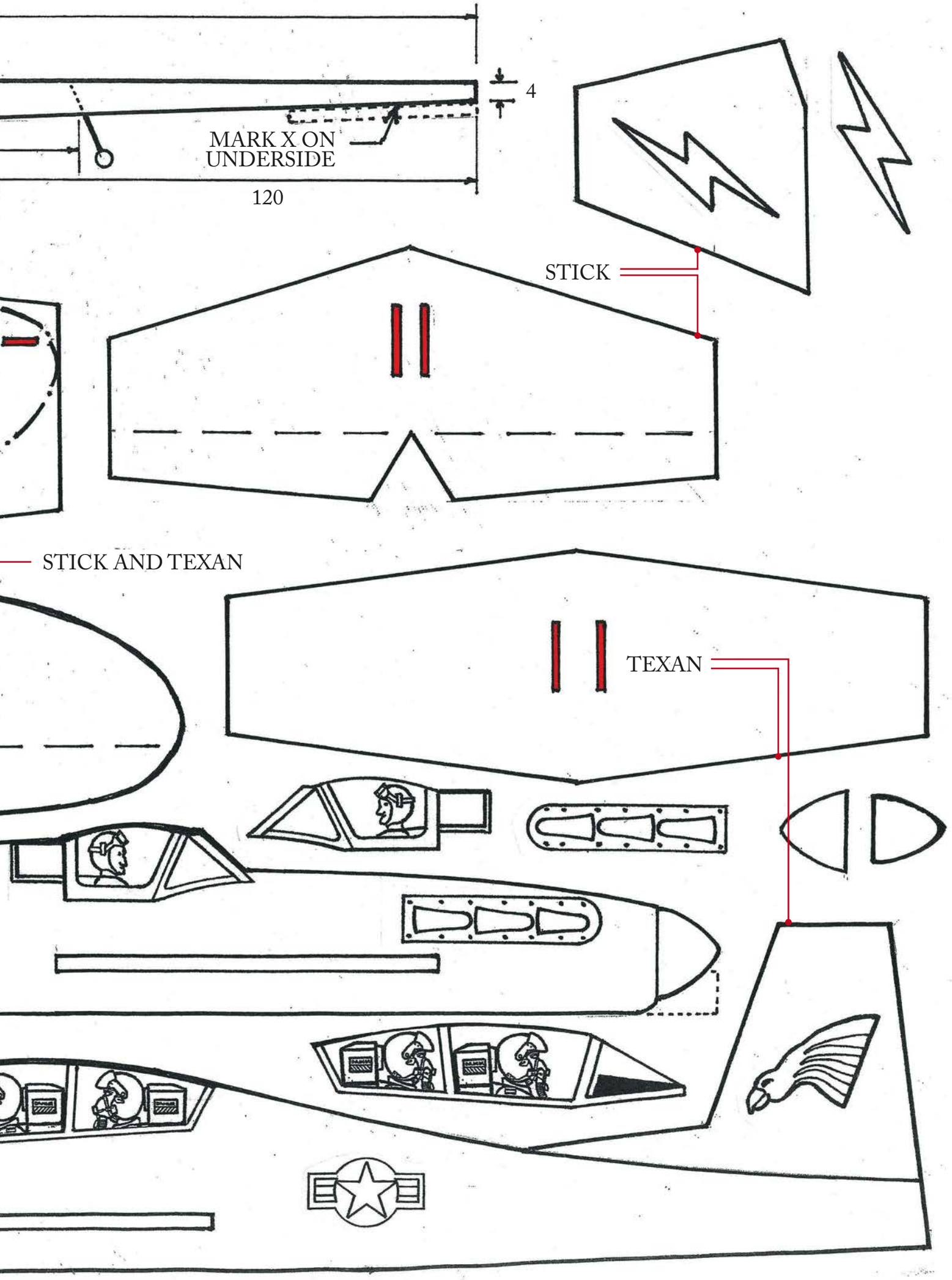
I will not challenge your abilities by giving step by step making instructions, only to highlight some important features.

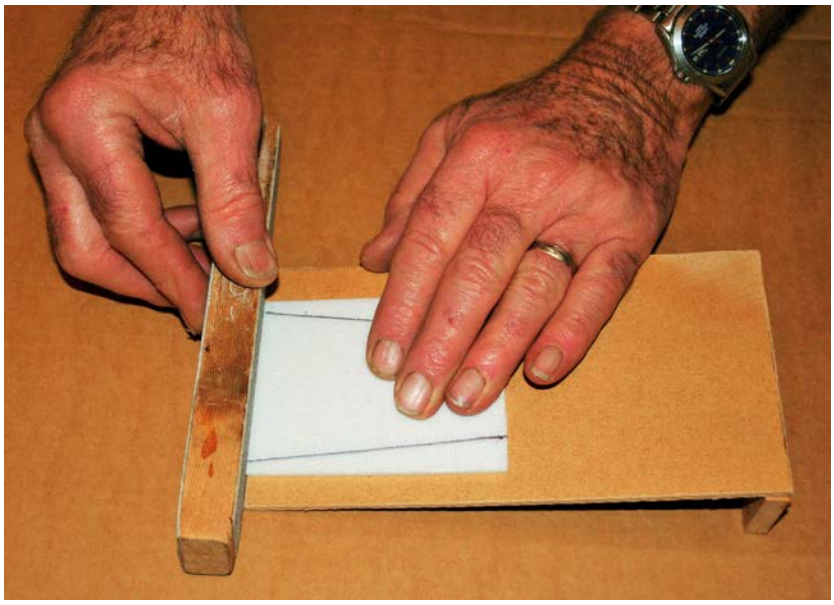
Making the Wings

Mark and cut out the wing pieces, remember to produce a pair of right and left hand outer panels by reversing the

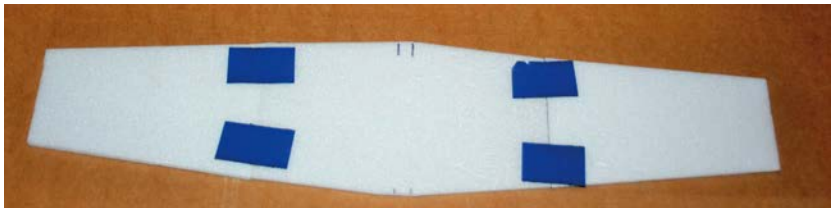
Use a rolling pin to remove the curl from a piece of unrolled foam sheet. Make sure this is done over a carpet or a surface with some ‘give’.


295
A
9
210
175
MATCH MARKS
BALANCE
FREE PLAN – STICK, TEXAN & SPITFIRE
PLAN 638 IN AEROMODELLER 966 NOVEMBER 2017
SPITFIRE


4
MARK X ON
UNDERSIDE
120
STICK
STICK AND TEXAN
TEXAN

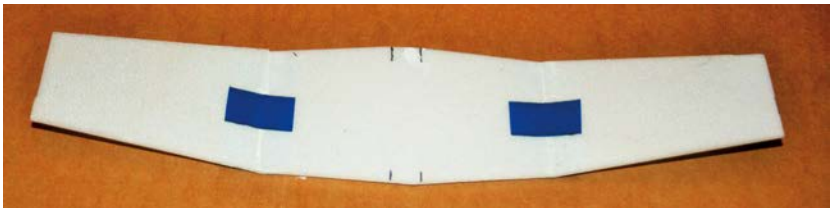


Place each wing piece just hanging over the edge of the prepared ramp and form the dihedral angle by gently moving the glasspaper block back and forth.



With the wing panels upside-down (marks upwards), apply the 4 sticky tape "hinges" to hold the wings together.

Opening up the "hinges" to apply thin beads of glue.



Using 2 more strips of sticky tape on the top side to hold the dihedral angles while the glue sets.

template. The match markings on the wings are on the underside, and when bevelling the dihedral angles the markings must be down.

Place each wing piece just hanging over the edge of the table and form an angle by gently moving the glasspaper block back and forth. Repeat for all 4 edges of the flat centre section and outer panels.

Place the pieces together with the marks upwards, so the edges just touch, and put 4 sticky tape "hinges" to hold them together. Note that coloured tape has been used to show up in the photo – better to use masking tape. Open up the "hinge" and put a thin line of glue along one edge.

Close up until the glue squeezes out and place another strip of sticky tape over the top to hold the angle until the glue has set – you can also prop each tip about 15mm with the wing centre-section flat. Check that the angle is the same both sides.

The Motor Stick

I am a great user of a "vibro saw" with an adjustable fence on the table. I believe most schools have these and they are ideal for cutting the 1/8 inch / 3 mm balsa.

Note, do mark the X (Cross) at the angled rear end of the fuselage stick as this is DOWN - if you can see the cross when the tailplane has been fixed, it has been done wrong!

Dimension A, the position of the wing leading edge on the motor stick, depends on the model: it is 70 mm for the Texan, 60mm for the Spitfire, but for the Stick it is found by the method described in Assembly below, to ensure no added nose or tail weight is required.

Assembly

All 3 models have the same "stick model" assembly, with the Texan and Spitfire having the additional foam sides glued either side of the motor stick and together at the tops.

I prefer to use "wash-offable" PVA glue with youngsters but only thin lines of glue should be used, something kids seem to have a problem with achieving! Too much glue not only takes longer to set but adds unwanted weight.

If you are in a hurry, narrow double-sided tape can be used to give an instant fix, but it is not permanent, and fillets of glue should be added in the corners.

To find Dimension A, and hence the location of the Wing on the "Stick" model, assemble the motor stick, propeller, tailplane and fin (including any decorations) and a rubber motor, then find the balance point – pins held each side make finding this easier. Put a mark on the top edge then put a

2nd mark 25 mm towards the prop. This where the leading edge of the wing goes. Make sure the wings are exactly square to the motor stick.

When gluing the foam sides you will need some thin (say 6mm wide) strips of masking tape to "stitch" pieces together whilst the glue sets. You can clean up the edges using damp wet and dry glasspaper.

If using thick (4mm) foam sides it is best to cut off both fins, then fix one only in the middle when the glue has set

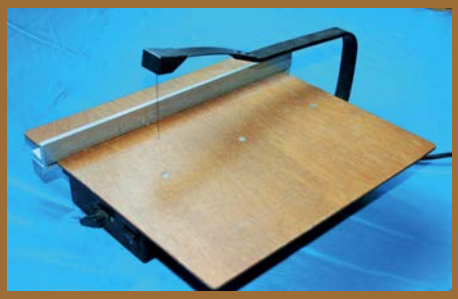
SUPPLIERS:

1/8 inch / 3mm balsa any model shop and some craft shops.
Propeller Assemblies – BMFA, Flitehook, SAMS Models and others.
Depron – Flitehook, SAMS Models and others.
2mm Wall Veneer – DIY / Wallpaper suppliers.
4mm foam – B&Q
TAN Rubber – Flitehook, SAMS Models, Freeflight Supplies.
Complete sets of parts can also be obtained from Midair Models (made to order, as they are not stocked.)
www.bmfa.org
www.flitehook.net
www.samsmodels.com
www.freeflightsupplies.co.uk
www.midairmodels.co.uk

Decorating

Felt tip pens take a long time to dry and tend to smudge when used on the foam, so colouring only the paper items is suggested. More advanced colouring should (sparingly) use acrylic paints.

Always colour the selected paper items before cutting out, and glue them in position with a thin line of glue round the edge only. A blob of glue in the centre means the edges will curl up!



Vibro Saws. The green / grey one is an Aeropiccula saw. This is superior to the other one (that has had the platform extended and an adjustable fence fitted), in that the blade does not want to wander.

Balancing

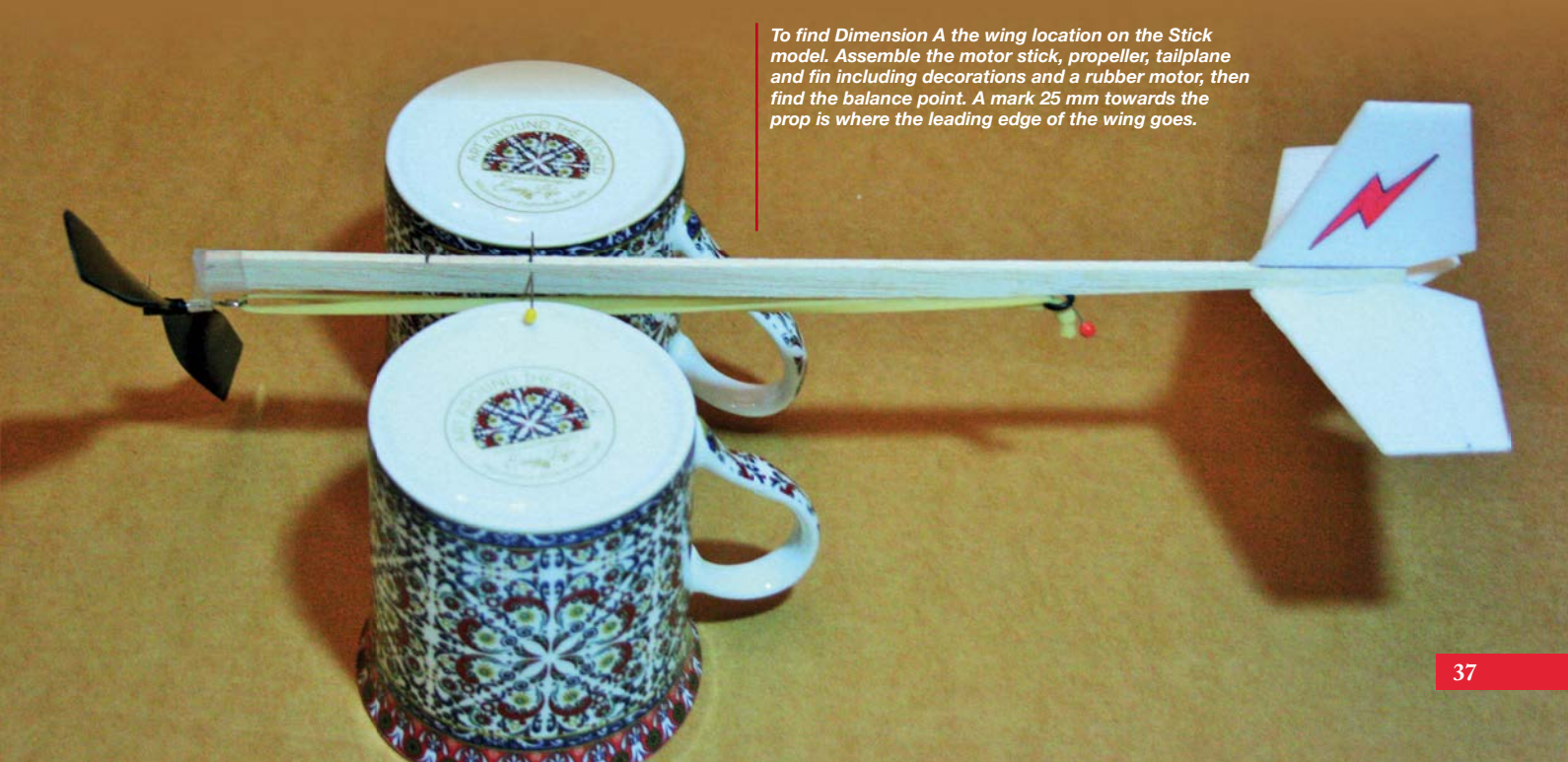
At the tips of the wings should be marks which indicate where the model is to balance. Press pins into the ends of the wings and add weight as needed to get the motor stick horizontal when supported by the pins.

