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Surveying the potential of Moel Siabod with fellow glider guider and mountain walker, Paul Jubb.

Well Christmas came and went, with 2009 seamlessly following the very limp-wristed 2008, which is now fading to obscurity without much to show for it! There was some uncommonly grand weather over the holiday here, somewhat made up for that appalling summer, leading to my going for the odd drive in the sports jobbie, hopping on one of my motorcycles, scrambling up a few mountains and I even got to fly a model aeroplane!

Certainly, avoiding conurbations seemed eminently sensible, given that hoards of unsavoury proletariat scavengers would now be desperately clawing through the desperation of the 'January Sales' and even 'parks' now describe retail rather than leisure facilities, so they're to be given a big miss too. Those do at least serve to keep all the animals in the zoo, so to speak! This annual mindless mayhem gets in the way of everything 'normal' so leaving the great unwashed stuffing themselves silly on yesterday's lightly killed guinea fowl, swilled down with liberal doses of Chateau Vin Deux wobbly legs, before nipping into the Trafford Centre to buy a ruddy lawnmower, I took full advantage of perfect winter photography conditions which are rare and precious in this business!

Calm conditions, albeit allied to temperatures well below freezing for the entire holiday period, resulted in brilliant blue skies for a couple of weeks solid and that induced my group of like-minded friends to gather for a bit of festive fun. We're all lucky enough to have fields to fly from next to our homes, so we partied from house to house flying a bunch of models from dawn till dusk (and beyond…), ninety-nine percent of which turned out to be Multiplex Elapor foamies, from Easy Gliders to Funjets and everything in between pretty much, which says a great deal about the sheer success of these amazingly capable models. As a self-confessed aeromodelling 'snob' who harks back to the glory days of diesels, sticks and tissue, with everything liberally clear doped with cellulose, I do feel as though I've strayed from 'the path of true righteousness' somewhat! There is, on the other side of that coin, absolutely no doubt that we simply wouldn't have flown for the time that we did, were it not for these incredibly tough (and repairable…) models that saw us dive into the house for a squirt of CA and a 'winter warmer' pausing only to unhook a freshly charged battery, before nipping back to the field for another sortie and with a Flycam 2 aboard the Cularis we captured the magic of it all on video to play back over the dinner party afterwards - great fun, inexpensive and achievable by almost anyone!

Yes, this is certainly a super hobby but it keeps getting in the way of my love of the mountains, although I have vowed to take a backpacked slope glider up the next ridge I climb - anyone fancy joining me for a sortie? Moel Siabod certainly has dynamic sloping 'potential', as the photograph shows!

Steve Dorling

PRE-FLIGHT

Stop press! Attention MacGregor JR DSX 9 users

Just as this was about to go to print we received the following notice from MacGregor!

MacGregor Industries Limited would like to inform all customers for JR DSX9 radio control systems of an important Service Notice. This Notice shows how to perform a very simple mechanical modification to prevent possible chaffing of the stick wiring on one channel. No electrical work is required and the performance of the radio is unaffected.

DSX9 sets sold by MacGregor after 8 January 2009 have all been modified and are identified by a blue sticker on the base of the transmitter.

The Service Notice can be viewed at:http://www.macgregor.co.uk/Support/dsx9_wiring.htm

This modification should be easy for most customers to perform at home. However, those who are unable to do so should contact their retailer, who will arrange this modification for them.

For customers without access to a computer, a printed copy is available on request from the MacGregor Service Department. Please call 01628 760430.

Kevin Crozier, MacGregor Industries Limited, Tel: 01628 760430 Fax: 01628 760435. www.macgregor.co.uk

Just a final note on this one: the foregoing applies only to Mode 2 transmitter set-ups. Model 1 wallahs should contact MacGregor.

Free Flight Conference

The BMFA Free Flight Tech. Committee have arranged a conference on free flight in the UK at The Gliding Centre, Husbands Bosworth Airfield, Lutterworth, Leicestershire (www.theglidingcentre.co.uk) on Sunday 1 March from 9.30 until 4.00pm. The objective is to discuss and develop ideas for the way forward to ensure free flight remains a vibrant aeromodelling activity with as many active participants as possible across the whole age range.

Subjects covered will include:

- The contest calendar, including the Free Flight and Space Nationals, the galas and decentralised events.
- The classes and rules.
- The team selection meetings and selection methods.
- The advance of technology, particularly in the FAI classes.

The day will feature speakers from within the FFTC presenting the current thinking and ideas, together with other speakers who wish to make a contribution to the debate. This is your chance to have your say so please get in touch with the Chairman of the FFTC, Mike Woodhouse (call 01603 457754), to book a ten-minute slot. After the presentations there will be a chance to make individual points and there will then be an open forum to bring together the various views and ideas. Lunch will be provided and there will be breaks for coffee.

Booking

There is no charge to attend the session, however in order to ensure that they cater for the right number they would like to know if you are coming: Please advise Chris Strachan - Tel: 01223 860498 or E mail: chris.strachan@btinternet.com

Make a date to be there and have your say on the direction that free flight takes within the UK!

Electric-powered gliders

This latest initiative could mean a bright future and new challenge for R/C electric soaring enthusiasts worldwide. The BMFA recently introduced a new competition format for electrically-powered gliders. The format uses a tiny altimeter unit in the model to switch off the electric drive motor at a fixed height above launch. This makes it possible for any electric soaring pilot to compete on an equal footing with other glider pilots in a true thermal soaring competition, without the expense and difficulties involved with developing a highly efficient driveline.

Models will compete in two separate classes for up to 2 metres wingspan and up to 4 metres wingspan. Competitions qualifying for the BMFA UK eSoaring League are planned at a number of venues in the UK. The 2 metre model class, in particular, will enable newcomers and those on a limited budget to compete using one of the dozens of ARTF electric gliders readily available from most model shops today.

The competition format is also ideally suited to a worldwide postal format and there is already considerable interest in Eastern Europe, the US and Australia.

Anyone who is interested in electric-powered gliders can obtain further information from the eSoaring website at www.eSoaring.net or by emailing pro Martin Bell at: www.ElectricSoaring.co.uk - Email: pro@eSoaring.net Mobile: 07785 113922 - Electric Soaring Competition - website: www.eSoaring.net

SAM 35 Gala - 'Theme for a Dream' contest

You know how it is! You sit in your favourite armchair thinking of the new season ahead and what to build and fly. It is such a pleasurable experience. But then your mind drifts off to those heady days of youth when winds were light and summer days were endless and that favourite model of yours comes into your mind's eye. You remember the saving up, the obtaining of the wood and glue or possibly the kit, the discussion with your dad or uncle or friend about how to build this wondrous model aeroplane and how it might fly! Then the build with its challenges and worries until the model is finally finsihed. You gaze at your creation in admiration and find family and friends to admire it with you. You've built several models before but none have been too successful - will this be the one that really flies?

Then the preparation for flight and the big day when you go off to the field to fly your model. All your hopes are fulfilled, this one really does fly, against all previous experience it stays in the air long enough for you to admire its flight! Your whole being is swept up with the excitement and accomplishment. It is a day and a model you will never forget throughout your whole lifetime!

Well SAM 35 would like you to share this model and your memories by bringing a replica or the original to the SAM 35 Gala on 27-28 June 2009. They will provide a compound and marquee for all the models to be displayed and if you wish to bring a simple storyboard to tell of your modelling adventure so much the better. Special certificates to commemorate the occasion will be presented to every modeller bringing their 'dream' model for display and special trophies will be presented for those judged best in class for F/F, R/C, C/L, Scale and Indoor. As you can see, whatever you built the organisers will be delighted to see it at the SAM 35 Gala! In addition, a special trophy will be awarded to whoever in the judges' opinion produces the best storyboard. As this will be a particularly historic occasion they will be making a complete video and photographic record of the occasion so magazine and newsletter editors of whatever model discipline are most welcome to attend. It should be noted that models are not required to fly to receive certificates and trophies but of course for those who wish to recreate that 'magic moment' where better in the world than the grass airfield at Old Warden?

Those old free-flight sports jobs bring out the boy in everyone.

So if this has captured that old spark of enthusiasm for a special moment in your life, why not dig out the old plan and start building, or if it's still in the loft carefully lift it out and see what a little renovation can do for your original creation. Think you may not be able to make Old Warden on 27-28 June? Then while you may miss out on the fun you can still send your model by proxy with a modelling friend or clubmate and still receive a special certificate. The organisers aim to bring the biggest number of vintage model aircraft and their builders ever achieved, all with special memories for those involved, together at Old Warden,. So put the dates in your diary now. Certificates will be presented on both days, judging for trophies will take place on both days and be presented at a special prizegiving in the afternoon of Sunday 28th.

For further details contact :- Brian Lever SAM 35 President, 3 The Park, Peakirk, Peterborough. PE6 7NG. Tel: 01733 252416, email: blever@btinternet.com

Good luck with your model memories and renovation/replica build. See you at the SAM 35 Gala.

THE WRITE STUFF?

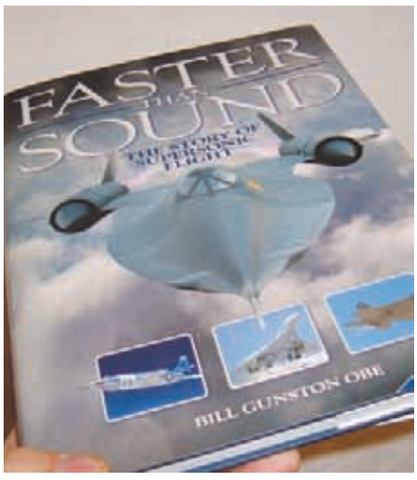
WANABE A CONTRIBUTOR? Have you got what it takes? If you can write a bit, take a decent digital photograph and produce work to deadlines, then we need you. AMI depends on contributions from others to vary and diversify the content – drop a note in the Ed's email box and he will call you to discuss.

SHOPTALK

Seen these? Some of the latest goodies available in model shops and on-line this month

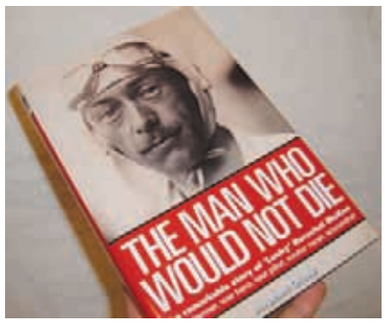
HAYNES - 'FASTER THAN SOUND'

Bill Gunston OBE is a highly respected author in the world of aviation and his 'Faster Than Sound' is now printed in a second edition by Haynes and makes for fascinating reading, with some truly inspirational illustrations. In the late 1940s, test pilots in the USA and Great Britain pierced the 'sound barrier' for the first time, showing the world that it need not be a barrier at all. In the years that followed, even the commercial aviation world enjoyed supersonic flight with Concorde and military aviation developments invoked some truly heroic innovations with quantum leaps in speed during that supersonic era! Today supersonic flight is taken as a given, but back then the fastest piston-engined machinery, along with the early jets, suffered catastrophic failures as the transonic boundary was broached. Bill describes in a thoroughly informative manner the concept of the sound barrier, the theory and the implications of the speed of sound and man's attempts to break through it - a thoroughly good read and a great addition to your library!



'THE MAN WHO WOULD NOT DIE'

This is the remarkable story of 'Lucky' Herschel McKee - barnstormer, war hero, test pilot, motor racer, scoundrel! This whisky drinking decorated hero of both World Wars was a bigamist and full-time scoundrel indeed! Herschel Jessup McKee was all of the above and then some - a compulsive risk taker who crashed in racing cars, on motorcycles and in aeroplanes, only ever suffering minor setbacks, had no fear, nor worries it seems and was fantastic to a fault! Once introduced, life will never be the same again. A brilliant read and full of energy - highly recommended for a rainy day!



ULTRA POWERFUL SERVOS FROM JR

JR have expanded their already extensive range of servos with some new units for very specialist tasks. Two of these are their 'Full Metal Jacket' digital servos that feature their highest quality servo motor, mated to a 'Super Hybrid Gear Train' made in aluminium and S45C 'super iron.

Of these two, the DS6301 is an ultra high torque type that delivers a huge 33 kg/cm. with a full 60 degree travel in 0.17 seconds. Alternatively, the DS6305 delivers 16 kg/cm over a 60 degree travel arc in just 0.08 secs. - and it's all done from a 4.8v. power source because JR emphatically advise against any higher voltage power supply.

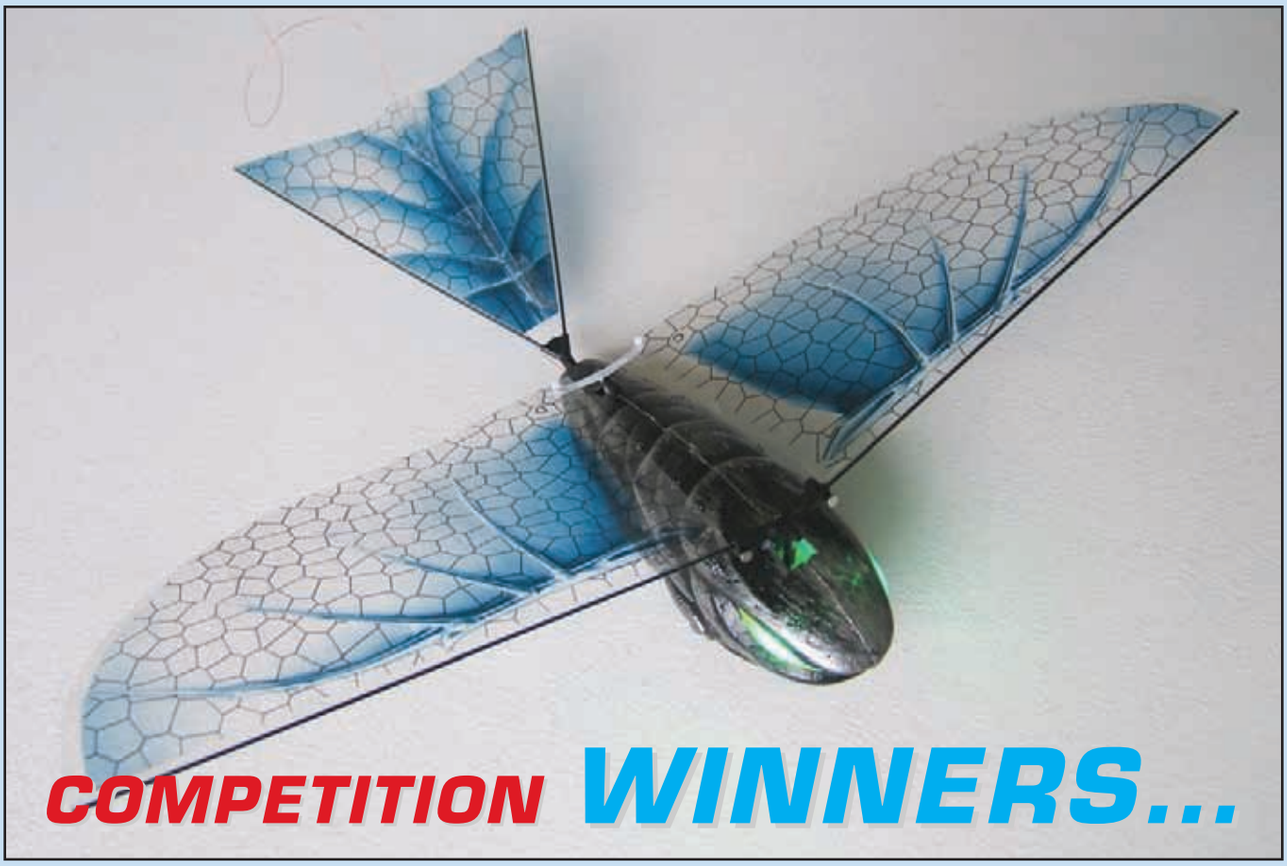
Both are special-order items that take a month to deliver and each costs £284.96.

Also on the way is the DS9501, low profile digital servo, designed to deliver extra punch with a drive output of 6.2 kg/cm for a full travel time of 0.17 secs. If you want greater travel speed, then the DS9505 is even faster with a travel time of just 0.12 secs.

Price is expected to be £109.95.

JART LT

Jart - named after the lawn darts - was the tag chosen for Californian slope guru Reed Sherman when his combined graphics designer and aeromodelling skills were put to good use, resulting in the most gorgeously sleek and purposeful looking aerobatic slope glider! Reed has managed to combine the looks of a fighter jet with the aesthetic elegance of a full-size sailplane, resulting in a machine that looks as though it's going through the sound barrier when parked up and in the air. It's every bit as purposeful as its appearance would suggest! Until now, if you wanted a Jart of your own, then you downloaded the (free) plan from jartworld.com and got your sanding block out, but now, after bowing to constant pressure, Reed has come up with the Jart LT - or lightweight Jart - and she's a real beauty, with a gel-coated epoxy glass fuselage allied to Oracovered built-up wings and a full hardware pack. For a current price delivered to your door, visit www.jartworld.com where, additionally, the full Jart experience may be enjoyed. AMI will have a full review of the Jart LT in next month's magazine!



COMPETITION WINNERS...

Our December issue competition certainly seems to have struck a chord with many of our readers anxious to sample the Silverlit i-Bird R.C indoor ornithopter.

The FIVE lucky winners, who will be able to get very flap-happy at their next Club meetings are:-

● James Benson, Truro ● S Baxter, Knaresbrook ● R. Randall, Coventry
● R.D.R. Woods, Letchworth ● R.Gibbs, Swindon
We hope you have a lot of fun with your prizes.

WHAT, WHERE, WHEN

Entries in 'Whatm where, when' are completely free. Send them in writing to our Amersham offices or by email to: alec@modelactivitypress.com

FLYING FOR FUN

APRIL 25-26
LLEYN MAC WARBIRDS WEEKEND. An informal meeting for all types of warbird R/C models. All welcome. Contact Dylan Roberts on 07917410707 or email to flyeruk-admin@tiscali.co.uk

MAY 30-31 2009
KINTYRE RADIO MODEL CLUB's ever popular fun-fly at RAF Machrihanish near Campbeltown, Argyll, for all disciplines - radio, free-flight, controLline and indoor. For information and vehicle registration, contact Bryan Passey on (01546-602918) or b.passey@sky.com

FREE FLIGHT EVENTS

MARCH 8
1st BMFA AREA CENTRALISED MEETING. Area Venues. C/P (White), F1A (K&MAA/Plugge), F1G, Vintage (Plugge), HLG/CLG (Plugge). Contact: BMFA Area Comp Secs.

MARCH 22
2nd BMFA AREA CENTRALISED MEETING. Area Venues. C/G, F1B (Weston/Plugge), F1J/BMFA1/2A, Mini Vintage (Plugge), P30 (Plugge). Contact: Area Comp Secs.

APRIL 5
3rd BMFA AREA CENTRALISED MEETING. Area Venues. C/R (Gamage), F1C/F1Q (Halfax/Plugge), F1H, SLOP (Plugge), Tailless (Plugge). Contact: Area Comp Secs.

APRIL 10
(Good Friday) BMFA NORTHERN GALA. Venue: RAF Church Fenton. B/G (CMA), B/R (Caton), B/P (Hamley), O/E, SLOP (Falcons), F1G, F1H, F1J/BMFA1/2A, Mini-vintage, C02, E30, HLG, CLG. Contact: Dennis Davitt 0113 2675433.

BMFA LONDON GALA & CLUB CHAMPS. Venue: Salisbury Plain. 18th: C/R, C/G, C/P (Club Champs), Vintage, P30, C02, CLG. 19th: F1G, F1H, F1J/BMFA1/2, SLOP, Mini Vintage, E30, HLG. Contact: M.Dilly 0208 777 5533.

MAY 9-10
BMFA STONEHENGE CUP (World Cup Event). Venue: Salisbury Plain. F1A, F1B, F1C/P (Dick Johnson Memorial), F1Q. Contact: P.Williams 01252 842120.

MAY 17
1st BMFA F1E MEETING (Team Selection). Venue: Near Sheffield. F1E. Free Flight Soaring. Contact: Ian Kaynes 01252 512538.

MAY 23-25
BMFA F/F NATIONALS. Venue: Barkston Heath. B/G (Thurston), B/R (Model Aircraft), B/P (Shelley), O/E, Tailless (Lady Shelley), Women's BG/BR/BP (SAA), Junior BG/BR/BP (Frog Junior), CLG, F1A (Ronytube), F1B (Fred Boxall), F1C/F1Q (Eddie Cosh), Vintage (Jubilee), SLOP (Peter Harris), HLG (Nats), P30, Novice Glider & Rubber (J (junior kit glider & junior kit rubber), F1H (BA), F1G (308), F1J/BMFA1/2A (Hales), Mini-vintage, C02 (Sparklets), E30, Vintage Glider. Combined Classic. Plus Junior championships (Heather) and overall category championships. Also Bowden, and Non-Championship F/F Scale and SAM events. Contact: Mike Woodhouse 01603 457754.

INDOOR FLYING

JANUARY 24
WALTHAM CHASE AEROMODELLERS Indoor R/C meeting at the Main Hall, Havant Leisure Centre, Civic Centre Road, Havant, Hants. 7pm till 10pm, NO F/F. Admission £6 for fliers (including juniors), £1 spectators, accompanied children free. FliteHook in attendance, this event is supported by BMFA Southern Area. All welcome, proof of insurance required. Contact Chris Carr on 023 8043 7805, Alan Wallington on 01489 895157 or visit www.wcaer.fsnet.co.uk

JANUARY 25
OFMAC INDOOR FLYING at The Castle Leisure Centre, Wallingford. 10am till 6pm, Fun-fly for all, Free-flight, Rubber, C02, Electric. Refreshments available, Flitehook in attendance. Take your own table and chair as there is a shortage. Contact Dave Dobson on 01491 837789.

JANUARY 31
TONBRIDGE GASSERS & RUBBER FANCIERS Indoor Flying at The Angel Centre, Tonbridge Kent located in Tonbridge town centre in Angel Lane at rear of High Street next to Sainsburys where there is a large car park adjoining the leisure centre. Free-flight 6pm to 10pm and lightweight R/C 9.30pm to 10pm. Entry £6 per flyer and £3 for spectators. Contact Eric on 01622 737814 or Stuart on 07956 066463 before travelling.

FEBRUARY 8
WORCESTER INDOOR FREE-FLIGHT at The Sports Hall, Bishop Perowne College, Merriman's Hill Road, Worcester. WR3 8LE. 2pm till 5pm, Rubber, Electric and C02. BMFA insurance mandatory, please take own table and chairs. For further information and directions contact Ed Garner on 01905 381579 or 07866 923674.

FEBRUARY 14
NORTH LONDON MFC INDOOR R/C meeting at Furzefield Sports Centre, Potters Bar, Herts, EN6 3BW (J24/M25). 6pm till 10pm, admission £8 fliers, £2 spectators. All-up weight limit: fixed-wing 225g. and 36" span, helis 400g. BMFA insurance required. Contact Peter Elliott on 01707 336982.

FEBRUARY 21
WALTHAM CHASE AEROMODELLERS Indoor R/C meeting at the Main Hall, Havant Leisure Centre, Civic Centre Road, Havant, Hants. 7pm till 10pm, NO F/F. Admission £6 for fliers (including juniors), £1 spectators, accompanied children free. FliteHook in attendance, this event is supported by BMFA Southern Area. All welcome, proof of insurance required. Contact Chris Carr on 023 8043 7805, Alan Wallington on 01489 895157 or visit www.wcaer.fsnet.co.uk

FEBRUARY 22
OFMAC INDOOR FLYING at The Castle Leisure Centre, Wallingford. 10am till 6pm, Fun-fly for all, Free-flight, Rubber, C02, Electric. Refreshments available, Flitehook in attendance. Take your own table and chair as there is a shortage. Contact Dave Dobson on 01491 837789.

FEBRUARY 24
BOURNEMOUTH MAS INDOOR FLYING MEETING at the Allendale Centre, Hanham Rd., Wimborne, Dorset, BH21 1AS, 7.00p.m. to 10.00p.m. Free-flight only. Prizes for longest flight and longest flight by a scale model. Flitehook in attendance. Free parking in public car park in Allendale Road. Contact John Taylor on 01202 511502 or Roy Tiller at: roy.tiller@ntlworld.com

FEBRUARY 28
TONBRIDGE GASSERS & RUBBER FANCIERS Indoor Flying at The Angel Centre, Tonbridge Kent located in Tonbridge town centre in Angel Lane at rear of High Street next to Sainsburys where there is a large car park adjoining the leisure centre. Free-flight 6pm to 10pm and lightweight R/C 9.30pm to 10pm. Entry £6 per flyer and £3 for spectators. Contact Eric on 01622 737814 or Stuart on 07956 066463 before travelling.

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MARCH 15
IMPINGTON VCMAC INDOOR MEETING at Impington Village College, Cambridge. 9.00am to 5.00pm. Go along and fly indoors all day. RTP and small electric helicopter flying in separate hall. Model Exhibition and a Seminar by Roger Simmonds:- Jetex Reborn. 'Success with Small Scale Free Flight Jets'. Details and free plans of Bostonian and Frog Junior models for comps on the day. Contact Chris Strachan Tel:- 01223 860498 email: chris.strachan@btinternet.com

MARCH 21
WALTHAM CHASE AEROMODELLERS Indoor R/C meeting at the Main Hall, Havant Leisure Centre, Civic Centre Road, Havant, Hants. 7pm till 10pm, NO F/F. Admission £6 for fliers (including juniors), £1 spectators, accompanied children free. FliteHook in attendance, this event is supported by BMFA Southern Area. All welcome, proof of insurance required. Contact Chris Carr on 023 8043 7805, Alan Wallington on 01489 895157 or visit www.wcaer.fsnet.co.uk

MARCH 29
OFMAC INDOOR FLYING at The Castle Leisure Centre, Wallingford. 10am till 6pm, Fun-fly for all, Free-flight, Rubber, C02, Electric. Refreshments available, Flitehook in attendance. Take your own table and chair as there is a shortage. Contact Dave Dobson on 01491 837789.

APRIL 5
WORCESTER INDOOR FREE-FLIGHT at The Sports Hall, Bishop Perowne College, Merriman's Hill Road, Worcester. WR3 8LE. 2pm till 5pm, Rubber, Electric and C02. BMFA insurance mandatory, please take own table and chairs. For further information and directions contact Ed Garner on 01905 381579 or 07866 923674.

APRIL 11
NORTH LONDON MFC INDOOR R/C meeting at Furzefield Sports Centre, Potters Bar, Herts, EN6 3BW (J24/M25). 6pm till 10pm, admission £8 fliers, £2 spectators. All-up weight limit: fixed-wing 225g. and 36" span, helis 400g. BMFA insurance required. Contact Peter Elliott on 01707 336982.

APRIL 28
BOURNEMOUTH MAS INDOOR FLYING MEETING at the Allendale Centre, Hanham Rd., Wimborne, Dorset, BH21 1AS, 7.00p.m. to 10.00p.m. Free-flight only. Prizes for longest flight and longest flight by a scale model. Flitehook in attendance. Free parking in public car park in Allendale Road. Contact John Taylor on 01202 511502 or Roy Tiller at: roy.tiller@ntlworld.com

MODEL & FULL-SIZE AIR SHOWS

MAY 3
10th ANNIVERSARY ABINGDON AIR & COUNTY SHOW at Abingdon airfield, Dalton Barracks, Abingdon, Oxon supporting the Thames Valley & Chiltern Air Ambulance. A three-hour flying display plus static aircraft, historic vehicles, craft marquee, children's amusements, tank rides, Dr. Who's Tardis and the Daleks, Farmers Market and much more for all the family. Public admission £10 adults, £5 children 5-15years and senior citizens. Under 5s free and car-parking is also free. Discount rate admission tickets available early in the New Year from the web-site: www.abingdonfayre.com and also from selected local outlets.

PYLON RACING

APRIL 5
CLUB 2000 Pylon Racing at Northampton. Contact Graham Clarke on 02476 411142 (home) or 02476 256200 (work) or visit the Pylon website at: www.ukpylonracing.co.uk for details and maps.

MAY 10
CLUB 2000 Pylon Racing at Northampton. Contact Graham Clarke on 02476 411142 (home) or 02476 256200 (work) or visit the Pylon website at: www.ukpylonracing.co.uk for details and maps.

R/C SCALE COMPETITIONS

MAY 24
LADMAS LOW KEY SCALE COMP at the club's large flying field at Halsall (Nr. Southport, Lancs). All types of fixed-wing scale aircraft are welcome. All 35 MHz frequencies and 2.4 GHz. Insurance compulsory. Minimum 'A' certificate, 'B' cert and failsafes over 7kg. Simple flying only event to introduce newcomers to competition flying. Contact John Wheeler whealthcare@blueyonder.co.uk or 07973 952457 for details.

SPACE MODELLING

APRIL 18-19
1st FAIR SPACE TEAM TRIALS. Venue: Salisbury Plain. S1, S3, S4, S5, S6, S7, S9. Contact: G.Seabrook 01483 285456.

MAY 23-24
FAIR SPACE NATIONAL CHAMPIONSHIPS and 2nd Space Team Trials. Venue: Barkston Heath. S1, S3, S4, S5, S6, S7, S8E/P, S9. Contact: G.Seabrook 01483 285456.

SWAPS/AUCTIONS/BRING & BUY/COLLECTORS

FEBRUARY 22
MODELLERS' SWAPMEET at Hurworth Grange, Hurworth, Darlington, Co. Durham. 10am till 1pm. This event, now in its fifth year, gets bigger every time and offers an ideal opportunity in the North East for aeromodellers to sell, buy, swap, browse or simply network. For details, bookings, etc., contact Sam on Weston on 01748 824702 or email: westonsam12@aol.com

MARCH 7
REDDITCH ELECTRIC FLYERS Annual Bring & Buy at Walkwood Middle School, Feckenham Road, Redditch, Worcs, B97 5AQ. For anything R/C related - aircraft, cars, boats, helicopters, etc. Doors open for vendors at 8.30am to 3pm, general public 10am till 2pm. Admisssion £1 on the door. 2m tables £5 in advance, 2m pitch (bring own tables) £4 in advance. Refreshments available. Table sales contact: Bringandbuy@redditchelectricflyers.co.uk or call Bob Moseley on 01527 545620 evenings/weekends. More details plus booking forms at: www.redditchelectricflyers.co.uk

LUTON AIRCRAFT ENTHUSISTS' FAIR at Vauxhall Recreation Club, Gipsy Lane, Luton, Beds. LU1 3JH. 10.30am till 3.30pm. Go along to buy or sell anything aircraft-related, including models, accessories, books, etc. Enquiries and stall bookings to Keith Manning on 01372 725063 (evenings), email: londoner657@blueyonder.co.uk or visit www.aircraftenthusiastsfair.co.uk

MARCH 15
24th ANNUAL NORTHWICH SWAPMEET at the Memorial Hall, Northwich. 9am till 1pm. For table bookings and other info, contact Wayne and Ruth Howman on 01565 631190.

MARCH 20
DUMBARTON & DISTRICT MAC AUCTION SALE of scale aircraft and everything else associated with the hobby. Entry from 6.30pm and the auction starts at 8pm. Refreshments available and there will be trade stands and various exhibits. Contact Maurice Irvine on 01475 689711 or email: almoraima@hotmail.co.uk for venue and other details.

MARCH 22
HORAM MODEL FLYING CLUB Annual Swapmeet at Horam Village Hall, a quarter of a mile south of the village on A267. Starts 10am. Entrance fee £2, tables £6 and £2 for helper. For table bookings contact R. Richardson on 01825 762372 or by email to: rob.richardson@talktalk.net

AIRMAIL

Incoming

Got a beef, useful comment, or sound advice on any aspect of the hobby that you'd like to pass on? Good - then here's your right to reply!

Hot Hacker!

Hi Steve,

Thought you might like to hear about the little Hacker Cub you recently reviewed - here's my 'tuned' version, i.e. with an outrunner up the front. Ho ho!

Had to delve into my box of spares to get some GWS Beaver wheels to clear the enormous prop off the ground and I also found that if I went by the book (which I did for 99.9% of the build) the control runs came in too low to meet the servo horns, so I put the 'Z'-bends on the servo horns instead. Of course the front bulkhead had to be moved back to retain the aesthetics and I presumed the balance, but what a fabulous little model - it was a treat to build, although out here I could not get any accelerator for CA so used a combination of adhesives, some five-minute epoxy for the wings, motor bulkhead and tail, with thin and thick CA for the rest with the odd dab of white silicone sealant for the wing servo.

She was purchased from the lovely Peggy Chng (no, that is not a typing error) of Singapore Hobby Supplies PTE Ltd. Peggy is a very knowledgeable lady when it comes to model aircraft and is not only charming but very helpful, as are all the staff there. The shop is tiny, but there again, so is Singapore.

I have enclosed some snaps.

Cheers, Derek

Derek's sprightly Cub enjoys a power hike!

Silicone warning

Hi Steve,

I am partway through enjoying your latest; the following may be useful as a letter to the editor.

As a returnee to the model aero scene, after some 40 odd years, I have found many of the articles in AMI to be extremely helpful in getting up to speed with modern developments.

Peter Miller's most recent and very interesting article (Jan. '09 issue) included discussion on clunk tanks and their installation. He mentioned that silicone sealer is proof against all fuels. This is probably true for the traditional diesel and glow brews, but may I add a word of caution in connection with petrol power, which seems to be gaining in popularity for larger models.

Silicone and petrol engines do not mix - beware!

This is based on automotive experience. Some years ago, I prepared an ageing TVR Tasmin for hill-climb competition. One of the repairs entailed curing a leak around the fuel gauge sender flange, and yes you've guessed, I used a well known silicone sealer. On the way home from the next event, the car lost almost all power, and came home on a Relay truck. Subsequent strip down revealed an orange goo clogging up the pipe leading to the fuel pump and its inlet filter.

It is probably the case that some silicone sealers are more equal than others, but nevertheless, some care may be needed if they are used with petrol power, particularly in locations where the silicone may be drawn into the fuel system.

Best regards, David Fenner

Yes indeed - silicone will not withstand petrol for long and paraffin-based diesel fuel will eventually cause it to swell, too - Ed.

Boll-Aero success

Steve,

I enclose a photo of my Boll-Aero engine in a Bumble Bee free-flighter I have made from the drawings in AMI. I too built the Midge and run it successfully in a K.K. Bandit free-flighter. My Boll-Aero runs well and was easy to build, ideal as a first timer. I find it a bit bulky and there were a couple of problems with the drawings but overall it's excellent. In fact I was assembling it with diesel fuel as a lubricant (without the carb.), turned it over with a prop fitted and it fired in my hand!

I have it fitted in my Bumble Bee free-flighter and was going to fly it at Middle Wallop a couple of weeks ago but the weather had other ideas. Any more engine designs in the magazine would be great.

Regards and thanks, Mike Blankley

Pretty as a picture - engine, model and 'model'! Both engine and aeroplane from AMI plans.

Letters sent in will, wherever possible, be reproduced unexpurgated, unless overly lengthy or libellous. We cannot handle hand-written correspondence, but emails are invited to steve@modelactivitypress.com

DEESIDE SCALE CONTEST '08

Our man tarries awhile on the marsh to report 'a good scale do'!

Phillip Kent (left) congratulates Alan Glover on his victory.

The Deeside Club used to be called the Heswall Club, which by my reckoning makes it the only English model flying club within Wales. Their field is down on the Dee Marshes, a surprisingly lovely location in early autumn. We had a glorious day for one of Phillip Kent's famed 'all welcome' Unlimited Competitions. All day the sun shone, the larks sang, and the bacon butties sizzled on the griddle. To put you in the picture, if the exalted BMFA Scale Nats are for the Beethovens of Scale, Phillip's contests represent the 'easy listening' end of the scale continuum: popular, accessible, and great fun.

First off

You know it's going to be a good scale do when you spot three Brian Taylor plans as you stride through the pits. First off was Colin Bostwick's Spitfire XIV. Later Marks of Spitfire look just that bit more aggressive, and this one is a cracker. Colin's Spit is Laser 120-powered, but he had a petite problemette with the undercarriage. A lost grub screw limited him to a single flight, which was a shame, since this is a great model. Another excellent Spitfite XIV, this time in the famed Ginger Lacey colours, was just a few paces away. This one is also Laser 120-powered, but was owned by Dominic Brassey-Williams,

Rhyl Club member Richard Thomas' P51-D ARTF from Hangar 9; Roto 35cc on a 20 x 10.

TOP LEFT: *Colin Terry's Sea Fury. 72" span, 1:6.4 scale; Laser 150-powered, weighs 13lb.* **TOP RIGHT:** *Brian Brassey's Fokker DVII: SC 120-powered; weighs 9.1/2 lb; 1/5th scale.* **ABOVE LEFT:** *Gary Protheroe's 93" span/12.1/2 lb French Navy Fieseler Storch from the ancient Svenson kit.* **ABOVE CENTRE:** *John Armstrong's 'Red Rose' (of Lancashire) Avro Avian MkIII biplane. 84" span, Laser 100-powered. Has scale wing folding.* **ABOVE RIGHT:** *Brian Brassey's 72" Fokker DVII is built to an enlarged and modified Butcher plan from 1967.*

a young rising star on the local Clubman scale circuit. As I have discovered on my travels around regional Clubman scale comps, young and capable Dominic is usually in with a shout.

Cranked wing bird

The third Brian Taylor design I spotted was Brian Wood's superb Corsair. This has all the patina of a well-used operational aircraft. This ten years old model is 82" span and sports homemade retracts. Unfortunately, and most unusually for a Laser, Brian's Twin 240 was playing up. He lost a pot, and had to ditch her in the reeds. Damage was minimal, and after a brief field repair to an undercarriage door, she was back in the air again. Incidentally, all Brian's models are built to very exacting standards; he is clearly a very handy lad around the shed.

Storch

Gary Protheroe is a regular competitor at Phillip Kent's peripatetic scale comps. Today he was flying his ancient 93" span Svenson Fieseler Storch, which was built in 1980. This was finished in the smart, French Navy scheme. The Fieseler is Laser 90-powered, and weighs 12.1/2 lb. Fieseler Storchs always seem to retain the full-size aircraft's flying qualities. The Svenson kit was very popular over the years, although supply was somewhat variable. Nevertheless, many of my own clubmates have built exactly this model.

Ron Feeney's MD F 15B two-seater variant.

Dominic Brassey-William's Spitfire IV in Ginger Lacey's colours. O.S. 120-powered, from the Brian Taylor plan.

Tiger Moth

Andy Bowman was giving the beans to his immaculate blue and silver Tiger Moth, G-ANDE. This nifty model is built from the Flair kit. Andy was chucking the Tiggie all over the sky with great skill, which delighted his audience. Later, Andy was awarded third place. Andy hails from the Skem Club, that well-known hotbed of scale endeavour, where I have many mates.