Flying

The instruction I give is "Hold the model near the nose and wind the propeller Clockwise looking at the front." Often kids wind the propeller backwards and it won't work! (In this digital/smartphone age how many kids see an analogue clock-face to know this instinctively? - Editor)

Gentle, straight and level forward launches are required (NOT THROWS!) - start test flying with a "powered glide", just a few turns on the motor building up to longer flights. Bend the foam for rudder and elevator adjustments.

Without a propeller and rubber motor, if correctly nose weighted with Plasticine or Blu-Tak, these designs make excellent Stage 2 Gliders. But let the child's natural curiosity lead them to play and experiment, as this teaches the importance of having the correct centre of gravity, and what the control surfaces do.



To find Dimension A the wing location on the Stick model. Assemble the motor stick, propeller, tailplane and fin including decorations and a rubber motor, then find the balance point. A mark 25 mm towards the prop is where the leading edge of the wing goes.

Steve appeared in January 1972 AeroModeller with this model hot air balloon plan.

Aeromodelling CV

Steve T.Midson – Aeromodelling Autobiography

One of my earliest memories is entering a blue painted solid balsa model aircraft in the Scouts Modelling Competition in 1947. It was due to be awarded 3rd prize until a built-up model covered in Izal toilet paper was brought in to take 1st prize and my model dropped off the prize list - childhood experiences can be very memorable and formative.

My first successful rubber powered model was a FROG Midge kit, 3 shillings and sixpence (17.5 p) from Hamleys – It flew right down the garden on its first flight. I made another a year ago and was impressed that I was able to assemble the small and fiddly bits when I was about 10! - it too flew well. Sixpence (2.5 p) weekly pocket money was spent alternately on a sheet of balsa and a tube of OMY balsa cement from the long since gone Chingford Model Aerodrome shop.

Training to be a Handicraft Teacher (CDT in modern parlance) was quickly changed to an Engineering Degree and Career. However, teaching continued on and off running after school, and summer camp model making classes – using mainly balsa.

I had been fascinated by my father telling of (probably pre WWII) Japanese made tissue hot air balloons, and experimenting lead to an article and plans in the AeroModeller January 1972 issue. It was at this time that the title 'Midair' was created – a mix of my surname and flight.

I still occasionally make these tissue balloons with groups, and use them regularly with my 'Air' lectures to demonstrate that heated air expands and is thus lighter. Indeed a photo of them appeared in the March 2017 AeroModeller.

In about 1987, a work colleague Geoff Jones, who at that time was big in EzeeBee duration (unfortunately he has recently had a serious stroke and will not be flying again), said " They have started making model aircraft out of expanded polystyrene, you should try it."

A roll of wall veneer foam was purchased and wow, 60 'Vulcan' shaped gliders for less than £2 – ideal for the summer workshop. Development of built up, rubber powered models followed leading to a series of articles in AeroModeller from July 1989 onwards.

The first models flew well, but were very light and somewhat flimsy, and were not suitable for 'Yoof' so they were simplified and strengthened. Then someone asked me to make some kits – which I did and still do to order.

It was at the SAMS Watford indoor flying meetings that make and fly workshops started in a small way, and over the years these have developed into about 50 workshops per year with youth groups, schools and with the public at exhibitions.

With a few minor revisions, the original Delta gliders are still being made with over 30,000 to date, as well as a range of quickly and easily made models under the Midair Models title – see www.midairmodels.co.uk . These being light, fly well.

Unfortunately the computer/game console/ smartphone has has had a severe impact on youngsters making models etc. However, when they do get the opportunity they very much enjoy it, and it is important to give the young people of today the opportunity to be creative and use their hands – these are the engineers, technicians, and craftspeople of the future.

I often get feedback saying "the seeds of interest" sown during workshops have lead to engineering and similar degrees, and careers.

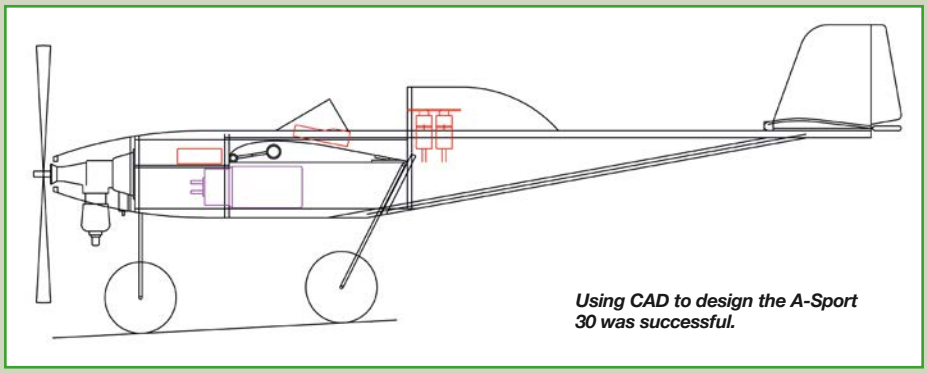
Steve Midson can regularly be seen at shows such as the London Model Engineering Exhibition helping children build and fly foam Deltas.

Give CAD a Chance

PART 4: *Bob 'Sideshow' Davis on the built result of his CAD endeavours.*

As readers of CAD Part 3 in June AM will know, I designed a small free-flight model to compete in the Bowden Trophy. Well I finished it and got it to Barkston Heath for its maiden(!) flight in Round 1 of the contest. That's the only good bit – it was too heavy and the engine mount was falling apart; it didn't get off the ground.

Several people recognised the model from the article. If anyone laughed, I didn't see them. Thanks.



Using CAD to design the A-Sport 30 was successful.

Excuses…

• The Timer – weight of – really sank me. In such a small model the only place for it was just behind the engine – so that dragged the CG forwards a lot. Then I had to add a stack of lead under the tail to get the cg back before I could get any kind of a glide out of it. Should have used a small external visible fuel 'tank' like most other people did.

• The little Enya – brand new before it went in the model – had plenty of grunt but took such a whack to get it running forwards that the beautiful little spun aluminium engine mount that came with it was starting to fail before the contest. I botched it up as best I could but it's first and only attempted take-off was probably with a leaking back-plate (same screws as hold the engine mount).

• Nowhere to test fly FF round here. What chance have you got from that starting point?

Good Stuff…

• The skeletal rear made from 5x3 (5mm OD, 3mm ID) tube certainly worked. Incredibly stiff and strong. 4x2 would have been quite adequate on this model. I shall certainly progress this approach on a 4-channel RC design.

• The wrapped carbon tube based wing was easy to make, very stiff and strong. Over The Top in the context of a small free-flight model but certain to reappear on an powered 55" hot-rod biplane next spring. It gives a very "period" looking wing while at the same time delivering a very clean aerofoil. This is something I've achieved before with a plywood box-girder approach and used in a "fake vintage" design, but the carbon tube really opens the door to getting that period look on much more aerobatic models.

• I know from comments on the day and emails seeking help that people had been struggling to pass first base with CAD before the articles. That's why I did it.

Unfinished Business? Maybe. However, the model's intact and a machined-from-solid engine mount would sort it out. In fact my mate Kevin reckons he could 3D print one. I'll see how I feel at Christmas.

Anyone want a lump-of-brass timer free? First email to bob.davis.design@gmail.com gets it.

The A-Sport 30 before the Bowden Contest. I'm sure Bob would recommend running in the engine and test flying before the event!

CL AEROBATICS BRITISH CHAMPIONSHIPS

PETE TINDAL REPORTS FROM THE STUNT CIRCLES AT THE NATS - NATS SPEED & TEAM RACE NEXT MONTH.

Apart from the terrible journey to Barkston Heath because of the first promised sunny Bank Holiday for ages, things looked good. It is usually windy, rainy, depressing and frustrating, so we were in for a great competition providing it didn't break. The horrendous journey was welcomely followed by an early entry to the site, alleviating the rush to gain you're chosen spot.

Control line Aerobatics was once again on the usual runway, with the Trade section being returned to its previous position by the concrete pad at the far end of the site. Due to the runway being re-finished, rubber mats were supplied for use by the IC powered aircraft in order to protect the surface from fuel spillage and exhaust gasses.

Pilots briefing was at 9.30 on the Saturday morning, detailing the way the competition was to be run and the safety regulations to be followed. Also the fact that our regular judge John Bonner was unwell, a decision was made by our CD Alan Watson to step up in his absence and share his CD duties with Mervyn Jones, F2b rep on the CLTC. (Control Line Tech Committee) Jeff Smith was our other judge with Roger Ladds being the judge for the flyoff. After pilots briefing, Barry Robinson volunteered to do the judges warm up flight before the comp started.

The event was blessed with superb weather with wind approximately 4 to 6 mph straight down the centre line of the runway, however straight into the sun as well! There were few incidents to talk about with most flyers more or less where they would have expected. Bill Daniels' problems continued from past weeks and Steve Foster was becoming very confident with his Laurie Malila

Yatsenko Shark having damaged his Under Pressure during practice some weeks before - during a downtime fiddle with this model, the shaft on the aging motor broke, forcing Steve to fly his classic in F2b. Sadly this was with an overrun in one round followed by an early engine cut in another flight costing

Flyoff group. From left, Steve Smith, Kevin Morgan, Brian Turner, Judge Jeff Smith, Glen Alison, Pete Tindal, Mark Williams, Mervyn Jones, Roy Cherry, Barry Robinson.

Tony Johnson releasing for Dick Stepney.

Roy Cherry's Shark is half way through a re-finish.

Glen Alison's beautiful Maxim own design.

In the foreground Kevin Morgan's Yatsenko, and Mark Williams Dago Red.

Barry Robinson designer/builder of Dago Reds.

Glen Alison's vintage model.

valuable points that could have seen Steve in or close to the flyoff.

In the qualifying rounds for the flyoff, Roy Cherry led the way with a superb score of 2101.9 flying his recently obtained electric Yatsenko Shark, followed a way behind by Mark Williams on 2054.1 flying a Robinson Dago Red, also electric. In position 3 with 2033 was Graham Leatherland flying his own design IC model, closely followed by a 2030.6 score from Pete Tindal's IC Shark, Retro 68 powered, who didn't fly in the last round following a destroyed schedule caused by turbulence from a strong drifting thermal. Pete was offered a re-flight by the CD but declined. 5th place went to Kevin Morgan with a healthy 2021 with his Yatsenko electric model, very closely followed with a 2019.7 by Steve Smith with his OD Yats Maths electric model. Mervyn Jones flying a piped motor in a Dave Fitzgerald designed Thunder Gazer with a 2003.3 score made 7th and Brian Turner with another mathematical Yats on1994.7 made 8th place. This left only 2 more places in the fly-off and these were awarded to Glen Alison in 9th with1989.4 and Barry Robinson in 10th with1988.4.

Both blinding sun and drifting thermals probably had some small effect to all of the preliminary rounds but it was still the best Nationals for years.

The Top Ten

The flyoff competitors were then randomly drawn into 3 flying rounds during the evening of Sunday, for a completely new competition on the Monday. This meant that from a spectators point of view, there would be 30 flights of a good standard to enjoy and critique.

There were a few surprises with Graham Leatherland having motor problems and withdrawing from the comp, having had the highest score in one of the eliminator rounds. Another was Pete Tindal sailing through the schedule and deciding to finish with a triangle just to let everyone know that he had forgotten them during the flight, thus costing him in the region of 95 points!

Mark Williams led the first round with a 986 over Roy Cherry with a 956, he also led the second round with a 972 over Pete Tindal with a 965 and again the final round with a 1004 over Steve Smith with 937. Pete chose not to fly in the final round so forfeited a throw away score.