Avro Avian MK III

John Armstrong's 'Red Rose' Avro Avian Mk. III biplane is an exquisite Class 1 scale model. G-EBTU spans 84" and is Laser 100-powered. She even has the correct folding wings of the prototype. In fact, when you take a good gander, this superb model is a master-class of scale techniques. The scale engine is perfect, the metal panel work is utterly convincing, as is the minutely observed rigging.

As a point of scale trivia, G-EBUG, the sister to 'Red Rose' in silver and blue, was flown by noted American aviatrix Emilia Earhart.

Fokker DVII

Brian Brassey brought his very appealing Fokker D VII, built from the Norman Butcher plan. Norman Butcher was the Editor of Radio Modeller whom, I believe, now lives in Spain. Brian scaled up the original 1967 plan to 1/5th scale, and she is SC 120-powered, and weighs in at 9.1/2 lb. Like a Come Dancing diva with her sequins, Brian patiently applied all the lozenges by hand. (He's bigger than me, so I'll get a clack for that!). This was one of my favourite models on the day, and a lovely sight in the air. I have long adored all Fokker aircraft, and I've even flown in one or two. Brian has much modified the original plan, and the colour scheme faithfully replicates that of Leutnant Rudolf Stark's aircraft which flew in the Royal Bavarian Jagdstaffel 35b.

ABOVE LEFT: *Brian Wood's Brian Taylor design Corsair, powered by a Laser 240 Twin.* **ABOVE RIGHT:** *Colin Bostwick built and flew this fabulous Laser 120-powered Spitfire 14. Brian Taylor plan.*

Sea Fury

To my mind, the Hawker Sea Fury is the very

ABOVE: *Andy Bowman's immaculate Tiger Moth from the celebrated Flair kit.* **BELOW:** *Gareth Gordon's Thunder Tiger 90 FS-powered World Models Extra 330 ARTF.*

ABOVE: *Rhyl Club's Richard Thomas carrying out Colin Campbell's ARTF Chipmunk.* **RIGHT:** *Colin Campbell's ARTF DH Chipmunk from Seagull. O.S. 61 SFX-powered. 62" span, weighs 8lb.*

pinnacle of the British piston-engined fighter. It always seems to look pugnacious, and yet ageless. Like all the great fighters, it projects aggression, even when parked. Colin Terry's superb model is scratch built from a three-view - with no plan - and has a balsa skinned wing and fuselage. She's Laser 150-powered, spans 72" and weighs 13 lb. Power is delivered via 16 x 8 prop. That authentic looking spinner is a full 4.3/4" diameter. She has Unitract pneumatic retract gear, and she also has flaps. A very fine model indeed.

Mustang

My pal Richard Thomas from the Rhyl club had brought his very quick Mustang. This P51-D is an ARTF from Hangar 9, extravagantly powered by a Roto 35cc, on a 20 x 10 prop. Unfortunately, on one flight Richard was brought down by enemy action, when he just clipped the tall and treacherous reeds. Damage was annoying, but not too serious, but Big Dick never lost his sense of humour, which I always feel is the mark of a proper modeller.

MDF?

I like modern jets almost as much as I like early jets. Also, modern model jet turbines are utterly fantastic. Therefore I was delighted when Ron Feeney flew his fine MD F-15B in the contest. In case the designation has you guessing, this is the two-seater variant of the F-15 Eagle. Although it looked like the well-known Phil Avonds kit, Ron's model was reformulated around a res-

ABOVE LEFT: *Colin Terry settles his Sea Fury on the strip.* **ABOVE RIGHT:** *Kerin Taylor steadies our Editor's steed before flight.*

urrected scrap g.r.p. fuselage. Ron's jet is powered by a Wren Supersport turbine and weighs 17.1/2 lb. Ron flew her very smoothly indeed. Against a deep blue sky the jet loops were enormous and the vertical climbs appeared endless. We are so lucky to live in the age when model jet turbines have become perfected.

Jungmeister

Bucker Jungmeisters seem to wax and wane in popularity. Once they were everywhere, then the rise of the Extra and its sleek clones saw them off for a while. However, there now seems to be a nostalgia factor creeping in, and I saw three last season. The Jungmeister is a superb scale subject, two wings and a round engine, a humpty-back, and loads of little fiddly bits - well it can't fail, can it? My mate Keith Fear had brought his silver Bucker Jungmeister to Deeside. His model is in the well known G-TAFF colours, but built to an obscure Polish plan. I wondered if this might be the 1/4 scale version by dearly beloved Pavel Bosak, but Keith couldn't remember. It goes without saying that the chunky yet handy Jungmeister flew very well.

Stampe on it

In the final reckoning, things were close. Pipping young Dominic Brassey-Williams by a narrow lead was Alan Glover with his Stampe biplane. This was built from the well known Precedent kit. It is 80" span, Laser 150 powered, and

FAR LEFT: *Keith Fear's G-TAFF Bu 133 Bucker Jungmeister on a take-off mini-flick. Built from a Polish plan.* **ABOVE:** *Steve Dorling's sprightly but now ancient Moki 135-powered Goldberg Ultimate - adequately powered!* **LEFT:** *Colin Terry's superb Sea Fury. 72" span, 1:6.4 scale; Laser 150-powered, weighs 13lb.*

Kerin Taylor's Ripmax ARTF DH Comet Grosvenor House. Twin O.S. 52 four-stroke power.

ABOVE LEFT: *Lyndsay Todd's colourful 90" span Stearman from the Flair Kit. Zenoah 45 power; weighs 22.1/2 lb.* **ABOVE RIGHT:** *That little triangle of rough caught out many flyers besides Lyndsay!*

weighs 14 lb. Alan flew this model in a very controlled and disciplined manner. His flight reminded me of seeing Brian Lecomber aerobat a full-size Stampe in the 1980s. He was a worthy winner and Phillip Kent presented him with his certificate.

The verdict

Phillip Kent has struck gold with these low key/high fun comps. They suite the modern zeitgeist and attract modellers whom otherwise might run a mile from a competition. They make relatively modest demands on the host club, and they bring ARTFers and Thousand Hour Scalites together, which is a Good Thing. On top of this, The Deeside Club made us all exceedingly welcome - and the bacon butties were sublime. ■

ABOVE: *Keith Fear's Bu 133 Bucker Jungmesiter reed-hopping.* **RIGHT:** *The winner! Alan Glover's 80" span, Laser 150-powered Stampe, from the famed Precedent kit.* **BELOW:** *Ron Feeney's fine MD F-15B variant. Wren Supersport turbine-powered; weighs 17.1/2 lb. Placed third.*

Results

The Top 5 places were:

1st	Alan Glover	Stampe	189 pts
2nd	Dominic Brassey	Spitfire XIV	186 pts
3rd=	Andy Bowman	Tiger Moth	185 pts
3rd=	Gareth Gordon	Extra	185 pts
3rd=	Ron Sweeney	F-15b	185 pts

SERVOS

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JR PROPO®

Micro Servos

Weighing between 6-9g, JR Micro Servos are ideal for small foam & balsa electric models. The DS Digital Servos are also widely used for small electric helicopters (up to 400 size).

ES316
0.7Kg / 0.08s

W: 6g
20.9 x 11.2 x 19.8mm
JRC316ES

ES375
2.0Kg / 0.16s

W: 6g
20.9 x 11.2 x 19.8mm
JRC375ES

DS385
2.0Kg / 0.16s

W: 9g
21.5 x 11 x 21.5mm
JRC385DS

DS318
2.0Kg / 0.16s

New

W: 6g
19.8 x 11.2 x 20.9mm
JRC318DS

Standard Servos

JR Standard Servos are a great choice for everyday 40 - 60 size sport models (and equivalent size electric planes), as well as being a good starting point for helicopter training in a 30 to 50 size helicopter (600 size electric).

NES-577
3.4Kg / 0.24s

W: 44g
38.3 x 18.6 x 35mm
JRC577

NES-591
5.1Kg / 0.24s

W: 36g
38.3 x 18.6 x 35mm
JRC591

DS599
5.2Kg / 0.21s

New

W: 45g
35.5 x 19 x 38.5mm
JRC599DS

DS589
5.2Kg / 0.21s

W: 42g
37.5 x 19 x 38.5mm
JRC589DS

Midi Servos

These 30g Digital Servos are welll proven in medium size electric and IC aeroplanes, and also 450 - 500 class helicopters. JR midis are also popular in gliders, where the low weight and small size allows them to be used in compact installations.

DS3301
4.0Kg / 0.22s
Dual Mount

W: 30g
33 x 15 x 33mm
JRC3301DS

DS3405
2.8Kg / 0.13s

W: 30g
26.5 x 15 x 33mm
JRC3405DS

Premium Servos

Digital Servos form the bulk of JR's Premium Servo range. Offering a wide combination of speed, high torque and holding power. JR DS Servos are favoured for model jets, F3A and large-scale aerobatics, 3D and F3C helicopters.

DS8305
9.6Kg / 0.15s

W: 49g
39.5 x 19 x 39mm
JRC8305DS

DS8511
15.0Kg / 0.19s

W: 66g
40 x 21 x 40.5mm
JRC8511DS

DS8911
25.0Kg / 0.19s

W: 69g
40 x 21 x 40.5mm
JRC8911DS

DS8915
12.0Kg / 0.09s

W: 69g
40 x 21 x 40.5mm
JRC8915DS

This is just a small selection from the current JR Servo range. For full details please ask your local JR dealer for a free copy of our MacGregor/JR Servo Catalogue or download it from www.macgregor.co.uk/downloads

All specifications are shown for 4.8v

Prices shown are suggested retail prices and may vary from actual shop prices.

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T-REX 500CF

Easy to assemble and a versatile performer, this new electric helicopter from Align ticks all the boxes

Align have stormed the helicopter market and successfully cracked the mass market with their 600 offerings in both electric and nitro formats. We have tested the 600CF within these pages and been more than impressed with the performance of both power variants. So where next for Align and their designers?

The answer comes in a bit of range infilling and the latest offering fits neatly in between the 600s and the smaller 450 series with which Align first made their mark around four years ago.

Helicopters with 500mm blades have not been prevalent with kit manufacturers, but taking into account that Align were ahead of the pack with the release of their 600-sized machine it is not surprising to find them pushing into new markets. We test here the 500CF boasting carbon fibre mainframes. As with other sizes, glass frames are also available at a slightly lower cost. As with all Align models I was impressed by the quality of finish on the 500's components and the considerable proportion that were in metal rather than the often-used plastic of other manufacturers.

With batteries for the 600 models still costing in the order of £190 for decent Flightpower 6S packs and, as good as the 450SE is, it is still a small and potentially fragile machine. The 500 addresses both problems being sized between the two and capable of running on lower capacity main packs, albeit with the benefit of 6S performance. For the cost conscious the 500 can be flown on a pair of 2100 mAh 450 packs running in series to provide the required 6S format. Failing that, packs specifically for the T-rex 500 range from around £60 to £100 for high performance variants.

With the 6S format it will handle more extreme outdoor conditions well and is perfect for summer evenings and perhaps not too large for the odd indoor winter night.

When one considers the RRP kit price of £295 for the carbon version (the glass fibre-framed kit is some £30 cheaper) and the fact that it includes a capable BEC equipped speed controller with governor plus the 1600KV motor, it represents good value against its rivals that often are not so well specified. Included in the full kit are good quality carbon blades whilst combo kits are available without blades.

You will need to source suitable radio equipment of receiver, three mini cyclic servos, and mini tail gyro/servo combination also need to be sourced. You will need to factor in the costs of main propulsion battery (or batteries) and suitable charging equipment.

Opening the box

Opening up the very compact box it really is a work of art to see how small a helicopter can be packed when you try! A good look through the box and a check on the components reveals a consistently high level of quality which augers well for a straightforward build using the comprehensive manual supplied.

Some basic tools are required to assemble the T-Rex 500 correctly, Allen screwdrivers and small pliers proving useful. A small amount of cyano acrylate glue is also required. Align supply the usual threadlocks nominated as R48 and T43. These are two different types of threadlock for varied applications on the metal-to-metal or plastic fixings. Make sure that all components calling for such treatment are threadlocked…. even the factory-assembled components which need to be stripped and checked during assembly.

The manual is very clear and each step is logically ordered. By following the sequence suggested, building this helicopter should be a relatively easy task even for a complete beginner. Align have a standard assembly process referring each manual section to a particular bagged selection of parts. Each section has its own bag and this for the uninitiated ensures that a logical process is concluded before moving on to the next. Complemented by the clear diagrams in the manual, parts identification is similarly improved by restricting them to their appropriate section. If you get to the end of a section with parts left over then you have probably made a mistake!

So let's start

We start with the head and the main rotor housing to which we fit the flybar seesaw, mounted on two ball-races supported on M3 collar screws. Around this seesaw the flybar and its linkage cradle is assembled together with the SF mixing arms, again ball-raced and mounted to the flybar seesaw.

The three servo/120 degree CCPM swash plate is pre-assembled and ready to use. We first assemble the washout around its aluminium base and it is useful at this stage to drop the 8mm main shaft through the swash, washout and head to locate and true the components. The head block is retained on the mast with the customary 'Jesus bolt'. Very quickly the head

Glassfibre canopy, great moulding, lightweight and pre-painted ready to fit.

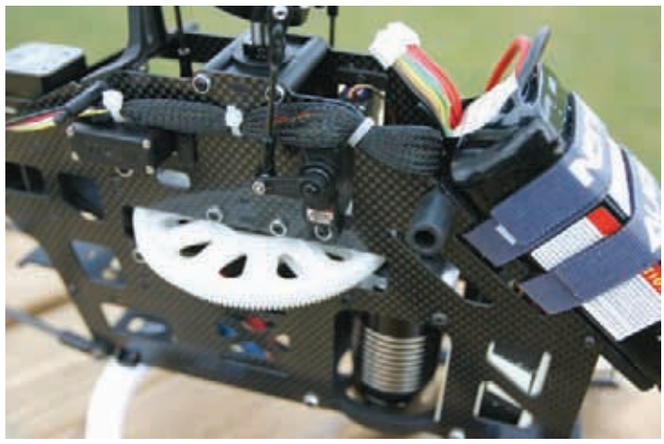
Handed carbon side frames and base moulding form the basis of construction.

The addition of an undercarriage makes for a stable building platform.

Quality carbon blades are perfectly capable for advanced flying.

Align 520L/1600K V motor and matched 60 Amp speed controller as supplied in the standard kit.






TOP LEFT: *Boom-mounted tail servo mated to Futaba GY401 gyro locks the tail in.* **TOP RIGHT:** *Nice lightened 3D tailplane with boom struts supporting the boom incorporated in the mounting plate.* **ABOVE LEFT:** *Main gear installed and battery in place. All radio cabling is neatly routed and protected in conduit.* **ABOVE RIGHT:** *Tail rotor gearbox and assembly follows typical T-Rex style and design with toothed belt drive within the boom.*

is taking shape.

The blade grips are next, nicely made and of aluminium construction, the quality really shows in areas such as this. For many models such aluminium grips are an expensive aftermarket upgrade. With a very similar design to the earlier Align models the blade holders are mounted to a feathering spindle supported on rubber dampers within the head block. The blade holders themselves are each supported upon two substantial 4mm ball-races and an additional thrust-race.

The plastic flybar paddles are lightened with holes across their length. These are covered with adhesive transfers before screwing onto the threaded end of each flybar to a consistent distance each side before levelling against each other.

The head is topped off with an aluminium head stopper - useful when slowing the head after a flight with the palm of the hand.

Main frames

For now we are done with the head and our attention turns to the main frames, bolted together initially around two main shaft bearing blocks sandwiched between the frames. Fastenings for the frame construction are a mix of 2.6mm self-tappers and 3mm button-head socket screws. As with previous models these are soft and best described as single use although an upgraded stainless set is available. Alignment of the main bearings is enhanced if the main shaft is inserted as a guide whilst bolting up these blocks. The frames are then further braced with the moulded plastic base plate and aluminium motor mount to the front of the frames. The fixings from each side have neat cupped washers supplied with the kit.

The strong plastic undercarriage legs are mounted at this stage to the plastic base plate of the frame and the aluminium skids inserted. This makes the frame nice and stable to work on for the remainder of the build.

With relatively little done to the frames at this stage, we install the CCPM servos

Specification

LENGTH
850 mm
HEIGHT
310 mm
MAIN BLADES
425 mm
MAIN ROTOR DIAMETER
970 mm
TAIL ROTOR DIAMETER
200 mm
MOTOR PINION
12T/ 13T
MAIN GEAR
162T
FLYING WEIGHT
1.7 kg
BATTERY 1
Align 2100 6s1p (20C)
MOTOR (SUPPLIED IN KIT)
Align 520L/1600KV

BELOW LEFT: *View from beneath, showing easily accessible motor for ease of maintenance.*
BELOW RIGHT: *Close up of the completed head assembly; it's predominantly metal - ensure that threadlock is employed wherever the manual dictates.*


which are mounted close to the cyclic controls of the swash plate and provide direct to head connections. The recommended servos for this machine are Hi-Tec HS-82MG or HS-5245MG, both of which fit the mountings within the frames for such mini-servos. For these servos Align have provided suitable mounting blocks and heads with the correct geometry. Without the CCPM cyclic levers of previous models the installation is simplified and speeded up, as well as weight saved along the way.

Once the three CCPM servos are in place the battery tray and front canopy supports further strengthen the side frame assemblies.

Tail end

Turning to the rear of the main frames we now assemble the tail boom casing which encompasses the tail drive gear assembly and its associated toothed belt. The drive gear, mounted on a pair of bearings, sandwiches between the plastic tail boom mounts which in turn are clamped between the frames at the rear on four hexagonal spacers.

Following the manual, the head assembly is now fixed through the main bearings and secured to the autorotation and main gear assembly. A locking collar on the main shaft above the upper bearing takes out the play in the assembly and is best adjusted by allowing the frames to hang under their own weight whilst holding the head.

Next stage of assembly sees the tail boom inserted in the back of the main frames. The tail boom is slotted to line up with a pin inside the tail boom case. The tail drive belt is inserted through the boom with a 90° rotation in the belt to fit it onto the tail drive pulley. Follow the clear illustration in the manual because if the 90° rotation is made the wrong direction then your tail rotor will turn the wrong way.

With the boom in place and clamped on, the tail rotor servo mount can be assembled and fixed onto the clamps slid onto the boom together with the tail pushrod guides.

The two handed tail gearbox casings are next assembled around the rear of the boom and encase the tail drive shaft. The drive shaft is supported throughout with bearings for free movement and driven by the belt drive already in place. A small hole on the boom corresponds to the pin within the plastic moulding of the gearbox case and ensures its accurate positioning. Belt tension is taken up by pulling the boom backwards whilst tightening the clamps at its forward location with the main frames.

The tail rotor blade grips have their bearings pre-installed and are bolted through into the tail rotor hub and should have a VERY small amount of threadlock applied to them.

The tail rotor control mechanism is nearly complete now and needs bringing together, including the tail pitch assembly and the pre-assembled tail rotor control arm which screws directly onto the tail gearbox.

Tail boom braces and the lightened plastic 3D-style horizontal and vertical stabiliser fins are added to the boom completing the rear end of the machine.

We turn next to installation of the drive system. The motor needs its pinion installed before it is offered up and mounted to the alloy engine plate using M3 bolts. The pinion is secured onto the motor shaft using an M4 setscrew requiring plenty of threadlock onto a flat on the motor shaft - the speed can be pretty significant and we do not want the pinion to work loose. Align provide a choice of pinions allowing a selection of flying styles.

Meshing the main gear and

pinion well is essential before tightening the engine mount bolts to ensure a reliable and friction-free installation that will enhance power output.

Electronics

We chose to use the recommended Hi-Tec HS82MG servos in our review model; the frames and fittings are suited to these and with the metal gears of this mini-servo we should be equipped for the demands of the direct to head CCPM linkages.

Pushrod connections to the swash are very simple, given the removal of the transfer linkages and seesaws often found. It is still however vitally important to ensure that the servo outputs are all levelled, servo throws balanced and linkages adjusted to ensure parallel movement of the swash through its range.

Tail rotor control was managed by a similar HS82 servo running through a Futaba GY401 gyro.

The whole radio installation once in place can be neatened up with the routing of servo leads through the airframe within protective hosing secured with small cable ties at various points away from any rotating components.

The JR receiver was installed under the battery tray to the front of the frames, nicely out of harm's way.

Speed control was achieved with the supplied RCM-BL60G electronic speed controller. This unit was secured to the side frames alongside the motor and in the airflow to maximise cooling. This speed controller provides our receiver with a regulated voltage supplied that can be chosen at 5, 5.5 or 6 volts depending upon servo and gyro used. An effective governor for head speed is also included within the controller.

We used the recommended Align 6S 2500mAh packs for the flight testing of the 500CF. These packs proved entirely adequate for our purposes and allowed some spirited flying with flights between seven and eight minutes duration.

Finishing the whole 'copter off requires simple fitment of the ready cut and attractive painted epoxy fuselage in house scheme. Two schemes are available in either red or yellow with more optional schemes available as aftermarket accessories.

In conclusion

Building the T-Rex 500 was straightforward and a pleasurable task with no items causing any concern for any level of builder. As we have come to expect, the manual is very thorough and clear at every stage. Being that bit larger than the smaller 450 the fiddly bits were less fiddly and easy to access with fat fingers. The T-Rex 500 is therefore easy to recommend for beginners to the heli scene.

Since its completion I have now had many successful flights with the T-Rex 500 and enjoyed them all. Within the hangar I am fortunate to have a number of the Align variants, both nitro and electric. To choose a favourite is impossible since they all have their own individual performance benefits. The current high prices of scarce high nitro fuels may push the economics in favour of electric. The 600 is of course more stable given its size but the smaller footprint and reduced weight of the 500 makes it very manoeuvrable and highly aerobatic.

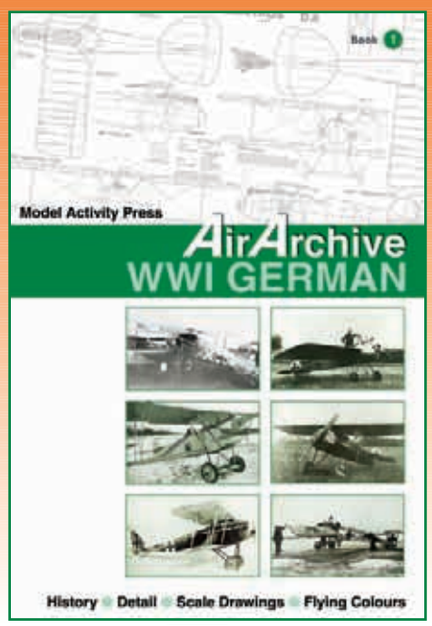
The standard carbon blades are of a high quality and have performed well through my mild aerobatics and basic 3D. Loops and rolls are powerful and effortless. Performance is such that confidence in the machine is quickly gained. With the 6S power configuration, higher head speed allows for good autorotation performance and the nicely balanced blades perform well all the way down with energy in reserve for a nice flare

Downsides are few, but if I had to highlight any it would be the lack of flying whilst you wait to recharge. You can always buy additional batteries but that can get pricey. A clear advantage is always returning home with a clean airframe and a model the wife can't complain about in the house!

If I have a gripe it's the frame fixing bolts - pretty please would you make them of something more substantial than cheese… but there is a fully recommended stainless set available anyway at around £20.

One great source of reference as always has been the Internet where much data can be found on setups and background to the T-Rex of all variants. One such website worthy of mention is www.thetrex600forum.com where a whole community dedicated to the Align helicopters lurks electronically. ■

Book 1



Book 2

Book 3

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● Type history ● Flying colours - service colour schemes ● Scale drawings 1:40

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● Type history ● Fokker Warpaint ● In detail - close-up ● Flying colours - service colour schemes ● Scale drawings 1:40

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De HAVILLAND DH82a TIGER MOTH
● Type history ● Tiger Moth sketch page ● Flying colours - service colour schemes ● Tiger Moth in detail ● Scale drawings 1:40

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LUNA MKII

Pound for pound the best two-metre moulded slope/thermal machine on the market! That's Steve's verdict on Sloperacer's latest

A while back, a good friend of mine introduced me to the Luna, which is a lovely two-metre class all-moulded glider, a type that has been popular on the slopes for a few years now and typified by machinery such as the Blade, which I was flying at the time. Up to that moment, I had been quite happy with my trusty old Blade, but seeing Steve's Luna in the flesh was an eye-opener, immediately invoking dissatisfaction with the Blade, which was clearly quite pedestrian, showing marked limitations throughout the performance envelope, not the least of which showed up in the landings, with Steve's Luna cruising to a halt, courtesy of its excellent crow braking. Whereas the Blade was always a crash in the making, with its lack of flaps - it was time to 'move up' as they say! Unfortunately at that precise moment, my Blade bit the dust in a big way and, wouldn't you know it, the Luna became 'unobtanium' with those who owned one, jealously guarding them until, that is, a year or so later, when the Mk II became available from Sloperacer. I needed no second bidding, my order was placed and soon after a very striking orange and black Luna was sitting on the workbench!

Unburstable!

The Mk II shows marked improvements over the Mk 1 version - made in China, the new Luna is far stronger and more accurate in its construction, with all trailing edges knife sharp and beautifully straight when viewed end on. The fuselage is altogether changed too, with a stronger and slightly blunter nose cone and a much stronger tail boom, this allied to a larger fin and rudder with very pleasing lines. When I couldn't source a Luna last year, I did consider the 2m all-moulded Ruby as an alternative, but the fin on that one is about as ugly as the Luna's is pretty and that sort of thing always puts me off.

The two models are similar, but not identical - the Editor's well-flown Mk 1 sitting alongside my Mk 2.

ABOVE LEFT: *Compare and contrast - the Mk 1 and 2 fins are markedly different.* **ABOVE RIGHT:** *The huge fin and rudder have a lovely shape and give the Luna superb authority in yaw - very effective rudder control on this one.*

shown the model to be very lightly constructed and relatively flimsy, whilst the Luna on the other hand has earned an enviable reputation for being unburstable, so that was a decision made!

There isn't anything of particular note to point out about the build on this model - everything is very straightforward, given that we're describing an assembly rather than a true build with a moulded glider like the Luna! I chose the now, almost 'standard' and quite superb value for money Hitec HS85MG servo for everything - four of these in the wings operating flaps and ailerons, with a further pair in the front fuselage actuating the rudder and all-flying tail via a cable and carbon rod respectively, hooked up via the now equally ubiquitous Multiplex green six-pin plugs. Some advocate running single positives and negatives to these, but not I - you want redundancy in your aeroplane wiring if possible, just as the full-size boys do it! You will need to make up a ballast tube, or alternatively, order one from Sloperacer as my model didn't have this included, and likewise a set of clevises and pushrod ends and so forth for your control linkages!

Off for a bit of Luna formation flying with Steve - nice part of the world but your Ford Ka isn't going to hack it up here!

Assembly and installation

Take your time - make up your aileron and flap control rods carefully using locking nuts and solder to keep things fixed and if you've never assembled a 'mouldie' before, then get together with someone who has - the procedure is simple in the extreme, but good engineering skills are important if you're to get the best from your Luna as you certainly don't want anything letting go during a one hundred m.p.h. plus dive across the slope. Good installations generally lead to a long lasting model, whereas a poor installation will prove frustrating and at worst let you down at the wrong moment, destroying your pride and joy in and instant. An extra half hour on that linkage will pay dividends in the long run!

Due to the revised fuselage shape, a standard AA four- or five-cell battery will fit comfortably in the nose; I went with a four-cell AA 2000 NiMH! For those using other than my chosen HS85MG servos - anything less than about 13mm thick and producing 2.5 kg/cm torque will do the job in the wings, but to be frank there isn't anything to touch the HS85MG for the money and with thousands in use on the slopes worldwide, they are well proven too. I would think that Hitec must sell a dozen of these for every other similar spec'd servo out there!

I fitted a JR RS7O synth mini Rx, bearing in mind that unless you have one of the better transmitters you'll need a seven-channel device, even though you only use six, as you can't use the throttle channel when flap mixing!

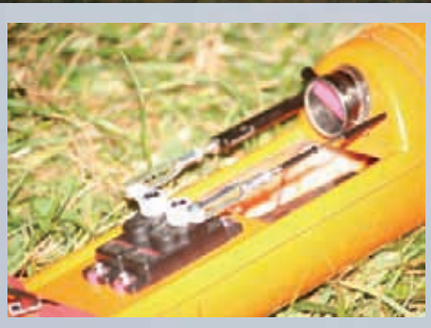
One small point - don't cut too large an access hole through the wing seat for your wiring outlet to the wing plugs. This will (does...) weaken the fuselage in that area on any moulded glider, leading to cracks from twisting moments induced during landings, that being the only consideration really when grinding and drilling for your fuselage installation. Again, there is very little work to do here.

Moving on to the wing panels, there is only one way to install a wing servo these days - the excellent Cubitt servo mounts which completely eliminate the abhorrent practice of floating servos in on a sea of five-minute epoxy and the Cubitt mounts facilitate simple servo removal if need be, too - excellent!

There is a little work to do on the drag

BELOW LEFT: *Radio installation is a breeze on the Luna, just be methodical and plan forward. See text regarding the cut out for the wing plugs.*
BELOW RIGHT: *The beauty of a 2 metre cross-tail model like this one is the way it 'flat-packs' for transport purposes.*

In its element over the very picturesque Glaslyn valley with the old slate port of Porthmadog in the far distance.



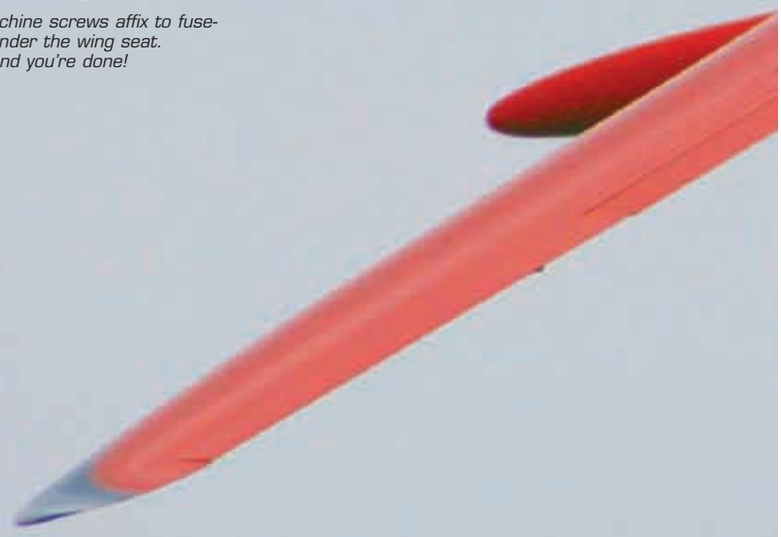
ABOVE LEFT: *Wings are two-piece with a cranked carbon joiner. Four machine screws affix to fuselage top.* **ABOVE RIGHT:** *If fitted, your ballast tube sits at a jaunty angle under the wing seat. Loading and unloading ballast takes seconds - just pop the nose cone off and you're done!*

spars to facilitate full flap movement, but there isn't really a need to achieve the oft vaunted 90 degrees of down flap as these are very effective on this model even at half that travel, and being top-driven unlike some other models, there is no slop in the linkages either - superb! I achieved about 80 degrees of flap with no real issues and in the air their performance is striking, hauling the machine to a stop immediately, which makes landings a snap! On the opposite side of the coin, you won't achieve more than about five degrees of up flap before becoming hinge-bound - just get as much as you can and go with that for 'flapperon mix' and you'll be fine as the roll rate is crisp on this one, courtesy of the model's size and the general aileron response!

All flying tails are easy - line everything up, either by eye or with an incidence meter and you're done. Nothing particularly difficult about this and the same goes for the rudder linkage - it's all very straightforward, as you might assume!

Mixes

Everybody will have their own ideas on setups and mixes, but for starters you'll definitely want 'crow' mixed in on a switch and probably allied to your throttle stick too, so that you can vary the brakes on the way down - so many make the mistake of using brakes when not needed at all, or using more brake than needed, with the resultant 'stop and drop' to terra-firma ugly and so often destructive. My chums on the slopes tell me that the word is 'commitment' with slope landings, oh and to remember to fold the brakes away before you touch down, for fear of dragging a flap! Other than that, you'll want a switchable flapperon mix and possibly



Specification

SPAN:
2 metres
LENGTH:
1170mm
WEIGHT:
1600g
WING SECTION:
MH32
CONSTRUCTION:
All hollow moulded epoxy glass
SERVOS:
6 x Hitec HS85MG
WING:
2 piece, 4 servo wing for easy transport
TAIL:
All-moving
BALLAST:
2lb ballasting capacity
RRP:
£235

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the wings off their Lunas on many occasions, from hills various, so I knew what to expect but I was very pleasantly surprised by just how easy this one is to handle, feeling immediately 'right' from the very first moment she was released into her natural environment. I can't speak with huge authority on all-moulded gliders, having only owned three to date, but for me the Luna is a beauty with real grace and poise and what a lovely thing she is in the air with attractive lines from any angle. The Luna has a great turn of speed - accelerates briskly with a sniff of down elevator, holds the most beautiful thermal turns and when put into a fast bank she holds a line beautifully too. Two words sum up the Luna - 'efficient and poised' for she feels like a 'sports car' thoroughbred on the slope.

To date I've not had the opportunity to ballast my Luna, but I've seen the earlier version hauled around in fine style with a pound of lead aboard and in a good blow too. Andy desperately attempted to prove that 'brilliant gliders don't come in at these sort of prices' when he first got his hands on the earlier version, vainly attempting to pull the wings off his Mk 1 - to no avail, despite five-hundred foot vertical dives with square pull ups and the like, so you're most unlikely to break this one in the air. More to the point, I made a complete hash of a landing when attempting to set mine down on a turbulent edge. Remembering back to what I said about using too much air-brake, I stopped my Luna about twenty feet aloft and the vicious turbulence punched her into the top of the ridge on the nose and one wingtip! Fearing the worst, I wandered over to survey the damage, but there was none - not a crack or a mark even. Somewhat helped, no doubt, by the soft ground, but amazing considering the sickening noise which suggested the worst!

So what's to criticise about this one then? Well not a lot really. I didn't much care for the cranked and round section carbon wing joiner - square would be better, but in practice it's not a big deal. The tail tubes don't terminate in a blind orifice, which means that you can push the joiners inside if you are ham-handed - either CA them in (lightly and only on one side) or bear in mind this shortfall. Other than that, the Luna is, pound for pound, the best 'two-metre' moulded slope/thermal machine on the market and that's not just my opinion, as a trawl around the Internet shows on forums generally! This isn't a good model - it's a great model and I love it! In fact it would still be a great model at half the price again as its performance and looks are a country mile ahead of the non-moulded stuff of comparable size and cost out there. The original Luna was a bit of a bargain and the Mk 2 certainly is. Well done Sloperacer - I'm now looking enviously at the Editor's new 3m Javelin from the same source - that one looks a real beauty too! ■

ABOVE: *Looking very clean with everything folded away. Ballasted or unballasted, she's very fast with a great turn of acceleration.* **BELOW LEFT:** *Now you can see why the crow braking is so effective - superb brakes!* **BELOW RIGHT:** *There isn't a single straight line anywhere on the Luna, save for the trailing edges. A very elegant machine I think you'll agree!*

a drooped trailing edge for 'thermal' but don't get too hung up on mixes and programming until you fly the model - you can fine tune things later. I went for the safe option on the balance point, i.e. exactly where advised and that proved perfect for me - you can go aft with it a tad afterwards if you're seeking the ultimate in performance, but I like the feel of mine as is!

Flying - what it's all about

I've seen the Editor and Andy Ellison flying

AERIAL PHOTOGRAPHY - By Ian Lever

The Editor's heaven! Your esteemed editor has places like this to fly all the time. The lift was smooth and huge - no motor required, which is great for clear pictures. I didn't realise how far I could fall if I went over the edge...

WATCH THE BIRDIE!

Part 2: In this concluding article, Ian discusses the practical issues involved in taking great airborne photos

In part one of this article (AMI Feb. '09) I described how to modify a TwinStar and a JP Swift so that a compact digital camera could be installed and operated from the ground. This article looks at how to take the pictures.

Taking good shots

In general the same rules apply as you would use for your holiday shots. Point the camera at the subject, have the subject well lit, avoid taking shots into the sun, keep the camera steady keep the object in focus. Aiming the camera is clearly a problem as without an onboard video link to the ground you can't see what the camera is pointing at. You will find by trial and error that you can place the model in approximately the right position and attitude to get a good shot

Setting up the camera

The most difficult and interesting part of aerial photography is the business of pointing the camera at what you want to take a picture of. It is only when you can look at the pictures you have taken with the model back on the ground and the camera removed that you see what you have got. My most successful pictures have always been taken using the widest angle the camera is capable of. At narrow angles camera shake is more pronounced and pictures lose the dramatic effect that taking them at height achieves.

Getting the shot in focus

There are two approaches to achieving a good focus. The first and simplest is to use

FAR LEFT: *If the camera is pointing directly down you tend to get flat and boring pictures.*
LEFT: *This picture was taken with the motor running - you get a more stable platform on the glide.*

ABOVE LEFT: *Bright sunshine always improves the shot when from the side or behind the camera.* **ABOVE RIGHT:** *A good first shot (and continuing favourite) is to aim the camera at yourself on the ground - from around 50 feet in this case.*

the landscape setting on the camera. This has two effects. First, it disables the flash function on the camera which means that you don't waste time waiting for the flash to charge before taking the next shot. Second, the focus is fixed at infinity so that the ground will be in clear focus when you are above 30 feet altitude. For air-to-ground shots I have found this to be the best setting. The alternative is to use the auto setting on the camera which enables the autofocus setting. This usually operates so that pressing the shutter button lightly causes the camera to focus on what it is pointing at and pressing the button further takes the picture. This, in my experience, is only worth the trouble of setting it up when trying close air-to air-shots.

There is one other setting which is worth experimenting with and that is the burst mode. Here the camera takes pictures as long as the shutter is pressed. Depending on the camera it may take three or four frames per second for a limited period. When flying close it may just result in one frame where the subject is in the middle.

Setting up the transmitter

You need a transmitter which has a free channel to operate the servo which will operate the shutter and the facility to be able to adjust the servo travel so that the servo arm moves far enough to operate the shutter, but not so far that the servo is stalled with consequent risk of servo damage - or worse, high current drain which causes receiver failure.

On the simple models I have used for the job, channel 6 has been free and I have assigned a three-position switch on my Multiplex Royal Evo 9 to channel 6. It is a fairly straightforward job to rig the model with camera installed and powered up on the bench so that at the first position the servo arm is not touching the shutter button and that at the second position the camera goes into autofocus, while at the third position the shutter is operated and the shot is taken. If you are using the landscape mode then only two positions will be needed as focus will be fixed at infinity.

Positioning the camera in the model

I am talking here about the angle of the camera as it points out of the aeroplane. This angle makes a difference to the shots. If the camera points straight out of the side of the model you will take pictures which include an out-of-focus shot of the wing. Assuming you

My home town from four miles away and 1,400 feet. More height gives a wider picture.






TOP LEFT: *Low shots of the flyers are always interesting to those in the frame.* **TOP CENTRE:** *Shots from height can give a new perspective on your flying location.* **TOP RIGHT:** *Shooting whilst doing a turn with the camera on the outside is likely to end up like this!* **ABOVE LEFT:** *Judging the relative position of models is difficult for both pilots. Here the subject is too low.* **ABOVE CENTRE:** *It helps if the subject model can slowly overtake you.* **ABOVE RIGHT:** *See if you can hang the camera plane and let the subject plane approach the camera.*

are flying straight and level (more on this later) this has a number of effects on the shot.

Firstly, the shot will be aimed at the horizon so that you will get a panoramic image of the area with a significant amount of sky. Secondly, part of the picture will be obscured by the wing. Thirdly, you get an impression that this is an aerial shot because you can see the wing. If you point the camera down at an angle of 30 degrees or thereabouts you will see (depending on the height of the shot) mostly the ground and just enough sky to make the shot make sense. The shot will not be obscured by the wing.

Taking the pictures - general

The same rules which apply to any photograph apply here. Bright sunlight will mean the camera will automatically select faster shutter speeds with less chance of camera shake. Bright sunshine will also provides more detail and colour in the shot, which adds interest. Shots with the sun behind the camera will generally come out better than shots into the sun. However, accidental shots into the sun sometimes produce dramatic results.

Height: The higher you are the larger the area you will see. Some of my shots taken from 1500 feet have radically changed my view of the areas I live and fly in. Height enables you to see things from a perspective you just would not ordinarily see. Some of the most interesting shots are those of the flying site and people flying. Here shots from around 50 feet to 100 feet seem to work well.

Speed: The more stable the model when you take the shot the better. Pointing into the wind with the motor off and the model flying as slow as possible in a straight line will provide the best chance of avoiding camera shake. If you have access to a slope, this provides ideal conditions as you can effectively hang the model in a stationary position whilst you take the pictures.

Direction: The side of the model from which the camera points out makes a difference. To make this clear, if the wind is blowing from the west and the camera is pointing out of the left side of the model with the model flying into wind at mid-day, the camera will be pointing directly into the sun and taking good pictures becomes difficult. Under these circumstances a camera pointing out of the right side of the model is preferable. I have cut holes in my JP Swift so that I can point the camera out of both sides to allow for this.



Taking the shots

It is worth spending some time playing with the camera in the model on the ground to get a feel for the way your camera works and in particular how long it takes to recover between shots. If you take shots too close together you may find pictures which have

ABOVE LEFT: *Careful flying has brought the two models into line flying at the same speed.* **FAR LEFT:** *If you spend a lot of time trying to fly in close formation this is a risk. The Twinstar's wing was sliced off. The other model was okay, the camera miraculously survived and the Twinstar was soon flying again.* **LEFT:** *Flying at different times of day provides opportunity for variety in shots.*

not been properly recorded on the camera's memory. I have found that counting to three at each stage of operating the camera allows it time to perform the function of focusing, taking the picture and storing it. The procedure (if using all three switch positions) is to move the switch from 'off' to 'focus' - one, two, three, move to operate shutter - one, two, three, move back to first position - one, two, three. You are ready to take the next shot.

Aiming the shot

I found a good first exercise was to try to take a picture of myself from various heights. If you can see the side of the model with the camera pointing out then there is a fair chance that the camera can see you. It also gives you a chance to practise shots with the model in different attitudes. A shot with the model straight and level into wind with the motor off is the most straightforward. If you want a more vertical shot then a gentle banking turn with the camera on the inside of the turn will also succeed. The movement of the camera relative to the ground is reduced under these circumstances so can reduce blur. Conversely a shot with the camera on the outside of the turn will probably result in a blurred shot of the sky.

Taking a shot of anything else on the ground is largely a matter of trial and error. Point the camera in the general direction of an area you want to snap and take lots of pictures. I found that my ability to point the model and camera in the right direction has improved over time.

During the course of a flight I often find I have taken more than 100 shots. Half the fun is in sifting through them on the computer screen afterwards to see what you have taken. Using a modern compact camera with good resolution you will pick up surprising amounts of detail.

Air-to-air

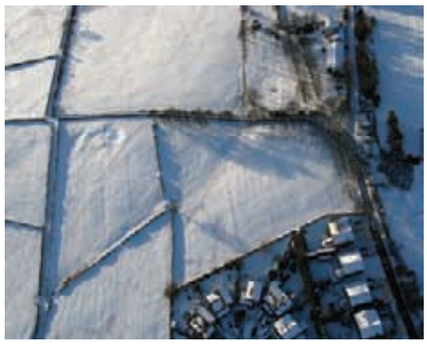
When you have taken shots of your flying site with you and your mates on it and the area surrounding it, I bet you will be keen to try air-to-air shots. This is great fun and in my experience the most difficult task.

Pointing the camera at the ground is easy as you are guaranteed to have something in the shot. Trying to photograph another model in the air is a real challenge to both flying and photographic skills. To succeed you need a willing clubmate to fly within the frame of the shot fairly close to the camera model, parallel to it, and at the same speed for long enough for a shot to be taken. This is not easy, is a real test of flying skill and a mid-air collision is a real possibility so you and your mate need to be prepared for that to happen and unless your flying skills are better than mine (not difficult) then a coming together is likely if you spend enough time in close formation. I have found that the following helps:

Flying slow relative to the ground gives you both more time to align your models. Having both models directly in front of you and flying away from you makes it easier to judge their height relative to each other. A nice steady breeze to help reduce ground speed helps.

You don't want to be too high as that makes alignment fiendishly difficult, 100 feet to 200 feet is about right. On the slope you can be at eye level. It may help to use the burst setting on your camera, if it has one, so that a rapid series of pictures is taken, one of which may be of the subject aeroplane.

If the camera plane flies slowly and is slowly overtaken by the other model it provides more opportunities for a shot to work. It is important for the pilot of the other model to know where the camera is pointing so that he can try and position his model in shot. You need to stand close so that you can have a constant dialogue about position. There are four approaches which I have found to work.



TOP LEFT: *The world looks different at different times of the year.* **TOP RIGHT:** *If you can slow the subject model right down, a banked turn with the camera on the inside of the turn around the subject can produce good results.* **ABOVE LEFT:** *Sometimes attempts to move closer produce an interesting shot accidentally.* **ABOVE RIGHT:** *A slow banked turn with the camera on the inside of the turn can produce sharp pictures.*

The first is with the camera pointing straight out of the model and with both camera plane and subject plane at the same height and flying alongside each other. The second is with the camera angled down at 20 to 30 degrees and the subject model flying past to one side and below the camera plane. The third is for the subject plane to hang stationary into the wind (only easily possible on a slope site) so that the camera plane can fly in an arc round it. The fourth is to rely on pure luck - if you take enough pictures and other people are in the air, the chances are some pictures will have models in them!

The ideal is to fly off a slope; under those conditions with models of a similar speed, you can both hang both models in the air in close proximity and snap away with a reasonable expectation that some shots will succeed.

Conclusion

I hope I have shown that it is not difficult with a modern compact digital camera to take good quality aerial photos. The whole process of building the model and flying it adds a new dimension to model flying. After a flying session I love scrolling through the pictures to see what the camera has seen, often with surprising results. If you have not tried it already, why not give it a go? ■

Shots into the sun don't usually work. Occasionally, and accidentally, a shot into the sun can work with dramatic results.

TALKING ELECTRICS

Something a bit different this month - the first of two special features on the joys of RTP!

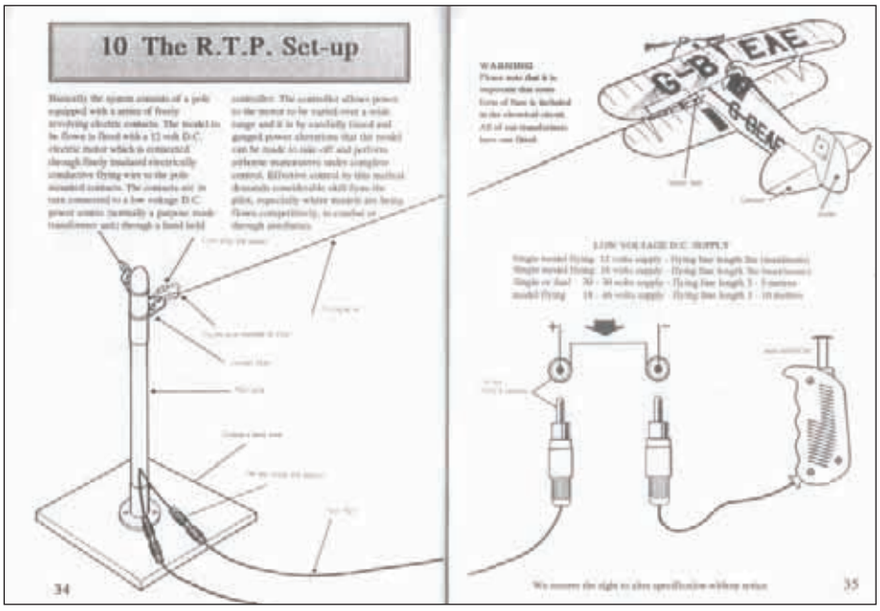
Welcome again to Talking Electrics. This month, we focus on a little-known aspect of electric modelling, electric RTP. A number of readers have expressed an interest in seeing RTP appear in the column, which is great because there's so much material that the editor and I have decided to spread this feature over two issues.

Electric 'Round the Pole', or RTP, has been around for many years. The first references I've found to RTP are a mention of an exhibition in January 1945, and an advertisement in an August 1948 copy of Aeromodeller (see image). For those who aren't familiar with this form of flight, models are flown in circles around a pole in a similar way to control-line flying except that the pilot stands outside the circle using a slot-car type hand throttle to control the model. A surprising degree of control is possible by this means.

Model(s) of the month

Model of the Month focuses this month on father and son team David and Will Beavor, who are leading exponents of RTP. David and Will are real craftsmen and always build beautiful models. We've already seen some of their scale R/C achievements in previous columns. Several of their RTP models are detailed in the accompany-

ABOVE: *This aerobatic model was designed by Will Beavor and was originally published as a plan in Aeromodeller. It's called Barnstormer, and under the right conditions it can perform loops. To do this the model needs to be trimmed to fly slowly at part throttle. The application of full power then causes the model to loop.* **BELOW:** *The Hercules is a large model for RTP; it is of all built-up construction, spans 840mm (33") and weighs a hefty 285g (10oz).This model didn't start off flying as well as it looks - the model has a semi-symmetrical wing of narrow chord, which isn't very suitable for this particular job. Once flaps had been added, the wing worked much better and the model now flies more slowly and gracefully. The hum from four motors adds to the overall effect.*



ABOVE LEFT: *This advert appeared in the August 1948 issue of Aeromodeller. WW2 had finished three years previously, and rationing was still to be enforced for another six years. I imagine the idea of electric-powered model flight might have seemed very exciting in such times!* **ABOVE RIGHT:** *This image shows the basic RTP set-up. This image is by kind permission of Ballards from whose excellent catalogue it was taken.*

ing captions. Many thanks for sharing your fine work, gentlemen.

My first encounter with RTP was in 1976 at a school demonstration given by a fellow pupil, and I was immediately hooked. I was perhaps 12 years old and already very keen on models, all free-flight types at that time. However, here was a form of controlled model flying, which had the advantage of not relying on those mysteriously hard-to-start beasts, internal combustion engines. Instead, for power a small electric motor was used and this was, I think, the genesis of my love of electrically-powered model aircraft.

A major advantage of RTP for a young schoolboy was that it was a very low cost way to fly - several models could be made from a single 12" bargain balsa bundle, the motors were cheap and what little electricity was used was paid for by my parents! I immediately set about getting the necessary equipment and spent many hours building and flying all manner of electric RTP models.

My power supply, being an ex-model train unit, was rather poorly suited to the job though at the time I never really understood why. My higher powered motors never did well on my system although this didn't stop me having a lot of fun. Eventually I did get to grips with engines, control-line, radio-control and so on, and these took over from RTP.

Interest revived

My interest in RTP was revived at the 2002 UK Nationals, where I chanced upon a beautiful model of a Lockheed Hercules, complete with four tiny electric motors and working navigation lights for sale in the swap meet. No one else seemed interested in this small miracle, so I bought it in the meet's dying minutes.

I first flew the model indoors on five metre (16 feet) lines; it flew well but was too fast to look really scale-like. I added some large simple balsa flaps set at 20 degrees to the trailing edge of the wing. These also served to increase the wing area a little, as per the full-size. The flaps had the desired effect and the model then flew much more slowly, and with a certain graceful quality.

I also tried the model on seven metre (23 feet) lines but the increased length caused the balance of forces on the model to change to its detriment. This, combined with the fact that the tip weight was now insufficient for the increased length, caused the lines to become slack and the subsequent crash towards the centre of the circle became almost inevitable. The model sustained considerable damage but happily it has since been repaired, this time with more tip weight.

Later on in this article, there's a more detailed discussion of the technical aspects of RTP flying. This type of flying is more technical than you might suppose, and it's a great vehicle to learn about the physics of circular forces, electricity and aerodynamics!

What is such fun about RTP is that you really feel as though you are controlling the model; you feel connected to it in a similar sort of way to control-line flying. However, because you are standing outside the flying circle, you get to see the model cruising past and this can be very satisfying to watch, especially if it's a scale model, in a similar way (for me at least) that makes free-flight models so fascinating. The only control is the throttle; another thing that RTP teaches of direct relevance to R/C flying is that the throttle is much more of an altitude control than a speed control. Loops are even possible with the right model when it's trimmed correctly. More than one model can be flown at the same time, so formation flying and combat are both possibilities.

Sharing the fun

As I wanted to share the fun of RTP with other members of my club, I lashed up a simple 'trainer' by taping a hook and an old slot car electric motor to a small, formerly rubber-powered model. This model was 490mm (19") span, 75mm (3") chord and weighed 47g (1.3/4 oz) complete with ancient Scalextric motor. It became very scruffy, but still flew exceptionally well. The high aspect ratio, cambered wing seemed to be the main reason for this. Many fellow members enjoyed flying the model which accumulated many hours of flight time and sustained

This profile model of the Beavors' Republic F-84 Thunderjet uses a cunningly disguised propeller rotating in a slot in the fuselage. The pair of large, low-slung bombs (or are they fuel tanks?) probably also help to keep fingers away from the blades. This model beautifully illustrates the pleasure of simple RTP models.

David Beavor designed and built this simply exquisite Sopwith Pup. The model appeared in Aeromodeller some years ago. It must be a real pleasure to see this lovely scale creation wafting past.

This fine SE5a is another model from the Beavors' stable. Will built this one from the Keil Kraft kit. RTP models tend to be long-lived, so it's worth putting in plenty of effort to make well finished models. I just wish I had the ability to produce such fine models! The propeller is particularly realistic.

ABOVE LEFT: *This simple power supply unit, when combined with the hand throttle, makes for a beautifully simple solution to the need for an RTP power system. Both units are available from Ballards.* **ABOVE RIGHT:** *This hand throttle will be familiar to anyone who's ever enjoyed Scalextric racing. It's ideal for controlling RTP models.* **BELOW LEFT:** *This is the Ballards' two-headed pole. It's available in kit form, or ready-made as seen here. Both versions are very reasonably priced, and both need to be screwed to a simple square of wood for a base.* **BELOW RIGHT:** *The pole's ballraces carry the current from pole to lines. Nice neat wiring on this ready-made unit.* **BOTTOM CENTRE:** *Ballards can supply everything for getting started in RTP. Seen here are examples of their ready-made flying lines.* **BOTTOM RIGHT:** *The smaller of these simple motors (Ballards 4550 'Wren', 20g) is the same one as used in slot cars and is rated at 0.5A maximum. The larger one (4551 'Sparrow', 30g) is about 50% more powerful. Both of them are available from Ballards and both work very well in RTP models, in spite of the tiny propeller.*

multiple crashes. One surprise to me at least was that this humble trainer with its tiny motor, if trimmed carefully (and flown in the opposite manner!), is also very nearly capable of a loop on long lines.

I also used this model as a test bed for a gearbox which I'd added to the original motor. Driving a large prop at the same current as without the gearbox, the leap in performance was quite remarkable. This was a very stark reminder of just how much better brushed motors are when used in a geared format on a suitable model, another lesson directly applicable to electric R/C models. The increase in performance was, I think, almost all down to the increased efficiency of the larger prop, which leapt from 3" to 5". Eventually the model was worn out and replaced by the Tadpole, a new design I came up with employing a similar wing design. This also flies exceptionally well.

The RTP pole

The pole I use is a home made one, employing three pairs of ordinary ballraces (one pair per model) to carry the power from the fixed pole to the rotating model. This allows three models to be flown altogether. When formation flying, slightly different line lengths are desirable, in order to help prevent collisions, while for combat flying lines are the same length.

Line wire

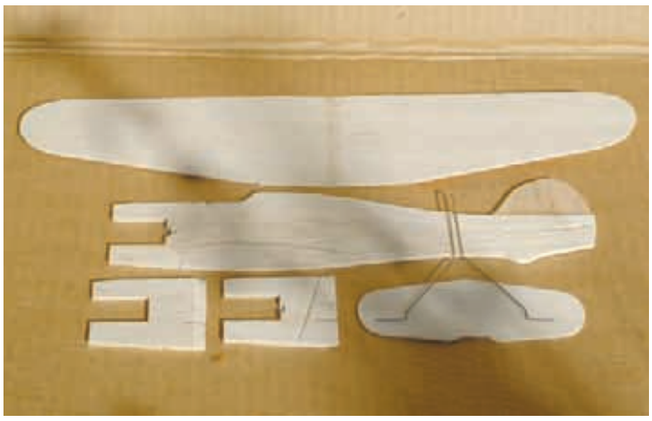
For the flying wires, in my school days I'd used 2m lines made of low-voltage multi-strand PVC coated electrical flex. Being relatively thick and heavy, this was less than ideal, but I didn't know any better at the time.

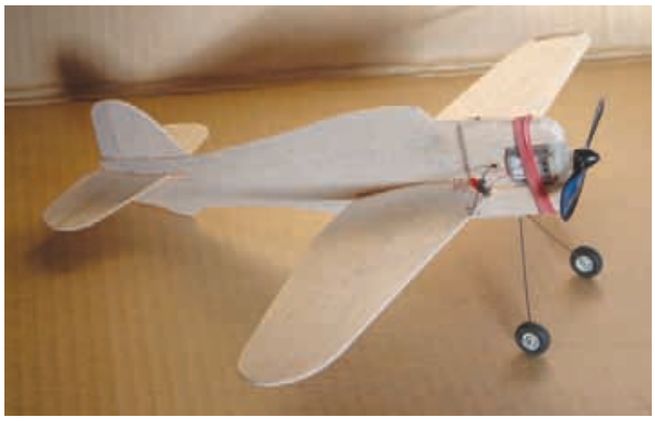
This time round I'm using the much better solution of very thin (28-32swg) solid copper wire which is insulated with a thin clear coating. This has a much thinner cross sectional area, so it's great both for minimum weight and low aerodynamic resistance. Much longer lines are possible with this type of wire. The weight of such lightweight lines is still significant, so a tip weight is necessary, as with control-line models. The only disadvantage of the thin wire is that its resistance is high, so a higher supply voltage is needed to make sure motors get their full voltage.

For securing the lines to the model a fuselage-mounted hook is needed, about 2" (50mm) long. This is typically located just in front of the leading edge. The position of the hook can be adjusted to fine tune the model's flying characteristics.

Line length and tip weight

Line length can vary from as little as 2m, all the way to 8m or more. With short lines, centrifugal force can tend to dominate and models can be made to fly satisfactorily with the balance point very well forward - perhaps as far forward as the wing's leading edge. However, even on short lines a more normal balance point is better. As line length grows, my experience is that it becomes progressively more and more important to ensure that the model's balance point is placed normally, at around 30% of chord. Indoors, especially on long lines, a well





TOP LEFT: *These are the components that make up the Ballards fighter. It's loosely based on the Hurricane, and builds quickly.* **TOP RIGHT:** *The Ballards fighter, completed. I elected to leave off the moulded plastic fuselage sides to save weight. I actually built two of these for combat use. One is a little lighter than the other, and this difference translates into a significantly better performance. I also shortened the nose of both models to bring the balance point closer to the 1/3 chord point, and this also has really helped their performance.* **ABOVE LEFT:** *This RTP power supply unit allows up to three models to fly simultaneously, with each model receiving an appropriate voltage. There's no need to have a unit of this complexity, though it is useful.* **ABOVE RIGHT:** *This is the rear face of the PSU I built. The holes are the outlets for the twin cooling fans. The black socket is for a multi-way connector, linking the PSU to the pole via a single thick cable. A piece of card is used to allow models to pass over the cable without becoming tripped up.*

trimmed model may be observed to be truly flying, with the lines appearing slightly slack.

Like to have a go?

If you fancy having a go at RTP, and I hope you will, a great way to start is with a small profile model, about the same size as the trainer I made, using a slot-car type motor for power and a small (75mm/3") prop. Profile models can be built very quickly as they are so simple. It's best to avoid long-nosed types because the weight of the motor can easily make small models nose heavy (unless you use a simple extension shaft).

If all this has whetted your appetite, you may like to know of Ballards, a specialist RTP retailer in the UK (01892 531 803). They do an interesting and very informative catalogue for just £2.

We will finish up this RTP feature next month. In the meantime, with the editor's approval (I hope this is okay with you, Steve), I have a small announcement to make:

New Gibbs Guides website

I'd like to let readers know that GibbsGuides.com now has a new website up and running. A growing number of free-to-access informational articles appear on the site, and I hope these will help to demystify electrics for readers. You can also subscribe to a free newsletter which will contain valuable information on electric modelling each time it's sent out. Please feel free to visit the site at www.gibbsguides.com ■

Continues next month

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website - www.ballardshop.com

LEFT: *This elderly Pitts Special was built from the Ballards kit. It's a bit motheaten, having spent years in an attic. I remember lusting after one of these as a young boy!* **ABOVE:** *This is the geared motor from the Pitts Special. It's a bit of an antique, and nowhere near as powerful as a modern motor. Full throttle current on this one is about 2.5A, making it a 30W motor.*

MINI FIREWORKS

An old dog learns some new tricks with this lightweight discus-launched glider from PCM

DLG for slope flyers?

As a slope hack I am of course ideally qualified to review a high performance DLG (Discus-Launched Glider) and thoroughly test the claim that it is also suitable for beginners! It was probably because I was asked by another slope hack (who, true to form, didn't think it through either) but I like to believe it was to advance the humanitarian notion we can all benefit from learning something new and I remember that rare occasion very clearly.

It was on a Sunday morning of another F3F slope race event about to be called off due to lack of wind. I sat there with a magnificent slope taunting me. Of course we had the usual entertainment: A few couldn't resist and scratched precariously. These brave souls risked not only pride but also international humiliation as the audience included some of the best European flyers!

One of them, a German competitor, readied his small lightweight. A comical run, skip but admittedly impressive '360' put paid to any jibes as his DLG zoomed, making the telltale sound of high speed respected by all racers. The fact that it stayed up was enough to make it more successful than anyone else's attempts. But not only that, it was rolled, bunted and even went into an imaginary F3F run. The final straw was when he caught it by its wing tip, spun and did it all again!

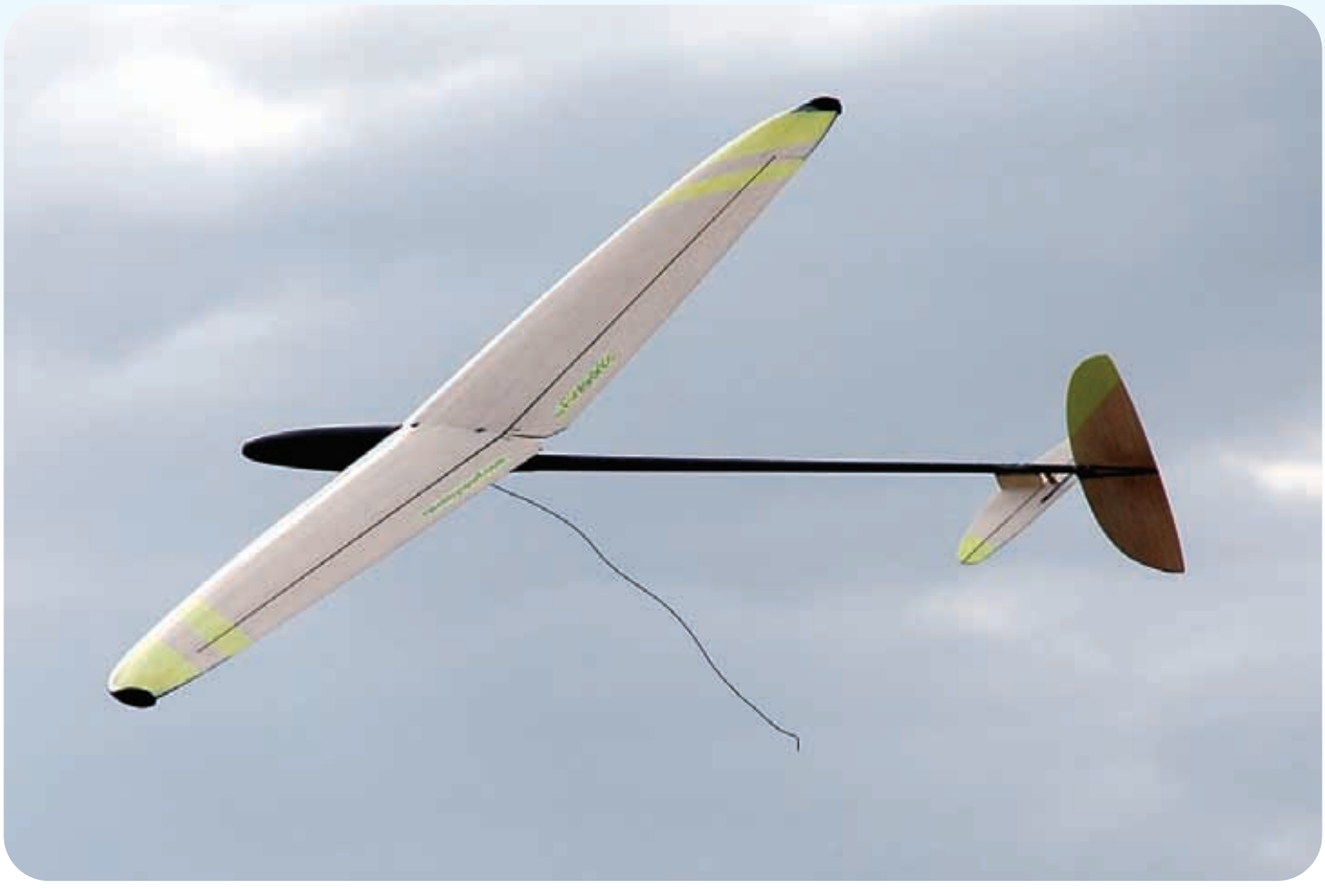
A light came on in my tiny brain at that moment.

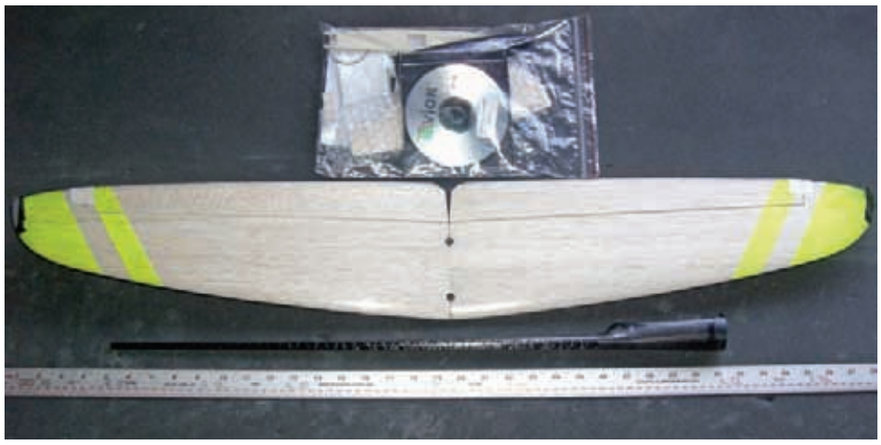
Which DLG to have?

One like his will do! Until I discovered it was, in fact, a 'state-of-the-art' competition DLG, with RDS and Dissler wing, which meant it is very costly and had a year-long waiting list. (It was a SALpeter, incidentally.)

So when the makers of all things 'bling' and manufacturer of the 'Erwin' introduced a 1m version of their acclaimed Fireworks series of DLGs, it was that light again! PCM describe their Mini Fireworks as having 'maximum fun factor' and 'extreme starting heights', but they had me at 'Hello!'

There are two versions, a rudder/elevator (mini-S) and an even newer 3-channel, aileron/flap/elevator (mini-Q). Flat fielders and beginners will go for the lighter mini-S,





LEFT: *As it comes - tiny and doesn't seem very much for your money!* **ABOVE:** *Prepare first and make sanding blocks and templates for sanding the section in the fin and tailplane. A piece of glass makes an excellent flat surface to work on.*

but I couldn't control my slope hack predisposition and went for the aerobatic 3-channel, mini-Q.

I got mine from T9HobbySport; R/E versions are £135 and £160 for the three-channel.

What do you get?

The Mini Fireworks sports a modified Drela section, AG03, an HLG section especially for low drag during the high speed launch phase and good manoeuvrability for working small, low level lift. The wing is a diminutive 950mm and a glass/balsa sandwich, hollow mould with carbon reinforcement in the spars, tips and ailerons. The wing mounting holes are done and suitably reinforced.

The tips are trademark PCM and, like their competition DLGs, contoured in carbon for good finger hugging. These are mirrored at both ends for right or left flingers.

The ailerons are full span, bottom-hinged with tape and the hinge gap is therefore on the top surface. It is not sealed. This is because the section is designed to delaminate the air by the time it reaches the hinge point. So, true to the minimal design philosophy, the gap is left and not an oversight.

The fuselage is a pod and boom with a removable nose cone and moulded in carbon. The pod and cone moulds are paper thin and feel like a soft shell crab! Fortunately, a liteply radio tongue adds some rigidity and also ties in the boom, which strengthens things up considerably. The boom is made of sterner stuff and oval in cross-section to add extra strength. Booms need to be rigid to resist energy sapping bending which will, during the more exuberant launches, reduce launch heights.

The fin and tail is 4mm lightweight balsa sheet, with only the profile cut. You have to shape this yourself to make an aerodynamic section!

Finally, you get some very thin multistrand cable, a bit of wire, carbon pushrods, very nice carbon control horns, some glass cloth, carbon tow, wing bolts and a paper template for sanding the fin and tail sections. Oh, and best of all, you also get a CD containing very comprehensive building instructions with lots of useful photos and excellent throw setups suggestions.

The build

This is fairly straightforward but more involved than a normal mouldie. It's pretty much to instructions so not a lot to report except go for smaller cells, 1/2 AAA, 210 mAh for the lightest setup. PCM's photos show this smaller battery which helped me achieve the quoted weight of 165g.

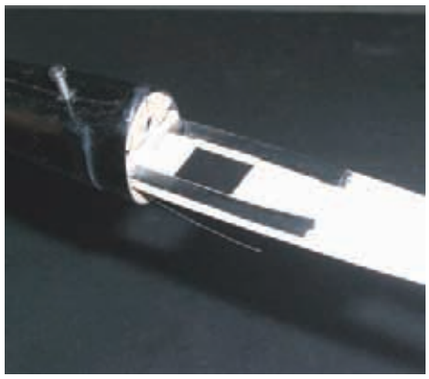
Flying

First flight was at the slope, naturally, and unusually in perfectly suited conditions with

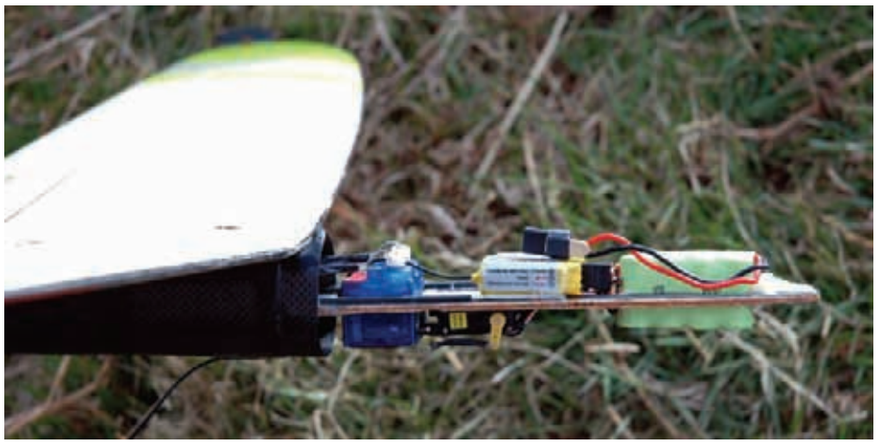
Finished back end reinforced with glass. Look in the open hinge and see the thin wire spring that keeps the elevator open. The carbon horn has a thin multi-strand wire hooked over and pulls against the spring. Simple, accurate and very light.

Standard liteply radio tongue, reinforced with carbon tows using thin cyano.

Modified with a former, which wasn't part of the instructions. The lightening holes gave about the same amount of wood removed as that added!



ABOVE LEFT: *Modification added a bit more rigidity to the 'soft shell crab!' It also locates the tongue accurately.* **ABOVE RIGHT:** *Beautiful CNC produced carbon aileron horns in place.*



Here's one with HS55 squeezed in, a new lighter tail and fin allowed lighter 210 mAh battery to be used. Since changed 55s to SD100 and got the weight down to 165g. Yippee!

ABOVE LEFT: *Ready to go and finished with logos printed on tissue and lacquer in place.* **ABOVE RIGHT:** *It's tiny at 950mm span. The tail was finished in water-soluble lacquer for lightness but some carbon tows were added to stiffen the fin and elevator. A highlighter marker adds a little trim matching those on the wing.*

only lightweights flying. The trim was only marginally out on the elevator thankfully and easily clicked out. The aerobatic setup with 10mm snap flap up and down (!) and loads of equal aileron throw (18mm) is not what you would expect for a thermal soarer. The CG was moved back from the recommended 62mm which was nose-heavy for the slope. I ended up with 64mm. Slopers will appreciate this and in light slope lift it batted around with ease. It rolls easily and loops (and bunts) can be made ridiculously small.

It's surprisingly quick, too; no paper bag this, despite its obvious light weight and generous dihedral. It does a surprisingly respectable reversal, and inverted isn't bad either. In fact you can easily gain height inverted. So, the mini-Q is teaching me something already! Of course, you won't get great energy retention, it's just too light, but it uses the available lift very effectively and gaining enough height to point the nose down was not a problem.

Next time was a virtually windless day in the company of a full-sized carbon Fireworks III. Well, what a hilarious session that turned out to be! After some trimming in start mode the mini-Q easily launched as high as its bigger brother, impressive! The best bit undoubtedly was catching the little beast. Brakes set with just down flap were surprisingly effective, definitely no sign of tip stall. These funny middle-aged men were getting a bit of a sweat on; coats were coming off!

The antics got worse; launch, then goading each other to do sillier and sillier things as we reverted to type and all this when everything else was grounded. Its aerobatic envelope was fully explored and coming straight from a launch attempting a rolling circle is exciting stuff with the ground coming in ever closer and closer!

As for extending flight times, I've had a few sessions at this. Now no way am I a thermal soarer, but even I could see that the bigger Fireworks III floated around better. The mini-Q has a faster glide - slow it down too much and it loses height. It veers off easily and speeds up and slows down without input from me. In fact every little bump in the air and it responds. I know it's trying to tell me something…

Conclusions

The Mini Fireworks is an entertaining aeroplane and I've had a few, but nothing so small and seemingly fragile. You will, however, need be obsessive about keeping the weight down and be prepared for the more than average build work.

For your efforts you will be rewarded with a minimalist lightweight with a difference for those low to windless days, as this is built to withstand a few 'Gs' and high speed.

A sports aeroplane it is then but with some important differences: Want a bit of exercise? Try the run, skip and spin. How about just a quick flying session without the long trek to the slope or, even better, slope soaring a tree or a building? For the even more reckless, loops at ridiculously low levels and catching inverted keeps my slope hack mentality amused.

There is, of course, the deeper intellectual challenge of gaining lift and nothing will train you better. The mini-Q circles in the tiniest of spaces and responds to bumps and lumps in the air more sensitively than anything else I have flown. And yes, you will need to search out and actually find lift; this will not hang there waiting for lift to come.

Overall, even without taking its more attractive cost into account, the mini-Q is a better introduction to DLGs than most. It does it with a lot of fun which sugar coats the medicine of learning to thermal soar in earnest. And despite the fact that it may not float quite as well as a full-size machine it just might have the right balance to provide the necessary encouragement, especially if you predominantly slope fly like me.

It will creep up on you, timing your flights will be the first indication. This will give instant feedback on your progress and it's a major part of the enjoyment. Then you'll be thinking days when the wind doesn't blow aren't so disappointing; in fact they're something to look forward to. A transformation will have started… Now, where are my shorts and sandals? ■

BELOW LEFT: *A bit of exercise, hilarious fun but keep that arm straight! Who said you can't teach an old dog new tricks!* **BELOW RIGHT:** *Brakes are very effective and catching is much simpler than any other model in my fleet.*

AERO MODELLER

March 2009

MIND THE LINES!

The weather gods smiled on last Autumn's Old Warden Air Spectacular event

- **FOR OLD TIMES' SAKE**
- **FREE-FLIGHT FILE**

6TH EUROPEAN SAM-RC CHAMPSCHAMPIONSHIPS

Holger Menrad reports the action at the 2008 Pan-European R/C vintage gathering in Italy

VINTAGE R/C - By Holger Menrad

Welcome from SAM Italy

6TH EUROPEAN SAM-RC CHAMPS

Holger Menrad reports the action at the 2008 Pan-European R/C vintage gathering in Italy

Logo RC-Eurochamps 2008 in Italy.

The friends of the SAM-RC Eurochamps met in 2008 in Italy, for the second time in two years from June 13th to 16th. Hungary had been the intended venue for 2008, but this could not be achieved due to the sudden and unfortunate death of Gyula Munnich who had been organizer dsignate for Hungary. Fortunately, Nick Bruschi stepped in to manage the competition in Italy again. Well done, Nick! All participants should be obliged to him, having saved the continuity of the competition. Many thanks to him and also to Sergio Scirocchi, the president of the Italian SAM Chapter 62 and his willing helpers, last but not least Maurizio Baccello who had done a lot of valuable work for the Champs.