A great time was had by all and I would like to thank the CD for all his efforts in sorting prior paperwork etc. and the judges for their patience, concentration and standing all day. Last but not least, thanks to the tabulators, Robbie Robinson, Helen Jones and Angela Williams. ●

Mervyn Jones releases for Kevin Morgan

Mervyn Jones' Thunder Gazer.

RESULTS

20 entries, 17 flew. Final placings as follows

1st-Mark Williams-1990
2nd-Roy Cherry-1888
3rd-Steve Smith-1882
4th-Barry Robinson-1865
5th-Mervyn Jones-1846
6th-Pete Tindal-1834
7th-Glen Alison-1831
8th-Brian Turner-1801
9th-Kevin Morgan-1775
10th-Graham Leatherland 552

COMBAT AT THE 2017 BRITISH CHAMPIONSHIPS

MICK LEWIS REPORTS WITH ADDITIONAL COVERAGE OF OLIVER COMBAT BY RICHARD EVANS. PHOTOS BY LEANNE GREENWOOD, ALAN GREENWOOD, STEVE MALONE, RUSS HAZARD AND RICHARD EVANS.

Usually at the Nationals all five combat classes are flown, but this year the 1/2A class had to be sacrificed due to unforeseen circumstances. Nevertheless three days of excellent weather saw continuous action with pilots from Wales, Scotland, Ireland, Belgium, Gran Canaria and of course the host nation England.

F2D

This is the International class of combat, the pinnacle of our sport. Models are large, well over a metre in span and purchased ready to fly, just bolt in your motor and go. Motors are 2.5cc glows running on pressure feed and turning very small propellers at nearly 40,000 rpm. Clearly not for the feint hearted but a high level of adrenalin is generated.

Whereas in Russia and eastern Europe youngsters are queueing up to take part, sadly the same is not true here in the UK there being just nine entries this year two of which came from Belgium. We can but hope for a resurgence of interest. Jo Michiels and Nino Usala our Belgian visitors were eliminated at the earliest stage each losing their first two bouts. More surprisingly so was Mike Whillance who boasts two European Championships and many Nationals wins to his name. Andrew Shields one of the team members at the recent European Championships in Hungary was next to go closely followed by fellow team member Dave Wiseman with two wins and two losses by round four. John Hammersley who has not flown this class for many years was doing much better and made it all the way through to round six finishing fourth overall just edged out of third place by Harry Walker. A most creditable performance using equipment begged or borrowed from other flyers.

So two flyers were in the race to become National Champion. Gordon Price and Graham Ives had each lost one of their two lives so it was sudden death! After the bout the scores were totted up and Graham was the winner and F2D National Champion for 2017.

F2E

This is also an international class but rarely flown between nations. Models are similar to F2D but slightly smaller and powered by 2.5cc diesel engines running on suction feed. Hence speeds are lower and possibly more suitable as a prelude to flying in the F2D class. The class appeals to two groups of flyers: the F2D people looking, I suspect, for a little slower action and the Vintage flyers looking for something just a little quicker.

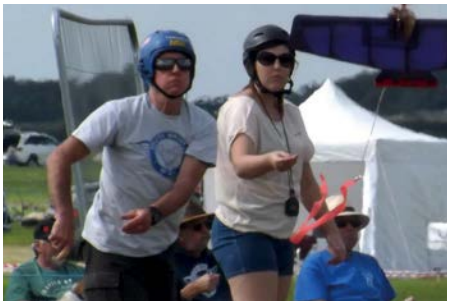
Eighteen flyers contested the event this year. Worthy of mention for his efforts in round one is Francis Roberts whose victory over the new F2D champion Graham Ives was not predicted by many. Graham redeemed himself in the second chance round by ending the involvement of John Spink who had previously lost to Ben Johnson. Round two however saw the demise of Francis Roberts at the hands of Mike Whillance, and Graham Ives was just too strong for Alberto Parra our visitor from the Canaries. This round also saw the demise of the Vintage contingent apart from Simon Cassidy who won against fellow Vintage flyer Eamonn Forsdike. Simon went on to have an excellent win against Graham Ives in the subsequent round. So into the semi-finals went father and son Martin and Ben Johnson, Simon Cassidy, and Dave Riley by virtue of a bye in the previous round. As luck would have it the Johnsons were drawn apart so the prospect of them meeting in the final remained a strong possibility. Reminiscent of the Fishers Roger and Chris who had faced each other in the vintage final a few years ago. Ben did his part in defeating Simon Cassidy but Dave Riley had other ideas and made it through to

Supermonger V Supermonger in the Vintage final.

A few legends here! John Hammersley, Vernon Hunt, Richard Wilkens, Simon Groom and Steve Malone soak up the atmosphere.

Jo Michiels launches for fellow Belgian flyer Nino.

Severne Up! Leanne is correctly watching Dave Chalk's model, not her own.



Sam launches for Dad, Karl.

"What? Me?"

face Ben in the final where Ben would exact revenge for the defeat of his Dad. So Ben was the winner with Dave in second and Simon taking the final podium position.

Vintage Combat

With over fifty entries, the most for many years, it was decided to use both circles for the Vintage class on the Saturday. The aim was to get as far as the quarter finals, the remainder of the competition would then be run on the Monday. Being 'tied' to the organisation of circle one I saw very little of the action in circle two so please forgive me if you were a star of that circle and do not get a mention here.

Very little wind and bright sun might seem like perfect flying conditions, and for most classes this is true. However, the sun is a real problem for combat flyers as the loss of sight of the model for just a couple of seconds can spell disaster. Perhaps that is the reason that there were few cuts and much ground time in many of the early bouts. British F2D team member Gordon Price refused to follow the trend and with two cuts managed to defeat Mark Legg in a close re-flown bout after a drawn first attempt.

Malc Pinnock making a welcome return to combat showed his 'rustiness' against Nigel Thorpe losing by two cuts to nil despite his T4 powered Supermonger matching his opponent for performance. The only other flyer in circle one to register two cuts was Mick Lewis against Dave Chalk who spent much of the bout on the ground. With less than one minute to go there was a coming together which saw Mick's Supermonger completely destroyed.

Results from circle 2 for the first round were somewhat better with many more flyers recording a cut. Jo Michiels visiting from Belgium had a good win over ex-GB team member Harry Walker but Alberto Parra from Gran Canaria suffered a disqualification against John Leggott. There was more excitement from the F2D flyers who have joined us recently when Graham Ives took two cuts from the luckless Nick Stowe who spent more than half the bout grounded. Another flyer spending a lot of time on the ground was John Hammersley whose luck was out against 'Moggs' Morris who took the only cut of the bout before his opponent was 'downed'. Ground time would also be John's downfall in his losers round bout against Nino Usala from Belgium.

Other flyers for an early exit were Willie Wallace, Tim Hobbins, Francis Roberts and Samantha Severne. So without the loss of any 'names' we progressed into round two which would see an end to most of the overseas challenge for this year. Nino Usala was well beaten by Bob Payne by two cuts to nil but his countryman Jo Michiels was given a real pasting by Martin Kiszel who took three without reply. Alberto Parra on the other hand was very unlucky against Richard Herbert going down by a single ground point with cuts at two each. Master magician Stu Holland, over from the Emerald Isle, was much too good for Eamonn Forsdike on this occasion winning by two cuts to nil. Others who impressed with multiple cuts were Dave Wiseman and Tony Frost against Simon Cassidy and Leanne Greenwood respectively.

Tony Cookson then made a name for himself by defeating reigning champion Roger Fisher. Although cuts were one all Tony was victorious with considerably less ground time. John Leggott, who has been much improved recently, had a superb win over Simon Miller by two cuts to one as did Simon Groom over Stuart Vickers by the same score.

No less than five previous winners went forward into round three. Some of whom would be destined to fall at this hurdle. First to go was Steve Malone losing to Pete Happle, there was nothing between the models as the cut score of two each suggests but sadly Steve was the one with the damaged model and resulting ground time. The man from Ireland was at it again in his bout with John Allcock. Two cuts to one was becoming a very familiar scoreline. For those interested John is now 'sponsored' by PAW to use their new and very good 19TBR motor which keeps pace with the best around.

The bout between Tony Frost and Gordon Price was certainly one of the best and showed how combat is meant to be flown. Taking it in turns to get behind each other, cuts followed; victory for Tony by three cuts to two.

Remains of Richard Herbert's Piranha XL after a major mid-air in the Vintage semi.

Stu Holland centre with pit crew Malc Pinnock and Mick Lewis before the Vintage final.

Mick Lewis was next to fall to John Davidson. John raced into a two cut lead after which a very nasty line tangle occurred. While trying to find a way out of it John took a third cut and then hit the ground. The tangle just could not be undone and despite losing eleven of his twelve points John was the winner by a single point. Last years beaten finalist Richard Evans set about his opponent Dave Wiseman in determined fashion. Perhaps a little too determined as not long into the bout he removed all of Dave's streamer. This in itself is bad enough but the collision that followed saw Richard eliminated.

In a clean bout with no ground time Harry Walker showed he is a serious contender in Vintage when he beat Simon Groom by two cuts to one, the same score that Richard Herbert imposed upon Martin Kiszel of the Darley Moor club. Graham Ives then joined Harry in carrying the F2D flag beyond round three with victory over 'Moggs' Morris. By this time it was late afternoon and ten flyers remained so the decision was taken to cease and recommence on the Monday morning.

Fast forward to Monday and an eliminator round had been drawn to bring the numbers down to eight for the quarter finals. Pete Happle put on a spirited display against Richard Herbert but with a lack of recent involvement just could not match Richard's level of ability. Going out at this late stage Pete seemed happy with his weekends work. John Davidson then went through against Graham Ives into the quarter finals where Richard Herbert would be his next opponent.

Despite taking two cuts off Richard, which is an achievement in itself, John's ground time saw him vanquished back to Scotland for another year! Harry Walker then ended John Leggott's involvement as did Stu Holland that of Tony Cookson. Both these flyers had flown well all weekend and must be watched out for in the future. The bout between Tony Frost and Dave Wiseman was to say the least a strange affair. Hardly had the bout started when Dave's model hit the ground and broke into two. And that was that as they say.

Much of the semi-final between Harry Walker and Stu Holland was very good. With the score at two cuts to one in Stu's favour there was a serious mid-air collision rendering both models un-flyable. Thinking the score was one cut each Stu's pit crew worked feverishly to get him back in the air. As the bout ended they were told that none of their efforts had been necessary-such is life!

Would the second semi live up to its billing? It started well enough with the pilots seeming evenly matched. Do you remember earlier I mentioned the sun not being the combat flyers friend? How wrong I was because as Tony lost sight of his model for a fraction of a second it 'clobbered' Richard's inboard wing. Game over and Tony Frost into the final.

Harry Walker declined to fly off for third place and so it was straight into the final. Both were using Rothwell powered Supermongers which unsurprisingly looked evenly matched. First blood to Tony as he took a cut to be quickly followed by a slight coming together. Both were soon back in the air with equal ground points lost but it was clear that Stu's model was not performing as it should. A tear in the covering was slowing it down considerably. A cut would give us a re-fly which was probably what most neutrals were hoping for, but it was not to be, because despite hitting Tony's streamer a couple of times a cut just would not come.

So Tony Frost is this year's Vintage Combat Champion twenty two years after his only other win (in F2D) and just a few months after he had thoughts of giving up. A well deserved win.

Oliver Tiger Combat

Although there are only three competitions for this event every year, Oliver Tiger Combat continues to grow in popularity. It's the nearest thing to the way combat was in the late sixties and early seventies. This year there were thirty entries which is very gratifying. All types of 2.5cc Oliver Tiger engines and their clones are allowed except the Rothwell R250 due to its lack of availability and extra power. The Para T3 is becoming increasingly popular particularly in its "Especial" form. It should be remembered that for Oliver models there is a speed limit of thirty seconds for ten laps without a streamer. In fact not may models actually go that fast even though lighter film covering is allowed.

The weather conditions on day two of the Nats were almost perfect with light winds and the sun gradually moving upwind. Few surprises happened early on and it took a while to really get going, although new CFA Chairman Tony Cookson, Secretary Mick Lewis and regular visitor from Ireland, Stu Holland lost their bouts against Eamonn Forsdike, John Leggott and Nigel Crabtree respectively. Sadly for Mick he lost again in the losers round.

Despite a recent hip operation, Moggs Morris flew well but went down in the losers round to Scott John Davidson, Razor Blade Man Pete Tribe lost to Frank Marshall, hard working Nick Stowe was eliminated by Stu, and "young" Chris Fisher was beaten by Tony Cookson.

Into the second round a very fast, two cuts all bout between Richard Herbert and Eamonn Forsdike resulted in a draw. Richard won the re-fly one cut to nil. The highest score of the event now went to Stu Vickers beating newcomer Nigel Thorpe by four cuts to two. Nigel did very well to get his two cuts. Excellent! As usual Stuart flew a Finale and Nigel the 1971 Steve Jones design Orcrist. The Finale is normally considered rather large for Oliver Combat but someone else was using one too, as we'll see later.

Other losses at this stage included John

Allcock and Malc Pinnock. Your writer was pleased to see Malc flying the Warlock design from 1969, but he lost two cuts to one to enthusiastic Scott Alan Bunker. Malc also centre marshalled for most of the weekend although obviously not when he was flying! Thanks Malc.

The quarter-final early on the Monday first brought together Richard Evans and Steve Malone. By now the breeze had become quite strong making upwind flying somewhat problematic. Richard was flying his traditional (and old) Ironmonger 69 with a CS Oliver and Steve the Finale powered by a Ridley MK4. These two spent four minutes trying and succeeding to dummy the other into the ground. There was very little between the two models. No cuts. Richard lost by one point.