We all enjoyed going to Italy again. A very favorable airfield, accommodation in a nice location on the Adriatic coast and a well prepared organization which made the whole event an agreeable stay. We were also able to welcome our American friends. Ed Hamler had organized a cruise in the Mediterranean Sea for the US group and other tourist activities during the days prior to the SAM event.

The competition

During the first day, Friday June 13th, OTVR (gliders) and NMR 2.5 (Nostalgia 2.5 cc engines) had been scheduled. ('Nostalgia' denotes models before 1957), with four flights for every model, in individual time periods during the day. As previously, the gliders class had the biggest number of entries.

Nearly 40% of the registered models were gliders.

The NMR 2.5 class proved to be a new experiment. The Nostalgia class had been initially introduced in the US

TOP LEFT: *Nick Bruschi at the introduction ceremony.* **TOP RIGHT:** *Many gliders (26% of all participating models).* **ABOVE LEFT:** *Eduard Grilz, Germany with his glider Weltensegler, wingspan 248 cm (97.6").* **ABOVE RIGHT:** *Ulf Mett, Germany and his daughter Cris start the Lerche glider.*

SAM Champs by the late Loren Schmidt in order to encompass models and engines of a later generation which possibly might be favoured by younger model flyers. This 2.5 cc class seems to be a special arrangement for the European vintage flying sport, as we had a tremendous development delay during and shortly after WW II. The reduction of an engine capacity to 2.5 cc should allow use of the most common engines in Europe during that time period.

However, the practical experience in this first step to a possibly new combustion engine class had shown only a rather limited participation. Maybe this idea was too new, and it may need some further time to be developed. Or maybe it is of interest only for a limited number of specialists? Time will show the further development. Anyway it was a valuable attempt to increase the rather low number of powered models during the European RC - Champs, and we appreciate the idea and the effort of the organizer to give more chances to the application of combustion engines.

Weather conditions during the first day were not the best. Medium winds with strong sudden gusts across the landing area caused several models to disappear into the neighbouring corn field where retrieval was difficult. All that had been interrupted by light rainfall but the planned flying schedule had been completed.

During the second competition day, heavy rainfall and extremely strong winds brought a halt to activity activity in some of the worst weather conditions seen in that area during recent years. It started during the night and continued the whole day, so no flying at all was possible, washing out the day's events for the OTMR (gas models), Electric Old Timer and Texaco models which should fly during this day.

The third competition day had to cover all the remaining flight classes besides the scheduled NMR (Nostalgia), 1/2A Electric Old Timer (Speed 400) and 1/2A Texaco. A restricted flight program and flexible adoption to the situation by the organizers managed all that without problems. Instead of four, only two scoring flights were permitted in each class. Excellent weather conditions with sunshine and light winds favoured this last day of the competition. Finally at the closing awards ceremony, the 6th European SAM RC-Championship came to a satisfying end.

Unfortunately there had been some confusion in a few instances during the limited engine run (LER) competitions. It had been difficult to convince some timing officials about the effect of sonic speed. When the engine is stopped at the kind of height that some models can achieve, the engine noise will be heard for a moment after the engine has stopped, which can be in the range of one second (sonic speed about 320 metres, 350 yards per second). We had this problem already during previous events. Hopefully it will be better understood and eliminated for the future.

Apart from this exception, all other organiza-

BELOW LEFT: *One of the biggest gliders with a wingspan of about 3.5 m (138").* **BELOW RIGHT:** *A nice gas model. Ohlsson with a wingspan of about 3 m (118"). Texaco class with a 10 cc MVVS diesel.* **BOTTOM RIGHT:** *The big Lanzo Bomber is seen at every vintage flying event.*

ABOVE LEFT: *The Dallaire Sportster, an elegant and successful model, beautifully built by Gabriele Montebelli, Italy.* **ABOVE RIGHT:** *Giovanni Ridenti, Italy with his Streamlined Ciclone. First place in the Texaco class.* **LEFT:** *Ed Hamler, USA hand launches his Airborn in the 1/2A Texaco class.*

tion was well done, including a nice banquet and a happy winners' award ceremony at the end of the last day.

The participants

As usual in the recent years, participants came from different European countries mainly from Italy (of course) and from Eastern Europe, the Czech Republic, Slovakia and Hungary. It had been a great pleasure to welcome our special friends from the US. Together with several Germans, we had nearly 200 pre-entries and finally more than 160 models were flown during the contest.

However to our disappointment, there was no-one from our friends in the UK. We hope to welcome some of them this? The distance from England to Germany will be only half of that to Italy.

The models

Many of the participants brought designs from their own home country, representing an interesting variation of different concepts.

As already noted, the dominating model type were gliders, with a wide variety of designs from Czech Republic, Slovakia, Italy and other countries. Also some German gliders were present with good results.

Among the power types, US models like the Playboy were popular in competition, with several designs from different countries. Some models proved to be top performers and some Italian models were particularly attractive, for instance the 'K.L. 69' from Fabrizio Landini , and the 'Streamlined Ciclon' from Giovanni Ridenti, which took first place in the Texaco class. These were not only attractive, they also produced the best cmpetition results. Fabrizio's K.L. 69 flew in the Texaco class also, with a wingspan of 305 cm (120"), weight 3,200 gr (112.8 oz) and was equipped with a 10 cc MVVS diesel.

Another example of an interesting model was the 'Under Construction' built by Heinrich Dabrowski, Germany. This Michael J. Roll design was published in the 1938 Aeronautics Yearbook by Franc Zaic. Technical data: Wingspan 322 cm (127"), wing area 74 qdm, (4.8 in2), weight 2659 gr (93.8 oz). The model was flown in the Texaco class with an Irvine 40 diesel and ACP 16x6 propeller.

Heinrich Dabrowski from Germany is always good for new, interesting and obscure model designs. We know him and his models already from former Eurochamps meetings, and he is expected to bring to every Champs one or more new models. And Heinrich is not only a perfect model builder, he also demonstrates them in very convincing competition ratings.

US SAM Champs and the Eurochamps

The US SAM rules are the basis also for the European events, with some rvisions regarding the different situations.

There are every year two completely different events in European vintage flying:

- Many years ago David Baker, the founder and present honorary president of SAM 1066 had started the Eerochamps for free flight models which is normally flown on the Middle Wallop airfield in southern England, end of August. A traditional event with a lot of international participation.
- About seven years ago some European participants at the US SAM Champs had the idea for the R/C-Eurochamps in Europe, limited to R/C models. Nick Bruschi together with his Italian vintage modeller friends organized the first competition in Italy. A rapidly growing event that meanwhile is scheduled every mid-June in successive European countries.

Some figures may show the difference between the European RC-Champs to the traditional US SAM Champs:

During the R/C-Eurochamps of the recent

ABOVE LEFT: *Heinrich Dabrowski, Germany launching his big Under Construction.* **ABOVE CENTRE:** *A Lanzo Bomber returning from a flight.* **ABOVE RIGHT:** *The nice and fragile looking KL 69 from Fabrizio Landini. Details see text.* **FAR LEFT:** *Heinrich Dabrowski, Germany with his successful Scimitar. First place in the 2.5 cc Nostalgia class.* **LEFT:** *Family cooperation. Nick Bruschi and his wife.*

All kind of engine modifications are permitted in the TEXACO class. Here is home made cylinder head for a Super Cyclone ignition engine.

ABOVE & BELOW: *Pylons, the higher the better?*

Results

6th SAM RC-EUROCHAMPS in Italy, Valle Gaffaro

OTMR, Gliders, 38 models

Pos.	Name	Country	Model	Score
1	Gelencser, Kalman	Hungary	Harkaly	764
2	Gelencser, Kalman	Hungary	Ju 52	745
3	Mersecci, Rover	Italy	Cingo cengo	726

NMR 2.5 Nostalgia 2.5 cc, 8 models

Pos.	Name	Country	Model	Score
1	Dabrowski, Heinrich	Germany	Scimitar	674
2	Hrncar, Lubomir	Slovakia	Jaded Maid	546
3	Bortolai, Tiziano	Italy	Mini Hogan	393

NMR Nostalgia, 10 models

Pos.	Name	Country	Model	Score
1	Bruschi, Domenico	Italy	Herky	987
2	Dabrowski, Heinrich	Germany	Gool	704
3	Gianati, Walter	Italy	Cloudster	632

OTMR Oldtimer Gas models, 9 models

Pos.	Name	Country	Model	Score
1	Dabrowski, Heinrich	Germany	Playboy Sr.	1463
2	Dabrowski, Heinrich	Germany	Westerner	1300
3	Hamler, Ed	USA	Airborn	1268

TEXACO, 23 models

Pos.	Name	Country	Model	Score
1	Ridenti, Giovanni	Italy	Streamlined Ciclone	3003
2	Cancelli, Marcello	Italy	KI 61	2456
3	Binelle, Luigi	Italy	Il Duca	2234

1/2A TEXACO, 17 models

Pos.	Name	Country	Model	Score
1	Gianati, Marco	Italy	Playboy Sr.	1623
2	Gelencser, Kalman	Hungary	Tm 17	1287
3	Mett, Ulf	Germany	ETB 42	1287

ELOT, Electric Oldtimer, 33 models

Pos.	Name	Country	Model	Score
1	Mersecchi, Rover	Italy	De Filippis	3254
2	Mersecchi, Rover	Italy	Sine 46	2452
3	Harding, Dave	USA	Stardust Special	1935

1/2A ELRTTR, Electric 1/2A , 23 models

Pos.	Name	Country	Model	Score
1	Sladec, Lubomir	Slovakia	President	2280
2	Mokran, Stefan	Slovakia	Ciclone	1902
3	Mett, Ulf	Germany	ETB 42	1845

BELOW LEFT: *Winner award ceremony Nostalgia class: First: Nick Bruschi, Italy, second: Heinrich Dabrowski, Germany, third: Walter Gianati, Italy* **BELOW RIGHT:** *Heinrich Dabrowski, Germany wins the trophy for the alltogether most rating points.*

four years (2005 to 2008) we could count in an average:

About 150 active models participating in the classes:

- Gliders (26%),
- Gas models and Nostalgia (7 and 8%),
- TEXACO (16%),
- 1/2A TEXACO (13%),
- Electric Oldtimer and 1/2A Electric (15% each).

While in the US, the dominating number of models are (petrol) engine designs, it is obvious that we have, in keeping with traditional European model history, a large proportion of gliders, a very limited number of traditional engine models (Gas and Nostalgia) and a continuously growing number of electric models.

A new introduction for 2008 had been the 2.5 cc Nostalgia class (5% participation). Maybe some other attempts will be advisable in order to increase the number of combustion engine models and to find out which way will be the most effective decision for this purpose. A wider range of permissible engines may help to convince some modellers to participate in the engine classes if there are less problems in obtaining a competitive qualifying engine.

This year

The 2009 RC-EUROCHAMPS will be organized by the German SAM 85 at the town of Suhl in Thueringen, in central Germany, near to the traditional Wasserkuppe area, from June 10 to 14. We hope to welcome there many of our foreign friends. This event will be only about 780 km (less than 500 miles) from the ferry port Calais, so we hope to see our UK friends there this time. ■

Phil launches an open rubber model when open meant open.

Phil Ball is pleased to be in the F1A team.

Phil prepares to fire up his F1C in foreign parts.

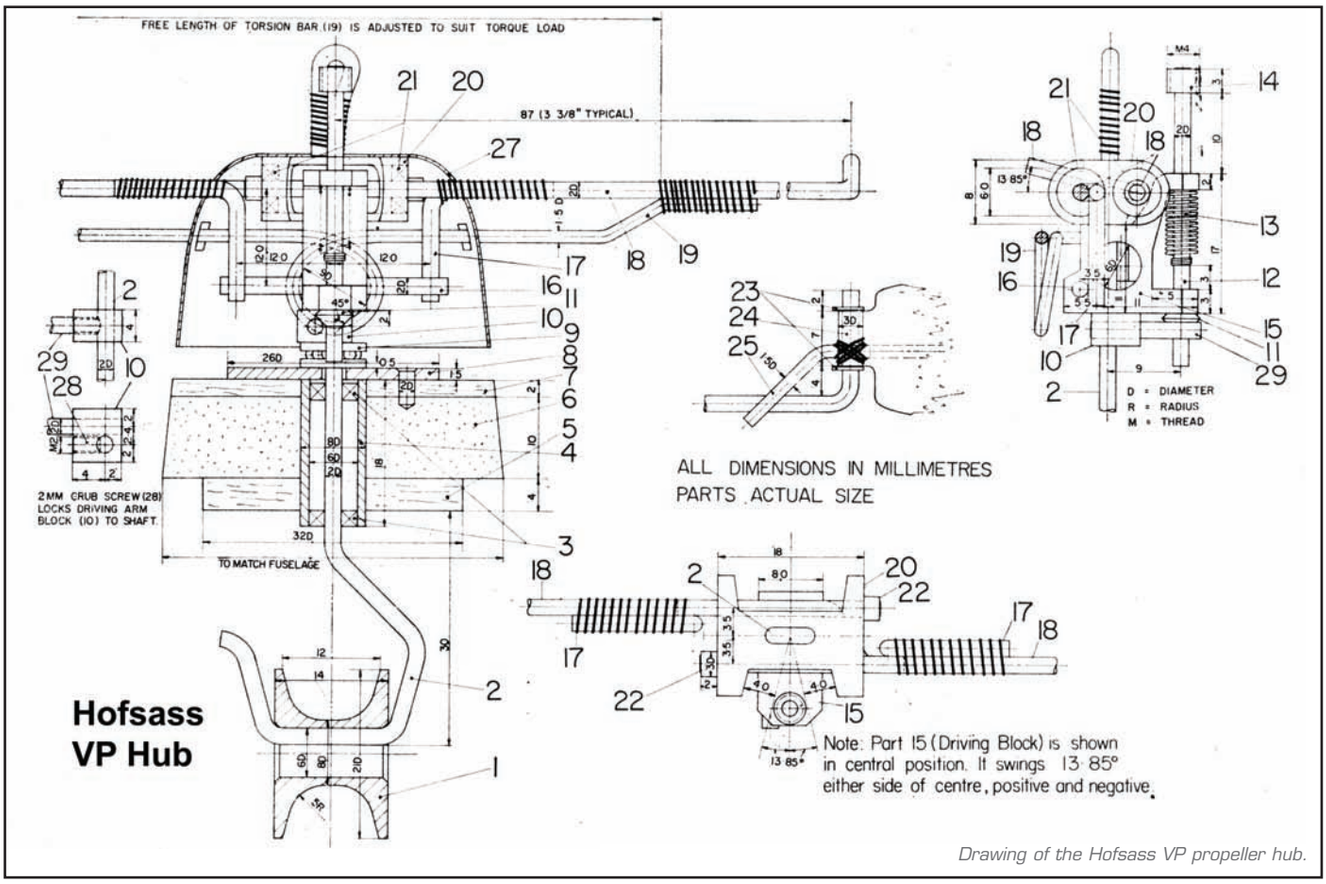
Comment

It is remiss of me for not noticing before that the Free Flight Team Trials held in 2008 to select the team to represent Britain at the 2009 World Free Flight Championships in Croatia in the summer was particularly special for one man! That man was Phil Ball. Phil gained a place on the F1A glider team and as a result he is one of only three Britons ever to be chosen for all three international outdoor free-flight classes, F1A glider, F1B Wakefield rubber and F1C power. The other two being the late Jack North of Croydon & DMAC and Ray Monks of Birmingham MAC. Ray Monks did go one better however adding FID indoor rubber to his list of team places.

Phil is a member of the Grantham MAC and his earlier team places have taken him to Germany, Italy, USA, Hungary, Romania and Portugal and was part of the gold medal winning F1C power team at the last two. Phil also managed the British team at the World Junior Championships in Yugoslavia and Czechoslovakia and has served on the free-flight technical committee for several years. He has also won the BMFA Senior Championship on a number of occasions.

PHIL BALL JOINS THE ELITE CLUB

Mike Evatt takes a look at variable pitch propellers, reviews the NFFS Symposium report and reveals the 2008 Aeromodeller Trophy results



Drawing of the Hofsass VP propeller hub.

Phil recently retired from Rolls Royce at Derby, where he was a development engineer working on advanced turbine blades. Always a prolific aeromodeller Phil prefers to design and build his own models. Now he has more time on his hands one wonders what new heights he can scale!

Variable pitch propellers

Variable pitch propellers are becoming very popular in most of the rubber powered competition classes where rubber weight is restricted and it is necessary to take steps to squeeze out that last morsel of performance. Certainly in F1B rubber and F1D indoor rubber a VP propeller assembly is the front end of choice. Of late there is much interest being shown in applying this technology to F1G (Coupe D'Hiver) rubber also. What I will attempt to do in this and other related articles is to outline the principles behind the technology and point reader in the direction of commercial units as well as offering suggestions to those who would like to make their own.

The basic principle is that the torque applied to the propeller shaft modifies the blade angle in the anticipation that the resultant thrust is deployed more effectively to power the model's climb phase.

Many years ago I was given an old propeller assembly by my local model shop proprietor (the great Ted Evans of 'Jaguar' fame). This turned out to be a variable pitch and variable diameter free wheeling featherer that he had used in the late 1930s. This was my first recollection of seeing a variable pitch propeller.

Nearly a decade later the August 1968 edition of Aeromodeller magazine was notable not just for a photograph of a young Roger Baggott on the cover but for an article entitled "Torque Operated Variable Pitch Propellers" by Reiner Hofsass. This was a relatively unsophisticated design in terms of manufacture with lots of soldered piano wire but it did seem to work for Reiner and his colleague Walter Czinzel. More compact versions were developed and used with good effect over the years. I built one of these, the pitch change was a massive 27 degrees and as I recall the climb was almost at a constant angle and constant velocity but on my limited testing only a marginal increase in duration was observed in still air although performance in a thermal appeared to be enhanced. However the model had poorer performance in turbulence - it was unable to punch through the turbulent layer.

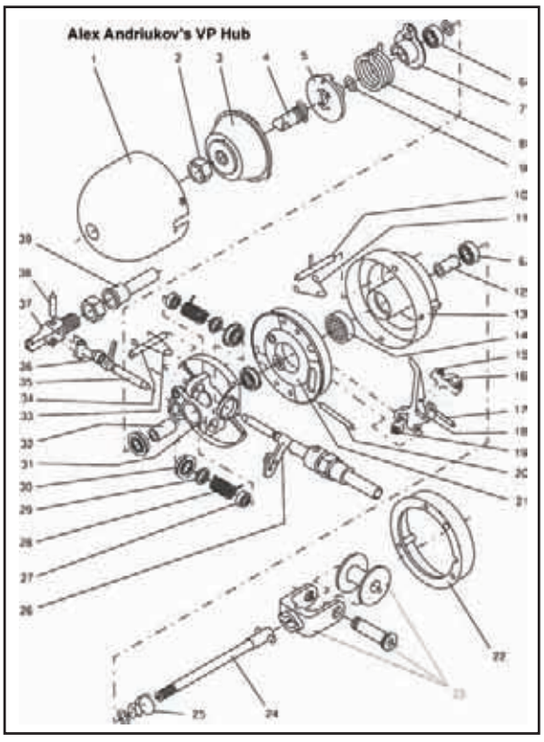
About 25 years ago Alex Andriukov was developing his now legendary VP DPR F1B hub. Alex was probably the first to combine all the functions and to use locked out and feathered blades at launch. This complex unit was beyond the scope of most modellers manufacturing skills so it was no surprise that commercial production started in the early 1990s.

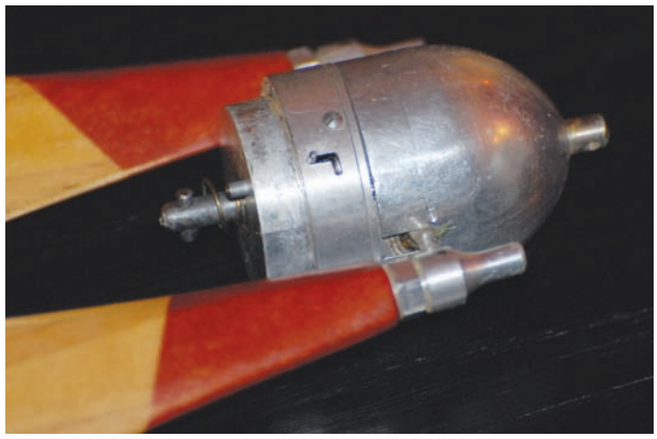
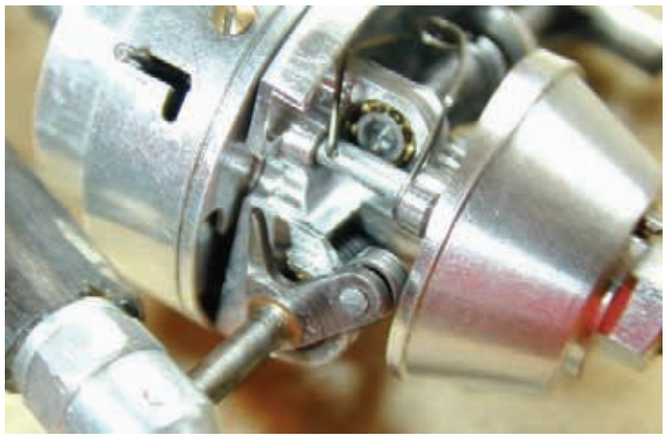
Over the ensuing years many other flyers and suppliers have produced VP hubs.

The Bob Piserchio F1B hub was featured in the NFFS Symposium Report 1988. This was a relatively simple unit with a 15 degree pitch shift and a claimed height gain of 25-30 feet.

The Cyclon Russian-made VP Hub appeared

TOP: *Spring loaded torque arms from a Hofsass unit.* **ABOVE:** *Alex Andriukov's website at http://home.pacbell.net/andriuko.* **RIGHT:** *Drawing of Alex Andriukov's VP propeller hub.*



TOP LEFT: *An Andriukov front end for F1B.* **TOP RIGHT:** *An Andriukov front end reveals its complexity.* **ABOVE LEFT:** *The author's VP front end for F1G.* **ABOVE RIGHT:** *The inside of author's VP front end for F1G.*

in the early 1990s - the VISH unit. This had a linear cam with about 6 degrees of rotation. It may be of interest to note that this company also made a torque operated variable diameter unit but it was never sold in the UK. This only had 20mm or so of diameter increase which may not have been sufficient to show a duration improvement.

The Carl Perkins' VP hub for F1B was featured in the NFFS Digest (circa 1995 exact date unknown). This used a 7 degree shift and featured a neat auto-rudder release.

W Hobby markets an F1B VP hub - this has a tensioning device to adjust the hub for different motor strandage and has what appears to be a non-linear cam. Once again the pitch shift is around 7 degrees.

Evgeny Gorban produces both F1B and F1G VP units.

A coffee table classic from NFFS.

This section was never intended to be a comprehensive guide to Variable Pitch Propellers through the ages but rather to put current thinking into context.

The National Free Flight Society Symposium Report 2008 - A review

Late in the year, just in time for Christmas and New Year reading, the NFFS Symposium report is published. The Symposium is presented annually by the National Free Flight Society of the USA. The primary purpose of the Symposium is to promote and encourage the investigation, discussion and documentation of the technical and theoretical side of free flight. Papers addressing historical, administrative, documentary and philosophical aspects of the sport are also welcomed. Outstanding models and modellers are honoured.

It is nearly always a fascinating read and a reference tome for the bookshelf for years to come. It attempts in some measure to put some numbers to the phenomenon that we observe every time we fly a model. It also has some pretty good cartoons by Will Nakashima and Cass Pangell.

So if you would like to understand a little more about model aerodynamics then look no further.

I won't even attempt to review each paper of which there are sixteen but rather give an indication of the sorts of things to expect in its 164 pages.

On the theory side there are papers on F1A Airfoil Design and wing optimisation, Theoretical optimal design of three panel wings, Variable camber F1A and F1B models and Improving the span-wise lift distribution in circling flight.

Turning to the more practical side we have: F1E Dynamic hand-launch bunting system, A systems approach to FAC scale design, Energy testing and the performance of rubber powered models, The evolution, status and future of mechanical timers for free flight and Is digital free flight your future?

The 2008 Models of the Year, selected by committee under Bill Booth Jr feature:

Spin-Up Indoor HLG by Mark Benns
Turn-Up Outdoor HLG by Tim Batiuk
F1B No.11 by Blake Jensen
R60 AMA A/B power model by Reid Simpson
Day Break, Dawn Mulvihill open rubber model by Carl Redlin

And special recognition is given to:
Scat Electronic News by Roger Morell!
USA FIP Junior development program by Jim Parker and Bob van Nest
Indoor Speciality Tools by Ray Harlan

Hall of Fame recognition has been selected by a committee under Louis Joyner for:
Walter Rozelle, Rex Hinson, Herb Kothe, Alexander Andriukov, Roger Simpson, and Reid Simpson

The Symposium Report closes with a report by the NFFS President Phil Sullivan and biographical notes on the authors.

The 2008 Report is available from Ian Kaynes at Free Flight News for £19.50 including postage in UK or Europe.

Free Flight News
7 Ashley Road
Farnborough,
Hampshire UK. GU14 7EZ

David Beales launches in F1G, but hopes that isn't the timekeeper.

Results

F1G - Aeromodeller Trophy (22 flew)

1. P. Brown	431
2. T. Grey	380
3. A. Longhurst	375

Vintage Coupe d'Hiver - AAA Trophy (5 flew)

1. R. Oldridge	221
2. P. Tolhurst	214
3. S. Willis	177
4. R. Woodruffe	155
5. R. Willes	22

Flitehook Team Trophy
Crookham Contest Modellers

Crookham's Peter Hall launches his tissue and Mylar covered F1G.

2008 Coupe Europa and the Aeromodeller Trophy

I am indebted to Martin Dilly and David Beales for the details of the 2008 Coupe Europa competition held at Middle Wallop on 30th November.

This event was run by the Croydon & DMAC and the organisers were surprised and gratified at the turnout, considering the foul weather that was forecast and duly arrived. The wind speed, wind direction and sporadic drizzle dictated a reduced max of 90 seconds, but thankfully no fly-off was required.

Phil Brown, a very welcome relative newcomer to contest flying, flies beautifully-built large F1Gs and was very active throughout the contest, chasing his models immediately after launch, clad in an increasingly soggy-looking black leotard as worn by cyclists. His efforts were rewarded by a convincing F1G first place, almost a minute ahead of Trevor Grey.

Trevor flew a rather scruffy old F1G but showed that he'd lost none of his skill as a rubber flyer after his recent concentration on electric models.

Third placing Andrew Longhurst, is a small rubber specialist and was particularly active, flying in both Vintage CD'H and F1G classes.

Previous winner Rex Oldridge decided to attend at the last minute in spite of the forecast and was well rewarded by winning the AAA Trophy for Vintage Coupe d'Hiver. Rex, who has built most of the Vintage Coupe designs, flew his 'Bagatelle' so well that if he'd flown to the same standard for five flights, would have won F1G.

The Tolhurst family were a blur of activity, with Peter flying both Vintage and F1G, and taking an excellent second place in Vintage with a Michel Etienvre design. Son Oliver successfully retained the status of junior Coupe champion with four well-judged F1G flights.

Renowned rough weather expert Spencer Willis dropped his first F1G flight, so turned to Vintage, securing third place, using a 'Bagatelle' for his first flight and a 'Macahon' for the rest.

The tradition of the Aeromodeller Trophy goes back to 1975 and the meeting being the final round of the Southern Coupe D'Hiver League also drew competitors. The proceedings were rounded off with a blessedly warm and dry prizegiving in the Museum, with welcome warm drinks and biscuits for all. ■

BELOW LEFT: *John Cooper of Biggles flying F1G hunkers down against the wind and rain at Middle Wallop.* **BELOW RIGHT:** *Andrew Longhurst took third place in the Aeromodeller F1G Trophy at Middle Wallop.*

MIND THE LINES!

The weather gods smiled on last autumn's Old Warden Air Spectacular event

Covered in Modelspan, this Veron Midget Mustang was built by Chris Edwards.

It was that time of the year. Autumn was upon us as summer had been unofficially cancelled (or written off) and it was time to visit Old Warden. Many people say there is something magical about the place and I believe they are right. After the mediocre weather of last year, the one place that can boast of two previous weekends of perfect flying conditions is (you've guessed it) - Old Warden. The forecast for the coming weekend in late September was good, but I still carried my giant golf umbrella in reserve. I was accompanied by Alex Whittaker, renowned AMI and FSM contributor, after I had convinced him that Old Warden was the place to go before you are fitted for your angelic wings.

Welcome to Old Warden

We were welcomed to the Shuttleworth site with the launching of a Virgin hot air balloon. We thought it was specially for us, but Pete Tindal assured us that it was fairly commonplace at this centre of traditional aviation. We set up camp and then journeyed into Old Warden village as I had a hankering to visit the Hare and Hounds, the only pub in the village. It looked traditional from the outside but sadly (in a way) it was very nouvelle cuisine on the inside, with a bowl of soup costing nearly as much as a gallon of 5% nitro! Somewhat disappointed, a further voyage into Biggleswade for the traditional fish and chip supper proved to be infinitely more enjoyable.

Back at base camp, we were invited for a lemonade at Tindal Terrace, with Sandra in charge of catering. Long chats about the developments in the various areas of aeromodelling kept everybody interested until we crept back to the command module remarkably early. The morning came as a bit of a shock as a heavy fog had descended on the airfield but a chance meeting with a local flier who indicated that it would lift by 'tennish' brightened the outlook.

It wasn't long before the foggy dew was disturbed by the buzzing of something aerial. It was the Coventry Crusher, Pete Iliffe, disturbing the

The Britten Norman Trilander, powered by three ASP 15s and flown by Trevor Tabor.

ABOVE LEFT: *Combat winners (l. to r.) Roger Fisher 2nd, Chris Fisher 1st, and Mike Loughlin 3rd.* **ABOVE RIGHT:** *Combat league awards, (l. to r.) Mick Lewis 2nd, Richard Herbert 1st, Richard Evans 3rd.* **BELOW LEFT:** *Trevor Tabor uses the down-the-line system to control throttles and flaps in the Trilander.* **BELOW RIGHT:** *Using an appropriate black box, the contents are a restyled Sanwa radio set with switches and trims re-sited.*

ABOVE LEFT: *The early morning mist was just dispersing when Roy Cherry took off for the dawn patrol.* **ABOVE RIGHT:** *Back in the pits, Roy Cherry checks the inside leg measurement on his tuned pipe.*

misty murk with a neat Etomic Ember. It was an excellent flier, weighing in at 17g. and flying on 2.4 GHz with geared longitudinal servos. Pete had originally purchased it for the control system which he hoped to transfer into one of his beautifully built scale models but he liked flying it so much he was keeping it until it was dinged to death! It certainly flew well and with radio, model, LiPo and all the bits for just over fifty notes, it was a bargain!

The fog provided a slight delay in the proceedings and as we began to move towards the flightline we were distracted by the machinations in the Midland's mess tent. Master modeller Chris Edwards rolled out a superb Veron Midget Mustang, originating from the excellent Replikit. Due to house a restored AM 25, the model is clad in genuine Modelspan, and is neatly finished with a cowl held in place by one dowel and two magic magnets (great idea!). Any ideas of seeing any air beneath its wings were dashed when Chris explained that the model had been commissioned for display only. Still he did not disappoint when he opened his car boot and lifted out a Performance Kits X-AC-6, a peculiar shaped creation designed to test the capabilities of an asymmetric model. Free-flight and powered by a Mills 1cc Aurora, I did see the model flying high, and strangely stable, in the noonday sunlight. Chris' Brummie buddy, Bob Everett, continued the master display when he unveiled his Dasboot, based on a Starlifter. Difficult to describe, it was something like a speedboat, a blimp and a German WW2 weird design, but beautifully built and covered in yellow tissue. With a PAW 1.5cc up front, and Commander Chip Hazard (beheaded dolly) in the cockpit, it was a delight and flew well.

The fog lifts!

As the fog lifted enough to see the tented village near the flightline, people got itchy feet and models and flight boxes were toted to the various areas. There were a few tentative flights in the R/C area, but everyone was flying close to their chests due to the limited visibility. The first competitive flight came from Roy Cherry as he lifted his Saturn off the damp grass in F2B aerobatics. A good flight in the mid-nine hundreds set the mark for the rest of the field and John Allcock and Brian Turner were not far behind. Peter Jackson showed a return to form as he went into the lead flying his Jen 57-powered Gatekeeper. The model was built in 2002 and Peter used it to finish 3rd at the 2003 Nats. Pete Tindal was enjoying himself until his Chipmunk cut out while at the top of the cloverleaf, due to fuel shortage. Mick Castell was up with the front runners, guiding

ABOVE: *A well executed inverted landing by Pete Tindal - unfortunately not required in the schedule!*
BELOW: *Another masterpiece from Mick Castell, a profile Cardinal.*

ABOVE: *Brian Turner goes overhead as judge John Bonner looks on.* **ABOVE RIGHT:** *Gary Church takes to the air with his Ron Parsons' Pallas.* **RIGHT:** *The Parson's Pallas in flight, a commanding presence in the air.*





TOP LEFT: *The Cardinal goes inverted, Mick Castell on the handle.* **TOP CENTRE:** *The Ohlson sparkie in the Voetsak, the first control-line model to be flown in GB.* **ABOVE RIGHT:** *Terry Baker keeps his model, a Vector 40, at the regulation five feet.* **ABOVE LEFT:** *This young pilot had great fun mastering his model. He's now off to Specsavers for some cool shades...* **ABOVE CENTRE:** *Ray Skinner, and pit-person Susan, enjoyed the day flying his modified Flitestreak.*

his Cardinal, powered by a Merco 61 metamorph, through the schedule before Paul Winter slid into 3rd place with his 78 oz. Strega, with a Saito 72 up front. He was also in practise mode for his future trip to Dallas, USA, to meet, and fly with, Al Rabe. Some people have all the fun!

A few paces up from the aerobatics circle, HMS Incontinent lay becalmed, guarded by an Atomic submarine in the sea-green Carrier Deck circle. Trevor Tabor, ably assisted by Alan Morgan, brought one of the larger models, a three-engined Britten Norman Trislander. Brightly clad in original yellow Aurigny colours, Trevor had worked on the full-size when it was based at Stansted. The model flew well with the three ASP 15s, being rarely challenged as it cruised around, using flaps, throttle control and offset ailerons. To add to the scale display, Alan Morgan wound up the two ASP 21s in his Handley Page Harrow, to run a tank through the brand new motors. The throttle response was good and it



ABOVE LEFT: *Alan Morgan and Trevor Tabor flew two-up in a demonstration of ARTF-DTW scale flying.* **ABOVE CENTRE:** *The Handley Page Harrow is constructed from a Complete-a-Pac kit and powered by two brand new ASP 21s.* **ABOVE RIGHT:** *Peter Jackson, calm and peaceful, with his Gatekeeper inverted.*

ABOVE: *Pete Tindal checks out his Novi, in all orientations to ensure a good engine run.*
RIGHT: *The Stunt Queen, flown by Peter Rabjohn, is a typical model of its period, fast and manoeuvrable.*

ABOVE: *The Gatekeeper, powered by a Jen 57, in the cloverleaf.* **RIGHT:** *David Underwood flew his crisp, clean Jameson Special in Vintage.* **FAR RIGHT:** *The Devil Bat was flown in Vintage by Richard Soames.*

wasn't long before the Harrow, built from a Complet-a-Pac kit, took to the air for its first flight - superb! Being nosy, I noticed a neat line-up of large scale control-line models which I interpreted as the results of the poor summer weather and some dedicated shed-time, but more of this later!

Other disciplines

As a relaxing interlude I visited the free-flight area and came across Rob Smith who has embraced the Ebenezer theme and applied the formula to any design that appeals to him. His Me 334, with band-on wing and magnetic under-fin, was a delight and after a frantic trimming session, the model flew and drew a lot of attention. On the R/C line, Ken Sheppard flew his nicely appointed DH racer, powered by a Zenoah 45 as a warm-up for another test flight. He then rolled out his Lanier XL4, powered by an LA40. Apart from the odd shape, the Lanier features a louvre-like vacu-wing which creates a low pressure area on top of the wing and so generates lift. Clever, and it works, but Ken did say the model has its own unique flight characteristics. Another model that impressed was the Consolidated Constellation, built and flown by Phillip Noel. Built to 1/17th scale, it spans 88" and is powered by four 480 brushed motors. It looked so realistic in the air and a 1/10th scale version is on the way with a span of 148 inches, using a genuine scale wing section and four Scorpion 4020/10 motors.

Back to C/L

Enough distraction for the day, let's get back to the control-line camp.

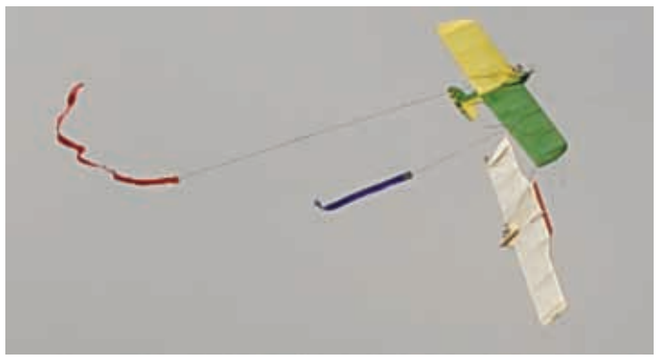
On the way back I came across Colin Monk who was test flying a Hornet, built by Hugh Sewell, and powered by an O.S. Max 35. Colin was just here for the fun and although he could have flown in F2B, he preferred to just test out his new model. He's not a bad designer himself, having created the Billy Bunter control-line model. Ray and Susan Skinner were here for fun. You could tell by the smiles on their faces. The Oliver Tiger-powered Pluto had undercarriage problems but the pink Phantom (Susan's model) flew well. Ray gave us all a treat when he flew an own-design, based on a scaled-down Flitestreak. Powered by an E.D. Baby, bought when Ray was eight years old, the smile on everybody's face was worth its weight in gold. In F2B Ray Cherry was busy measuring his tuned pipe as his engine was slightly 'off', while Peter Jackson had broken the 1K barrier as did Paul Winter. There



ABOVE LEFT: *Richard Soames winds up for an overhead manoeuvre.* **TOP RIGHT:** *Ideal weather conditions contributed to some closely-fought bouts in Vintage Combat.* **ABOVE RIGHT:** *Roger Fisher (blue) and Harry Walker tussle for position.* **BELOW LEFT:** *Tim Hobbins is happy the parts-count is quite low.* **BELOW RIGHT:** *The engine of choice for Vintage Combat, the PAW 19, is due to cease production in 18 months.*




ABOVE LEFT: *Mick Lewis (blue) and Bob Payne seek advantage, closely watched by circle judge Simon Timperley.* **ABOVE RIGHT:** *Richard Evans warms up his PAW, firmly attached to the green/yellow Orcrist.* **BELOW:** *Evans hooks the blue streamer on his wing but misses the cut.*



was little change in the places and Peter Jackson duly took top place on the podium.