Richard Herbert beat Stu Holland two cuts to nil. Stu's 34" span original Anduril just wasn't up to Richard's later 36" version. Richard was using a Parra T3 and Stu a Ridley Mk4. Although often seeming to be on the back foot with apparently slow Oliver models, Roger Fisher now beat Alan Bunker two nil. Alan also lost two ground points. Lastly Tony Cookson saw off Simon Cassidy two cuts to nil using a film covered, very light Vendetta from the Tim Hobbins Combat Model Factory. These have recently become popular in both small and XL versions.

The first semi was exciting! Steve beat Roger by three cuts to two, Rog doing well with his slower Anduril but ultimately outperformed by Steve's large Finale.

The second was a bit of a non-event. Early on Richard dummied Tony into the ground and do what they might Tony's pit crew simply could not restart the engine. The cause was later tracked own to a tank vent blocked with earth during the crash.

Tony Cookson won the fly off for third place against Roger Fisher - a smashing time was had by all. Tony took an early cut which was then followed by a huge coming together. Roger's model could not get back in the air but Tony's was cut into three separate pieces - the engine was found to be inside the film covered wing…

At risk of not remembering the full detail of the final, participant Steve Malone was contacted to give his view of the bout.

"Any final against Richard Herbert is going to be tough but as the Nats Oliver event was in danger of becoming the one that got away for me (I've never previously made the final let alone won) I was determined to give it my best shot.

The action started straight from the word go with both of us testing the limits of each other's equipment. Who is tighter in loops and bunts, who is fastest, and importantly, given the Barkston wind had appeared, who could go upwind? All that happened in a few seconds with no clear advantages, both of us were working hard to try and secure an early lead and put the other on the back foot. Richard had the first opportunity but unfortunately for him overshot and took all my streamer. Disaster for most pilots but Richard has pulled victory from the jaws of defeat so many times. He just switched to a high-speed chase all over the circle. When two flyers are trying that hard margins are very tight and there was a mid-air collision. My model was relatively unscathed but Richards lost the outboard wing tip. Game over you would think, but not a bit of it, as it flew well with half a wing.

I had gained some airspeed as I was no longer towing a streamer and then one of those rare moments occurred. There was a chance to attack Richard's streamer with a speed advantage. A double pass and two cuts! Richard crashed at this point and when he came up again it really was all over.

A few thanks are in order, my pit crew John Hammersley and Simon Groom for their commitment, and the late Tom Ridley who built my MK4 Oliver."

Steve Malone will receive the superb Peter Freebrey Trophy which will be awarded a the BMFA dinner in November. ●

Richard Herbert flies against Tony Cookson in Oliver Combat.

The popular Vendetta design.

The remains of Tony Cookson's model held by Tim Hobbins after the third place fly-off. The engine is inside wing!

Great pose from Steve Malone in the Oliver Tiger final.

Oliver Tiger finalists: 2nd Richard Herbert, 1st Steve Malone and 3rd Tony Cookson

Steve Malone and his Supermonger plus pit crew. "I eat worms"is an"in"joke!

FREE FLIGHT SCALE

MIKE SMITH ON THIS ADDITIONAL EVENT FOR FF SCALE AT THE BRITISH NATIONALS. PHOTOS BY GRAYSON HARTLEY.

The Trophy events for Free Flight Scale were held at the May Nationals but it was felt by many that a presence at the August Nats would be beneficial all round. A flying-only event was organised by Chris Allen with Doug Hunt as C.D. Judges were "volunteered" on the day for Saturday and Sunday with 3 rounds each evening. Best Flight, including a scale realism mark, would sort the order of honours.

The attendance was way over expectations; 16 entries with a very diverse range of models from kit-scale to super-scale. We did intend to have 4 rounds but we would have been flying in the dark so 3 rounds was agreed. It was also encouraging to have a large crowd of knowledgeable spectators to support our efforts. The Barkston Breeze eased off right on cue for both evenings, thus giving everyone a chance to impress the judges.

On the Round 1 I was first up with my Sopwith Snipe and the dreaded power stalls had returned. The model was quite

Mike Kelsey´s well-seasoned McHard SE5a gets away for a good flight.

Mike Smith fitted a replacement (heavier) rudder to his Snipe, leading to some dramatic stalls.

This is Phil Smith´s new Avro 560, built from the Model Aircraft plan with a span of 41". The Dart has now been replaced with a PAW 55 for more oomph. Covering is silver Litespan.

Chris Brainwood launhes his neat DH Moth, built from the John Watters plan.

RESULTS

1	Ivan Taylor	Crusader	865
2	Gareth Tilston	DH75 Hawk Moth	800
3	Andy Sephton	Lacey	790
4	Dave Causer	Cessna	770
5	Mike Kelsey	SE5A	745

balletic until it nosedived into the runway to the groan of the onlookers. It bounced and I got away with it - tuff old bird - to fly the next round just as badly. I had fitted a new and strengthened rudder and the CG had moved back a fraction to make it unstable again. School boy error. No matter what the model weighs get the CG right first. I put another ounce in the front for the next day. Terry Aydon was in the same club; his Aeronca Sedan shed its engine cowling on takeoff and went into zooming stalls, the ensuing meet with terra firma caused a lot of damage.

Dave Causer's ED Baby powered Cessna 170 was a delight to see flying slow and wide. It weighs "nothing". Mike Kelsey with his well flown SE5a put in a couple top flights. The only new model that I was aware of was Phil Smith's Avro 560, a Lympne trials design. The Dart engine decided to not play ball but the model did show promise in the powered glide. An engine change should sort it.

The wind was almost at flat calm now and very nice flights were performed by the rubber powered models: Ian Lever with a Miles Magister, Mike Sanderson's DH Beaver, and Andy Sephton with his Lacey managing third place. This is a larger version of his peanut model which was in February's AM and like all his Laceys is a fine flyer.

Gareth Tilston flew a DH Hawk Moth in a slow and very realistic manner and gained second place.

Dave Causer campaigned this KK Cessna 170 from the Replikit/VMC kit. Powered by an ED Baby, the model depicts a Cessna Dave spotted at Tampere, Finland some years ago.

Derek Knight launches his EDF Miles Student.

Terry Aydon releases his dramatic Mercury Aeronca Sedan, complete with Oliver Tiger, but you can see that the cowl is already lifting.

First Place went to Ivan Taylor, our septuagenarian javelin launcher flying his ducted fan Crusader.

With a heave ho that an Olympian would be proud of the model was unflinching in its rock steady wide turns and slow descent to land to a loud cheer from the appreciative crowd.

The Sunday session, with different judges, was very similar to Saturday in all aspects save for the vagaries of free flight scale. Some that flew well on one day did not the next and vice-versa. The Snipe put in a really good flight with the extra ballast. Derek Knights ducted fan Miles Student whistled around us. The availability of electric ducted fans from KPAero and others now makes these models a good option if you want to go "modern".

We had 13 qualifiers from the 16 entries in a very respectable demonstration that Free Fight Scale is still popular. If you want to see the action, go to YouTube and search for "Scale Free Flight Action BMFA Nats 2017".

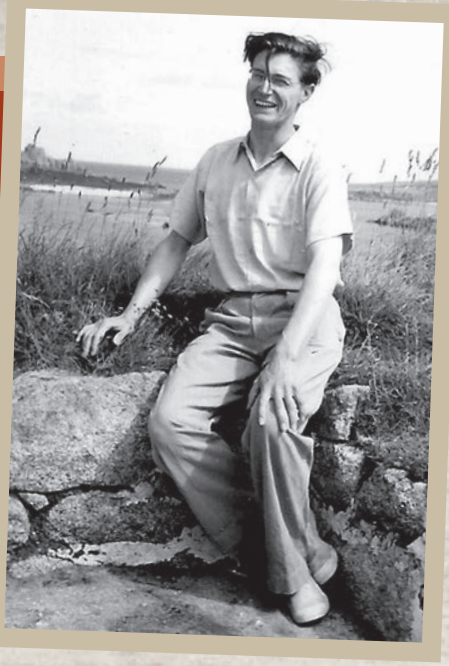
The number of kits, plans etc. and internet information available now makes it possible for anyone to have a go. FF scale is fun with enough adrenaline to make it exciting without the need for deep pockets. If you are thinking of having a go, try kit scale (flying only event, no static scoring), a good place to start and go from there. We don't bite. Get stuck in and give it a wiz… ●

Ivan Taylor won the event with his impressive big ducted fan Crusader - have a look on YouTube.

Remembering George Cull (1928-2017)

With the death of George A. Cull in July this year one of the last links to AeroModeller's immediate post-war years was severed. Richard Riding, who knew George for 70 years, outlines the life of this talented writer, photographer and draughtsman.

George Cull in 1952.

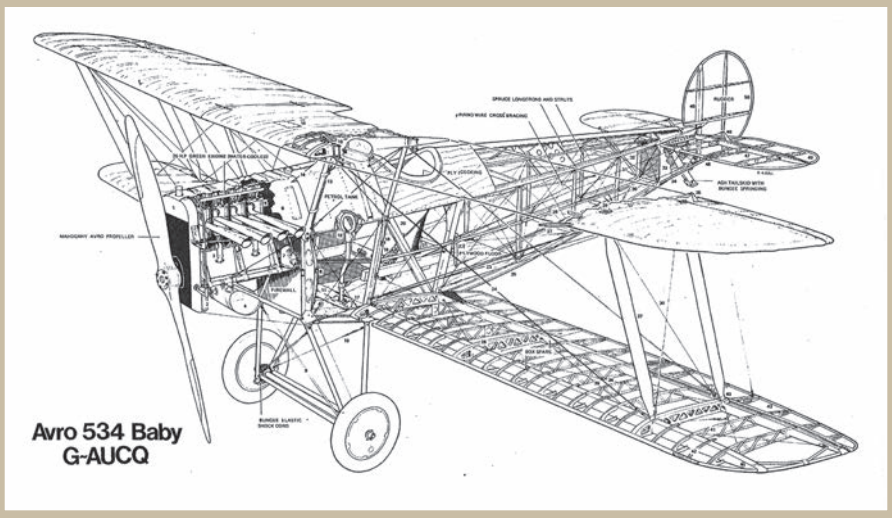


George Alfred Cull, who died on 18th July 2017, was born at Pond Square, Highgate Village, London, on 14th January 1928, the third of three boys named after kings of England; Arthur, Edward and... George. Their father, S.C Cull, was a racing mechanic to Sir Henry Segrave. George attended Finchley High School 1937-45 and when war was declared the family remained in London throughout the blitz. Young George got involved with fire watching from one of two Highpoint apartment blocks, once the tallest buildings in London. He ran an aircraft identification club at his school and aged 17 won a national competition for aircraft recognition. He was also a fine sprinter but refused athletic offers; he could still do handstands and turn cartwheels in his 70s.

On leaving school George got a job with Douglas A. Russell, managing editor of Aero-Modeller (as it was then styled). Although the magazine's official address remained at Allen House, Leicester, the company opened a southern office at Wilmary House, a large detached private house that had been adapted for office use, in Merton Lane, Highgate, just around the corner from where George lived. In November 1945 he and the rest of the staff moved out to Leighton Buzzard to work in former rural district council offices, named 'Brooklands'.

In 1946 George was called up for National Service and in January 1947 embarked on m.v. Britannia for India, where as 3080009 AC1 Cull, he worked as a rigger with No. 322 Maintenance Unit (MU), Chakeri, Cawnpore. Chakeri was the site of the so-called 'Elephant's Graveyard', where hundreds of Consolidated B-24 Liberators awaited scrapping. No. 322 MU also overhauled South-East Asia Command Dakota IIIs and IVs before they were returned to the USA under the lend-lease agreement. Royal Indian Air Force (RIAF) Tempest IIs were also based at Chakeri. George was primarily involved in rebuilding de Havilland Tiger Moths for the RIAF. Fortunately, he took many photographs of the local hardware which many years later I was able to publish in Aeroplane Monthly. When the MU closed in November 1947 George returned to the UK and was demobbed in March 1948.

Immediately he returned to his old job, now based at Eaton Bray. My father, E.J. 'Eddie' Riding (EJR), with whom he had kept in touch throughout his service years, made George his assistant and during the next two years he became an excellent photographer, proving also to be an exceptional draughtsman. When EJR was killed as a passenger in an Auster Autocar at the opening of the Boston Aero Club in April 1950 George took over EJR's regular Aircraft



An excellent example of George Cull's draftmanship, a cutaway drawing of Hinkler's record-breaking Avro Baby G-EACQ.

Described feature. His first task was putting the finishing touches to EJR's uncompleted 3-view drawing of the mammoth Bristol Brabazon. The feature was published in June 1950 under a joint credit. The Zaunkönig, described in the September issue, was George's first 'solo' feature. He continued producing the series for five years, long after he left the staff at Eaton Bray. During his time with the Eaton Bray Model Sportsdrome he particularly enjoyed two short spells at the DAGRA Engineering Company workshops, producing with others some of the finest solid scale models to be found in museums and private collections. Clients included Rolls-Royce, which ordered four solid scale models of R-R engines in addition to a dozen 1/48 scale WWII Rolls-Royce engined aircraft, some of which can still be seen in Derby Museum.

Meantime, George had met trainee teacher Jean, the pair spending happy times roaring around the country lanes of Buckinghamshire on George's 350cc BSA motorcycle, before getting married in 1952 - a marriage that was to last 65 years. Although having left AeroModeller, George was still producing articles for the magazine in the mid-1950s. But with a wife and two daughters to support he was 'burning too much midnight oil' and needed to concentrate on the day job. That was working as a technical illustrator and author for English Electric (1955-65) at Stevenage, to where the family had moved. In 1965 the family moved again, this time to Hampshire where George worked for and with air-cushion vehicle pioneer Sir Christopher Cockrell at Hovercraft Development Ltd.

In 1970 the Culls returned to Buckinghamshire. Here, during weekends and holidays, George embarked on building a Colt cedar-wood house at Slapton, a stone's throw from a long defunct Eaton Bray Model Sportsdrome. Construction was to take the meticulous George many years; after five years of waiting Jean moved in, despite there being no front or internal doors.

In the meantime George had learnt to fly at Spalding, now Fenland Airport, and became a member of the Stevenage Flying Club with Maurice Brett and Brian Hargreaves, flying Tiger Moth G-APAL and Thruxton Jackaroo G-AOIR. In 1983 the three flew along the 2,170 mile Oregon Trail, USA, in an Aeronca Champ, their wives following in a hired Ford V8 Station Wagon piled high with belongings, spares, cans of fuel etc as back-up for the trip. The trail was an immigrant route that connected the Missouri River to valleys in Oregon, carved by fur and other traders during the early 19th century. For a short time George owned Tipsy Trainer I G-AFSC, built in 1939 and Tipsy B G-AISA of 1946 vintage.

By this time George worked in London's Whitehall for the Ministry of Defence, editing the RAF's air safety magazine, Air Clues. The tedious daily commute took its toll though, George eventually electing to forsake connections with aviation, but instead transferring his writing and editing skills to a job nearer to home, with the Building Research Establishment at Garston, Watford.

George was a collector of rare and specialist artefact, including the first Heron class sailing dinghy, 'Flook', designed by Jack Holt in 1950 and now in the National Maritime Museum, Cornwall. He also possessed a rare BSA three-wheeled vintage car and for many years had a low-hour Pobjoy engine. When the late John Greenland, also a former AeroModeller contributor, started building his replica Comper Swift and was searching for a Pobjoy, I put him in touch with George and successful negotiations resulted in the completion of John's ambitious project. That Swift is now based at Breighton, to where George was a regular visitor in his later years.

George Cull was a total aviation person and shared his encyclopaedic knowledge unselfishly. His photographs and drawings graced the pages of the aviation press for a lengthy period. He had a keen eye for detail and was meticulously accurate with his writing and draughtsmanship. Tall, always slim (he was pleased a few years ago that he was still able to fit into the rear seat of 7/8 scale Spitfire on a flight from Cheddington), George retained a fine head of hair and always had an engaging smile and a twinkle in his eye. Nevertheless, he had an anarchic and rebellious streak and wouldn't stand for petty rules and regulations.

On a personal level, I will be forever grateful to George Cull for his wisdom and encouragement after I left school, rudderless, back in 1958, resulting in my own 40-year career associated with aviation.

Our sympathies go to Jean and daughters, Alison and Rebecca. ●

George Cull with the Stevenage Flying Club's Thruxton Jackaroo G-AOIR.

George Cull and the Aeronca Champ in which he followed the Oregon Trail in company with Maurice Brett and Brian Hargreaves.

Scale Modeller's Delight

MOST AEROMODELLERS LOVE SCALE MODELS AND APART FROM THE UBIQUITOUS PIPER CUB I SUSPECT THAT WW2 WARBIRDS ARE THE MOST MODELLED AIRCRAFT OF ALL – SO YOU CAN IMAGINE MY DELIGHT WHEN THESE THREE BOOKS, EACH DEDICATED TO A DIFFERENT WW2 AEROPLANE ARRIVED FROM FONTHILL MEDIA FOR REVIEW.

Review by Chris Ottewell

Hawker Hurricane
– The multirole fighter
By Philip Birtles
ISBN -13: 978-1-78155- 587-3
RRP £40.00 UK; $55.00 USA

Hawker Hurricane

This is an excellent book which put all aspects of the iconic Hurricane into historical, technical, military and political perspective. Quite an achievement in a single volume!

I found the section covering the evolution of the various Hawker design proposals from what really was a "monoplane Fury fighter" to the aircraft we recognise today particularly interesting. Then the transition from the early fabric covered wing to the various later metal covered wings with a wide range of different armaments culminating in the decision not to develop the airframe further (unlike the Spitfire), but to move on to the Typhoon as a replacement, nicely covers the whole technical development story.

It is very well illustrated and from the model builders viewpoint, the fact that many of the pictures show the aircraft structure is a great bonus. Whilst there are no colour pictures, a wide variety of markings are shown as well as Hurricanes in service with lesser known airforces – for example, who knew that the Romanian Air Force operated Hurricanes prior to WW2 or that the Iranian Air Force operated two-seat Huricane IICs after WW2? So there are loads of possibilities for customising your basic model in here.

There is also a very useful table at the back listing the more than 60 known surviving Hurricanes, where they are, their state at the time of writing. and if they are available for public view. Again, essential information to the scale model builder, as drawings and photographs can only tell you so much. If, like me, you are a Hurricane fan, you need this book.

The almost mythical "slip wing" Hurricane - It really did exist!

Messerschmitt Bf109

Having thoroughly enjoyed his history of the Ju 52, I was really looking forward to reading Jan Forsgren's history of the Bf109 and I have to say I was not disappointed. Over 33,000 examples of this iconic aircraft were eventually produced, powered by an assortment of engines from the Rolls Royce Kestrel through a whole range of German engines to the Rolls Royce Merlin engined Buchons produced in the 1950s. All are covered here.

As with the Hurricane book, the origins of the design are explored along with a brief look at the career of its designer, Willy Messerschmitt. I was particularly interested to find that like Frank Barnwell, the Bristol Chief Designer, Willy was a far better designer and engineer that he was pilot and like Bristols with Barnwell, the company tried very hard to stop him piloting himself and insisted that a company test pilot accompanied him.

Its start was far from promising with no less a person than Ernst Udet stating "This machine will never make a fighter" even before first flight. He mentioned the weak undercarriage and sure enough, it collapsed on landing on its delivery flight for service evaluation. Spinning characteristics were not promising either.

However, as we all know, following a period of development and "in service testing" in the Spanish Civil War, the aircraft went on to become one of the great fighters of WW2.

Jan lists all the major variant of the aircraft with brief details of the various "sub variants" all of which will be very useful to the scale modeller. There are also some little known variants included; I for one, was unaware of the one off Vee tailed Bf109G. Apparently it yawed a lot more on take-off, but was slightly faster than the standard Gustav.

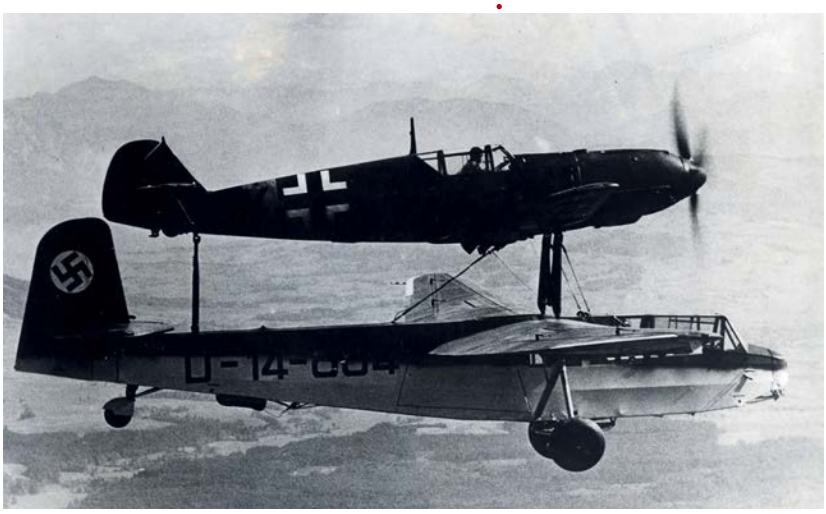
The in-service career of the Bf 109 is well covered along with the post WW2 use of the aircraft and several post war variant built in various countries and it makes fascinating reading.

Although there is no detailed table of survivors and their locations, there is a useful page which outlines what survives and in which country.

Finally, whilst the illustrations in this book are all monochrome, there are some really interesting pictures of unusual markings, including RAF and US Airforce schemes which will provide many modellers with some additional choices when painting their latest masterpiece.

An excellent book and a good companion to the Hurricane and Battle books reviewed here.

Messerschmitt Bf 109 – The design and operational history
By Jan Forsgren
ISBN – 13: 978-1-78155-586-6
RRP £25.00 UK; $32.95 USA



The Fairey Battle – A reassessment of its RAF career
By Greg Baughen
ISBN-13: 978-1-78155-585-9
RRP £20.00 UK; $30.00 USA

All published by Fonthill Media
(www.fonthillmedia.com)

Fairey Battle

The Fairey Battle is a perfect subject for a scale model, yet when was the last time you saw one? No, me neither! So why is that? I suggest it is because it is seen as a failure, or even worse, a dangerous death trap in which unsuspecting crews were sent off on suicide missions. In this book, Greg Baughen takes a detailed and critical look at the Battle, its reputation - and importantly, the way it was employed to see if that reputation is justified.

It very soon emerges that the Battle was a very much better aircraft than most of us imagine. It was let down by a failure to address its worst deficiencies, even when they became known, followed by a failure to deploy it in the most appropriate manner.

For example, even though self-sealing fuel tanks were eventually produced, they were not fitted - indeed it appears that in some instances they were on French airfields, but never fitted, even following repeated missions where the Battles almost inevitable went down in flames. Whilst such tanks may not have prevented the aircraft being shot down, the chances of the crew surviving would have been immeasurably better with them.

Then there was the ongoing belief that "The Battles needed no fighter escort, as they could beat off any attack with their combined fire-power"! Really? With one rearward facing machine-gun per aircraft, I think not.

Finally, there was the repeated refusal to employ the Battle in the role where it could have done well. With the armour plating and self-sealing tanks fitted; it could have been the ground attack aircraft to support the BEF. If you take a look at the success of the very similar Soviet Il-2 Sturmovik in such a role, this analysis makes perfect sense. Sadly, the Air Staff clung to the notion that the Battle should be employed to "strike the Ruhr" instead - a role it was patently quite incapable of performing.

So, this is an excellent and readable book, which goes a long way towards explaining some of the strange decisions made in the 1939/1940 period, as well as finally rehabilitating the much-maligned Fairey Battle. It left me really wanting to build a model Battle as well!

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Part 37
BETTER… RETRIEVAL 6

Dave Hipperson continues his Opus on FF 'Retrieval' and using tracking bugs.

When I had a very long retrieval, unless it was during the day and it messed up making the remaining flights, I actually preferred it to be windy. So much less likely to get into a tangle with a landowner close to the field if you have plopped it down miles away – this is one of the reasons I have so much suspicion about all this 'keep it in the field propaganda'. It risks *everyone going just outside* and annoying one landowner when it is so much friendlier if you can give him a break and over fly him occasionally. After all the model only lands once. Miles away is no riskier, just more interesting. Seven miles springs to mind and for that reason it is "The Seven Mile Rule". This might sound mighty odd but the fact is that fly-aways – pin prick in the sky at real altitude sort of fly-aways - rarely out fly seven miles whatever the wind. When calmer the longer the lift exists but the slower the model travels, and if windier the quicker the model travels but the shorter the thermal lasts because of turbulence breaking it up. This is a useful rule of thumb to remember when you have little or no idea of how far the model has travelled. However, you really should know as you should have been listening. Useful too when perhaps you don't have a bug in the model or when something has failed.

These bug tracking systems, certainly the Bio-Track and Ruyter based radio arrangement, will hear a bug for something like 20 miles clear line of sight. This was tested by Rodney Kenward using a micro-lite aircraft flying away with a bug.

As ever I am indebted to the many people who have contacted me with information and anecdotes since taking over the 'Better…' series. I can report from a reliable source (not the manufacturers themselves) that the Leo Bodnar/ Peter Brown bugs – already a popular choice amongst many of you - are at least comparable to the Ruyter bugs in as much as they transmit at a slightly higher power but compensate on battery life by pulsing at a slower rate hence still for 200 hours at least. They may possibly have a slightly greater range than the Ruyter bugs.

In the last few years smaller more compact receivers have come onto the market. Receivers that do the job as well as a C-150 or C-120 but at a fraction of the cost. (Some of the earlier compact receivers were not this good.) Bearing in mind the personal communication part of this retrieval process is now more than adequately served by a mobile phone, a small, cheap, but effective receiver only handset

Successful retrieval starts with preparation long before the launch.

Top, the Bodnar/Brown bug compared with a 'traditional' Ruyter unit. (Photo by Ron Marking)

Left, the Baofeng UV-5RE receiver showing how much more compact it is than the C-150 model – and much less expensive too. (Photo by Ron Marking)

would be worth investigating. The Baofeng UV-5RE is one that has been mentioned, there may be others. As this series develops I will endeavour to keep you posted on developments and experiences with full blown GPS tracking.

Back to the recovery procedure. If you can still hear the signal then it's still in the air, as long as it isn't in a tree and even then that tree would have to be within a mile or two at the most. Remember, if you have mounted the aerial horizontally as I recommend then if it's in a tree the signal strength will be constant because it is no longer moving. When it goes off it has landed or is certainly very low if at a distance. The best you can hope for as far as range with both you and the model on the ground is about a mile. This of course will be greatly reduced if you are in separate valleys with a hill between you, or conversely much increased if you are both on the top of hills with a valley between you. Even these variations in signal strength can be great clues as to the whereabouts of the model.