Results - F2B

1st	Peter Jackson	1049.9	1019.3	= 2069.2
2nd	Roy Cherry	998.1	975.7	= 1973.8
3rd	Paul Winter	1002	959.2	= 1961.2

In the early evening, the mysterious scale models made an appearance on the airstrip. Alan Morgan and Trevor Tabor were happy to explain their innovative work. The wealth of scale R/C ARTF models had prompted them to convert some of the range into control-line operation, using DTW control (Down the Wire). By the time Morgan, with the P-47, and Tabor, with the P-36A, had retracted the wheels and lifted the flaps, the two large models were aloft, amply powered by Laser motors. Control was implemented by use of a Futaba Challenger radio, demounted and re-established inside a Maplins box after removing the encoder (without an anaesthetic!). At the model end, an old Sanwa receiver, with the decoder removed, feeds the signal to the servos.

The lines are pike fishing line, which is insulated (and strong!) and provides the avenue for the electronic signal. The on/off switches and trim switches are transferred from the Challenger and mounted in the Maplins 'black box' for control of as many surfaces/gadgets as you have switches. The system works and I witnessed two-up scale flying, with all the bells and whistles in operation.

With the brain box still buzzing at the potential of this idea, up strolls Mike Welch with a strange, dark blue model. Yet another breakthrough as the carrier deck expert flew the first electric ducted-fan carrier model on a brief flight, using short lines as a proving flight. A satisfied grin from Mr. Welch indicated that the formula worked and possibly could open up a whole new area of carrier deck. As I have a number of redundant radios, servos and bits gathering dust, I now avidly scour the R/C mags for suitable (cheap) scale projects for possible conversion. Watch this space!

The mist was just lifting as the Iliffe Swalbe cruised past the Command Module on Sunday morning and woke up the press corps at rest. Nice one, Peter, but his glory was short-lived as he noted that the damp air was leaving his immaculate tissue covering a little limp. Sunday was slightly different as aerobatics would host the Vintage and Classic events and, up at the 'naughty boys' corner', Vintage Combat would take place throughout the day. You certainly get variety at Old Warden, and plenty of it! The first round flights gave a predictable verdict on the outcome of both Vintage (pre-1959 designs) and Classic (pre-1969 designs), with the top three scorers finishing in the same positions after three flights. In Vintage, David Underwood paraded a beautifully finished Jamison Special, powered by an LA 40, to finish in 5th place. Mick Taylor took top honours in both classes, with a fine display of disciplined, consistent flying.

Results - Vintage

1st	Mick Taylor	340	330	= 670
2nd	Mick Castell	324	319	= 643
3rd	Geoff Stevenson	302	245	= 547

Results - Classic

		App			
1st	Mick Taylor	966	961	35	= 1962
2nd	Pete Tindal	878	832.5	37.5	= 1748
3rd	Gary Church	784.5	792	35	= 1576.5

The balmy September weather provided ideal conditions for some excellent combat flying. A significant number of bouts produced prolonged duelling of the highest standard, raising the adrenaline and excitement level all round. Over a prolonged duel the experienced fliers seemed to benefit and the usual names of Lewis, Evans and Herbert featured in the winning zone. Ominously, Mike Loughlin and the Family Fisher, Roger and Chris, flew through the early rounds and seemed comfortable with their progress. General talk was of the prospective shortage of Taipan props and the change of formula to allow the use of the Rothwell R320 as an alternative motor to the PAW 19. After each 'landing', the question asked was "Is the prop okay?"

By the quarter final stage the mighty had all fallen in battle, Loughlin

BELOW LEFT: *Mike Loughlin launches the ill-fated Chris Fisher Warlock.* **BELOW CENTRE:** *I knew there would be trouble!* **BELOW RIGHT:** *Watched by an appreciative audience, Andy Housden's Seamew makes a low fly-by of HMS Incontinent.*



ABOVE LEFT: *Grantham MFC's Tim Bland gets going in Carrier Deck.* **ABOVE RIGHT:** *The Housden Seamew hooks a line and lands.* **BELOW LEFT:** *History is made as the first jet model (electric ducted-fan), flown by Peter Tribe, takes off from a carrier in British waters!* **BELOW RIGHT:** *Ever the Champion, Mick Taylor was undefeated in Classic and Vintage over the weekend.* **RIGHT:** *Close formation flying is not normally a feature of a normal combat bout.*

ABOVE LEFT: *Tim Hobbins (yellow) and Mick Lewis go overhead in search of the high ground.* **ABOVE RIGHT:** *Chris Fisher (blue) took a notable scalp in defeating Richard Herbert by three cuts to two cuts.* **BELOW LEFT:** *The Fisher family use metal engine mounts a la F2D.* **BELOW CENTRE:** *Tim Hobbins (yellow) and Mike Loughlin fight it out for the bronze medal position.* **BELOW RIGHT:** *"Now son, a word in your ear - you will be gentle with me, won't you?"*

disposing of Richard Evans, Hobbins taking two cuts to the Lewis one and, after a re-fly, Chris Fisher beating Richard Herbert by three cuts to two. By the later stages, it was Squig V Squig, as Tim Hobbins fought Mike Loughlin for 3rd place and came up short by three clear cuts. In the final it was Dad V Lad in a close-fought fight. The dad's Anduril took first cut but the lad's Warlock flew back to counter-snip, Chris finally taking Roger Fisher's knot to clinch the win. It was a fitting finish to an excellent day's flying and a very good season, despite the weather. Yet again, the magic of Old Warden had woven its mystical spell. ■

Results - Vintage Combat

League Positions	
1st	Chris Fisher
1st	Richard Herbert
2nd	Roger Fisher
2nd	Mick Lewis
3rd	Mike Loughlin
3rd	Richard Evans

FOR OLD TIMES' SAKE

Classic designs from the USA, early high-performance engines discussed, plus practical tests on a brace of small diesels

Interesting models

This month I am featuring American designs, built and flown in three different countries. The Americans had a large number of power designs published in the late nineteen-thirties and early 'forties, as they produced quite large numbers of model petrol engines during that period.

The first model featured is the Eastern States 'Gas Champ', that took first and third places at the All Eastern States Meet in 1940, held at Hadley Field in New Jersey. The winning model, designed and built by Russell Simmons, used the new front rotary valve Super Cyclone .65 spark engine, designed by Mel Anderson. The original model used streamlined wheel pants to reduce drag from the 3.1/2" diameter wheels.

I would have liked to feature the plans of this champion model, but it covered four pages when published in Model Airplane News magazine in December 1940. Russell mentioned that five planes had been built (by different club members) when his article was written, the models using the Ohlsson 60 Custom engine but lacking wheel pants to reduce overall weight. He also states: 'Be sure you have the 1/4" wash-in on the left wing, and you may need more with the more powerful motors.'

The model featured here is a 95% version built and flown R/C-assist by Ian Avery from Kiama in Australia. The photos were taken at the Australian Old Timer Nats, held at Loxton, South Australia, in April 2006. It was flown with an O.S. 32 two-stroke helicopter engine, the model weighing 54 oz. and covered with Super Monokote iron-on. The original 'Gas Champ', flown in 1940, was 76" span.

The next photo was taken by Tom Ryan at the 2001 SAM Champs at Las Vegas and features a nicely finished 'Anderson Pylon', scaled to 1,500 sq. in. wing area and powered with a modern O.S. 61 two-stroke glow engine. The original 'Anderson Pylon' was designed and flown by Alva Anderson from 1937, powered with a Forster 99 spark engine in this 90" span Texaco design. This was the first pylon design and it was copied by Carl Goldberg for duration flying with his famous 'Zipper' design, kitted in 1939.

The model shown here was built by Peder Samuelson and flown in Duration events, the model having Monokote iron-on covering that has the problem of slackening in the heat of the desert. Peder used 65% nitro glow fuel to obtain maximum power from the O.S. 61, along with in-flight mixture control.

Back to Middle Wallop in 2008, where Peter Carter had a number of new Vintage models, one being the 60" span 'Falcon' design by Paul Plecan and published in September 1940 Model Airplane News magazine. The original was powered with a Bunch Gwin Aero 45 spark engine, but Peter has used a black head A.M. 25 diesel, one of the engines I tested in last month's column.

The model built by Peter has Sig Coverall covering with red paint trim and flew very well. I featured the design and plan in this column back in November 2005; it is a fairly complex Plecan design - unlike his later models that were simple to build.

Ian Avery's Eastern States 'Gas Champ' climbs away in a Duration event at 2006 Oz Nats at Loxton, S.A. Engine is an O.S. 32 two-stroke heli glow.

Another American design, seen flying here, is called the '1938 Berryloid Trophy Winner', designed and flown in 1938 by Harold Coovert. Berryloid Paints gave a trophy for the best painted and finished model at the US Nats each year. The model shown flying was built by Brian Ferrett and is powered with an original English Mechanair 5.9 c.c. red head spark engine from 1946 turning a 12 x 6 nylon Tornado prop. The original 72" span design was published in November 1938 Air Trails magazine.

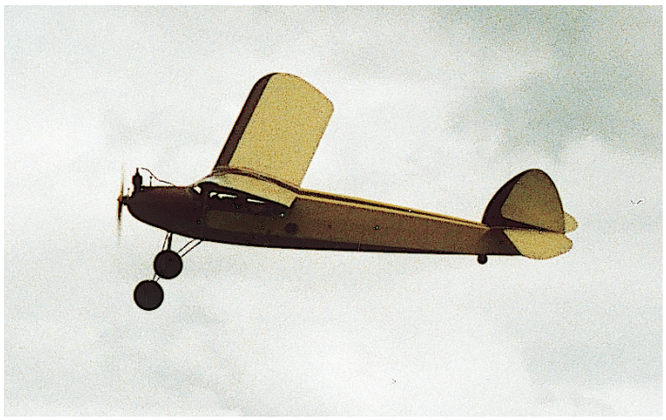
Cumulus

The plan featured this month is the 1949 design by Carl Goldberg, which was another of his rather complex designs. The 54" span 'Cumulus' was kitted by American Hobby Specialists (Top Flite Models) in Chicago, a company Carl was involved in until he formed Carl Goldberg Models in 1956.

Model Aviation in the UK obtained the publication rights for the design and it was featured over ten pages in Model Aviation 1950. It was also announced by Keil Kraft that they had British kitting rights for the 'Cumulus', but I suspect they found it far too complex and expensive to kit this design.

I remember I purchased Model Aviation 1950 when I was a boy, but never saw anyone who had built this model, as full-size plans were not obtainable and American kits were unavailable at this time in Australia. The magazine article had three pages of construction drawings, along with two-and-a-half pages of full-size parts, as all wing and tail ribs were different. It was all too complex, with many different formers in the fuselage which was sheeted with 1/16" balsa. The retracting single undercarriage wheel was, however, fairly simple to install.

I have to admire John Maddaford who, like me, had found the design far too demanding to build when he was a boy, but had decided to finally build the model he admired as a lad. John has used tissue, red dope and fuelproofer on the sheeted parts, these being the fuselage, pylon and fin. Chinese silk is used on



TOP LEFT: *Builder Avery with the 95% (original was 76" span) 'Gas Champ'; covering is Super Monokote and the model weighs 54 oz.* **TOP RIGHT:** *Big (enlarged to 1,500 sq. in. wing area) 'Anderson Pylon' with builder Peder Samuelson at 2001 Las Vegas SAM Champs. Power is an O.S.61 with in-flight fuel/air mixture control. Tom Ryan photo.* **ABOVE LEFT:** *Peter Carter from the Aldershot club, at '08 Middle Wallop SAM 1066 Champs with his Paul Plecan 60" span 'Falcon'. Has A.M 25 diesel power.* **ABOVE RIGHT:** *'1938 Berryloid Trophy Winner' sails by at Middle Wallop. Built and flown by Brian Ferrett, 72" span model has an original 1946 Mechanair 5.9 c.c. red head spark engine.*

the wings and tail, left as the original, natural silk colour.

The engine shown on the plan is a 1948 McCoy 19 rear induction glow and John has used a similar engine, this being the model with shiny-finish castings. This McCoy model uses a single rear ball-bearing and the rear venturi is part of the crankcase casting - all, I suspect, to reduce the cost of manufacture.

The engine and undercarriage tray is removable and this is shown in the photo, all being very well executed by John Maddaford. The designer trimmed the model to climb and glide to the left. This was obtained by bending the rudder and banking the wing slightly left.

Racing engines

Starting in 1940 with the Hornet 60 model race car engine that used twin ballraces, ringed aluminium piston and rear disc induction, this type of race car engine was developed by Dick McCoy, also in California during 1942, in very limited numbers.

At the end of the Second World War, the McCoy 'MCCR' .60 cu. in. (10 c.c. capacity) car engine was put into production by Duro-Matic Products Co. in Hollywood, California, proving to be the standard design of racing engine for the next 30 years or so. The 10 c.c. racing engines were used for model car racing at this time, but by 1948 control-line Speed flying was becoming popular and it evolved into a number of classes with different engine sizes.

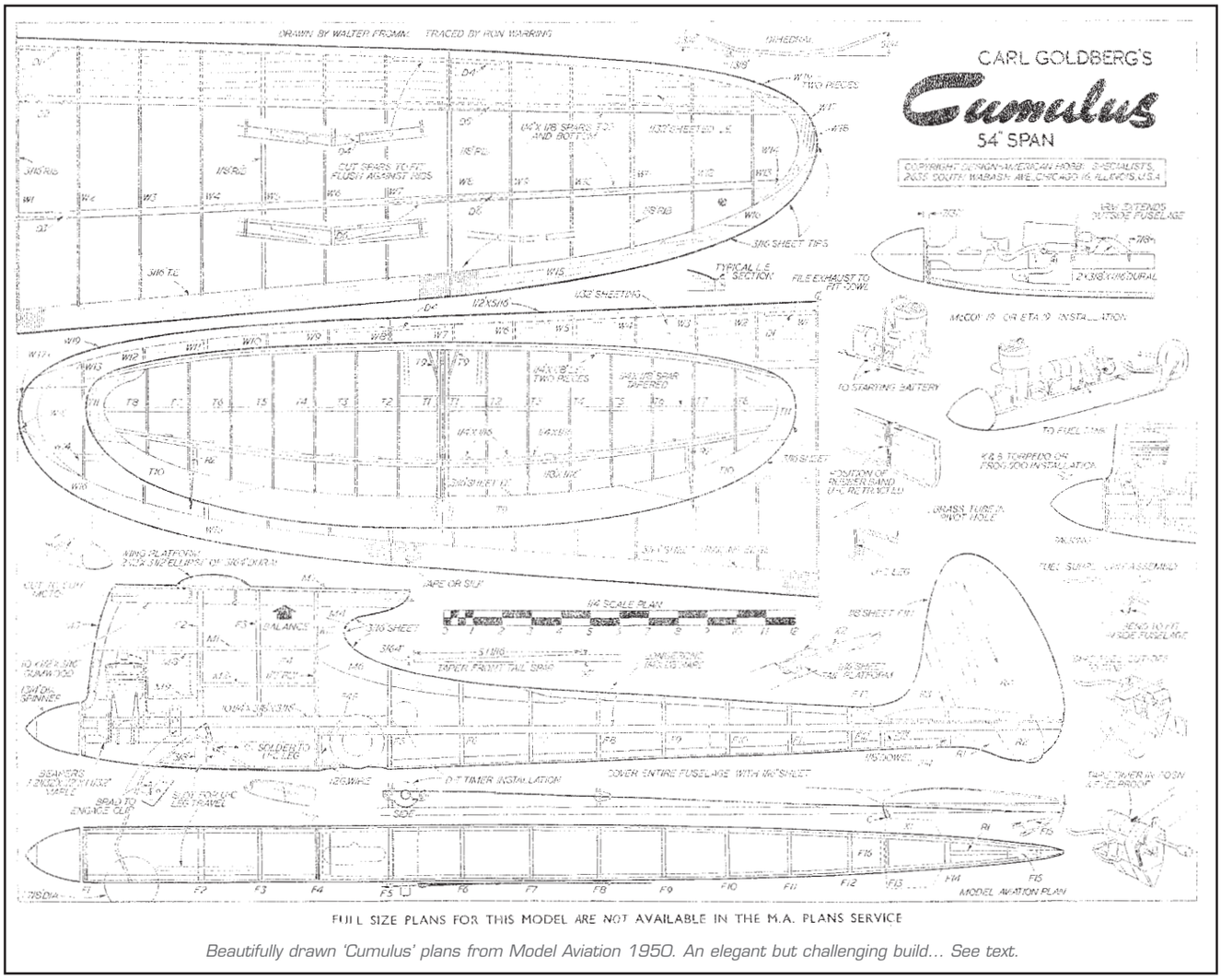
McCoy introduced racing engines with rear disc induction in .19, .29, .49 and .60 cu. in. capacities to take advantage of the American control-line Speed classes. Salvatore Angeloni in Italy has a good collection of the McCoy rear induction racing engines of the nineteen-forties and 'fifties and these are shown in the photo. Plain bearing versions, such as the Sportsman .36 and .56 cu. in. were also made in the nineteen-forties. By 1949 most of the engines sold were glow-plug versions, rather than spark-ignition models.

The only other American racing engines to match the McCoys were the Dooling 61 and Dooling 29, with the Dooling 61 becoming the dominant car engine from the late nineteen-forties. In the later part of the 'fifties, Bill Wisniewski was working for K&B Manufacturing in California and, along with his friend Roger Theobald, decided to design racing engines in the FAI .15 size (2.5 c.c.), their aim being to win the World Championships in C/L Speed.

Bill designed two engines for K&B, released in 1961, these being the Torpedo 15R and the Torpedo 29R, shown in the photo. The end result was that Bill and Roger won FAI control-line Speed at the World Champs in 1964 with an engine designed by Bill Wisniewski.

In the mid nineteen-sixties Gerald Nelson from Hayward, California, introduced 40-size pylon racing, as the new proportional control radios were now coming onto the market. Semi-scale models at 450 sq. in. wing area of the small full-size pylon racers such as Bonzo, Rivets, Shoestring, etc., were becoming popular, with plans and parts provided by Nelson Model Products Inc.

Noted engine builder John Maddaford with his 54" span Carl Goldberg 'Cumulus' at 2008 SAM 1066 Championships.



Beautifully drawn 'Cumulus' plans from Model Aviation 1950. An elegant but challenging build… See text.

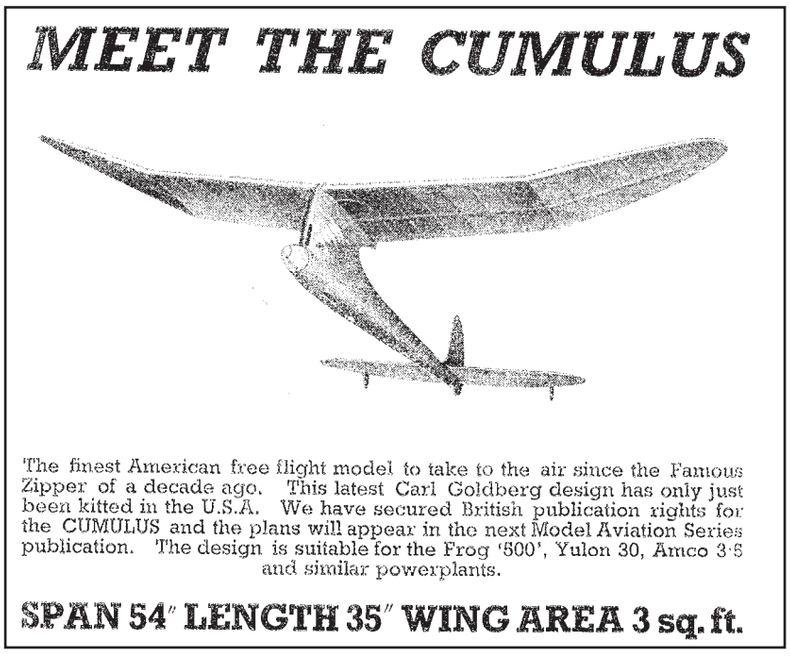
K&B saw the trend and the Torpedo 40 Series 67 was introduced in November 1966. This engine would dominate American FI R/C Pylon Racing with high nitro fuels for the next five years. I have included a photo of the Torpedo 40 Series 71, fitted with throttle that is used to cut the engine after the ten-lap race.

The FAI introduced a 40-size class of R/C pylon racing using standard (no nitro) fuel and much worldwide development of racing engines emerged. Most notable is the change to front rotary induction, which reduces drag and friction, along with special insert glow-plugs.

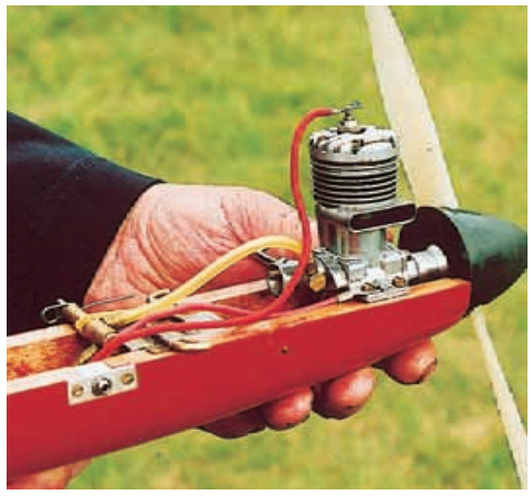
Ercolino

An interesting diesel obtained in Italy, thanks to Bob Scott in Tuscany, is the Ercolino 2 c.c. model made by Alberto Dalloglio Motori, Via Gramsci, La Spezia, Italy. It is claimed to be a replica of the first Italian diesel made in 1942.

The engine has a 12mm bore, 18mm stroke and weighs 150g, the size being similar to the Swiss Dyno I from 1941, on which most of the very early model diesel engines were based. The suggested prop size is 280mm x 160mm which converts to an 11 x 6 size. The quality of this replica engine is outstanding, with amazing attention to details

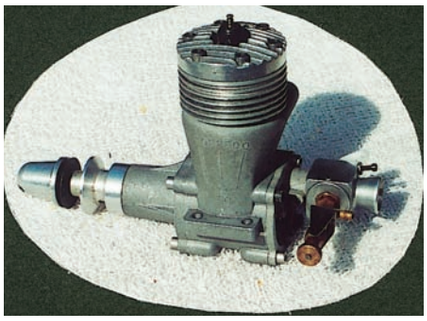


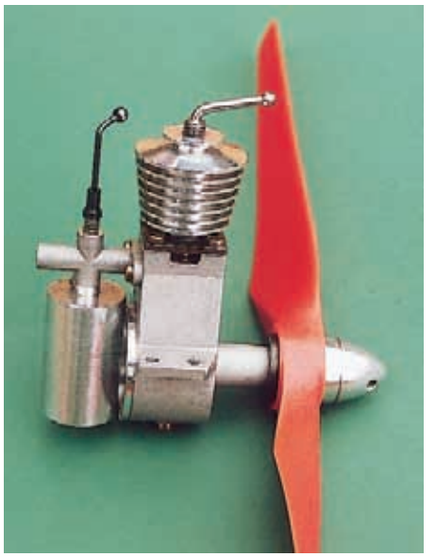
LEFT: *Advert from 1950 Model Aviation Model Planes Annual, trailing 'Cumulus' design and promising plans for the model in their next issue.* **BELOW:** *Business end of John Maddaford's 'Cumulus'. Tray for engine (a 1948 McCoy 19) and undercarriage is detachable as per original plan, as seen here.*



BELOW: *McCoy racing engines from 1946 to the nineteen-fifties from the collection of Salvatore Angeloni; sizes here include .19, .29, .36, .49, .56 and .60 cu. in.* **RIGHT:** *The K&B Torpedo 40 Series 71 early R/C pylon racing engine. They are now used in Nostalgia event models in Australia.*

LEFT: *K&B racing engines designed by Bill Wisniewski; left, the Torpedo 15R released in May 1961 for FAI C/L Speed. Right, Torpedo 29R Series 64, first released in 1961 and FAI Speed winner in '64.*
RIGHT: *Writer's replica Ercolino 2 c.c. diesel, made by Alberto Dalloglio in Italy. The original 1942 Ercolino is said to be the first Italian-made diesel.*





such as the compression lever and needle valve. Even the small screw cap on the top of the fuel tank shows that making engines is a work of art for Alberto.

The engine was set up at home with wooden mount as I did not wish to mark this quite expensive diesel by fitting it to a test stand. A red Taipan 11 x 5 composite prop was drilled out to 8mm to fit the prop driver. The engine was quite tight at TDC so I decided to give it at least 30 minutes' running before taking rev figures. The engine needs a prime to start and it is very docile to handle and easy to start.

After considerable running-in I took a rev reading on the 11 x 5 Taipan, the engine holding 5,500 r.p.m. and running nicely. I continued to run the engine and a photo is shown - it was not very noisy in the back yard. After more running it still held 5,500 revs so I concluded it must now be run in.

I decided several days later to test the engine on a larger prop, so a 12 x 5 power prop wood was drilled out to 8mm and fitted to the engine. Starting was again very easy and the engine ran very steadily on this large wooden propeller, the revs on this 12 x 5 being 5,000 maximum.

I think that the ideal size in an Old Timer radio-assist Texaco model would be an 11 x 7, this pitch giving enough forward speed at 5,000 r.p.m. The fuel tank is large enough, the engine is very economical at 5,000 r.p.m. and will run out the fuel tank without change of settings. I found this engine a delight to handle, due, I suspect, to the outstanding workmanship of Alberto Dalloglio.

C.S. Micro diesel

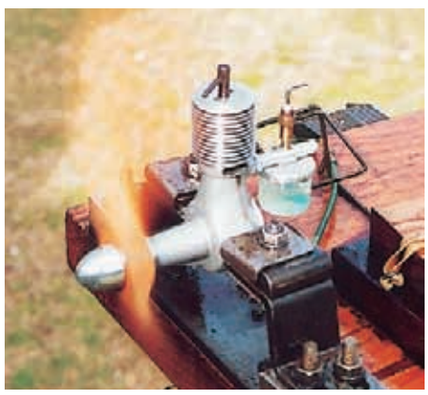
The original Micro diesel was released in early 1948, made in Detroit, USA. The engine had a .500" bore, .775" stroke and weight of 5.1/2 oz. Capacity was .13 cu. in. or 2.13 c.c. The engine was fitted with an aluminium fuel tank that could be taken apart for cleaning.

The C.S. (China) replica is very similar, the main difference being the fitting of a clear plastic fuel tank which is much more practical for free-flight sport models. The engine was owned by Bill Britcher, so it was tested at his home.

Bill mentioned that it liked to run on large props so the first one fitted was 12 x 5 Top Flite power prop wood. The engine was fairly easy-starting and on the 12 x 5 it was slightly uneven, the revs going from 4,800 to 5,000 r.p.m. - similar revs to the Ercolino on this size prop but the Ercolino was much smoother.

Bill said it needed a larger prop, so a 14 x 4 Top Flite Super M wooden propeller was fitted. The engine again started easily and was very even-running on this large prop, holding 4,300 revs. A 2.13 c.c. diesel turning a 14 x 4 is quite amazing and equal to an old spark engine of about 7.5 c.c., built in the nineteen-thirties!

The Micro diesel running at these revs had amazing economy, taking considerable time to run out the fuel tank. So, if you need a diesel for economy that should fly a fairly large free-flight model, this may be the answer. ■



ABOVE LEFT: *The little Ercolino running beautifully on an 11 x 5 Taipan composite prop. Engine exudes outstanding quality and performs well on large propellers. See text.* **ABOVE:** *C.S. (China) replica 1948 Micro 2.13 c.c. diesel; original had aluminium fuel tank but this modern version uses plastic, more practical for F/F.* **LEFT:** *The replica Micro diesel proved to be remarkably economical and enjoyed large props; here it happily turns a 14 x 4 wood at 4,300 revs. Amazing!*

CLIFF CHARLESWORTH SCALE GLIDER PLANS

Cliff Charlesworth has been designing big scale radio controlled gliders and sailplanes for the past 30 years. Each of these designs embodies years of experience in this fascinating field.

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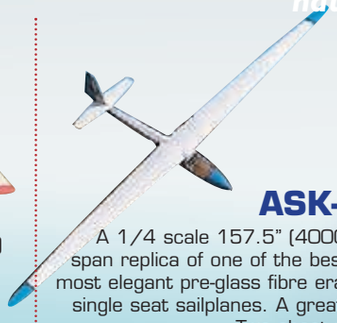

ASK-18

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

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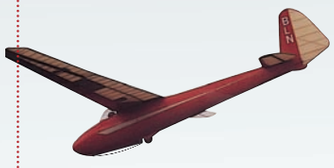

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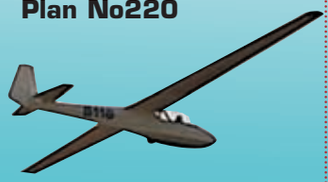

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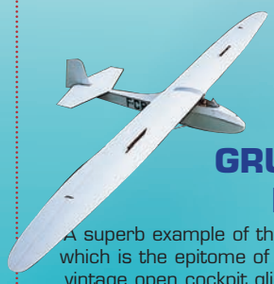

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TURBINE TRENDS

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Jet fuel

It is usually called paraffin in the UK. The term kerosene (or just kero) was originally a US registered trademark that eventually became generic, and is usual in Canada, the USA, and Australia. In my own turbines I have used aviation jet fuel from the airport. I successfully used the 'paraffin' sold in my local ironmonger for heaters and lamps. I have also burned 'kerosene' sold by a heating oil supplier as domestic central heating fuel, and I noticed no difference whatever. So how do these relate?

Jet fuel is clear-to-straw-coloured, and is a mixture of a large number of different hydrocarbons. The normal fuel is a paraffin-based fuel classified as Jet A in the USA and Jet A-1 elsewhere. Jet A has the higher freezing point of -40 °C (vs -47 for Jet A-1). Both have a density of around 0.8




TOP LEFT: *The early jet trainer models like this Kangaroo had the engine mounted up on top of the wing, fully exposed.* **TOP RIGHT:** *John Agnew's Fox Cub jet trainer with a Wren 44 hanging out in the open - but you never see full-size aircraft like this.* **ABOVE LEFT:** *On my model I tried to hide the engine away but still have it easy to mount and to work on.* **ABOVE RIGHT:** *In this shot of the underside you can see that the engine is fully accessible from below, and you can also see that there are no intakes on the fuselage sides. The air gets to the engine from below. Note also the burnt oil marks on the ceramic blanket covering the underside.*

kg/litre.

Militaries use a different classification system of JP numbers. JP-8 is similar to Jet A-1, while other fuels were specially developed with higher flashpoints, like JP-5 for use on aircraft carriers and and JP-7 for the SR-71 Blackbird. It seems we can burn whatever we can get, as long as it is clean.

A water content up to 30ppm (parts per million) is acceptable; above that water can give the fuel a hazy appearance. Jet fuels may also contain a number of additives:

- Antioxidants to prevent gumming
- Antistatic agents, to dissipate static elec tricity
- Corrosion inhibitors
- Fuel System Icing Inhibitor to avoid fuel system icing
- Biocide to avoid build-up of bacterial colonies in the fuel system.

Incidentally, I notice that a few aircraft engine manufacturers have begun offering diesel aircraft engines which run on jet fuel, because it is already available in most airports. Kerosene has always been a major constituent of model diesel fuel, so who has been copying whom?

Who needs intakes?

In the last column I included a couple of photos and the briefest of details of my own-design Jet Trainer, called 'JayTee' for want of originality and inspiration. I hot wire cut the wings from white foam and covered them with obeche veneer. Thirty six inch panels either side of the fuselage on a wing joining tube, plus wingtips, made up the 80" span. The fuselage is made from liteply with a curved balsa top that extends to the tail, the tailplane is built up from laser-cut balsa ribs, partially sheeted with balsa, and the fin has a balsa framework, also sheeted with 1/16" sheet balsa. A very sturdy epoxy/glass main undercarriage for 4" main wheels was made by Iain of IAD Model Designs and the short noseleg is heavy piano wire with a 3" wheel. On wheels it weighed 13 lb without fuel and my original Wren MW54 with 14 lb thrust hurls it around the sky. Even on long wet grass take-off was no problem, and big flaps endow it with short field landing performance to match. After some 25 flights I mounted it on floats and they too have been a great success.

Everyone who has seen it fly says, "very nice, looks good, flies well, but where are the INTAKES?" Well folks, I deliberately missed out the intakes because I always intended it as a waterplane and I don't want it taking in water. The underside of the engine is open, so that air can easily get to the front of the engine. After a while the drip, drip of "but where are the intakes?" got to me and I decided to try them. I made them from balsa sheet, suitably rounded off, and glued to the fuselage sides over holes that were first covered with wire mesh. The idea was that air would go in the front and through the mesh to the engine, but anything heavier would go straight past and out the hole at the back.

It is cheap to hope! Of three attempts on choppy water, two were successful but the third came to a hissing stop with clouds of steam and white kerosene vapour. I suspect that some water entered the intake, passed through the mesh, and the FOD guard and into the engine where it put the fire out. The model still has intakes but it flies off water with the covers fitted.

Since then I have added a further baffle below the front of the engine so that even when the water is rough I am unlikely to get water in the front. I have checked the engine parameters when running and it seems to make no difference. The engine manages to draw nice fresh air




TOP LEFT: *My newly added air intakes are under the wing, so here is a shot showing the air intake before the wing is attached.* **TOP RIGHT:** *Looking into the intake from in front, note the steel mesh in the fuselage side and the hole at the back that was meant to let the water go straight through.* **ABOVE LEFT:** *After suffering an instance of water ingestion, I fitted these covers over the intakes for waterplane flying.* **ABOVE RIGHT:** *I have now added this extra shield under the front of the engine which still allows plenty of air to get round to the front but will make water ingestion even less likely.*

My latest jet is a Composite-ARF Lightning, bought second-hand and requiring only a receiver - but the question is, which one? The previous owner used a 12-channel Futaba, so my 8-channel JR set will not be adequate on its own.

from the gap around the sides, without sucking in water. What I infer from these experiments is that air intakes for turbines are quite unimportant, unlike ducted-fans which do require very carefully designed intake ducts.

Engine life

Many's the hour I have spent watching the engine instruments in wonder, as they sit rock solidly expressing the amazing reliability of modern turbine engines. Hour after hour they point with never a flicker to cause any concern, but just how long do aircraft engines last? Dave Kelly, a British Airways engineer who is also a fellow model turbine enthusiast, passed on the following news story.

A Rolls Royce RB211 engine, fitted to a Boeing 747 when it was delivered to British Airways in 1999, recently set a world record for the longest continuous service of 41,500 hours, about 23 million miles worth, without being unbolted from its aeroplane. During their life these engines are continuously monitored, by the pilots and the ground engineers, and have regular checks. Their oil is routinely examined for metallic particles that could betray wear in a component, but as long as they check out healthy they are left to get on with the job, much like your car engine. The average life of a 747's RB211, before being removed for a strip-down check, is 30,000 hours. What about model turbines?

JetCat of Germany is the biggest-selling brand so I checked their website, but it's all in German! All I managed to decipher is that the service interval for JetCat engines is 50 hours. I then checked the JetCat USA site, where I could read that the US importer gives a three-year warranty, but it is conditional upon returning the engine for overhaul every 25 hours. Mexico's Jet Central engines enjoy a lifetime warranty, but again dependent on a maintenance check every 25 hours. Graupner Booster engines have a 50-hour maintenance interval, while another German manufacturer, Funsonic, give a warranty limited to 200 runs or 25 hours.

After 180 flights (plus a few ground runs) I noticed that my Wren 54 was up to around 30 hours total running, which means each run must be almost ten minutes, including start-up and taxying, so I thought I'd better check. The Wren warranty on their engines is for one year, 200 starts, or 20 hours running whichever comes first. They say that a bearing change may be required after 25 to 30 hours running on their Jet engines. I rang them up and was told not to worry. You can hear when the bearings are becoming worn as the sound of the engine changes and there is a 'grumbling' sound on spool-down. Mine sounds fine, and will get serviced when needed, like RB221s.

Radio systems for jets

Even on jets I have used just the standard radio setup - that's the one where you plug all the servos into the receiver (using a 'Y'-lead and extensions if necessary) plus a battery, via its switch. My Baby Boomerang flies like this, and now my new 0/D jet trainer JayTee is set up in this simple mode. Over many years of flying, failures have been extremely rare, so rare that I am prepared to accept the very slight risk involved in keeping things simple.

But jets are rarely simple, as they normally have flaps, retracts, brakes, gear doors, nosewheel steering, and multiple servos - whose mountings are often pre-determined in modern ARF models. It is not unusual to find that, having connected two flap servos or a pair of rudder servos with a 'Y'-lead, one goes the wrong way. One solution is to fit a Servo Reverser, a small back box. The other, and more common, solution is to plug the second servo into a spare channel which is then mixed with the command channel, thus giving control of throw as well as direction.

So a reasonably big jet will have two aileron servos, two flap servos, two elevator servos, maybe two rudders, nosewheel steering, a brake servo, servos for gear doors, and all these extras will want an auxiliary channel and a mixer so unless you have a top-of-the-range 12-channel set you will pretty soon run out of channels (and mixers).

One solution to that problem is the 'Matchbox', another little black box into which you put one servo command signal and out from which you control two or more servos each with its own throw and direction adjustment that lets you exactly match the two servos.

Similarly, the 'Sequencer' is a black box that takes in the undercarriage up/down command and controls servos for undercarriage doors and retracts while allowing adjustment of throws, and even the door opening and closing delays.

Lots of Amps

The bigger and faster jets can end up with a lot of servos, usually very high torque power hungry digital servos, that when loaded can pull a lot of amps of electric current through your receiver. Is that wise? Can they take it?

SM Services and PowerBox make systems like the Powersave, designed to remove the need for the current drawn by all servos from passing through the receiver and is for use with receivers that ARE voltage sensitive. The Opto Isolator does the same, and also isolates long extensions from the receiver circuits. Some systems use a single battery, but many have separate battery inputs for the receiver and servos.

Redundancy

It's the hard word if it relates to your employment, but a comfort when it relates to your models. It can mean that failure of a single component will not ensure the destruction of your model. On my Rookie, for example, I used two batteries through a little black box called a 'backer', which takes two 6v inputs and feeds the better one to the receiver, less a management fee of about one volt. I have a voltage monitor on the receiver and always check each battery in turn, with the other switched off. The radio is guaranteed to get at least five volts even if one battery goes flat. The PowerBox units mentioned above also use this redundant battery feature.

However, you are still depending on a single receiver, and all the wiring in between the two boxes, so how about the alternative of two separate receivers, each with its own Xtal, switch, battery and aerial, and each controlling enough

ABOVE LEFT: *Connecting the servos to my JR Rx through an Opto Isolator would solve the high current problem, but I would need MatchBoxes to synchronise throw and direction of the multiple servos.* **ABOVE RIGHT:** *My preferred solution, and a very expensive one, is to use a Weatronic Dual receiver, a very large item when compared to a CD as you can see, but it should do absolutely everything required in this and future ambitious models.*

Craig Gottschang from Georgia built this model of the Fairchild A-10 'Warthog' from the Mibo-Jets kit. Wingspan is 10 feet, fuselage length 9 feet and power is provided by a pair of JetCat P-120 derated to about 23 lb (100 N) thrust.

control surfaces to get the aeroplane down safely? I considered that option for my next big jet, and then I discovered Weatronics.

Enter Weatronic

I had heard of the Weatronic dual receivers on 35 MHz before, but until now I failed to realise what they could do. They answer is All of the Above, plus a lot more besides. Each Weatronic box contains two complete and independent receivers (each with an aerial), two voltage regulators, and sockets for a multitude of servos. Each individual servo connects straight into the box, and software allows the user to set the direction and extent of travel by connecting it to a PC. The functions of a sequencer for retracts and gear doors are built in. Even the battery switches have been replaced by a built-in fail-safe switch function for the two separate batteries. It appears to offer complete redundancy for all failures.

Thus the use of separate voltage regulators, switches, servo reversers, matchboxes, sequencers and all their interconnecting wiring is replaced by this single box. Not only that, but it records performance parameters as it goes, so that you can check up on it later. AND the top level ones have a built-in gyro for smoothing out one control axis, AND a GPS receiver which stores on the memory card the position, height and groundspeed several times a second.

I bought one of these amazing devices for my latest model, a Composite-ARF Lightning, and I intended to tell you all about the setup, but I have run out of space. Besides which, the first one wouldn't talk to my computer. I sent it back and the second one connected to the computer, but would not talk to my transmitter! Simple, it is not. Hopefully I'll tell you all about it next time… ■

Websites

http://www.wrenturbines.co.uk/
http://www.weatronic.com/
http://www.smservices.net/
http://www.powerbox-systems.com

TOP: *Steve Rickett originally used a pair of Futaba receivers, each with its own team of servos, to divide the control system of his Comet to provide redundancy.* **ABOVE:** *Steve has now converted to a Weatronic dual receiver on 35 MHz for this most impressive twin P-120 powered 183 inch span monster.*

The dry weight of the Warthog with all 11 pylons loaded (3 on fuselage, 4 on each wing) is 53 lb (24 kg). Control is through a Weatronic Rx to about 12 servos and several electronic valves that control rudders, elevators, ailerons, throttle, flaps, landing gear, brakes and gear doors, etc.

AeroDetail series

What makes a good scale model GREAT? It's the detail of course!

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AERONCA SEDAN - (80 images)
The last and most graceful of the Aeronca line of light/sports aircraft in fine detail.

AVRO 504K - (140 images)
The Shuttleworth Museum's superbly maintained machine, in full detail.

NEW... ARROW ACTIVE II - (50 images)
Sole remaining example of this 1930s racing and aerobatic biplane restored to pristine condition..

BEECH STAGGERWING - (45 images)
The distinctive back-staggered 1930s biplane with retracting undercarriage.

BELL P-39Q AIRACOBRA - (130 images)
Superbly restored example of this much maligned WW2 fighter aircraft, that was used with great success by Russian forces in the ground attack role and with saw much action in the south Pacific, from where this restored example was recovered.

BLERIOT MONOPLANE - (74 images)
The Shuttleworth Museum's machine, the oldest original example still flying. Much close-up detail showing all the exposed rigging, structure and the 'bedstead' main undercarriage, plus Anzani engine.

BOEING PT-13/17 STEARMAN - (54 images)
Subject aircraft is a current British civil register example used for airshow displays.

BRISTOL BULLDOG - (60 images)
This collection depicts the example assembled from two donor airframes and restored to superb standard by Skysport Engineering. It can now be seen at the Royal Air Force museum, Hendon.

BRISTOL F2B 'BRISFIT' - (28 images)
Full close-up detail, including photos of engine cowls, for both Rolls Royce Falcon and Hispano-Suiza engines.

NEW... BRISTOL M.1c - (100 images)
Early WW1 fighter monoplane. Example depicted is the faithfully authentic replica built by the Northern Aero Works and operated by the Shuttleworth Trust museum.

BUCKER BESTMAN - (43 images)
Authentic example as exhibited at the Fantasy of Flight museum in WW2 Luftwaffe colour scheme.

BUCKER JUNGMEISTER - (79 images)
Radial engine version. Example from Fantasy of Flight museum.

CHANCE VOUGHT F4U-1D CORSAIR - (132 images)
The famous 'bent wing bird' and super detail.

NEW... CHILTON DW1 - (90 images)
Original upright engined version of this diminutive British low wing sports/racer.

CHRISLEA SUPER ACE - (123 images)
Late 1940s civil light aircraft with distinctive twin fins and nosewheel type undercarriage. A fully restored example.

CHRISTEN EAGLE - (90 images)
The spectacular, stylish aerobatic biplane revealed in close-up. Example shown is the two seat version.

CIERVA C.30 AUTOGIRO - (35 images)
A study of the example hung in the Fantasy of Flight Museum, finished in RAF WW2 colours.

COMPER SWIFT - (91 images)
1930s racingg aircraft. Example depicted is the radial engined example at Shuttleeworth Mussem.

CURTISS HAWK 75 - (130 images)
The 'export' version of the Curtiss P-36 that saw service in during WW2 with Finland and during the 'Battle of France' in May/June 1940. Example shown is a combat veteran.

CURTISS JN-4 'JENNY' - (130 images)
An authentic, restored example in full detail

NEW... CURTIS P-40B TOMAHAWK - (130 images)
Rare. full restored example of the early version of the Curtiss fighter aircrfaft that was at Pearl Harbour on Dec. 7th 1941 - and survived the attack!

CURTISS P-40N - (100 images)
One of the later versions of the famous Curtiss Warhawk, the WW2 fighter aircraft that saw service in just about every combat theatre of operations.

De HAVILLAND DH84 DRAGON - (40 images)
Forerunner of the m ore famous DH 89 Dragon Rapide, this collection depicts a superbly restored example.

De HAVILLAND DH89 DRAGON RAPIDE - (100 images)
Graceful twin engine biplane airliner that saw service from pre-WW2 through to the mid 1950s. Several are still flying and three are shown in this picture collection.

NEW... De HAVILLAND DH 53 - (60 images)
1920s lightweight low wing sports aircraft designed to a low-power specification. Machine illustrated is the sole remaining example.

NEW... De HAVILLAND DH 60 - (140 images)
The aircraft that set the British 'club' flying movement on the road to success during the 1930s.

DH TIGER MOTH - (110 images)
Much close-up detail of civil register example, plus further detail of the IWM Duxford's example in Royal Navy trainer colours, showing the blind flying hood.

DHC CHIPMUNK - (70 images)
A bumper bundle of images that provides a vast array of detail pictures, plus photos of examples in both RAF trainer and civil colours.

ERCO ERCOUPE 415 & AVALON ERCOUPE - (115 images)
The elegant twin finned light/sport aircraft. Both original Type 415 and later Avalon resurection examples.

FAIRCHILD RANGER - (60 images)
Elegant U.S. high wing light aircraft in full detail. Two examples shown.

FIESELER STORCH - (90 images)
Arguably the first military STOL aircraft, this stalkey looking aircraft has long been a modellers' favourite. Two examples are represented, the machine at the Fantasy of Flight Museum, Florida and the RAF Museum Cosford's example.

FOKKER D.VIII - (69 images)
The Fantasy of Flight museum's example of the late WW1 Imperial German Air Service monoplane fighter, in full detail.

NEW... FOCKE WULF FW 190A - (90 images)
Germany's 'butcher bird' fighter of WW2, active on all combat fronts from 1941 onwards.

GLOSTER GLADIATOR - (50 images)
The Royal Air Force's last biplane fighter, star of late 1930s air shows and flown in combat during early WW2, including Battle of France, Battle of Britain, Mediterranean operations and North Africa.

GRUMMAN F3F - (34 images)
A study of the faithfully replicated example of the 1930s US Navy biplane fighter as seen at the 2001 Flying Legends Show.

GRUMMAN F6F-5 HELLCAT - (95 Images)
The US Navy's most effective WW2 fighter.

GRUMMAN F7F TIGERCAT - (63 Images)
Late WW 2 long range patrol fighter.

GRUMMAN F8F BEARCAT - (96 Images)
Hottest Navy piston engined fighter of them all!

GRUMMAN FM-2 WILDCAT - (95 Images)
WW2 Naval Fightger, served with the escort carriers.

HAWKER FURY - (55 Images)
No authentic example now exists, but the accurate replica photographed in extensive detail in this collection is as good a guide as can be found of this elegant 1930s RAF fighter. Includes some general arrangement pictures authentic to the period.

HAWKER HART & HIND - (115 images)
A combo collection featuring the RAF Museam's Hart bomber and Hart Trainer, plus Shuttleworth's Hind.

HAWKER HURRICANE MK.1 & MK.IV - (170 images)
Two versions of the famous 'Hurri' – one a true Battle of Britain survivor painstakingly restored to perfect authenticity, plus the cannon-armed, Mk.IV 'tank buster'.

HAWKER SEA FURY FB.XI - (140 images)
Hottest of all the piston-engine fighter aircraft, the carrier-bourne Sea Fury is also admired for its elegant profile.

NEW... HAWKER TOMTIT - (140 images)
Mid 1930s RAF biplane trainer aircraft, from the era open cockpits of silver dope and polished metal.

KAWASAKI KI100 - (62 images)

LUSCOMBE SILVAIRE - (74 images)
The elegant late 1940s US light aircraft. Several examples provided, with much close-up detail for modellers.

LUTON MINOR - (32 images)
Just one example of this light aircraft, to which the owner has applied many mods and variations.

LVG C.VI - (110 images)
The sole survivor of its type from the WW1 era, photographed in extensive detail. This is the machine housed at and flown from the Shuttleworth Collection airfield, Old Warden and now in storage, awaiting display at the RAF Museum.

MARTIN B-26 MARAUDER - (100 images)
The Fantasy of Flight Museum's example, photographed pre-restoration, soon after it was flown into the Museum site, thus in original, unrestored condition.

MESSERSCHMITT ME 410A-1/U2 - (79 images)

MILES MAGISTER - (100 images)
A firm favourite with scale modellers, this extensive collection of images depicts two examples in different Royal Air Force training colour schemes.

MORANE SAULNIER MS406 - (92 images)
French WW2 fighter that fought in the Battle of France, 1940. Swiss restored example.

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

NORTH AMERICAN A-36 INVADER/APACHE - (69 images)
The ground attack variant of the Alison engined P-51A. Photos, in detail, of the world's only airworthy example.

NORTH AMERICAN P-51B MUSTANG - (102 images)
First of the Rolls Royce Merlin engined Mustangs, this collection depicts the Fantasy of Flight Musem's restored example, with overly polished plain metal surfaces. Much detail.

Also, 41 images of The Fighter Collection's P-51C in bare metal restoration, showing much surface and internal airframe detail. A real bumper bundle! (over 100 images)

NORTH AMERICAN P-51D MUSTANG - (102 images)
The definitive, bubble canopy Merlin Mustang. In detail, showing several restored examples. This is the Fantasy of Flight Museum's over-polished example , but the close -up detail is all there.

NORTH AMERICAN B-25 MITCHELL - (74 images)
Fantasy of Flight Museum's example. Photographed soon after superb restoration. Full nose to tail detail.

NORTH AMERICAN T-28 - (118 Images)
US Air Force & Navy basic trainer.

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

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

PIPER L-4 GRASSHOPPER - (80 images)
Military version of the famous Piper J-3 Cub used during WW2 and close recconiasance and spotter aircraft and for many other tasks.

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

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

PITTS S.1 - (36 images)
Homebuilt example by Bob Millinchip, as seen at 2002 PFA Rally. Complete detail study

POLIKARPOV I-15 - (100 images)
The ultra agile Russian biplane fighter aircraft that saw widespread service prior to and in the early years of WW2 and during the Spanish civil war. Example illustrated is a superbly restored machine.

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

REPUBLIC P-47D THUNDERBOLT - (105 images)
Bubble-canopy version of the much loved 'Jug', photographed in fine detail.

RYAN PT-22 - (92 Images)
American primary trainer.

S.E.5a - (100 plus images)
Shuttleworth Museum's airworthy example presented in full detail.

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

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

STINSON 105 - (75 images)
Light, private aircraft of the 1940-50s era, with lots of character.

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

SUPERMARINE SPITFIRE MK.XIV - (58 images)
2nd of the Griffon-engined Spits (Mk.XII was first), the bigger engine forced a change of the classic Spifire shape.

SUPERMARINE SPITFIRE MK.XVI (BUBBLE CANOPY) - (116 images)
Last of the Merlin-engined Spifires. This collection depicts the 'cut-down' fuselage, bubble cockpit canopy later version.

SUPERMARINE SPITFIRE Mk Vc - (160 images)
Shuttleworth Museum's airworthy example presented in it's latest form with classic rounded wingtip planform.

SUPERMARINE SPITFIRE MK.IX - (90 images)
The most numerous version of the classic Spifire that turned the tables on the Luftwaffe's Focke Wulf Fw 190.

STEEN SKYBOLT - (89 images)
Attractive US aerobatic biplane, presented in full detail.

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

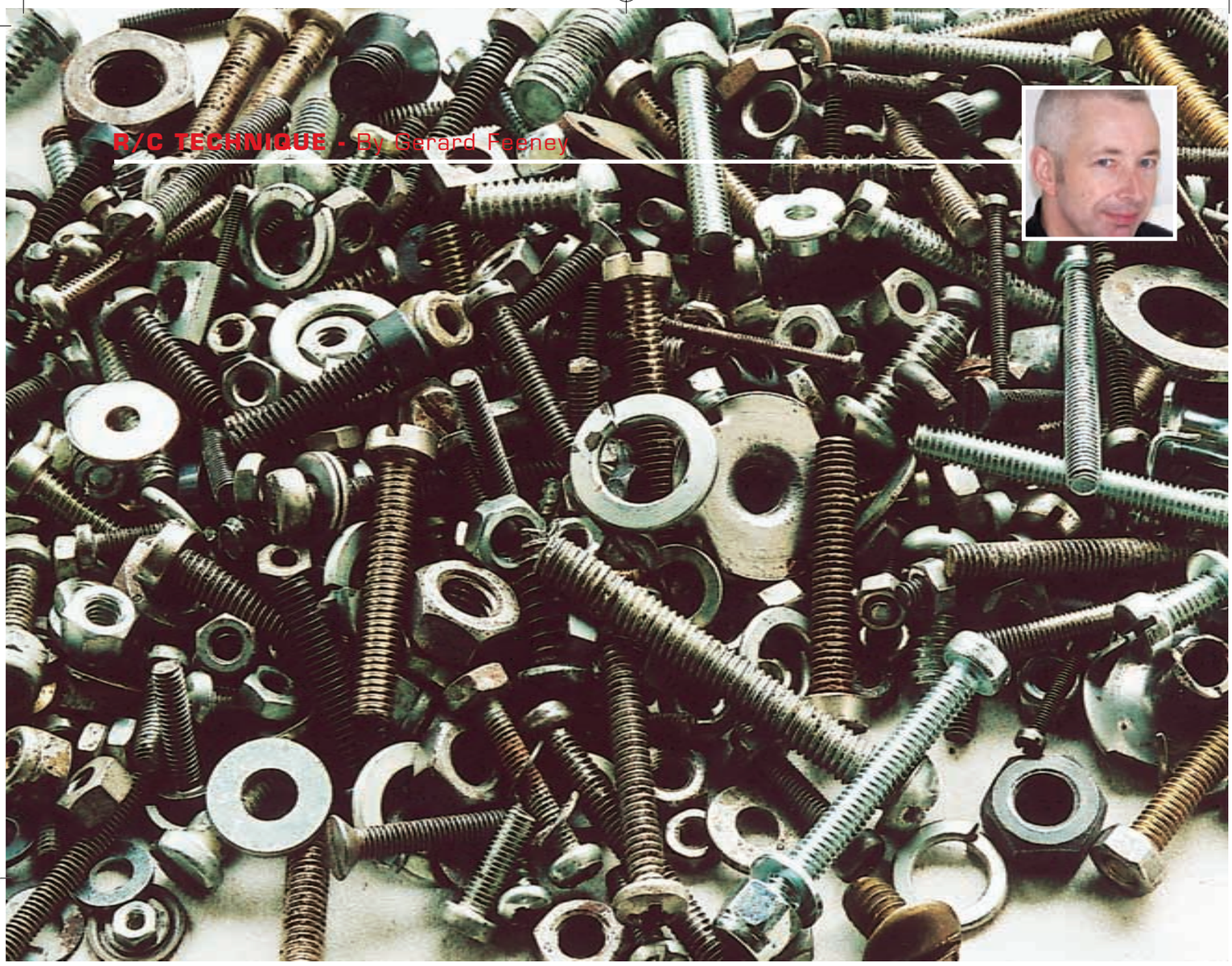
TIPSY BELFAIR - (35 images)
Highly attractive Belgian low wing light aircraft from the era of simple, open cockpit private flying. Machine offers scale modellers pleasant lines and simple shape.

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

WACO YMF-5 - (130 images)
Beautiful and graceful spatted undercarriage biplane of the 1930s 'golden aviation era'. Example photographed is an accurate-in-every-detail modern replica.

WESTLAND LYSANDER - (39 images)
The Shuttleworth Museum's airworthy example shown in both camouflage and Special Operations black finishes. Full close-up detail.

WHITMAN TAILWIND - (62 images)
Two examples shown, of this US homebuilt lightplane, with boxey shape ideal for modellers. Complete close-up detail.



Are all your airframe nuts and bolts tightened up properly? Read the text for the gory details!

FEENEY'S FLIGHT FILE

Further snippets of practical R/C aeromodelling guidance and advice

Nutty professor!

It's hard to get overly exited about the nuts and bolts that play such a crucial part in holding the various important bits of our flying R/C model aircraft airframes together. But, precisely for that reason, because they are so mundane and yet so relied-upon, these items should be properly tightened up in all 'holding-together' situations. With that in mind, Leeds aeromodeller and Period re-enactor Malcolm Fisher has been sharing his wisdom on the matter with me, showing that adept nut and bolt fettling takes both thought and preparation. And now, dear readers, I shall pass on his wise words to you…

The nut on the back-end of a silencer is a 'lock-nut' as it's used to lock the bolt which is threaded through the silencer from the front. It isn't the same as a 'self-locking nut' which can take a number of forms. Some have an insert, often nylon, at the top of the nut. Some have an insert, again nylon or fibre, part-way down the threads. Others have a sort of 'split-ring', again at the top of the nut. Using these will supposedly not allow them to come loose like an ordinary nut, and they don't require a second nut.

Proper' lock-nuts are the same as normal nuts, but usually thinner. The two nuts are screwed onto a bolt, and then one is held while the other is turned tightly against it. The original recommended procedure was to put the lock-nut on first and then the normal nut. They were tightened down together and then the ordinary nut was held while the thinner lock-nut was turned BACK against it.

Most people use two normal nuts, tighten the first and then follow it with a second and tighten that while holding the first one still. Both methods work. Self-locking nuts are easier and quicker.

I can honestly say that I have not read such a detailed account of how nuts and bolts form an intimate and, hopefully, long-lasting relationship before, and this information will be very handy to refer to in future. Many thanks, Malcolm.

Broke-bolt mounting

Still on this unbearably exciting theme, lemme tell you how I fixed a particularly tricky bolt-related problem after really 'screwing up' the situation.

There I was, happily tightening the four 4BA anchor bolts that held the hard-plastic engine mount to the firewall on my latest model. Three had been tightened fine and I was almost finished tightening the fourth, when suddenly all 'screwing-purchase' disappeared! Incredibly, the bolt had broken in two, leaving part of its shaft still stuck in the firewall captive nut!

With the engine mount removed, it was

a very awkward situation to behold. I couldn't gain access to the bolt rear through the tank bay and, at the front, only about 1/16" or less of the broken bolt shaft projected into the engine bay. I didn't want to hammer-tap the broken bolt and captive nut rearwards out of the firewall, if possible, as the captive nut had been securely glued in place, and it would be next to impossible to get the captive nut back in position again.

After much fiddling with needle-nose pliers and tweezers through the now vacated engine bay, I was getting nowhere and feeling more than a little aggravated! I could barely grip the broken bolt and, when I did, it wouldn't rotate. Then, I thought of a very simple rescue plan - but, would it work?

I cut off a short length of silicone fuel tubing and, very gently but firmly, slipped it through the engine bay and onto the small bit of projecting bolt shaft. It gripped okay, but could it be used for 'unscrewing purposes' as I had suddenly envisioned only moments before?

The fantastic news was that it would unwind out the broken bolt! By simply finger-rotating the fuel tube in an anti-clockwise manner, it dutifully unscrewed the tentatively-attached bolt fragment with amazing efficiency. What surprised me was just how easily the damaged bolt shaft unwound, in comparison to trying to unscrew it with the pliers!

The engine mount was now re-attached, using the three original bolts and one new 4BA replacement. I was exceedingly careful this time not to over-tighten all four bolts, while still ensuring that they were fully screwed down.

This broken bolt incident was a freak occurrence for me - I have never had it happen before and, hopefully, it'll never happen again. I suspect that the kit bolts I was using were a tad dodgy, as they seemed to be made from soft alloy. Also, some bolt 'screwing-resistance' had been encountered, as a chunk of rigid packing foam inside the tank bay was obstructing its penetration. Nevertheless, the bolt shouldn't have snapped and from now on I will only use better quality, independently-purchased, 4BA anchor bolts to attach kit-model engine mounts to firewalls.

Head case

We're still not finished with bothersome bolts! Like many modellers, I have been frustrated when trying to unscrew engine cylinder head bolts which are gummed-up by ancient 'heat-welded' castor oil deposits. Luckily, Peter Miller has some answers, so let's hear what he has to say...

First, soak the engine cylinder head in paraffin or WD40 for a time. Either of these oils should penetrate down the bolts. For Philips-head bolts there are several things you can now do. But first, make sure that the bolts' head-slots are perfectly clean.

Gerard broke a bolt when fitting the engine mount into his latest model. But that problem generated a highly effective 'sheared bolt-shaft' removal method!

Place the correct size of screwdriver in the bolt's head-slot and hit it with a hammer, straight down with a good sharp blow. This will often break the gummed-up oil seal and loosen the bolt. Some heat applied to the cylinder head can also help, followed by the aforementioned sharp hammer bolt-blow.

If this fails, hold the engine securely, preferably in a vice, so that it can't turn. There's no need to clamp it too tightly, just hold it steady in the vice. Place the screwdriver in the bolt head-slot and hold the screwdriver with pliers. Next, turn the screwdriver very slightly in the 'undoing direction', only just enough to start it rising in the slot. Hold firmly with the pliers and hit the screwdriver with the hammer. This action can often start the stuck bolt turning. It is the same principle as the 'impact screwdriver'. Use the same dislodging techniques on all the stuck Philips-head bolts.

If these ideas don't work, you may have to drill the bolt heads off and remove the cylinder head that way. The 'circumcised' bolt stubs will then come out with the aid of pliers, and new bolts can be fitted.

Allen-head bolt removal is more problematic. The straight-down hammer blows may work but the 'turning-and-hitting' won't because there is no cam action with an Allen-head bolt.

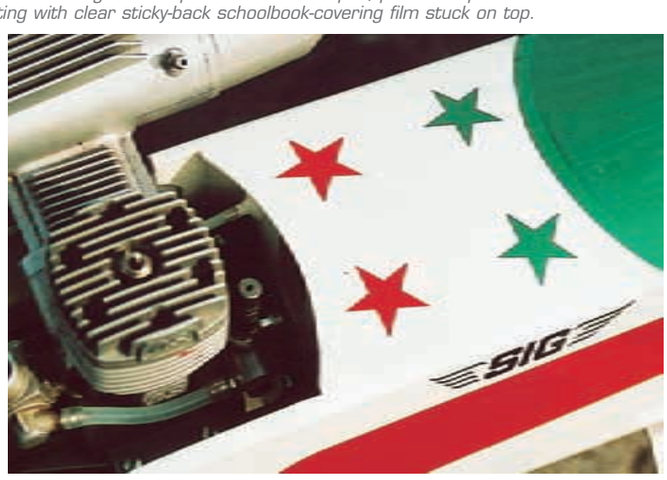
Thank you, Peter. I sometimes have sawn a slot through 'fused' Allen-head engine bolts in-situ and then used a straight-blade screwdriver to unscrew them. Of course, that only works if a Junior hacksaw blade can gain 'elbow-room' to cut across the bolt head(s) in the first place. Access is okay on backplate-retaining bolts but not generally workable on cylinder head-retaining bolts. Actually, sometimes it is at the corners, depending on the cylinder head 'finning' layout and the way you align the hacksaw blade.

Textbook example

Sticky-back Solartrim is fabulous for beautifying Solarfilm-covered models in both simple and elaborate trim patterns. However, Solartrim becomes considerably less self-adhesive with age, and trim pattern edges can lift when exposed to airflow and engine exhaust goo no matter how well they're initially stuck down. So, keep those stuck-on Solartrim designs in position for longer using the following simple trick...

Thoroughly clean the trim pattern(s) and the surrounding base film with meths and kitchen towel. Be careful not to aggravate the edge-lifting any further by gently tissue-rubbing in directions that keep the raised edges flat. When the trim patterns and adjacent areas are sparkling clean, re-seal

BELOW LEFT: *Engine cylinder head-retaining bolts can be particularly hard to remove if gummed-up. The text has helpful, practical tips from Peter Miller on how to sort the situation.* **BELOW RIGHT:** *Stop Solartrim designs from lifting with clear sticky-back schoolbook-covering film stuck on top.*



Shield and sheath your gel cell batteries' terminals with silicone fuel tube.

the 'iffy' edges with a modellers' warm mini tacking iron.

Now, using a sharp Number 11 scalpel and straight-edge, cut up custom-sized pieces of clear self-adhesive schoolbook-covering film (available in rolls in almost all newsagents) and overlay these bits of clear film on top and to each side of the lifting trim shape edges. Normally, it's just the forward-facing edges and tips of trim embellishments that lift, so you don't have to do much 'laminating'.

If your Solartrim is old and a bit 'stickless' to begin with, apply the clear self-adhesive schoolbook-covering film over suspect edges when you first cover and trim the airframe so that the exhaust gunk doesn't have a chance to 'get under your skin'.

Of course, the most sensible action is to purchase brand-new Solarfilm and Solartrim for your model-finishing job - that way everything should bond together firmly from the outset.

'Terminal' condition

Avoid possible dangerous 'short-out' accidents with your two- and twelve-volt gel cell batteries by sheathing their positive and negative terminals with a piece of silicone fuel tube when not in use. By just slipping the fuel tube over both terminals, they are simply but effectively insulated whilst in the flight box or in storage. The two-volt gel cell glow-plug battery particularly benefits from this short-out protection, as it's not unknown for a metallic object in one's flight box to fall onto the battery terminals when the box is being carried to and from the flying site. The twelve-volt battery is, naturally, always connected up in the flight box if one has a 'power panel' arrangement, but accidents can still happen if it has been removed or if you have a spare twelve-volt battery lying about in the workshop.

Boxing match

Talking of flight boxes, can you believe that mine is thirty years old in 2009? Yes, it's true - I built my one and only flight box from a 'Pilot' kit way back in 1979, when I was a young and foolish teenager of nineteen! Now, three decades later, I'm still foolish and the box is encrusted with grime, has a dodgy bottom that keeps giving way, and looks decidedly shabby and old - a bit like its owner, really!

I prefer my flight boxes like my swimwear - as small as possible, while still accommodating all my important bits 'n' pieces inside! In this respect the Pilot flight box is my kind of design, because it's not overly large while still being able to hold all the items I need for my 'field trips'. Its 'enclosed-box' design features a bolt-locked carrying-handle that doubles as a model engine-starting stand with the top-hinged lid closed. I rarely use that 'model-starting support' feature, preferring to leave the box's hinged lid open. I can then easily rummage through the various internal compartments on the rare occasions that I need to fiddle with the model during a flying session.

In the past my box contained a twelve-volt gel cell battery and power panel, but that stuff has long since gone as it was too heavy and unnecessary. Now I just carry a two-volt gel cell, glow-plug connector lead and 'chicken-stick' for engine starting, plus a minimalistic inventory of other knick-knacks.

I subscribe to the 'non-electric starter/non-power panel' school of R/C glow-engine model operation. In other words, I prefer to use old-fashioned 'touchy-feely' engine-starting techniques, which have faithfully served to flick-start all engine sizes in my R/C aeromodelling career so far. I most certainly don't believe in giving myself a hernia lugging around a half-ton nuclear-powered 'Start-up Station' equipped with an industrial-grade electric starter and flashing power panel displays, worthy of the Starship Enterprise bridge, just to fire up sports models. In my opinion, that burly flight box approach is only necessary if you operate quarter-scale gas turbine-powered B-52s! But, it seems to indicate a lack of starting technique, wrapped up in overkill, when used with 'ordinary' glow engine-powered R/C sports models of up to 100" span, in my view.

As with the traditional/ARTF aeromodelling scene, I think that flight boxes can fall into the 'charming' and 'garish' categories. For me, a beautifully-constructed wooden flight box, not too big, nicely finished in varnish or fuel-proof paint, and with tastefully-applied decals, is a joy to behold. If said type of flight box then contains all the important items neatly, whilst still remaining light enough to easily carry around, it's worthy of being called a 'model' flight box - in every sense of the word.

On the other hand, the various large plastic/metal 'tool-boxes' and similar massive receptacles (sometimes fitted with wheels to allow their enormous bulk to be dragged more easily across the bumpy ground), whilst undoubtedly capable of great carrying-capacity, are quite unsexy in my eyes. I acknowledge that large-scale, jet and multi-engine R/C models require such bulky paraphernalia-carrying 'coffins', but how many of those exotic aircraft do you come across at the average rough-pasture

BELOW LEFT: *Gerard's thirty-year-old flight box may look rough (like himself!) but it still proves to be ultra-reliable.* **BELOW RIGHT:** *Gerard really approves of the hand-cranked fuel pump he has fitted to his downmarket flight box. If you want hassle-free fuel tank filling and emptying, get one of these items now!*

flying site?

In my experience, the starting and field equipment needed for my R/C models could fit into a container half the size of my long-serving Pilot flight box. Are you completely sure that all the gear you drag to and from the flying field every weekend is absolutely necessary? (In case you're wondering, my current model is a SIG 'Four-Star 60' of 71" span and powered by an O.S. 61FX.)

When my trusty old flight box finally dies (that won't be for a long time yet, as I keep mending its rotting floor!) I won't buy any of the wooden or plastic/metal flight boxes on the market for two reasons: First, the wooden designs are too big, bulky and heavy, and the main central storage areas can't be covered by a lid if it rains. Second, I don't fancy the plastic/metal flight boxes for some deep-seated personal reason. Like ARTF models, I feel that these containers have no character or personal input, but of course that doesn't stop them from being capable of holding far too many non-essential items to strain your back on the way to the patch…

My next flight box, if and when it's needed, will instead be an own-design timber item, made from high-quality ply and lovingly sanded and clear-varnished. Its design parameters will be thus: It must hold a half-gallon of fuel, a hand-cranked fuel pump, a two-volt glow battery, glow-plug connector lead and chicken-stick, some glow-plugs, a plug spanner, a few props, various pliers and small spanners, plus a roll of kitchen towel. When that design concept can be enclosed neatly within a hinged-lid carrying-handle-equipped box, in as small a space as possible, I will be happy!

A final thought: Padraic Cryan uses a large plastic bag to carry his R/C model aircraft starting accessories about and it works fine. However, I think that his choice of 'flight box' is almost as repugnant as the plastic/metal monstrosities - not least because I don't believe in free advertising for a large supermarket chain every time I visit the flying site!

'Cranky' modeller!

I can highly recommend one item in my geriatric low-tech flight box - namely, the hand-cranked fuel pump. What a wonderful device this is! It's light, reliable, efficient and non-reliant on electric current to get the fuel flowing. When screwed to the box exterior and connected with silicone fuel tube to the fuel-carrying container, I crank the handle clockwise to fill the tank and anti-clockwise to empty it. I've used mine for years without a hitch, and it's one of the few R/C aeromodelling accessories that I would confidently endorse as being a darned good buy!

Padraic Cryan's 'plastic bag flight box' philosophy has worked flawlessly for him thus far.

Read-only memory

Some time ago, a friend lent me his copy of Ray Malmström's classic old book called 'Aeromodelling'. Thumbing through it, I was affected by both a sense of nostalgia and sadness. The nostalgia came from re-reading traditional F/F and C/L model aircraft building and flying techniques. The sadness emerged from thinking of how few of today's so-called ARTF 'aeromodellers' know about this kind of thing - the core principles of the aeromodelling hobby.

I wonder how many people who spend their cash these days on brightly-coloured shiny boxes with pre-made, pre-covered, aeroplane-shaped bits inside would be capable of building from the full-size model design plans contained in this book? Very few, I fear, if some of the 'modern aeromodellers' I've met are anything to go by! Perhaps in a future rant I will mention the guy who joined his ARTF R/C trainer's wings in anhedral form, and the other chap who wanted his father to supply him with an ARTF trainer literally 'ready to fly' without any input whatsoever from him, as assembling the pre-made/pre-finished bits was too much trouble!

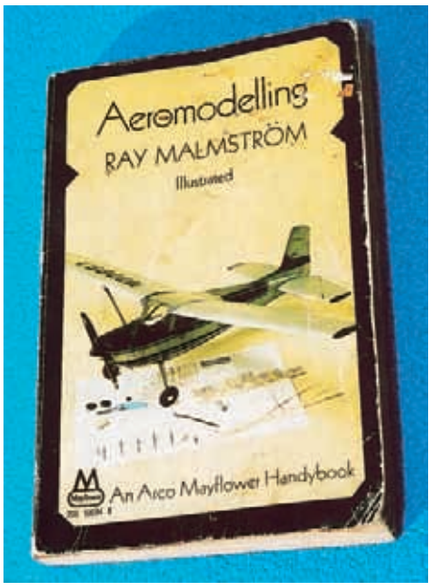
Here's an opportunity to combine traditional and modern R/C aeromodelling practices: Why not Google Ray's Malmström's book and buy it on-line or get it in a second-hand bookshop or library? Then have a good read. That way, you'll see how 'flying models' are built and what the underlying constructional and aeronautical principles are that allow your ARTF 'clone' to take to the skies in the 21st Century. Can you handle that challenge?

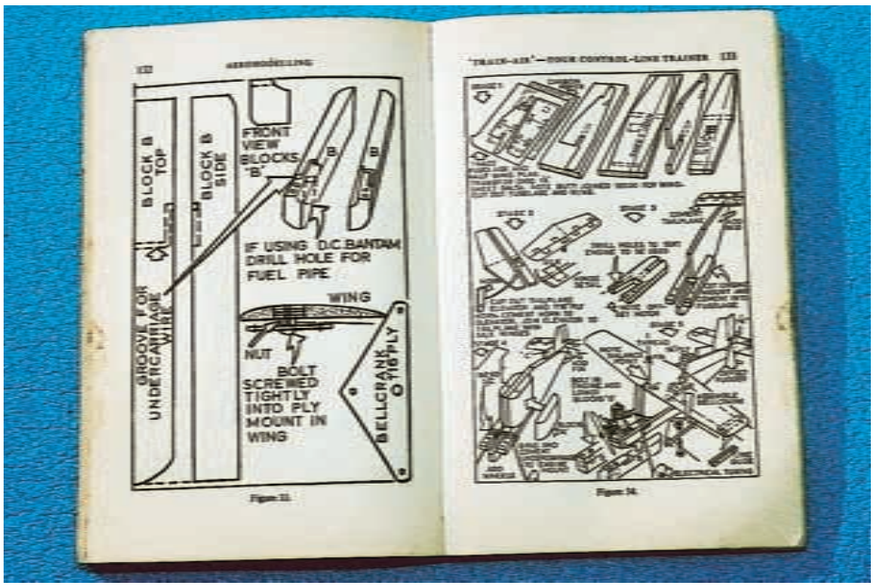
Instant message

Before I go, I must quote Malcolm Fisher's short and to-the-point comment regarding ARTF models…

"ARTFs have their place, but to me they are not 'proper' modelling, just an assembly of ready-made components to which are added an engine and radio."

Whatdya you think? Feel free to get in touch at:- feeneyzone@eircom.net with any comments you may have. ■



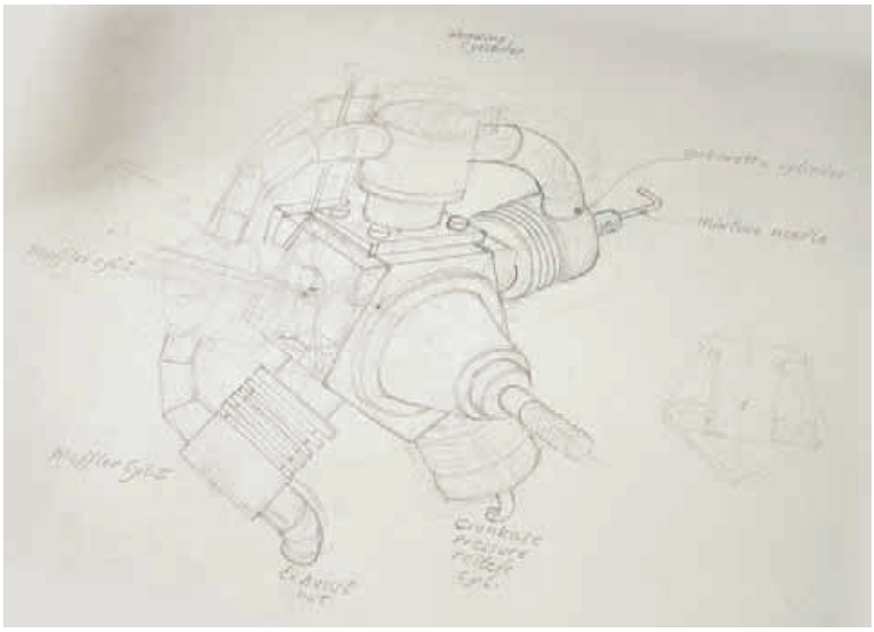


ABOVE LEFT: *A classic aeromodelling manual from Ray Malmström - but how many of today's 'aeromodellers' would understand the concepts explained therein?* **ABOVE RIGHT:** *Hey you - modern ARTF 'aeromodeller'! Would you be able to create a flying model aircraft from these drawings?*

MR. TURNER'S TURNINGS

(and millings and filings and drawings)

Introducing the work of Chris Turner - artist, scientist, engineer and teacher - who designs and manufactures his own engines with a small lathe and mill in his garden shed



ABOVE: *Chris Turner's isometric concept sketch...* **BELOW:** *... turned into the 'five-cylinder radial'. It pulls his Hawker Tomtit around the skies with authority.*

That perfect day

For me, that perfect day is in late spring or summer, at the end of the afternoon, when there is not a cloud in the sky and the breeze gently fades away. This is the time to enjoy gentle flying of charismatic vintage-type model aeroplanes by gentlemen pilots; savouring the nostalgia of the pioneering days of aviation, when it was an art, albeit supported by engineering and science.