So if it's out of sight listen intently on the radio; hopefully you will have put the Yagi together by then if only to maximise range. We are dealing with a typical successful fly-off situation here. Listen, listen, listen but not too near the timekeeper please. When it has gone off check the time but keep listening in case it hasn't quite gone. When you are sure go back to that time you last heard it. It will probably have flown for a minute or two longer than that depending on terrain. You now have its duration in the air, and you already know roughly what the wind speed is. Get the OS map out. A dot where you launched it from and draw a line from that point to a landmark downwind over which the model flew or if there is nothing obvious then take compass reading (outside the vehicle, well away from other cars and not on the peri-track or runway as they are often steel reinforced – remember what Martin Dilly said. He was right, no steel rimmed specs either!) The map has to be orientated but it's not rocket science. Important thing is that you get a pencil line on that map of the downwind path. If you happen to be on a field that you know well you can often do all this from landmarks you know already. Draw the line and also a couple a few degrees either side as a fan out and then calculate the distance down the line that the time in the air would suggest and make a cross. That's where the model is! Well it's a jolly good starting point.

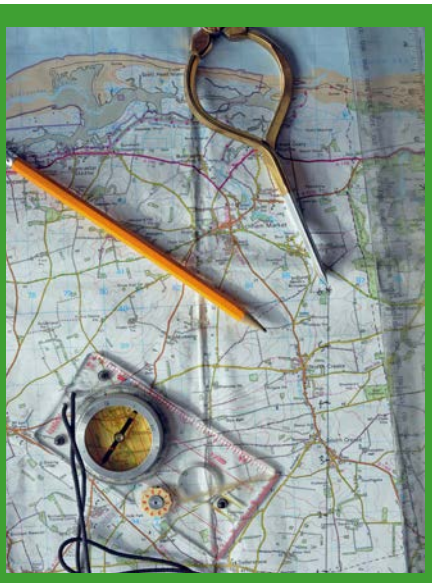
If it's a long one say 5-6 miles put up the roof aerial – mine I think came from Maplins. It has a magnetic base and sticks well to the top of a metal car's roof, and has a good range because of the reflective effect of the car's roof. Sadly some modern motor cars now have so much electronic gubbins in them that they mask the signal when you are near or in the car with the motor running. This is most annoying and it may require you to turn off the engine to hear properly thus slowing down the process. I will also have the Yagi assembled in the vehicle. This is where the map beats simple GPS every time – it shows you roads and contours and other useful landmarks like church spires and aerials and power lines which may be a help or a hindrance. Drive towards the landing spot but be listening all the time or as much of the time as possible. You need a co-driver if possible – ideally someone with experience with the radio and the noise it makes. If you find yourself on high ground even if you have not got as far as you expect the model to be – get out and have a slow sweep with the Yagi and make a little pencil mark on the map where you listened so you don't need to listen there again.

Keep Calm

If you are in a car and hear the model you will get an adrenalin rush of excitement. Be careful with the driving and don't immediately be in too much of a hurry to dump the vehicle and start walking. Drive around a bit - gently. See if you can get an even stronger signal. Once you have established you are at the point of strongest signal, as close to the model as you can get in a car, off you go into the countryside with the Yagi. The model is not far away. But do make sure it's the best signal you can get before you start walking cross-country.

Some years ago we tracked an enormous

It's a South Easterly on Barkston. This is the line and a very optimistic 4 miles marked off. I believe it was the Vintage fly-off and the track of my Lanzo Stick which went about 3 miles.



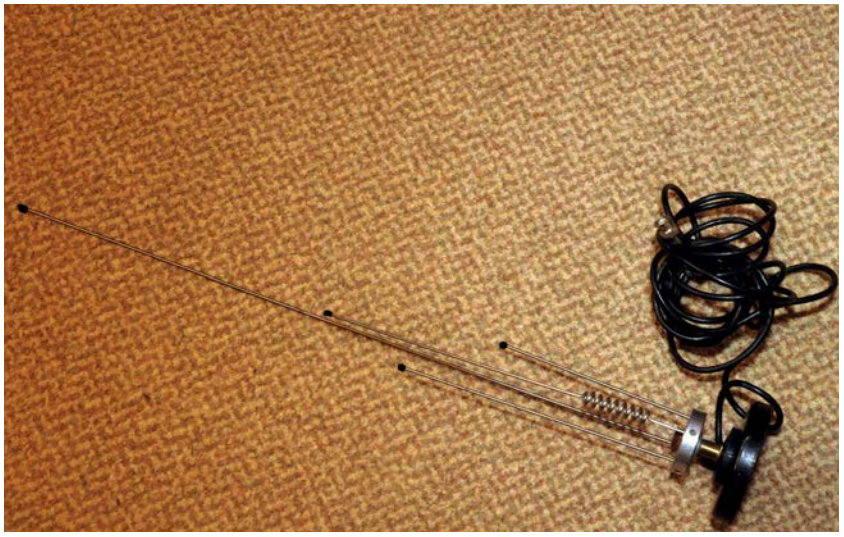
Useful tools laid out over a map of Sculthorpe. Compact marching compass, pencil and ruler. The nautical dividers are great to check off the miles but not essential - in this case they point to where the model was eventually found. Six miles out at Burnham Thorpe, Admiral Nelson's birthplace!

over 10 mins. fly-off with a Hep Cat from Middle Wallop, as there was a breeze it went quite a few miles. Got a smashing signal. Parked up, everybody piled out and started walking in the obvious direction but the signal only got slightly stronger. After we had walked a long way – probably a mile or more we realised we were walking towards a stand of huge pine trees. When we reached them the signal was off the clock with virtually no aerial. The model was obviously at the top of the trees and quite impossible to see in the canopy, but we would have saved ourselves a couple of hours if we had kept driving as there was a road quite close. I marked the huge trunk most likely to hold the model – this was not a night for ladders or poles far too high. I came back two weeks later. No rain, little wind and the model was sitting undamaged if a little warped - that's more warped than when I flew it as who owns a perfectly flat Hep Cat? - under the very tree. It flew successfully again.

Recovery Equipment

Then there is actually getting it after you have located it. There are hazards out there; deep cropped fields and trees being the most notorious and regularly encountered. Rivers and large lakes do often come into the picture but so far having some sort of inflatable boat with me would not have helped recover anything that I couldn't have done another way. (Julian Hopper carried one for a while).

Some years ago the late Joe Barnes was following a long flyaway of his Wakefield off Lindholme and eventually spotted it on an island in the middle of a flooded quarry. These are about the most dangerous things you are likely to come across, next only to a single full-sized bull un-tethered in a field - always be very careful and ideally have someone with you. Anyway all appeared lost but Joe walked around this quarry to double check that it was actually an island and discovered a punt chained up to a small tree standing amongst others on the bank. He didn't have bolt cutters and of course would never have done such a thing to the chain but he did have a saw in the car. So he returned with it and cut through the tree, slipped the chain off – paddled the punt across to the island and recovered the model. When he got back he slipped the chain back over the stump and replaced the tree-top looking just a little displaced, and even dirtied the cut a bit to obscure what had gone on. He always wondered whether the owner of the little boat ever noticed or whether he kept religiously re-chaining the punt back up to the sawn tree every time he used it until one day the tree died and fell over! There are some truly astonishing retrievals with a nautical element later in



Typical magnetic base car roof aerial. Invaluable for searching whilst driving. Co-pilot recommended both for safety and efficiency. Such units are often available from Halfords and Maplins.

Roof aerial in place on car. Note also the ladder. Lead from aerial should always be shut in the door rather than through the window where getting out in a hurry can damage the connection.

Ever since John O'Donnell wanted his nails back (story later) I carried a hammer that would remove them. The Bow saw will take down a tree of 18" diameter in a few minutes with one person at either end - a tip from Russell Peers, always travel with its blade wrapped tightly in a towel, otherwise it will cut or tear absolutely everything it comes into.

The Bow saw ready for action. Those are nasty teeth but work very quickly. Easy item to carry up a tree with you and so beautifully quiet and quick. Who needs power tools?

this series.

On a rough day the safest place for your model, after the model box and the sky, is in a nice soft deep field of corn, barley/wheat whatever. It will sit there happily untouched until you arrive or the farmer harvests it - he will probably only see it in time to know he has chewed up something which won't be edible. In any field that has tractor trams lines it is perfectly practical and possible to find your model – eventually- without damaging the crop in any way. Its not a bad idea to do a bit of 'triangulation' before you venture in. Take a bearing on the strongest signal direction from outside the field with the Yagi. Then walk around the other side and take another bearing. Although the walking around can be a bit onerous this system works best with big fields as it may be difficult to get an accurate direction if the field is small you are close to a strong signal. In that instance it might be helpful to walk back a bit away from the area to get more defined lines. This is the downside of a Yagi aerial. You can actually have too much information when close to, and determining the exact direction becomes difficult. It's the same problem we have in trees. If you are in close then going back to a less sensitive rubber aerial and masking the signal with you body might actually be a better method of getting triangulation lines. Try to ascertain roughly where the model might be – at least which end of the field or which side before you go into it. It will save you time.

Enter using a tractor tram line and keep walking up and down them looking very close by as in something like full length corn or even barley your model- even a big one - will be obscured by the crop if it's further out from you than about 6 feet. This is where the tracker bug is so useful because you know its there but I have sometimes still had to remove all the aerial and only found a model just before it was stepped on. It is perfectly practical to walk along tram lines in a corn field and not leave a mark where you have been. Always try to do this. Make it part of the process to look back behind you occasionally and make sure you are not leaving a mark. Consider that it's your living as well as your model.

Special consideration should be taken by those of you that are susceptible to sea sickness. If it's a breezy day you will be staring down at a sea of waving seed heads and after a while what is known as 'vestibular kinetosis' can set in and make you feel quite queasy. This is the effect of the brain either feeling movement but not seeing it or in your case seeing movement but not feeling it with your feet. It has happened to me once - I had to stop every now and again otherwise I would have simply fallen over. Very disconcerting.

Oil seed rape is a different story and it is usually nigh on impossible to venture in. The frustrating part is that you will probably be able to see the model as only the heaviest ones push down through it. The problem is getting to it.

Bernard Aslett tells of a technique of recovery from oil seed rape where it grows a bit higher than usual. Anything but a really heavy or very small model will sit on top for quite a long time so the chances are you have seen it. Bernard has been known to crawl underneath the crop using the signal from the tracker as a guide as to which way to go. Obviously very slowly in any direction. The model would still be pretty much impossible to see even when directly under it so occasional 'surfacings' have to be made as he gets nearer. Bernard was possibly a submarine captain in an earlier life. He never explained how after he recovered the model he got back out of the field though.

I once had this trouble in a huge field of maize with a very large wet open rubber fly-off model. Locating it had not been too difficult it but getting out was. Despite being in England this maize had grown to a tremendous height, nine feet probably. Quite easy to walk along the tramlines but impossible to walk across them through the huge leaves, particularly with a big wet fragile model in my hands. Trouble was I knew that the tramlines in this field ran the length of it and it was huge; if I went the wrong way I would be walking for a very long time. I needed to get out side-ways but couldn't with the model. It was getting dark. I couldn't feel any wind inside the maize and it was a solid grey sky which gave no clue to wind direction so I had little to navigate with. I was seriously considering ditching the model and just blundering out side-ways when my support party eventually got downwind wondering what was taking me so long. I couldn't see them, they couldn't see me but we could communicate on the radio so I stuck the wings of the model up through the maize and waved them about so they could see where I was. From there they told me which way to walk. It was a ma(i)ze all right! Well fed up by the end of that, it was some days later that I found out the flight I had just recovered was actually the winner in Team Rubber!

There is another safe place for your model which isn't quite so obvious and

Anselmo Zeri's 300 sq inch Cd'H model lies on a frozen and barren French field – not broken just DT'd. Tail popped and wings folded up. Like this it comes out of any thermal but Anselmo had great difficulty stopping people picking it up. The hinges are so complex no one could do it safely without breaking something. Please note his correct use of geodetics in the leading 30% of the chord in front of the main spar. Geodetics further back than that are a waste of wood and may only serve to support the tissue nothing else rigidity wise. Believe him he was the head of the European Aviation Patents Office.

ot all the equipment but most of it. Brightly coloured Gaffer tape for marking trees and/or securing sections of roach pole and fixing different ends to same. The ubiquitous 6" nails. Above them an oil filled marching compass in leather case. Above that a sample of polypropylene cord mostly used in short lengths for tying the top of the ladder to the tree so that one can swing around a bit with no chance of it sliding sideways. Two knives and below that a basic head torch - you simply can't have enough head torches but ensure they are charged or have new batteries Below that a short lead to fit into a car cigar lighter – going to be USB soon - this is for connecting various charging devices for the torches etc. Next to that some simple string; always useful. Above the string a very vicious little string saw for when you are stuck and have a line over the branch the model is in. Simply slip the saw into the line and haul it up to the branch. Astonishingly quick way of cutting a branch as long as your nylon line is tough enough to take the pulls. Top right some spare foam rubber for the end of the roach pole, possibly the most important item in the bag.

There are fittings for the pole end. The blades are useful if you are near enough to see where the DT hold down band or line is, or even the wing bands in desperation. Anything but freeing a model from a high tree in glide trim. It can only do itself harm coming down. Best DT'd, next best in component parts. Yes, DT fuse can be used too, a lit piece can burn through bands or lines and can often be easier to see in the dusk - worth a try.

that's up a tree. I know you are going to have the fag of getting it down but at least it is away from the eyes and hands of the public although not always. I had an early Wakefield quite high in a tree along side the road leading down to the Castle Brake caravan site on Woodbury Common. I thought it was safe to leave till the end of the day but an enterprising motorist passing by spotted it. Parked up, he had climbed and was successfully returning down when a passing modeller spotted him and took the model off him. He wasn't going to steal it – or at least he said he wasn't – but it would have been a shock to return and find it gone and then wait to be contacted. The public do have a habit of handling things roughly and sometimes even aeromodellers are a bit careless particularly when they don't quite know how your model goes together. The most careful person with your model will always be you.