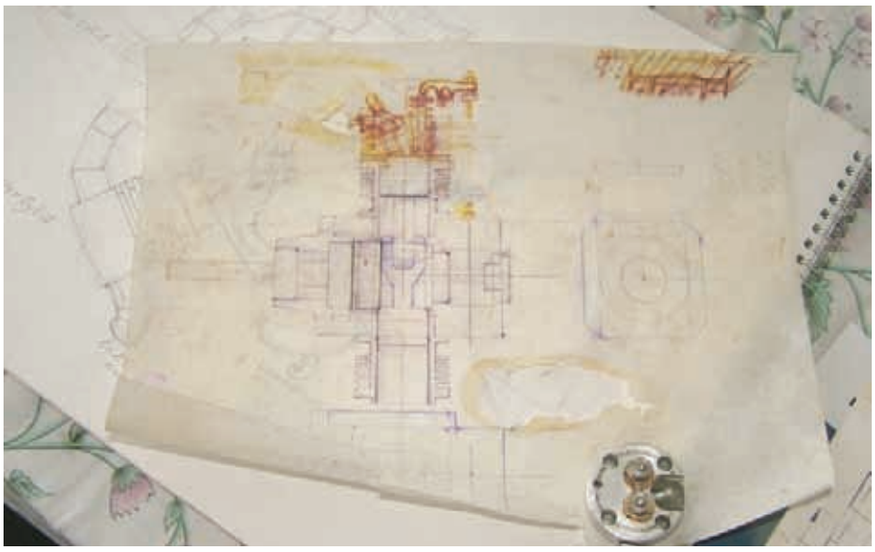
It was such a day more than a few months ago that some of the more experienced gentlemen in our club got their old and revered models into the air for a gentle potter about in the mellow warm sunlight. One in particular caught my eye - well, more accurately, my ears. Was it a Taylorcraft or a Cub? But what of the sound? Yes, it is the engine that seems to fire every seventeen yards of flight (whether it needs to or not) that is so evocative of the old light aircraft that - erm, well, my Dad told me about!

I remarked on the sound to one of the other clubmates, like me, standing and watching in appreciation of the sight and sounds of real, hand-built, models. "Yes, that is Chris Turner's model - he makes his own engines, you know!"

I wondered whether I, as most recent newcomer to the club, was having my leg pulled. However, when Chris had brought his model back gently to kiss the earth in a perfect scale landing, I approached to ask about the engine. Yes, Chris does indeed make his own engines. Not only that, he designs his own engines to boot! On close inspection, he makes them in entirety. Chris stops short of mining the iron ore, smelting it, rolling and transporting it. He also buys his glow-plugs and fuel (what a cheat!) but pretty much everything else comes from Mr. Turner's fevered brow and dark satanic shed! This guy is the real thing.

The engine I was looking at, with great inter-

FAR LEFT: *The first engine Chris built was the single-cylinder, seen here mounted in his veteran TaylorCraft Cub.* **LEFT:** *Cylinder heads for the 60/60 twin. Note on the right-hand side head, you see two valve guides. One has been drilled to accept a tool to drive it home. The other was screwed in whilst being held in the lathe and then parted off with a small saw. Brilliant!* **BELOW:** *Chris apologized for the state of this drawing. I would have none of it. Necessary and proficient.*



est, looked for all the world like a five-cylinder radial. In fact, there is a single combustion chamber. One dummy cylinder houses the carburettor. Two others muffle the exhaust, the first of which provides fuel tank pressure. The fifth cylinder is to enable crankcase pressure relief. Take a look, feast your eyes, at the photos to appreciate the ingenuity of Chris Turner's engine design.

Mention of these events to the Editor one morning, by exchange of emails, sparked the idea of a piece in the magazine. So, when the old timers on the patch start banging on about 'Cheque Book Modelling', the delights of dealing with dope, bravely bashing balsa, frenetic free-flight and all other alliterations, you can take them to task. You can point to their shop-bought shiny bling-ridden engines and remind them that Mr. Turner makes exceedingly good engines!

Invitation

Chris was kind enough to invite me to his home to look over his plans, drawings, models, engines and workshop. Chatting away excitedly for what seemed like minutes but was hours, I learned how Chris gestates his embryo engine designs. How he nurtures them in sketches and drawings and mills, drills, files and turns the metal into effective and efficient propulsion units for his models. It begs the question, of course, do you design the aeroplane for the engine or vice versa? It turns out - a bit of both!

The first engine that Chris built was closely based on a plan set developed by Derek Giles for the Nexus Plans Service and available from MyHobbyStore.com. They are still advertised on t'internet - indeed I bought plans of the original .60 engine and the later 60/60 twin that was developed by Richard Green.

The skills that Mr. Turner developed from building a couple of 'donks' from plans enabled him to design and build more engines. In particular, Chris has told me, he has learned to design details of the engines to make them easier to manufacture. For example, early in his 'knit your own engine' activities, he made valve guides and drilled into them two little blind holes to allow him to engage the guide with a special tool. Many engineers would recognize this as similar to a 'spanner head' screw. Chris realized that he could avoid this step if he screwed the cylinder head onto the guide whilst it was still held in the lathe chuck. Once screwed home, he was able to part off the guide with a small hacksaw. This is, in my opinion, the elegantly simple thinking that gave Great Britain early and massive leads in the development of engineering for mass production.

As Chris accumulated more knowledge of materials and manufacture, his projects have become more ambitious. Usually, once Chris has completed his conceptual sketching, he then draws, to large scale, details of components to figure out how to make them.

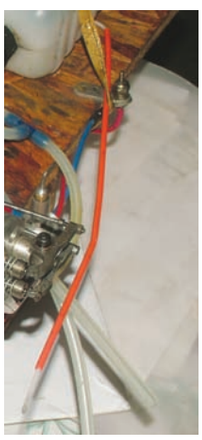
Chris taught secondary school pupils for many years in craft, design and technology. He told me delightful tales of making simple machines with household items - like Blue Peter on steroids! What was even more delightful was that he told me with much happiness of the joy that the children got from such simple investigations of the world of science and engineering. I remember an inspirational teacher when I was a boy - a man who had been a navigation officer in the Royal Navy. He gave me a fascinating insight into practical uses of mathematics with examples of spherical trigonometry with which to navigate around the globe. And the rest, as they say, is history!

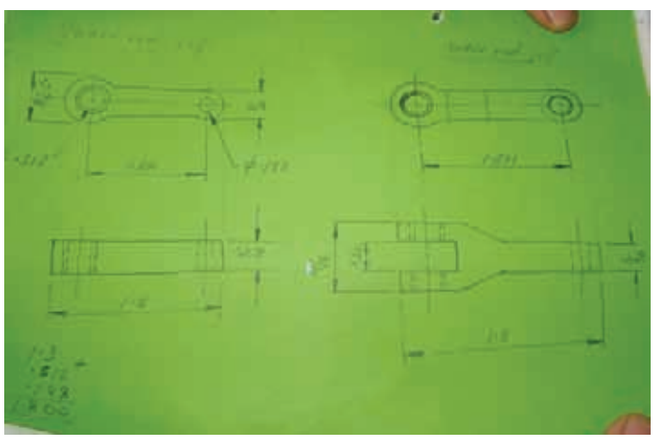
Concept design

Chris still teaches art on a part-time basis. He is an accomplished 'free form' artistic draughtsman and painter. He is also an adept and disciplined exponent of the rigorous methods of engineering drawing.

Having taught engineering drawing myself, I could readily appreciate the skills and discipline Chris has required to sketch isometric representations of his engine concepts. It is probably a dying art now, as so many young engineers are taught Computer Aided Drafting (CAD) from the outset of their studies. I confess that I held on until the last in my insistence on studying sketching skills for young undergraduates. I never got any complaints from older colleagues but the stu-

BELOW LEFT: *This 90 twin, also based on the Matador design, runs beautifully. Chris even winds his own valve springs from piano (music) wire from the local model shop.* **BELOW CENTRE:** *Here, Chris has drawn the cylinder head (at 20:1 scale) to work out how he is to make the component. Lying on the drawing is his carburettor, milled and turned from aluminium bar stock.* **BELOW RIGHT:** *Here, Mr. Turner shows his detailed drawing for the conrods in the 90 twin. Simple but effective!*





LEFT: *The great man at the lathe in his tiny shed.*
BELOW LEFT: *Chris used a high tensile steel Allen head bolt as a suitable material for a crankshaft. Modern 'management speak' aficionados would call it 'thinking outside the box'. I call it brilliant!*
BELOW RIGHT: *Imagine our surprise to find this mangled connecting rod when Chris stripped down one of his engines that had been running okay but sounded 'a bit dodgy'.*

dents did not always appreciate the importance of such skills. There is an old adage 'If it looks right…' and that sentiment ain't going to go away any time soon - however many computer processors Intel can bang out!

Also, I could never see the point of CAD modelling and plotting and printing simple drawings if you could do it with the craftsmen in the workshops with a pen and an envelope and a cuppa! It avoids that awful moment when an eager designer is told by the patient but weary foreman - "You can't make it and even if you could, it wouldn't work!" Don't ask how I know about that!

Please take some time to examine the photographs of Chris' sketches and drawings on these pages. Typical of the man is that he apologises for presenting 'tatty' pieces of paper with his beautiful work. I know that the knowledgeable reader cannot fail to admire his isometric sketches (see the headline picture).

Many of Mr. Turner's drawings are well used and he apologises for their appearance. No apologies needed! The drawings are evidence of their proper use by this accomplished artisan. They remind us of the days when engineers designed at the board, making working drawings, trying out ideas, rejecting the impractical or over elaborate, seeking to refine and re-tracing (as Chris did here with the valve gear) until he is clear in his own mind what is the plan. Note the carefully applied tea splodges, adding colour and authenticity to the plan!

The thought that kept buzzing in my mind after visiting Chris was 'what a waste'! There are so many talented people in retirement who have so much skill, experience and knowledge that is so sorely needed. Just imagine what benefit could be gained by manufacturers and distributors of modelling goods were they to consult people like Chris to examine their new products.

Detail design

Detail design is much more complex than just sketching something similar to a commercially produced engine. The method of making the parts and assembling them into a working engine will be very much different. Chris does not have computer aided this and that to help him, so every turning, milling, sawing or filing operation is rehearsed on paper before he repairs to the workshop to start work.

One of his Work In Progress projects is a five-cylinder radial engine for which he needed a 2:1 ratio gearbox. Lacking tooling for bevelled helical gears, he opted for an epicyclic gearbox. Design for this included a simple cardboard model; next, Chris made, by hand, a simple spur geared transmission, thoroughly to establish the possibility of hand-crafting a gear train - brilliant!

Spring in your step

Perhaps it is just me, but the story that made me chuckle most heartily was when I asked him where he sourced his valve springs from. I was astonished to learn that he 'rolls his own' from common or garden variety piano wire from the LMS around a dowel.

How, I asked Chris, does he make the crankshafts? Surely you need some kind of drop forged steel billet to machine to the tolerances required. He told me that he had decided that a large cap head bolt (or screw) would be made of a suitable alloy and proceeded to the nearest engineering fastening emporium to buy one large hexagon cap head bolt! As an aside, whilst there seems to be no universally agreed terminology for such fasteners, some would call it a hex cap screw! There is no doubt, however, that Chris' idea was one of admirable 'common sense'.

Eating the pudding

Whatever one thinks of the delightfully individualistic approach that Chris has applied to providing power for his models, the proof of the pudding is in the eating. Or, perhaps, the proof of the engine is in the flying! It is probable that much debate might ensue at the regular club nights when discussing 'What do you look for in a model aeroplane engine'?

Top of my wish list would be reliability - I really loathe 'dead stick' landings, especially if I have not flown much in recent times. Are Mr. Turner's engines reliable? You betcha! They start readily and keep ticking in the air.

On one occasion, Chris thought that his engine was a little down on power and sounded a bit odd! When he dismantled the engine he found that the little end plain bearing was somewhat distorted - in fact it looked like a 'U'-shaped channel where it had failed through bearing stress. Now, had one bought a shiny expensive proprietary engine from the LMS, one would be round there like a bat out of hell seeking recompense and apologies. Chris just toddles down to the factory - er, shed - and bashes out a new part from something a bit stronger. It is remarkable that an engine can run at all with a little end of the con-rod sheared through like that but it certainly illustrates that the rod is almost always in compression throughout the four-stroke cycle.

Back to the future

So, what of future plans for the 'Emmet Brown' of Kintbury, West Berkshire? Well, Chris is currently finalising the detailed design of his new 90 twin which is of modular design, enabling rapid removal of the gearbox from the rear of the crankcase. The distant future may see a fully functional five-cylinder radial. Chris has also discussed, with the 'high priced help' of this august organ, producing plans for one or more of his designs so that readers might have a crack at knitting their own engines.

So, readers, it is over to you. If sufficient interest becomes evident, we might just be able to make plans available with some notes to amplify and explain the cutting edge (pun, sorry!) technology and techniques required to produce something that you can proudly speak of as your own home-built model engine. ■

The latest project is this 90 twin. It is designed to be 'modular'. The gearbox is entirely Chris' own design. Note manifolds and headers from DIY store plumbing tube. Cast iron cylinders (and piston rings). Apart from fixings, everything was made by Chris in his shed. Respect!

GETTING AILERON FACINGS FLAT

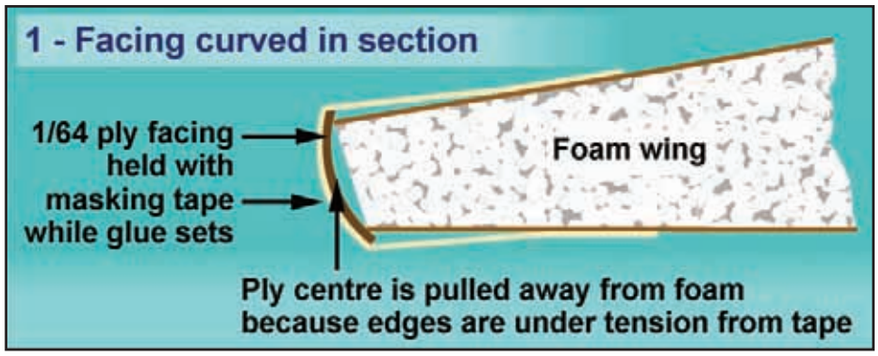
A simple, tried and tested cure for a common problem with foam wings

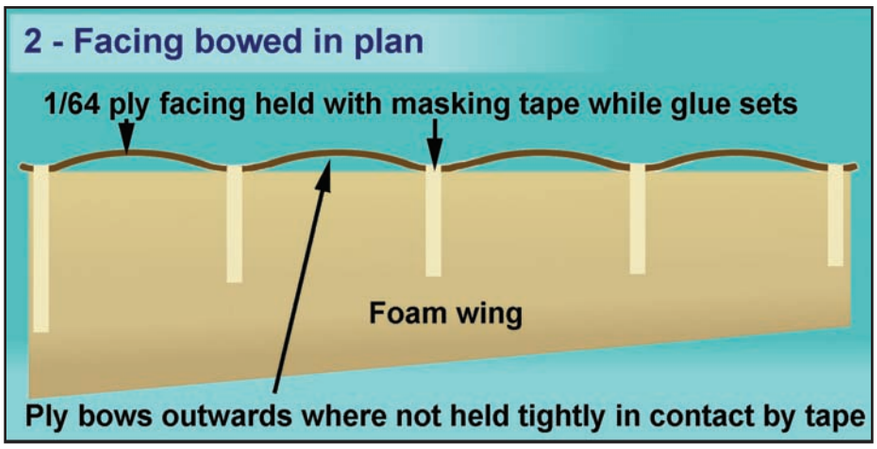
Gluing facings, especially thin ones like 1/64" ply strips, onto the cut edge along the aileron hinge line on a foam wing can present a bit of a problem. They can't easily be pinned in place to make good contact while the glue sets, and if held with masking tape, they tend to take up a convex shape across their depth. The convexity results from the pressure of the tape pulling the edges down, causing the middle to bulge outwards **(Figure 1)**.

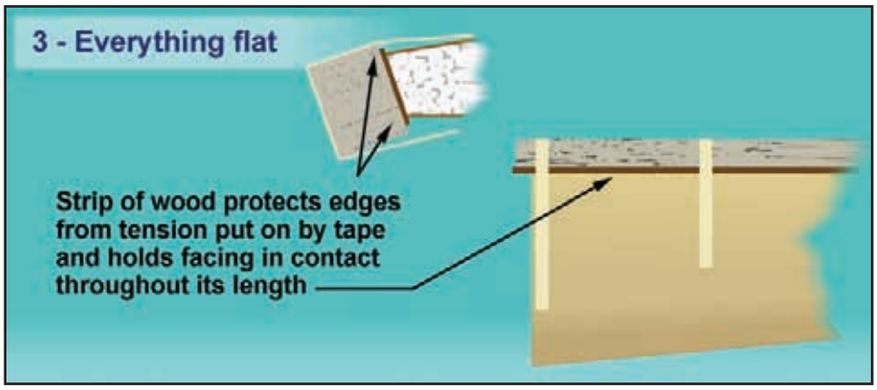
It is also the pressure of the tape that causes them to undulate along their length **(Figure 2)**, by holding the facing tightly against the wing where the tape is applied and allowing it to relax in between. Whilst this effect can be reduced somewhat by using more pieces of tape set closer together, it is never completely eliminated until each piece is almost in contact with its neighbour.

To eliminate both these problems requires only a simple solution. On top of the facing, and under the tape, place a length of balsa or other wood, at least 1/2" thick, and as wide as, or just slightly wider than, the facing itself. When the tape is pulled tight, this piece of wood holds the masking tape clear of the edges of the facing, so relieving them of any tension that might cause curvature. At the same time, it applies roughly equal pressure to the whole gluing area, not only eliminating the undulations, but also making for a stronger joint altogether **(Figure 3)**. The wood needs to be quite sturdy so as not to become bowed itself between the lengths of tape.

Inset ailerons are a little trickier, because it is rare to find a piece of suitable wood of exactly the right length to fit the aileron space, and perhaps not worth cutting a bit off a longer length to get it right. Several pieces can be used to fill the gap, and if there are small spaces between them it won't affect the result, so odds and ends that will suffice can usually be found. Of course, each piece must be taped close to both ends, so it may require the use of a little more masking tape, but that's a small price to pay. ■

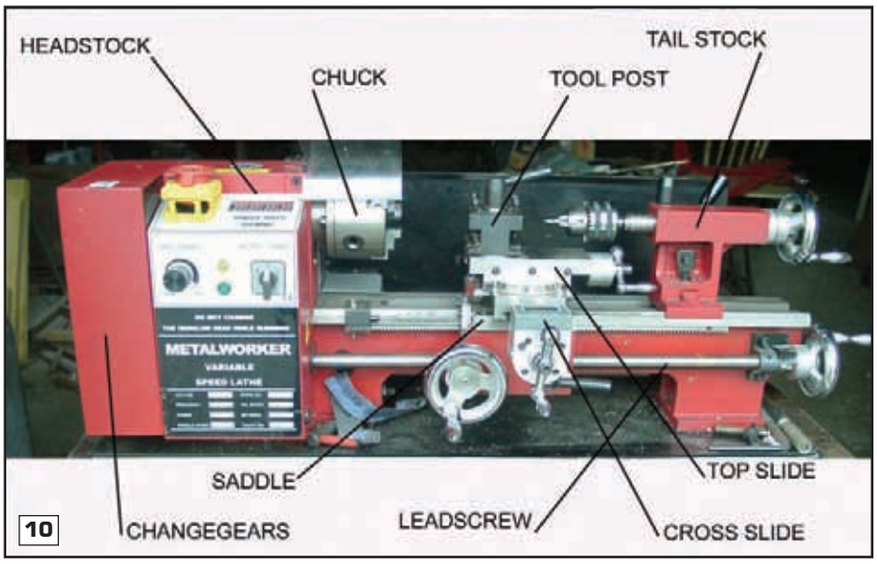






METALWORKING FOR AEROMODELLERS

PART 2: In the second of his introduction to metalwork articles, David describes the anatomy of the lathe and demonstrates the fabrication of a simple prop adaptor



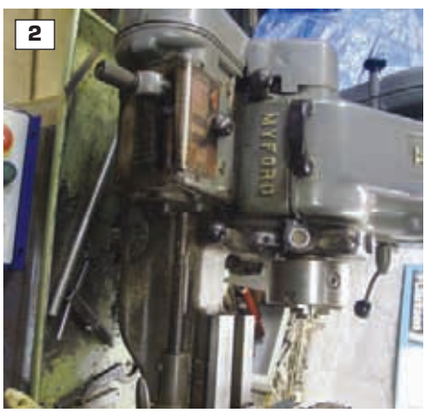
1: *Overview giving location of principal parts of lathe.* **2:** *The 'gap' may be seen below the chuck. This machine also has a 'quick change' gearbox for screw cutting, and inverter drive for variable speed.* **3:** *Headstock with gear cover removed. Visible are the electrical controls, the spindle speed readout, chuck and change gear train.* **4:** *The tailstock may be clamped in position along the bed by means of the handle to the rear. A drill chuck is in place carrying a centre drill.*

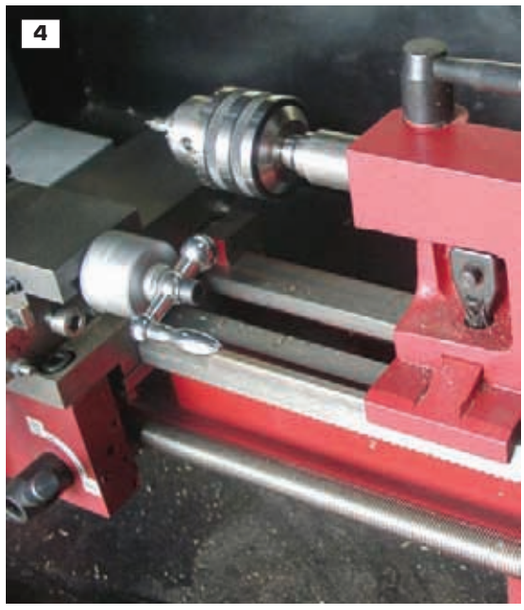
In the previous article, I attempted to outline a few of the advantages and opportunities which arise for model-making, if metalworking techniques are developed, also to present an overview of some of the basics. Let us now consider types of machine tool. For the processes of turning, drilling and milling, it is convenient to separate those operations where the job is rotated (typically, turning) from those where the tool spins (drilling and milling). A well-equipped model engineer's workshop may well have one or more lathes, a mill, a drill press, and some form of grinding facility. As noted previously, the choice of machinery will be influenced by a number of factors - notably, what it is that you intend to make or work on.

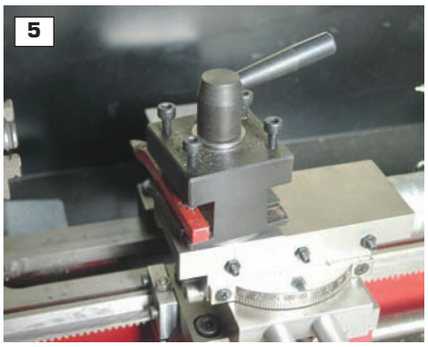
Those, who also pursue an interest in motorcycle or car restoration or competition will need larger capacity than is required for small-scale work. As the scale gets smaller, so does the need for such a variety of machines. A small lathe may be adapted for light milling and drilling, and so, once you are equipped with one of these, much becomes possible. As an example, the 10 c.c. glow engine depicted in the earlier article, was made entirely on an ageing 3.1/2in lathe, and while in these days of low cost engines it is less likely that many aeromodellers will wish to make their own, those who reside some distance from their nearest model shop may discover a newfound convenience in being able to make up odd accessories.

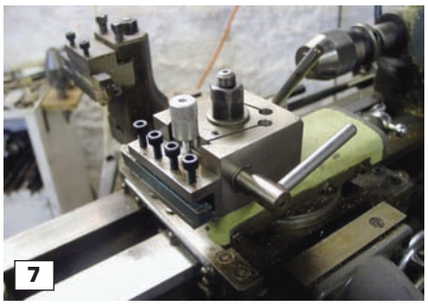
What's in a lathe

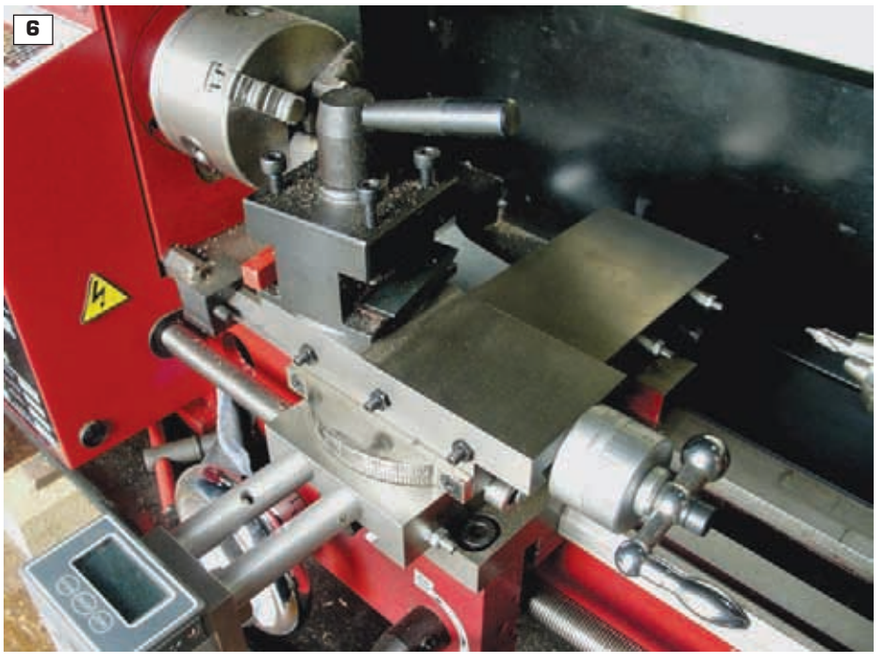
In its simplest form, it boils down to a rotating spindle holding the workpiece, into which a cutting tool is moved to generate a specific diameter and length and perhaps cut a shape. If you have a look at supplier catalogues, it will be apparent that the leading criteria used in describing a lathe are the dimensions for (a) swing, (b) between centres, and whether it has a gap or straight bed. The first of these - swing







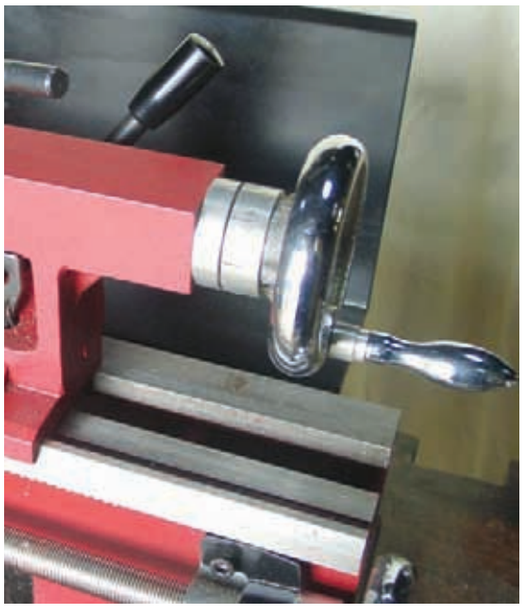




TOP LEFT: *This toolpost is a rocker type which takes two tools and allows a measure of height adjustment.* **ABOVE RIGHT:** *Topslide may be rotated, its travel being accurately controlled by the small handle and graduated collar. This photo also shows the home-made extra long cross slide.* **ABOVE LEFT:** *This toolpost is a home-brewed quick change type, having two tool positions. Several tool holders are needed to make it an effective proposition.*

- gives an indication of the diameter of work that can be accommodated, though it must be pointed out that two measurement standards operate - radial and diametral. 'Between centres' gives an indication of the space between centres fitted to the headstock and tailstock, and hence the maximum length of workpiece. A straight bed is most frequently encountered nowadays, as typified by the Mini-Lathe shown in **photo 1**, and in this picture, the salient parts are identified. A gap bed is one where the bed casting is profiled to admit larger diameter work close to the chuck. Myford ML 7 and Super 7 **(photo 2)** machines have this feature. A further embellishment here, to be found on some larger machines, is the 'removable gap' where a section of bed close to the chuck may be unbolted to admit large work, or refitted to give maximum support to the saddle when working close to the chuck.

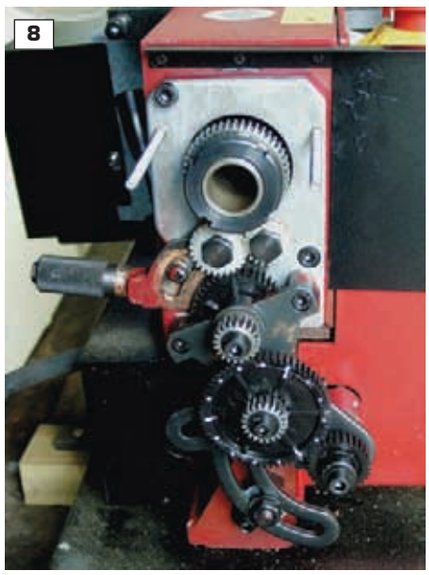
The headstock **(photo 3)** comprises a main casting, accurately aligned with the bed, carrying the hollow spindle, to which is bolted the chuck. (The chuck here is a three-jaw, self-centring, used for round and hex bar. The other main chuck types are the four-jaw, independent, used for rectangular and odd shaped work, and the collet chuck used where extreme accuracy and tubular parts are involved. It is also possible to mount work on a face plate using suitable clamps.) The spindle on this machine is bored through 20mm diameter, and has a No. 3 Morse taper. The drive in this case is by a variable speed motor via a two-speed gearbox, allowing the selection of any spindle speed from about 50 to 3000 r.p.m., maintaining good torque at low speeds. With the falling cost of electronics, more of the hobby-size machines are now equipped with a variable speed system. Many older secondhand lathes, such as the Myford, have a fixed speed motor driving through a system of belts and pulleys to give a selection of speeds. However, it may be noted that the Myford in **photo 2** has been fitted with an inverter drive to give variable speed.



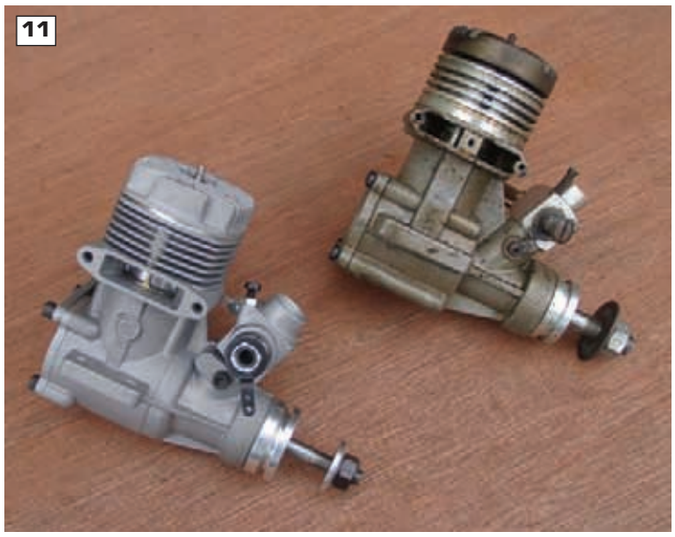
The tailstock **(photo 4)** has a main casting which slides along the bed, with which it is aligned and may be clamped in position using the handle visible to the rear. The second main component is the barrel which is bored, in this case with a No. 2 Morse taper, and is moved axially by a screw driven by the hand wheel. Work may be drilled using a drill gripped in the tailstock chuck, and long work may be steadied using a tailstock centre.

The toolpost **(photo 5)** is where a turning tool will be mounted, and the movement of the tool will then be effected by moving the saddle - along the bed, giving constant diameter, by moving the cross slide across the bed for facing cuts, and the topslide **(photo 6)** which can be set at an angle to cut short tapers. Several designs of toolpost are regularly seen; one that helps to speed up tool changing is a 'Quick change' toolpost, such as that shown in **photo 7**.

Associated with the headstock and drive, is the train of change wheels **(photo 8)**. These convey the drive from the spindle to the lead-screw, which, in turn, when the feed is engaged, will drive the saddle along the bed. Changing the gear ratio permits fine feed or screwcutting work to be handled. On some machines, such as the Myford in **photo 2**, a quick change gearbox may be either added or fitted as standard. This avoids the inconvenience of removing and refitting gears so that the gearing for any required screw thread within the machine's capability may be set simply by moving levers.



ABOVE: *Drive is taken by a train of gears from the spindle (top) down to the lead screw (lower right). The tumbler arrangement provides a feed reversal facility, useful for left hand threads.*
BELOW: *This easily made gauge speeds up tool height setting.*



10: *A digital caliper (above) is cheap and accurate enough for most work. A micrometer (below) gives more accurate readings but is limited in range.* **11:** *Older Merco 61 (upper right) has thicker shaft than the new SC46.*

Cutting metal

In many metal cutting situations, the cutting action may be compared to that of a carpenter's plane. A sharp blade is guided so that it peels off a thin slice of material. In the case of the plane, the slice thickness is controlled by the blade setting, whilst on a machine tool it is determined by the feed rate. In the case of the lathe, we mount a cutting tool at centre height. This ensures that cutting can continue right down to the middle of the work. If the tool is too high, then it will rub and stop cutting at small diameters, and if set too high, then it will simply pass beneath the centre of the work.

To achieve this setting, it is helpful to make up a setting gauge as shown in **photo 9**. To determine the centre height dimension with reference to the saddle, first place a length of bar in the chuck and measure from the top down to the saddle surface, then deduct half the bar diameter. Now that the price of six inch digital calipers **(photo 10)** has fallen to the point where there is change from a ten pound note, I would suggest that one of these be purchased for checking dimensions.

As a first exercise we'll make up a simple adaptor to fit a prop drilled for an old Merco 61, to a more modern SC46 **(photo 11)**. The Merco shaft has a diameter of 0.312in. while the SC is 0.250in.

Start by cutting a short length of bar of sufficient diameter and length. In turning work, 'sufficient length' frequently means adding on a bit for gripping in the chuck, so here I've cut an inch or so of bar having a diameter of about 3/4in. On more complex parts, some thought may be needed, concerning the sequence of operations. This example is pretty straightforward, but in general, if the drilling and diametral turning are done without disturbing the work in the chuck, then relative concentricity of the machined features will be good.

Start by taking a facing cut **(photo 12)** then fit a centre drill in the tailstock chuck and drill in an eighth of an inch or so **(photo 13)**. Centre drills are shaped to cut a recess for a tailstock centre and, due to their short stubby shape, when used to start a hole, they can be relied on to stay on centre and not wander off. We aim to produce a hole of 1/4in. diameter, and because drills frequently cut oversize, the drilling is done in two stages, first with a 15/64in. then with the 1/4in. **(photo 14)**. Shaving out just the last few thous as a second operation gives a hole very close to size, and often avoids the need for reaming. Next set the saddle stop so that the tool will cut the length required and take a series of cuts, gradually reducing the diameter, **(photo 15)**. (The speed and depth of cut will depend on your cutting tool and the workpiece material.)

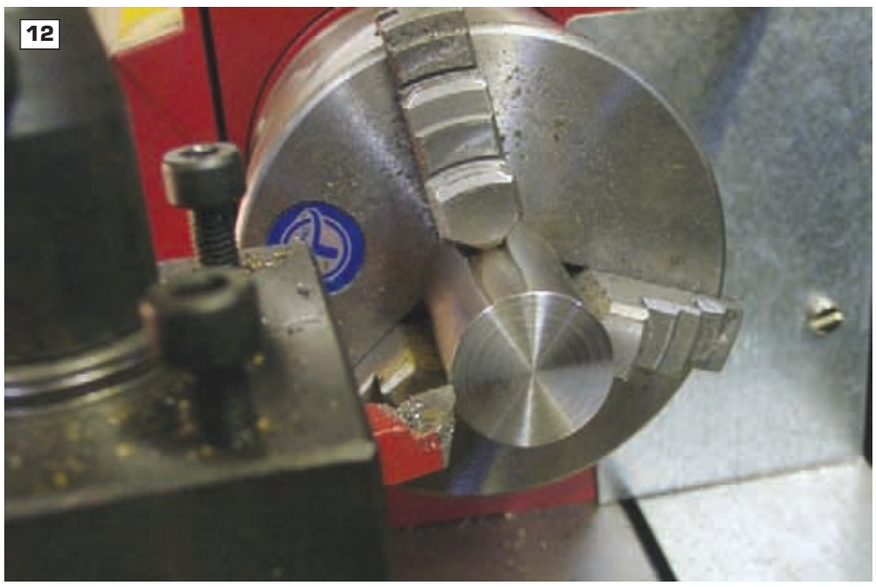
Once the diameter is down to the target 0.312, we need to think about parting off. This is an operation that causes difficulty for some amateurs using lightweight lathes. This is because, under load, a tool mounted in the normal front toolpost may deflect downwards and into the job, causing a dig in. The usual tooling solutions are 1) use a rear toolpost and inverted tool, which deflects up and out, or 2) if the chuck is not a 'screw on' type, use a front-mounted inverted tool and run the machine in reverse. If neither of these is available, all is not lost. Fit a Vee tool and cut a guide groove leaving a little extra meat on the part **(photo 16)**. You can then use an ordinary hacksaw to start cutting partway. If the part is then rotated and a fresh cut started, the vee will ensure that you don't stray far off the line. **Photo 17** shows this underway and also illustrates a simple wooden bed guard to avoid damaging the machine when the saw finally cuts through. The sawn off part is then reversed in the chuck **(photo 18)** and facing cuts taken to reduce the flange thickness to the desired amount. Finally, the Vee tool is used to cut a chamfer **(photo 19)**, removing the sharp edge and improving the appearance. **Photo 20** shows the adaptor in place on the SC 46.