The late Anselmo Zeri, being the great engineer he was, devised a wonderful tip tail and folding wing system to get his huge Cd'Hs down from European Summer thermals which we should never have been flying in, in the first place given the title of the class – Winter Cup?! Anyway it did the job beautifully but left the model vulnerable to anyone picking it up. It could easily damage itself in anything more than a flat calm. I remember waiting by it once in a cold French field at the Paris comp so that no one else would pick it up least of all me. I was able to get the shot of it you see here. Its not broken – just DT'd. He patiently explained the mechanics of the DT system to me on a number of occasions but I still don't understand how it worked! Always be very careful with other people's models and probably, now most of us have trackers of some sort, leave them alone as long as they are not in danger or in public view.

So back to trees. As standard equipment I would take a reasonable sized ladder (Fourteen rung two piece extendable) and a 10 meter carbon roach pole. I would carry small immediate stuff on my person all the time, the heavier recovery equipment was packed in a bag back in the vehicle. This bag would include more big torches, white or yellow Gaffer/Duct tape so it could be seen in the dark and not left behind, thick nylon line (80lb) and a throwing weight. A ball of string and some nylon rope about the diameter of traditional sash cord, as well as scissors, knives, pliers a lump hammer and some 6" nails. I would also be carrying a bow saw and probably bows and arrows, thin nylon line and a large plastic sheet to lay it all out on. I said it would be fun! ●

Next month we go tree climbing.

AeroPost

Do let us know your thoughts on AeroModeller and aeromodelling in general. We're happy to receive post to the Doolittle Media office address, or emails to editor@aeromodeller.com – all are read although you may not get a reply. Featured letters may be edited.
Regards, Andrew Boddington

ETHEREAL CL MODELS

Hi Ken,
Just a word of congratulations on your work with AeroModeller. Brian Winch's article (August 2017) on fuels is really helpful here in Australia. We cannot readily get diesel fuel here, ether being banned for sales. Not sure how the F2C guys get it, but I must ask them for fuel when I need some.

I had noticed my engines would fire when I used things like WD40 for cleaning up the engines. So Brian's article now means we can get diesel fuel anywhere, a great boon for diesel lovers!!

Cheers, 'Supercool' of Supercool Racing Propellers

Ken,
In the August issue a writer spoke of getting ether from engine start up fluid. He mentioned Start Ya Bastard, its label said 25% ether. A popular choice in North America which may also be available elsewhere is John Deere engine starting fluid which is 80% high grade ether. Perhaps you could pass this information along.

The magazine has been really great since starting up again! Hope it continues for a long time to come.

Allen Wale
Fonthill, Ontario, Canada

Dear Supercool and Allen, Brian Winch's series of articles on diesels have garnered many positive responses from readers. Anything that helps keep these engines running is information that we'll continue to share in AeroModeller. Regards, Andrew

SILK SUPPLIER

Andrew
I noticed in the May issue (#960, and yes, we're a bit behind the times out here in the antipodes) that Bill Dennis stated that silk as a covering material was becoming difficult to procure. This is certainly so should you be seeking something akin to the beloved Esaki stuff of old, but there are other options too.

Bill does list one possibility, but there are others. I source my silk from an American supplier called Thai Silks. The sole problem with this is the almost insane American postage costs, but, for your readers in the States that won't be a problem. The stuff you need is listed as Habotai, and it comes in several weights called mm, or momme. I use between 3mm to 8mm natural white Habotai, 3mm for lightweight 8mm for heavyweight. This stuff is tough, and easy to use, with a much tighter weave than the old Esaki so it fills quickly and has less bleed through problems. I have not dyed it, but I see no reason why you could not. It's just that I prefer to colour the dope instead of the silk.

Another source I have used with success is the dreaded eBay, and the postage was very reasonable for some lovely white 3mm silk.

William Olive, somewhere in OZ.

Thanks, William for the information – does anyone know a source of silk a bit nearer the UK shores? – Andrew

GEORGE BUSHELL RIP

Andrew,
Just to say how saddened I was to read your report of Duncan Pepper passing. I only met him once at Old Warden in May 2016 where he demonstrated his Super Capacitor, with twin KP00 motor, in a Merlin. It flew well but was attacked by a dog on landing. I was amazed by the calm way he accepted its fate. We corresponded for some months about the relative advantages of NiCads and Capacitors and I looked forward to his articles in the AeroModeller.

I also have to report the passing of another old friend, George Bushell. A bit of a recluse in later years, but back in the late 60's early 70's he was active in promoting bungee launch gliders and electric flight.

Best regards, John Foster.

George Bushell at Baldock in 2005.

VPD: VINTAGE POWER DURATION

BILL LONGLEY ON THIS CLASS WHICH GIVES NEW LIFE TO OLDER FF DURATION DESIGNS. PARTICULARLY SUITABLE FOR SMALL FIELD FLYING AND FOR THOSE PARTICIPANTS WITH RESTRICTED MOBILITY.

The principle object of VPD (Vintage Power Duration) is the recreation of Free Flight Power Duration models prior to 1960 (aligning with BMFA Classic configuration) but fitted with radio control to give trimmed flight and thus eliminating any arduous retrieving.

The rules are fairly basic to cater for different sizes of models with IC or electric power. There are 3 classes depending on engine/motor size: 1 cc or 100 watts, 3.5 cc or 250 watts and 10.5 cc or 650 watts. The engine run times are respectively 25, 20 & 15 secs, all classes endeavouring to achieve a 5 minute max. Flyers of sport type models have an extra 20% motor run; these motor run times have shown to give a fairly level playing field. (Currently the class is organised under the auspices of SAM 35. For full regulations see the www.sam35.org web site.)

The Tasuma Trophy.

Selection of Design

When choosing a suitable FF model for VPD I look at the design characteristics and I generally seek the following:

- Flat or near flat bottom wing section, this improves speed range capabilities.
- The fin not integral with the tailplane, and preferably at the rear - this gives easy control couplings and also easier transport in the car.
- Polyhedral is almost imperative, as 99% of the designs were thus. (Exception to the rule is Wes Denton's "Jumpin Bean" which he flies exceptionally well.
- Look for acceptable fuselage cross-section, the smaller 1/2A designs are very narrow. Sure radio is now small but 1/16 sheet sides on 3/8 longerons will really tax your ingenuity.
- Pylon versus non-pylon? As you do have some control via RC, albeit minimal, it is sufficient to overcome the old problems experienced by FF flyers. Again Wes Denton's "Bean" demonstrates an admirable flight pattern.
- Engine timing, original clockwork timers are getting very expensive, so the use of a micro servo strangling the fuel tube is now favoured, with the convenience of control from the transmitter. Electric is obviously controlled via the RC ESC.
- For other than the smaller 1/2A size designs, I fix the servos at the back of the fuselage under the tailplane, this gives

VPD flyers at BMFA Nationals 2016.

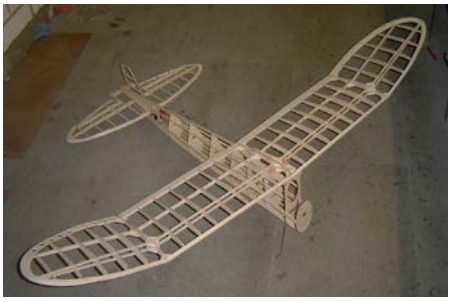
Wes Denton with Saito 62 FS powered Buzzard Bombshell, about to receive a trophy from Ian Lever.

Bill Longley's Stardusters.

Brian Jenkin's KK Gauchos, powered by PAW diesels.

Bill Longley Ramrod 1000 with 650 Watt motor.

Servo and surfaces fitment.



Brooklyn Dodger, 150% special from Belair.

short control rods. The connecting leads I make up with common power leads; servo power requirement is low so that there will be minimal voltage drop down the line. I only use quality 9g servos even on the big airframes, and these prove quite adequate.

- Tailplane tilt, since you will require to turn in both directions with the rudder, keep the tailplane flat.

With regard to my opinion on bullet 1), some years ago I constructed a 150% scale Dave Posner "Dreamweaver" with a Copeman tuned Oliver; still air performance was magnificent, PROVIDED you left it alone and only applied minimum trim change. This model has a very thin, highly undercambered wing section. It will only fly at one speed and attempts to do otherwise would see it would sink like a brick. Absolutely no good when there was a bit of breeze.

I have always believed "a good big 'un will always beat a good little 'un"! So I tend to scale up most of the vintage designs, or use established size with smaller motors – I have a +25% "Creep". My personal favourite design is the Sal Taibi "Starduster" - I do have it in 8 variants with wing areas starting at 350 square inch up to 1200(!), but of late I am flying a "Satellite 650" with 650 watt electric motor.

I may prefer big models, but Ian Lever and Wes Denton do show that small models are equally competitive, Ian with a Keil Kraft "Halo" and Wes with "Small Paatato" and "Jumpin Bean". At the other end of the scale Wes also has considerable success with his grossly overpowered "Buzzard Bombshell" from Belair kits which is fitted with a Saito 62 FS, so much so that at the recent Buckminster event he performed a vertical barrel roll just after take off. (Does not gain extra points!)

Brian Jenkins also shows that historic kit designs are competitive, using a standard and a scaled Keil Kraft "Gaucho" fitted with a P.A.W. engine. These older kit do show that the designs were top class; John Taylor flies a Contest Kits "Calypso" and Dave Yates the Mercury "Mallard". Climb heights now being achieved are in the region of 250 to 280 meters (800 – 900 feet).

Construction Techniques

These classic and vintage designs are pre the era of plastic covering films. Invariably the strength of the airframe and wings in particular depended on the covering material to impart torsional stiffness. I still use silk, and also the general FF approach of tissue on Mylar. Wes Denton has had success with the use of "Icarex", a strong but light material that does not require the use of dope.

Control surfaces are really little more than trims; elevator can be as low as 5%, the rudder no more than 25% as virtually all the designs are polyhedral. IC motor cut is best done with another little servo crimping the fuel tube.

Competitions

A series of around 12 competitions are run through the year with best 6 scores counting to win the Tasuma Trophy. Most of these events are run decentralised, so that you can fly at your local field, 4 of the events are on summer evenings. The decentralised scores are then emailed to the CD.

At the recent Buckminster event we tried "All Up Last Down" - launch at the whistle, cut your motor at your allowed time, fly longer than the other guy, on this occasion all 4 competitors had differing motor run times. It was so successful we immediately did it again. It has now been decided that we will run it at all meetings we are together, and there is now a VPD A.U.L.D. Cup, to be passed on to the winner at each occasion. It is also good spectator sport, particularly at moment of launch.

From the Armchair...

PART 25: Stuart 'Supercool' Sherlock attempts to conquer streamlines.

To add a bit of local colour article your editor went down to the Thames in Reading to take a photo of a swan in flight. As you can see plenty of swans but despite waiting around the they showed no inclination to fly, preferring to swim or walk. Lazy or what?!

The flow of air over the wing of a model aeroplane is difficult to observe: in flight, practically impossible. With cameras shrinking to the size of one's little finger, perhaps the day is nigh when tufts or strings attached to the wing surface may be used to record the local flow pattern. In the case of a propeller run on the ground, movement of a stick, with short strings attached, can be used to observe the flow direction at various points in the slipstream.

Such a test shows that air near the propeller tip is actually drawn forward from behind the prop disc in the static condition, something quite wonderful being quite contrary to expectations. Perhaps in the future such anomalous behaviour may be found in the flow over a model's wing in flight! In the meantime, one of the few tools we have, apart from the wind-tunnel, are computer calculations based on the theory of fluid dynamics. There is a computer code, called the Oshkosh Program, which allows one to construct an aerofoil shape, then also draw the streamlines around this aerofoil.

I was alarmed when watching octogenarian David Attenborough's brilliant nature program called "Conquest of the Skies". At one point he implied that if Vultures attempted to circle too tightly in a thermal, they may very well stall, crash and burn. Well, perhaps not burn. Another part of the programme had swans being tracked from a microlite and filmed in flight to show close-ups of their wings. There was also a presentation which purported to show the streamlines over a cross-section of a bird's wing. The commentary suggested that these streamlines showed the airflow speeding up over the upper surface with a consequent reduction in pressure, thereby generating "lift".

A cursory glance at the displayed streamlines suggested to me the opposite. That is, the wing was not generating upward lift at all. So, by what authority could I challenge David's observation?

There is a lot of information in a set of correctly drawn streamlines: some of that information is quite counter-intuitive, so it is worth investigating further. I will present below sets of streamlines at different angles to the free-stream, for three different aerofoil cross-sections Some folks think that symmetrical aerofoil sections cannot generate lift. Most accept the word of Lilienthal and Hargraves that cambered surfaces, such as seen on a bird's wing, are very effective at generation lift. Flat surfaces, such as the notorious "flat plate", are roundly condemned.

Streamlines By Gosh…

The Oshkosh Program can be invoked to test these notions. The Oshkosh program computes the shape of the streamlines in a robust way if we ignore the viscosity of air and assume that air is incompressible: these are conditions which fit the flight of model aeroplanes quite well.

The aerofoils of choice are a symmetrical one, Clark-Y, and a bird's heavily cambered wing section. We start with a series of angles of attack for a symmetrical aerofoil.

As might be expected, at zero degrees angle of attack the streamlines are the same above the aerofoil as below. Not so apparent is that at the aerofoil high point, the streamlines are a little closer together. There is no nett lifting force present. There is one streamline that stops dead on the nose of the aerofoil. The place where this streamline touches the aerofoil is called the stagnation point. This streamline leading to the stagnation point is called the dividing streamline, because air above the dividing streamline passes over the aerofoil upper surface and that air below the dividing streamline passes under the aerofoil.

Examine now the series of streamline plots below, for the same aerofoil, but with increasing angles of attack.

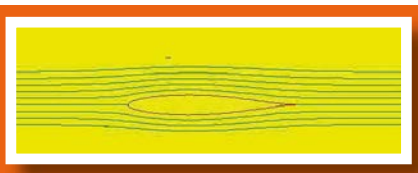
Since the air above the dividing streamline must pass over the aerofoil upper surface, the air above the stagnation point must now move forward against the direction of motion of the aerofoil. This is counter-intuitive, but none the less a fact. One can imagine that the air must struggle to get around the leading edge, and it does. That is why the leading edge must be rounded, to assist this awkward change in direction of flow.

A subtle point to notice is that the dividing streamline touches the stagnation point perpendicular to the aerofoil surface. If it did not, then there would be a component of flow along the aerofoil surface at the point of touch, and this would not then be a stagnation point.

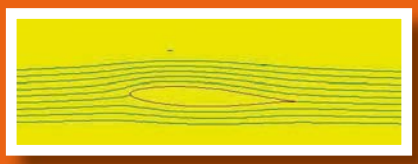
Also apparent is that the streamlines on the upper surface bunch up after they pass the leading edge. What is going on here?

The air fluid is constrained to forever lie trapped between the streamlines. Imagine now that the air moving between two adjacent streamlines have a name; we will call this configuration a stream tube, even though it is not a "tube". The same mass of air passes every point in the stream tube every second. The only way this can happen, where the streamlines lie closer together, is if the air mass speeds up. As noted by Sir David, the pressure in the speeded up mass of air falls and the consequent reduced pressure provides a component of lift.

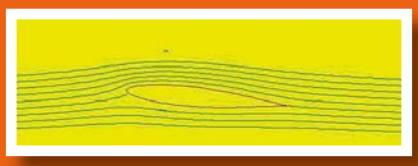
In a similar fashion, the streamlines passing under the aerofoil have moved apart. The flow has slowed down and the pressure rises, providing a second component to the lift so generated. In general terms, the fall in pressure over the upper surface provides a greater share of the lift than the pressure rise underneath.



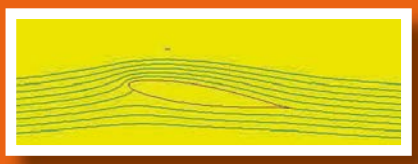
Calculated flow streamlines around a symmetrical aerofoil section at zero-degrees angle of attack.



Same symmetrical section but with the airfoil angle of attack increased to 4 degrees



Same again, angle of attack 8 degrees.



We now jump forward to the symmetrical aerofoil set at 12 degrees angle of attack. The pattern of flow has changed drastically. The stagnation point is now under the nose of the aerofoil, and, very strangely, the stagnation point is rearward of the aerofoil leading edge.

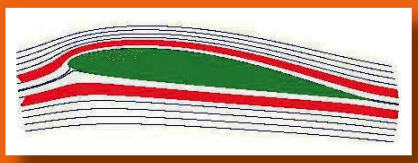
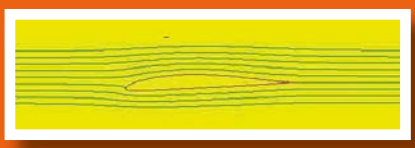


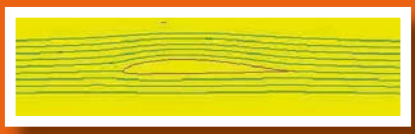
Figure above shows "stream tubes" in red. The width of the stream-tube depends on the speed of the air in the tube. A narrow tube, as on the upper surface, indicates increased velocity with consequent reduction in pressure. The reverse applies to the lower stream tube.

Lift Sucks?!

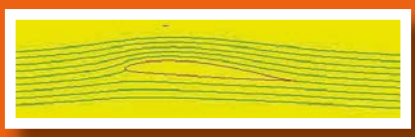
The terminology used is to say that the upper surface is the suction side, while the lower surface is the pressure side. We now have the interesting situation



This is CLARK-Y at an angle where the aerofoil section produces no nett lift. In this case the angle of attack is -3 degrees



This is CLARK-Y at zero degrees angle of attack measured to the chord-line. Some lift is being generated, even with the chord-line parallel to the free stream



Here Clark-Y is at 6 degrees, producing about as much lift as it can in the real world where viscosity of the air is about to intrude.

CLARK-Y here is at 12 degrees. The streamlines may now be unrealistic, as at this angle of attack the flow will have broken away, the aerofoil will have stalled and the stream-line pattern disrupted.

Trained Swan aerofoil section. Note high degree of camber.

Above is 1891 patent aerofoil by H. F. Philips. Not too unlike the trained Swan aerofoil shown above with streamlines. The angle of attack is probably set at the zero lift angle of the aerofoil.

In modern thinking, the sharp leading edge of Philips 1891 aerofoil would have leading edge stall problems. Immediately above is the same aerofoil, with the leading edge rounded off. Even closer to the trained Swan aerofoil section.

that the air flowing over the upper surface is faster than the free-stream, while that below is slower than the free-stream!

Now examine the streamlines before they reach the aerofoil. They are sweeping up toward the leading edge, even before the aerofoil reaches them. The air in front of the aerofoil knows that the aerofoil is approaching! Recall that the air is nearly incompressible, so that any displacement of the air is felt to some degree everywhere.

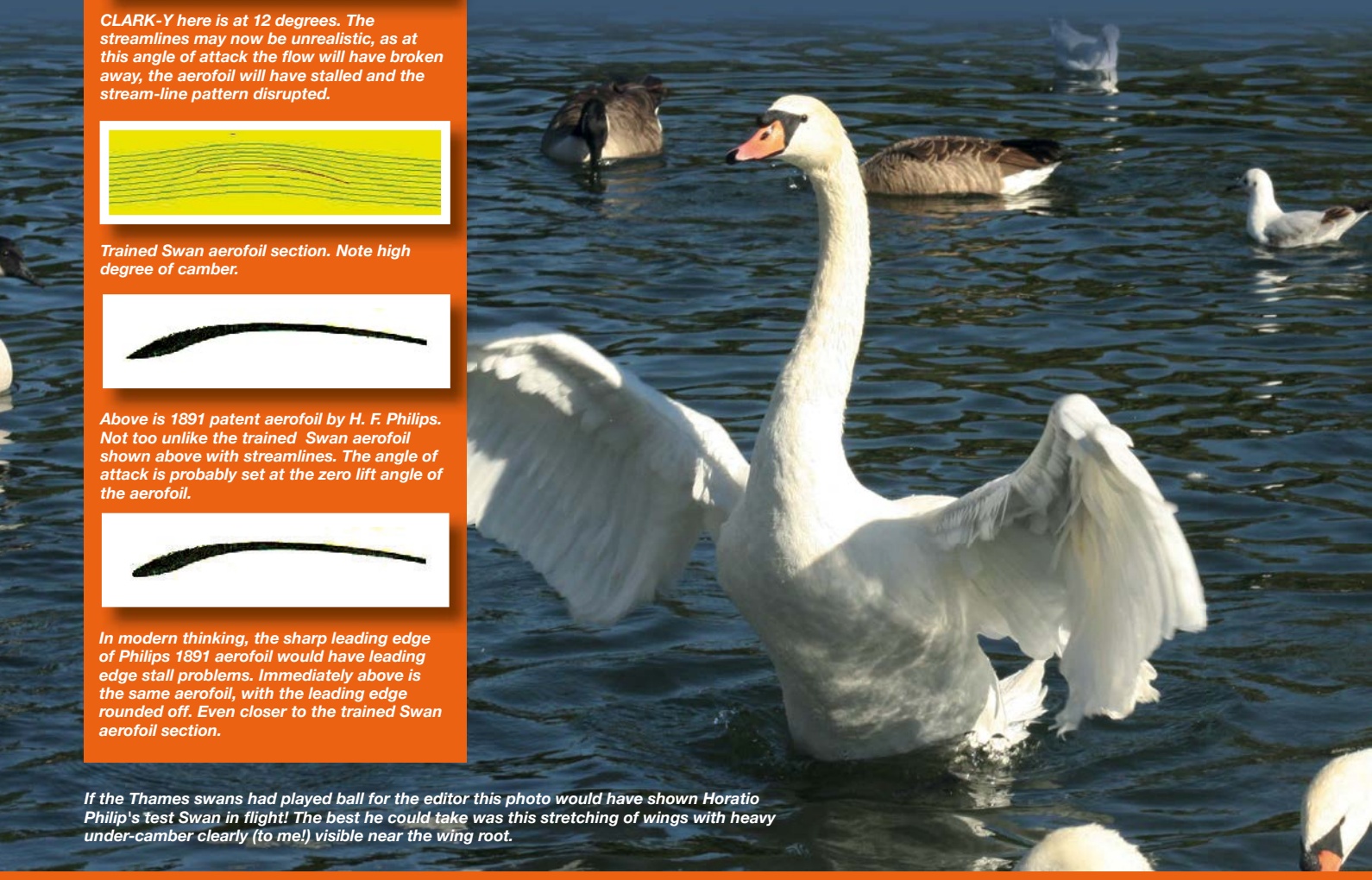
Be aware that from examination of the streamlines, we have shown that a symmetrical aerofoil can create lift. Now what about a cambered section, such as CLARK-Y? Examine the streamlines below.

There is another very useful concept called the boundary layer. In the above diagrams, the fact that some air very close to the aerofoil surface may be stuck to that surface is ignored. Indeed, this air may be responsible for the air breaking away from the surface, thereby ruining the nice diagrams we have above. We get around this by saying that the boundary layer thickness is that measured to the first streamline that does exist!

Now what about those heavily cambered sections visible on Sir David's cunningly tracked Swans? I mean to say, their wing tips were brushing his face! How can streamlines possibly form around those sections? Well I guess Sir David would say that a few million years of evolution would soon fix that, but we have only the Oshkosh program to depend on. Well it so happens that the Oshkosh program has 5 parameters, which cunningly jumbled can make just about any aerofoil shape you want. Below is my effort at jumbling!

There it is. Now to see how much of this ramble has entered my readers consciousness?

1 What is a streamline?
2 What is a stream-tube?
3 What is the stagnation point?
4 What is the dividing streamline?
5 How old is Sir David?



If the Thames swans had played ball for the editor this photo would have shown Horatio Philip's test Swan in flight! The best he could take was this stretching of wings with heavy under-camber clearly (to me!) visible near the wing root.

Buyers Guide

Tail End Charlie

Another pot pourri of aeromodelling miscellany…

Wow!

I've just come back from the Nats. What an event! I hardly know where to start. Superb weather, wonderful friends both old and new, great flying activity and great social activity, you just can't beat it. The contests are reported elsewhere, so here's my spectator's view.

There were many superb models on the RC Showline and whilst lots were ARTFs the scratch builder's art was also very prominent. I really liked this metal skinned Spitfire; sorry I didn't get the builders name.

The revised site layout allowed me to camp where I could sit outside my van and watch and listen to several control line events – Pulsejets at well over 200 mph were as spectacular as ever and the aerobatics were very entertaining as well; succeed or fail, everyone was having fun!

A little further away I found the CL racing classes, then once again I spent some time trying and generally failing to get good pictures of the combat flyers in action. As usual, I had dinner with some of them on the Saturday night. It marked the end of an era with Richard Evans finally stepping down after 25 years as Chairman of the Combat Flyers Association and Tony Cookson taking his place.

Sunday Sunday

Crack of dawn Sunday saw the swap meet well underway. Amazing the stuff you see for sale there. As usual, prices varied from "wow what a bargain" to "you cannot be serious"! I came away with a nice little Tee Dee 010 for a very fair price so I was happy. I also had a good chat with "Rocket Man" Stuart Lodge and discovered he had connections with the South Bristol MAC. He sadly declared that now he is the FAI Chief Rocketry Judge his competitive flying days are over – he was wearing the shirt to prove it!

Well Done Tony and Malcolm

Greatest drama of the whole event was on the Sunday afternoon however when Nigel Crabtree suffered a heart attack at the end of his Combat bout with Richard Evans. Tony Frost and Malcolm Pinnock were the local heroes immediately putting their life saving skills into action and looking after Nigel until the Air Ambulance crew arrived to take over. The best news of the Nats was that as a result of their immediate action Nigel was sitting up in bed the next morning having suffered minimal damage. Both our heroes are in the dinner picture. Tony went on to win the Vintage Combat event, so congratulations to him for that as well.

An impromptu "whip round" quickly raised well over £1300 for the local air ambulance charity. Inspired by this, the following week, Andy Symons of the BMFA raised another £1000+ on a sponsored cycle event.

Then there was the usual evening mayhem of the "Chuck and Duck" event. The Sunday night was a classic for me and the BMFA Marshalls should be congratulated for keeping everyone safe whilst making the minimum of interventions. Most participants were flying safely, but one or two clearly didn't understand free flight trimming or the need to launch towards a vacant space! I dodged most things but did catch one model full in the stomach whilst trying to get a good picture of another one.

Finally, don't forget to send your comments, congratulations or complaints to me either direct by e-mail to chrisottewell@anworld.com or by snail mail via the editorial offices. ■

By Chris Ottewell

Denise Hardy launches her model at the evening's fun FF flying.

Detail on metal skinned Spitfire.

Combat Flyers Dinner - Local heroes Tony Frost, second from left, and Malcolm Pinnock at head of table.

How to launch a combat model.

The setting sun catches Phil Worth about to launch.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