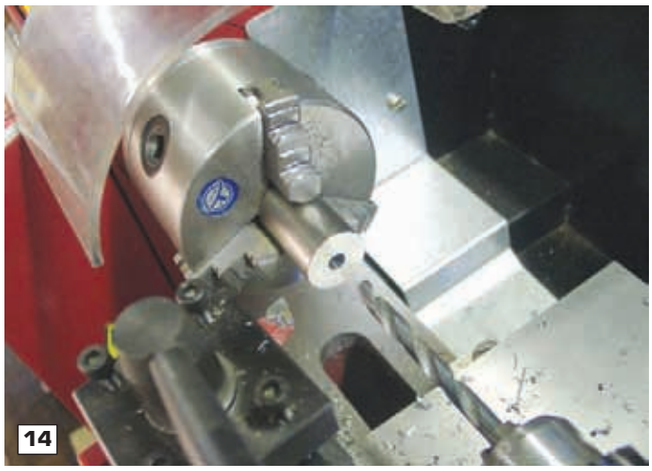
I hope that this has whetted a few appetites to look at adding a small lathe to the workshop armoury. If the editor agrees, then I hope to offer a future note on making spinner nuts and streamlined aluminium spinners.

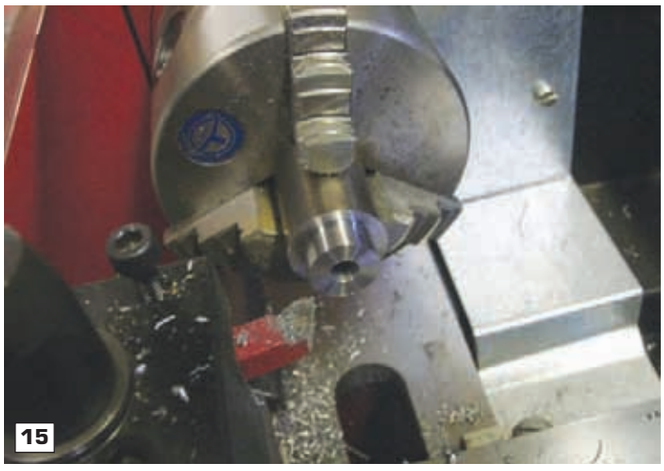
Further reading

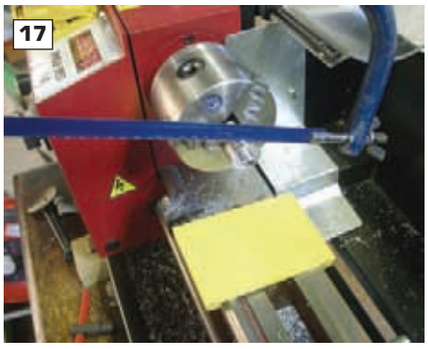
For those who wish to delve further into the intricacies of amateur metalwork, there are a number of magazines and books which may be of interest.

12: *If the tool is at the right height, then a facing cut will progress to the centre with little or no pip.* **13:** *A centre drill is used as the first step in machining a hole.*









14: *After drilling 15/64in. the final step is to run in the 1/4in. drill.* **15:** *A series of cuts is taken to reduce the diameter.* **16:** *The Vee tool is employed to cut a groove.* **17:** *'Parting off' with a hacksaw.* **18:** *Sawn surface is still visible, prior to a facing cut.*

From America, 'Home Shop Machinist', 'Machinist's Workshop' and more recently 'Digital Machinist' are magazines all aimed at the home enthusiast, the last being directed towards CNC applications. In this country, 'Model Engineers' Workshop' specialises in this area.

A number of books have appeared over the last fifty years or so, giving advice on lathe-work. Those I can personally recommend include:

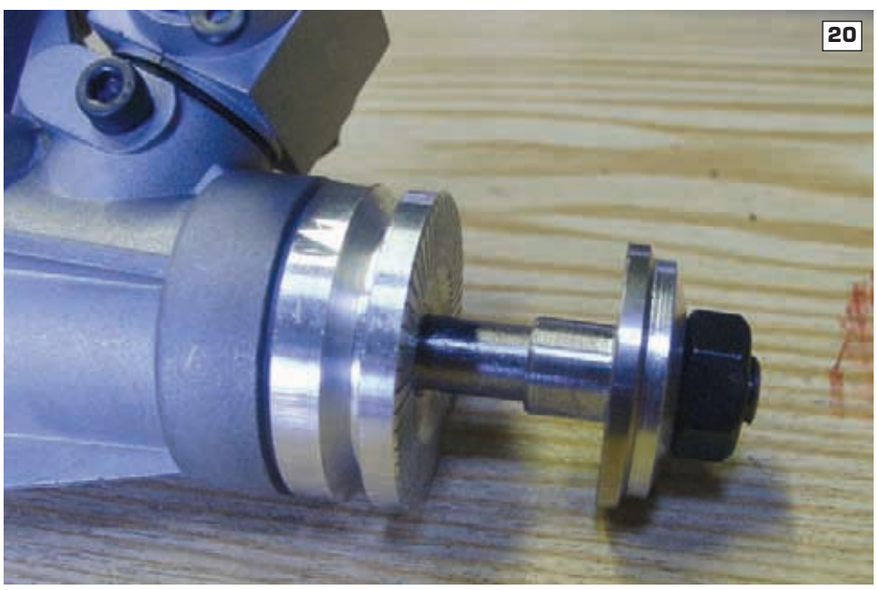
1 'Lathework - A Complete Course' by Harold Hall
2 'A Man and his Lathe' by L.H. Sparey
3 'Myford ML7 Lathe Manual' by Ian Bradley
4 'The Amateur's Lathe' by L.H.Sparey
5 'The Compact Lathe' by Stan Bray
6 'The Taig Lathe' by Tony Jeffree
7 'Unimat 111 Lathe Accessories' by Bob Loader
8 'The Model Engineer's Handbook' by Tubal Cain (more a 'data encyclopaedia' than 'how to' book)
9 'Lathe Accessories how to make and use them' by E.T. Westbury

Of those books mentioned above, while some are aimed at users of particular machines, others are more general in their approach. Those which are machine specific will nevertheless contain many ideas which may be adapted for other equipment.

For users of the Mini-Lathe, it is anticipated that a book carrying just that title and by this author will become available later in the year, within the Workshop Practice series published by Special Interest Model Books.

Books aimed at minority markets are not often to be found on high street bookshop shelves, although they may, of course, be ordered. Some will be stocked by specialist outlets such as Camden Miniature Steam Services and TEE publishing, also by several of the machinery and tooling suppliers such as Chronos, and Arc Euro Trade. ■

19: *A chamfer has been cut with the Vee tool. This may also be done with a file, but with less precision.* **20:** *The completed adaptor fitted to the SC46.*



MODEL BUILDERS' PRIMER

Part 37 - Methods for joining veneered foam wings

Join the panels

If the root faces are flat and fit together with no major gaps, PVA is the best adhesive to use for joining wings cut from white foam. If the cores are of pink or blue foam, epoxy resin will be better as these foams are not so absorbent. PVA dries by evaporation so it can take a lot longer to form a bond on pink and blue foam, and even then may not be as strong as required. If the root joint is not so good, it really should be re-worked until it is acceptable. However, if you are still left with some gaps, then I would suggest joining the panels using epoxy resin (not the quick-setting variety or you may not have time to align them accurately before it starts to cure) mixed with material to bulk it out a little, and filling any remaining gaps when the joint is set. Besides the adhesive, you will need some masking tape to hold the joint tightly closed while setting. If the joint is not good, it is even more important than usual to ensure it is braced adequately.

Block up to set dihedral

Most wings will have some dihedral, and to get this accurate it is wise to support the wings on blocks to keep the tips at the correct height while the glue is drying. Typically, the dihedral is not expressed as the true value at the chord line, but as the vertical distance from the bench to the underside of the tip of each panel when its root is in contact with the bench **(Fig. 14.107, A, d1)**. Sometimes, it is expressed as the height d2 under one tip when the other panel is laid flat on the bench. Note that for the same wing, d2 is slightly less than twice d1, but for dihedral angles up to about 10 degrees and wings of moderate size it is so close that it can be considered to be equal to twice d1. If you need to develop one from the other and are concerned to have it exact, a little trigonometry will produce the correct value, and trigonometry (or a scale drawing) will also be needed if the dihedral is specified as an angle, as very occasionally happens. The blocks don't need to be at the tips, so if you can't find anything exactly the right size, smaller ones can be slid under the panels to positions that raise the tips to the correct height with the roots on the bench **(Fig. 14.107, B)**. When the skins are balsa, some softer packing between the blocks and the wings will help to protect them from damage from the edges of the blocks.

To block up the wing correctly, the chord line should be horizontal, and it will help to achieve this by packing near the leading and trailing edges at the root **(Fig. 14.107, C)**. Of course, if the wing has washout the angle of the chord line will vary along the span, but generally the variation is small enough to have no significant effect. Occasionally, the wing will be designed to have its upper surface horizontal, and in this case the panels can be joined inverted on the bench with no blocks needed, other than those to set the chord line level.

Before proceeding, it is important to check that with the panels blocked up to the required dihedral the root faces are in close contact. Fix the panels together with a strip of masking tape across the joint underneath at the deepest point on the chord and sit them on the blocks. If the centre is held off the bench **(Fig. 14.107, D)**, or there is a gap along the top of the joint **(Fig. 14.107, E)**, the root faces must be reworked to get the proper angle. When correct, the joint should be closed along its full length. On most models a small variation in dihedral is unlikely to have any major effect on the model's performance, so if a small movement of the blocks corrects any gap in the centre joint this may be an acceptable alternative to reworking the root faces, and the following points may help you to make the right decision. In general, on a rudder-elevator model, a reduction in dihedral will reduce lateral stability and turning response, whereas an increase will have the opposite effects. However, too much dihedral will cause Dutch rolling, where the model rocks constantly from side to side, and is therefore to be avoided. On an aileron model, an increase in dihedral will also improve lateral stability when upright, but may reduce roll response and make inverted flight less stable.

Check for wing twist

When satisfied that the dihedral is correct, the wings must be checked to ensure that each panel is at the correct angle across its span, whether or not washout is incorporated. If, in flight, the wings are at different angles of attack, one will generate more lift than the other, producing a tendency for the model to roll; the faster it flies, the greater the rolling force will be - obviously this is undesirable. A difference between the angles of attack at the tips will have a more adverse effect than at the root, due to forces acting at a greater distance from the centre line generating more leverage than those acting closer in. Theoretically, the wing panels should be precise mirror-images of each other, but small variations can creep in during construction, as none of us is perfect. It is also possible that they may have warped, and maybe differently, if they have been stored in less than ideal conditions. Correcting warps and other dissimilarities in foam wings can be a difficult process, but if the differences are not too great, it is usually possible to make compensatory adjustments as the panels are joined. If severe warps have developed, it may not be possible to proceed until extensive remedial action has been taken, possibly extending to re-making the offending panel(s).

Figure 14.107 Blocking up for Dihedral

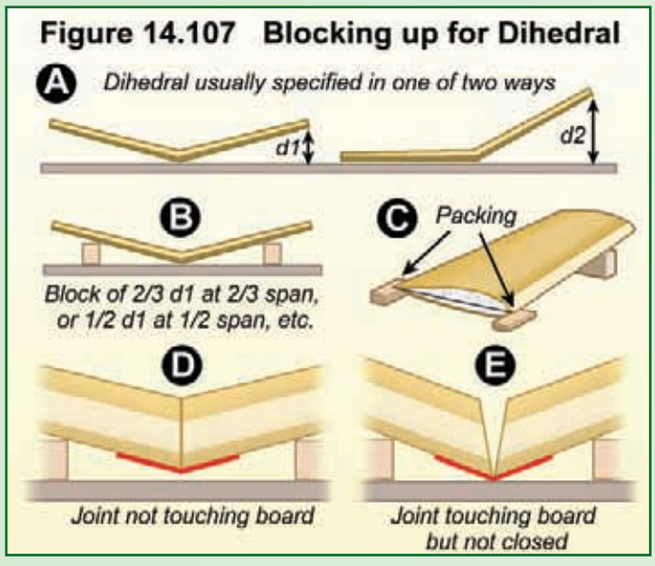
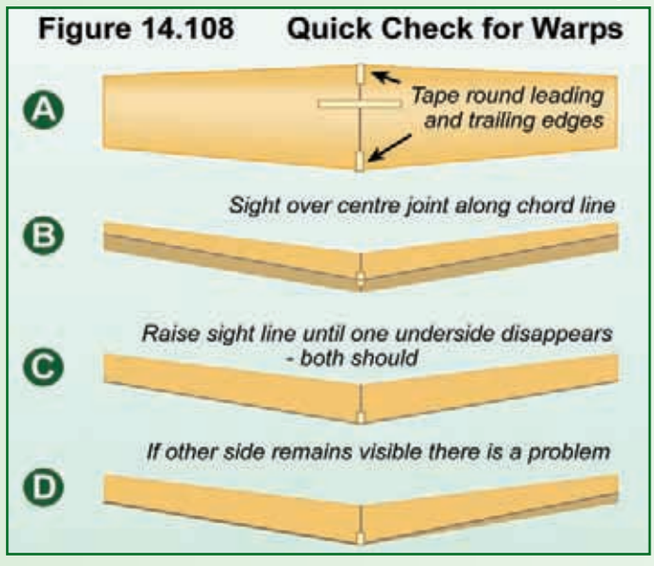
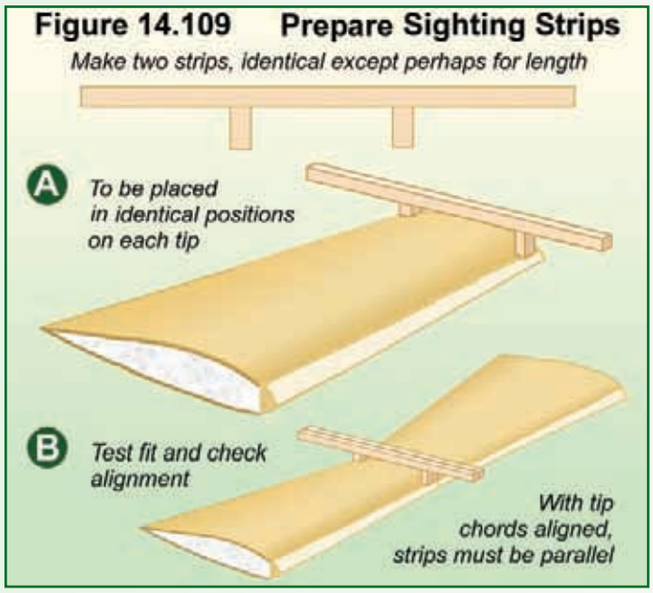


Figure 14.108 Quick Check for Warps



Wrap short lengths of masking tape round the leading and trailing edges at the centre joint **(Fig. 14.108, A)**, so that these edges register exactly together, and replace the panels on the dihedral blocks. The mating faces should match reasonably precisely across the full chord; any small discrepancies here may be ignored. From behind the wing, sight with one eye along the chord line at the centre joint: the view should be roughly as illustrated **(Fig. 14.108, B)**, where the upper surface is shown lighter than the lower. If there is washout, there may appear to be more of the lower surface at the tips than at the centre, but both wings should appear identical. Now move the sight-line upwards until one lower surface vanishes from view. The other should vanish at exactly the same time **(Fig. 14.108, C)**, and if this is so, there is no major discrepancy between the panels: if a small amount of one underside remains visible, compensatory action probably can be taken when joining the panels. If, on the other hand, a significant amount of one undersurface is visible when the other has disappeared **(Fig. 14.108, D)**, then one or both panels may be badly out of true, and each must be checked before a decision is taken as to whether to scrap and remanufacture either.

Figure 14.109 Prepare Sighting Strips



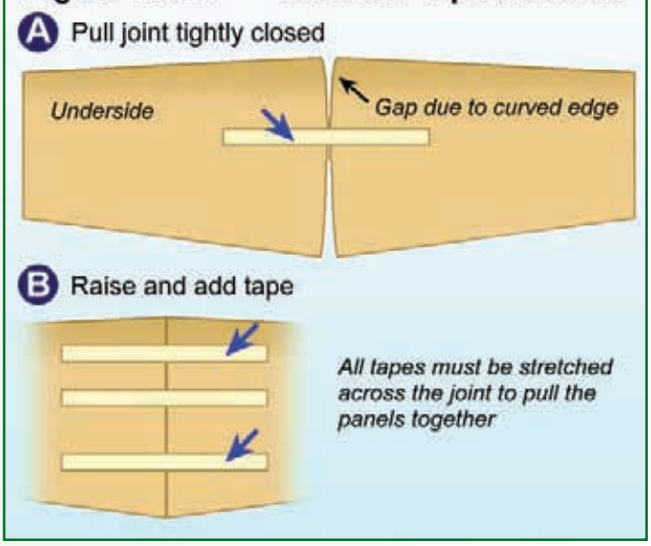
Assuming the visual check allows construction to continue, prepare two straight strips of any lightish material that will not bend under its own weight (e.g. 1/2" square hard balsa), later to be attached to each upper surface as near the tip as possible; they will need to be blocked up to span the surface curvature **(Fig. 14.109, A)**. The strips should be as long as is practicable with a minimum length of a foot or so, and you may find it helpful to make one rather longer than the other. Their purpose is to act as sighting strips when the panels are brought together for joining, to ensure that the chord lines at both tips are at the same angle. It is therefore most important that each is at the same angle to the chord line, so the blocks used must be absolutely identical in size and position on each panel, onto which they may be fixed with pins or tape in such a way that they remain firmly in place. The actual angle they make with the chord line is immaterial, as it is the only relative angle of the tips that is to be judged. Separate the panels and test-fit the strips. To check that they are aligned correctly, place the panels tip to tip so that the chord-lines lie together, and the two strips should be exactly parallel when viewed from a panel root **(Fig. 14.109, B)**. Adjust if necessary, then remove them, marking them to ensure they will go back on the right panels.

Glue and tape the joint

If using PVA, start by spreading adhesive on both root faces and rubbing them together. With epoxy, it is a good idea first to pierce shallow holes 1/4" or so apart all over the mating surfaces with a sharp pointed instrument: when these are filled with epoxy they help just a little to strengthen the joint. Having made the holes, spread the epoxy and at the same time force it into them before rubbing the joint. Whichever adhesive you use must allow at least 10 minutes working time before it grabs, as there may be some adjustments to make at the joint before the panels are left to set.

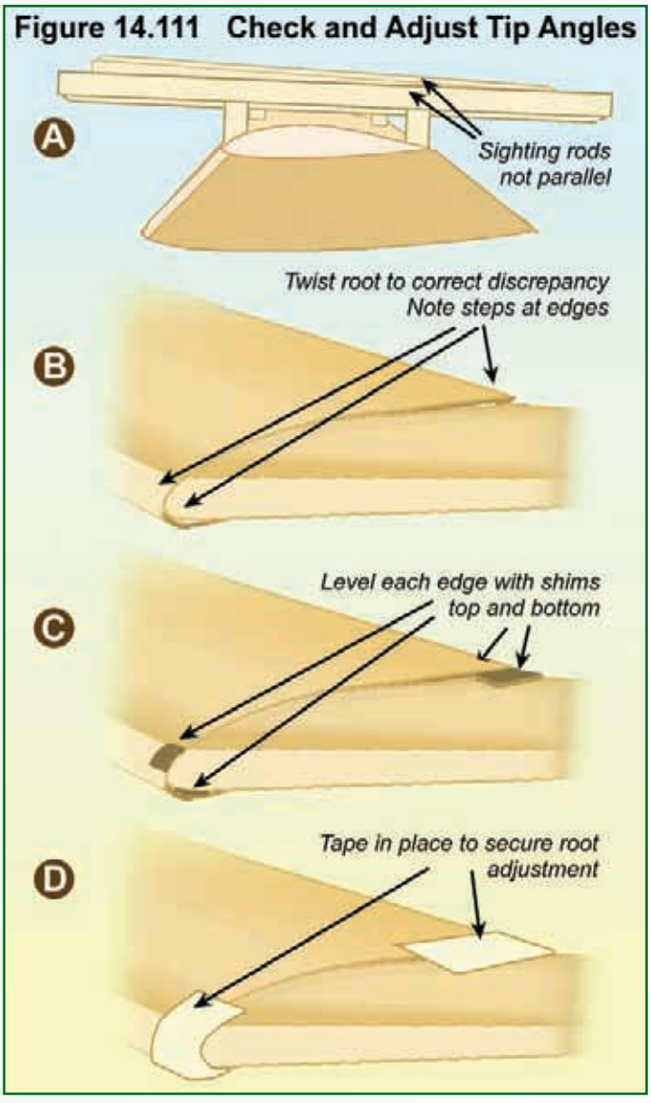
Remove any surplus adhesive that has been squeezed out, and lay the panels inverted on the bench (suitably protected with paper or polythene), touching at the root. In most cases they will make contact only at the thickest point on the upper edge, due to the curvature there. Stretch a length of masking tape spanwise across the joint at the thickest point so that the panels are pulled tightly together **(Fig. 14.110, A)**. Raise the joint off the bench until it closes fully and stretch two more strips across so it is held shut across the full chord **(Fig. 14.110, B)**, turn it right side up and let it settle back on the blocks. Now attach the sighting strips at the tips, stand back and sight over the length of the wing from the end that has the shorter strip. Adjust your sight line until the strips are roughly coincident **(Fig. 14.111, A)** and it will be obvious if they are at different angles (as shown),

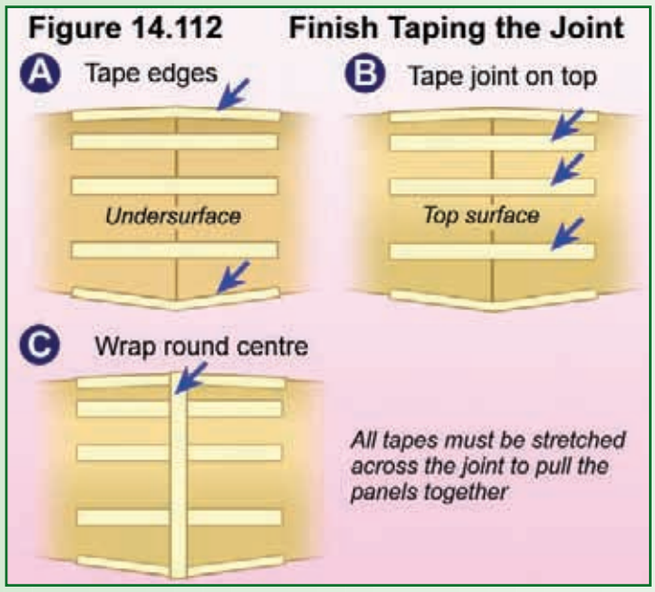
Figure 14.110 Glue and Tape the Joint



implying that so are the chord lines at the tips. If this is the case, twist the panels at the centre joint until the sighting strips are dead parallel This will give a small step across the joint at either or both leading and trailing edges **(Fig. 14.111, B)** - better a small step at each than one larger one. Place shims of balsa or ply, the thickness of the steps, at each side of the joint **(Fig. 14.111, C)** right on the leading and trailing edges (two shims will be underneath) and immediately wrap masking tape round each edge **(Fig. 14.111, D)** to hold the shims in place and fix the edges in position. Alternatively, balsa leading and trailing edges may be fixed in this position with cyano. This should lock in the adjustment made to the panels at the centre joint, but may need a little further adjustment or different shims if

Figure 14.111 Check and Adjust Tip Angles

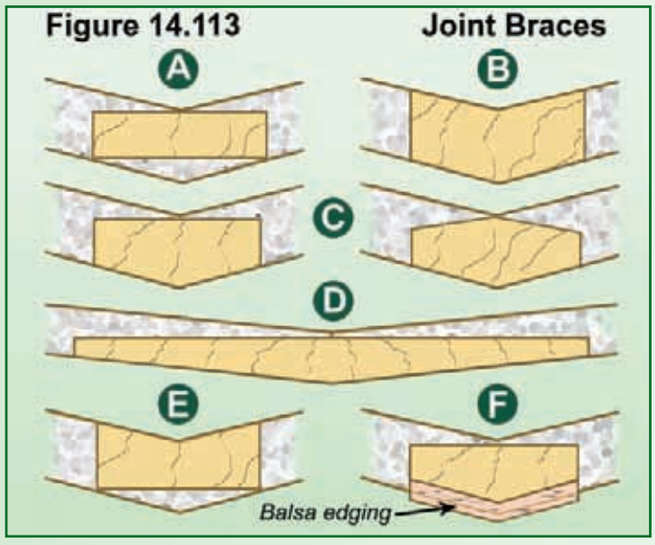




the sighting strips are now not quite parallel.

When satisfied, stretch a strip of masking tape along the leading edge (and wrapped around it), and another similarly along the trailing edge **(Fig. 14.112, A)** while keeping the dihedral, and then carefully turn the wings over and stretch more strips of tape across the joint on the other surface **(Fig. 14.112, B)**. These will almost certainly lift off the joint as they are stretched across the "V" formed by the wings, and will need another strip, or maybe two, stretched chordwise around the joint and over them to keep them under tension **(Fig. 14.112, C)**. Rub them down as it is applied, and finish by wrapping the ends round the leading and trailing edges and over the whole joint on the underside. Stand the wing on the bench and put the blocks and packing under the panels in the appropriate positions and check that the dihedral and tip angles remain correct: make sure that the centre remains in contact with the bench, weighting it if necessary. Weights should be placed as near the centre-line as possible to avoid bending the panels and having them spring back later with the wrong amount of dihedral.

With the centre joint made and set, the joint braces can be prepared and slots cut to house them. Braces can be cut as plain rectangles **(Fig. 14.113, A)**, to match the section of the wing across the joint **(Fig. 14.113, B)**, or tapered **(Fig. 14.113, C)**; each of these shapes has different advantages and disadvantages. From the point of view of bonding the panels together, the greater the gluing area the better, but the tapered shape has a better distribution of strength and lessens the sudden change in strength at its ends, reducing the chance of the panel breaking at the end of the braces. Provided that several braces of different lengths are used, this is unlikely to occur anyway, but if there is only a single one, then I would recommend that it is made quite long with a gentle taper to narrow ends **(Fig. 14.113, D)**. Try to avoid making a brace with a sharp internal angle at the centre **(Fig. 14.113, E)**, as this puts its weakest point right where it needs to be strongest (B is only a little better), and although it may be no narrower there than the width of the simple rectangle in A, the shape means that much of the stress on it will be concentrated at the apex of the angle. Stresses are concentrated wherever there is a discontinuous change in material strength, so there is an increased chance of breakage occurring there. This is why several

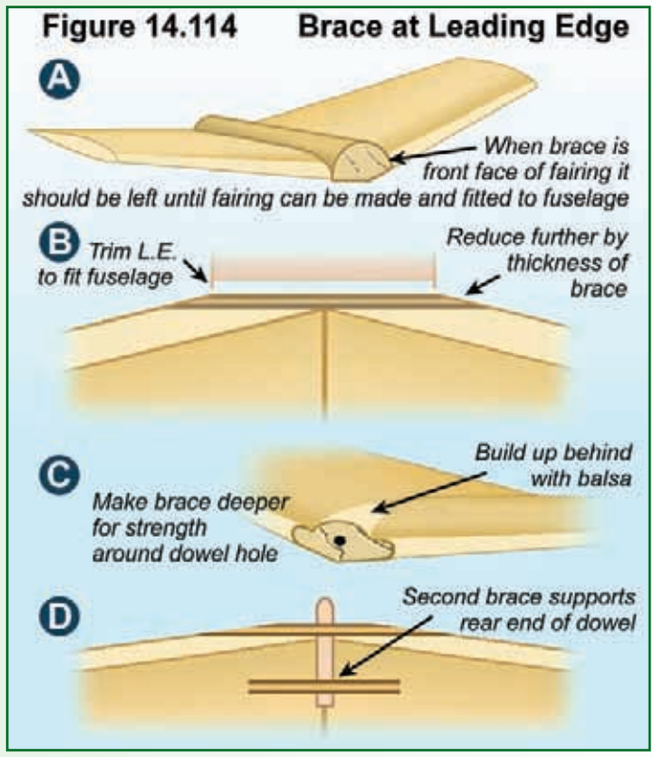


differently sized braces are better than one, and why gently tapering braces with narrow ends are better than untapered ones. In all cases they should be cut with the grain of the external layers of ply running spanwise for maximum strength.

When the braces are inserted into one face so as not to come right through the wing, it can be quite difficult to match the inner edge to the inside of the other surface of the wing. In most cases other than on a parallel-tapered unswept wing this edge would need to be curved to match precisely, and even more so if the wing is swept. Hence it is simpler to make the inner edge either straight or with a plain taper (as in C), which also makes it easier to rout out the slot to the correct depth.

Generally the worst part of fitting braces is finishing them off after fitting; sanding the edge of a piece of ply flush without damaging softer balsa or veneer skins is quite difficult. This problem can be avoided by making the braces a little narrower than the section into which they are to fit and edging them with soft balsa **(Fig. 14.113, F)** that will stand proud when they are in, and can then be sanded flush more easily. Alternatively, they can be made shallower than the slot into which they are to fit, sunk beneath the surface, and the gaps filled with balsa afterwards to be sanded flush. If the braces are to pass through both skins, both edges can be capped in this fashion.

Often there will need to be a brace or facing across the leading edge, which will frequently be cut off flat to butt against a former in the fuselage. Where this brace also forms the front of a fairing attached to the wing to blend it into the fuselage **(Fig. 14.114, A)**, it is wise not to fit it until the fuselage is built and the wing can be seated, so it can be aligned and shaped correctly. In other cases, where there is no fairing on the wing, the brace can be fitted at this stage; wing fairings should not be fit-



ted until the centre-joint of the wing is braced and bandaged. If the apex of the wing needs to be cut off to fit the fuselage **(Fig. 14.114, B)**, it should be cut back sufficiently so that the ply facing can be fixed in position and shaped appropriately. Besides reinforcing the butt joint at the leading edge, this ply can support a dowel used to hold the wing in place, and then sometimes it is best to make it deeper so there is ample material around the dowel hole, if this extra can be accommodated, and build up behind it (later) **(Fig. 14.114, C)** with scrap balsa before drilling the dowel hole into the wing. Leading edge dowels are also made more serviceable by fitting another brace further back, through which the back end of the dowel can be located, and which will help to prevent the dowel from ripping the inside of the wing if it should be knocked askew **(Fig. 14.114, D)**. For 3/16" and 1/4" dowel, the second brace should be between about 11/2" and 2" behind the leading edge: any further and the dowel may break between the braces if subjected to sudden lateral shock, any less and the brace may be torn loose too easily. This distance may be reduced for thinner dowel or increased for thicker. In reality, it is better to glue a tube into the wing and have the dowel a good fit but loose in it, so that a broken dowel can be replaced without hassle. The inner end of the tube should be securely stopped so the dowel doesn't vanish into the wing, and a slightly larger hole will be needed, so bear this in mind when making braces for the leading edge. Having decided on the shapes of the various braces, cut them to size and sand off any splinters at the edges. ■

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AMI IS ACCLAIMED WORLDWIDE FOR THE QUALITY OF ITS CONTENT SO DON'T EVER MISS AN ISSUE...

WEBWALK

Mike Evatt walks cyberspace once more

Aurorra Limited claim to be the electric propulsion specialists! Their website may be found at http://www.aurorra.co.uk The staff at Aurorra, feel that in order to develop reliable and top quality products they need feedback from skilled pilots flying different models in the hobby. This feedback is evident in their product range. If you seek an electric power unit for your latest creation then take a look at their range of 600 watt brushless motors.

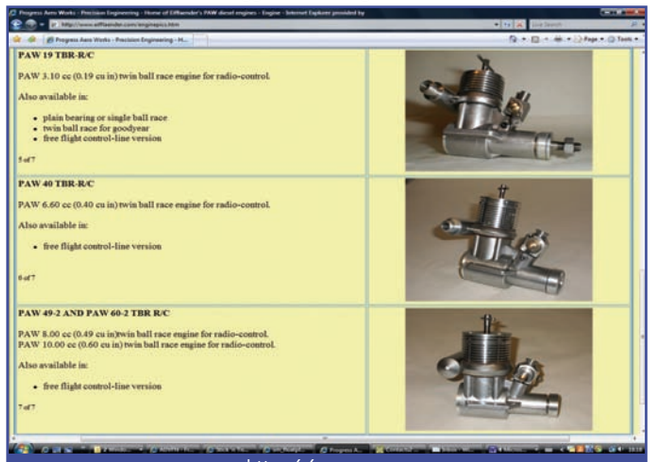
Progress Aero Works was set up by Gig Eifflaender at the outbreak of WWII. Gig was an accomplished control-line aerobatics flyer, by gaining victory flying aerobatics at the European Championships in Belgium and a host of other national events all using engines designed and built by himself. PAW is still a family business continued today by Gig's sons Paul and Tony. Their website at http://www.paw.ac gives details of their latest product range.

Control-line flying historically has been a convenient way to get into model flying for decades. Hangar 9 have recreated all the fun of control-line flying with the PT-19 Profile C/L 36 ARF model in the form of one of America's finest World War II trainers. In addition to its sturdy but light all-wood construction, the PT-19 also includes a comfortable easy-grip wooden control handle, a spool of braided music wire for the control-lines, a fuel tank and an aluminium spinner nut. With nearly every necessary component included and the illustrated assembly guide the PT-19 makes it easy for modellers to get into control line flying without any problems. Take a look at Horizon Hobby UK's website at http://www.horizonhobby.co.uk

Optifueltm is a new nitromethane based fuel for 2-stroke and 4-stroke engines of all sizes. It has been developed by professionals to give the user high power, excellent throttle response and a very clean burn with no carbon build up. Optifueltm is manufactured in a brand new flame proof plant designed specifically for the production of nitromethane based fuels and uses the latest weighing technology. Optifueltm is the product of extensive flight testing with hundreds of hours logged using the latest data logger technologies. The finest grade raw materials are used with 100% synthetic Klotz oil only. For more details log on to http://www.optifuel.co.uk

'Stick 'n Tissue' is the name of the Marin Aero Club blog. Its members are from all over the San Francisco Bay area and share a common interest in building and flying model aeroplanes. This website at http://marinaero.blogspot.com is a fascinating collection of information with many photographs and a great number of inter-

http://www.aurorra.co.uk



http://www.paw.ac

ABOVE LEFT: *Aurorra Limited claim to be the electric propulsion specialists.* **ABOVE RIGHT:** *Progress Aero Works manufacture some very respectable large diesel engines.*

http://www.horizonhobby.co.uk

http://www.optifuel.co.uk

http://marinaero.blogspot.com

ABOVE LEFT: *A PT-19 control-line trainer from Hangar 9.* **ABOVE CENTRE:** *Optifueltm is a new nitromethane based fuel for 2-stroke and 4-stroke engines.* **ABOVE RIGHT:** *'Stick 'n Tissue' is the name of the Marin Aero Club blog.*

http://www.t9hobbysport.com

http://www.hobbyplastic.co.uk

ABOVE LEFT: *T9hobbysport' is two guys based in Yorkshire.* **ABOVE RIGHT:** *Hobbyplastic.co.uk specialises in selling plastic products to modellers.*

esting links to follow.

'T9hobbysport' is two guys based in Yorkshire, importing high quality mouldies into the UK! The 'mouldies' they sell are all high spec and they can honestly say that they do what they are supposed to do, whether you are a slope-racer wanting to win an F3f competition or just simply enjoy the thrill of flying some of the best gliders in the world. They do not sell models that they would not fly themselves. Check them out at http://www.t9hobbysport.com

While the name MacGregor Industries is familiar to many modellers as a distributor of radio-control products, it is less well known that there is a separate division that operates as a very successful plastic engineering company. MacGregor Industries Ltd. (Plastics Division) is a supplier of machined plastic components, with a diverse customer base across military, civil aviation and medical engineering. As such they hold a vast stock of bulk plastic products in sheet and rod form, a selection of which are now available to modellers and craft enthusiasts via the Plastic Division's new web-site: http://www.hobbyplastic.co.uk Keep a sharp look out in the Off-Cuts section where the small left-overs from engineering jobs will be made available at bargain prices.

I have Ken Baker to thank for this next link. Log-on to http://www.scalesoaring.co.uk and follow the link 'Vintage gliders' then 'Documentation'. Then click Fafnir! Fafnir is a thing of beauty and was designed by Lippisch. Dr. Alexander Martin Lippisch was a German pioneer of aerodynamics who made important contributions to the understanding of flying wings and ground effect craft. His most famous design was the Messerschmitt Me 163 rocket-powered interceptor. Plans for a radio-control model (5.5M span) of this famous German glider are available free of charge for the benefit of the modelling community. Right click to download the Fafnir Plans - (2.1Mbytes) in PDF format.

http://www.scalesoaring.co.uk

http://www.telemastersalesuk.co.uk

ABOVE LEFT: *Fafnir is a thing of beauty.* **ABOVE RIGHT:** *The Telemaster is back!*

The Telemaster is back! This classic model is now available in the UK as a builder's kit or ARTF in a variety of sizes ranging from 3 ft (90cms) wingspan up to a massive 12 ft (360cms).

The Micro Telemaster is a fully 'built up' kit featuring traditional methods of construction. The only concessions to modern methods are the beautiful laser-cutting of all sheet parts and the recommendation to use CA glue. It is delivered in a sturdy cardboard box and comes with full-size plan and a very comprehensive set of instructions on 21 pages of A4 paper complete with appropriate photos. http://www.telemastersalesuk.co.uk is the URL if you want to know more.

ModelPower.co.uk is a family run business which started in 1992. They supply rechargeable batteries, chargers and many other accessories. They also attend many exhibitions around the UK and so you more than likely have seen them face to face.

Their web presence at http://store.modelpower.co.uk gives full details of their range of products which includes much much more than just batteries!

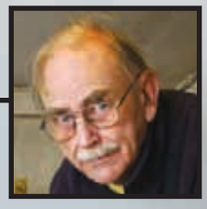
In 1949, a group of 11 very enthusiastic modellers assembled to form an organisation for those interested in model aviation. Their vision was for an association to officially represent the aircraft modelling fraternity in Canada. Today, the Model Aeronautics Association of Canada has grown from that group of 11 to a body of Canadian modellers over 13,000 strong, representing all facets of this exciting hobby, from the Atlantic to the Pacific and is the official governing body for model aviation in Canada. Their web gallery at http://www.maac.ca has many interesting photographs.

That's all there is time for from me this month so go push that button and if you find something out there of interest that might be good to share, email me at mikeevatt@hotmail.com ■

http://store.modelpower.co.uk

http://www.maac.ca

ABOVE LEFT: *ModelPower.co.uk for all your battery needs and more.* **ABOVE RIGHT:** *Excellent images from Canada.*



My Big Ship cruises past. I really love the relaxation of this model after all my hairy aerobatic aircraft.

MILLER'S TALES

Reminiscences of aeromodelling in warmer climes, plus a brass tube bending trick and personalised pilots

Winter blues

At this time of year, when Sundays are often wet, windy, cold and generally miserable, it doesn't take long for me to be wishing I was back in Aden. Having said that, last summer wasn't much better but at least the rain was warmer.

We had a great club at R.A.F. Khormaksar. The clubroom had been built out of old packing cases and was equipped with fans and even a fridge. The weather was hot, often 120°F in the shade in the hot season. In the cool season it was too cold to go swimming when the temperature dropped to 80°F.

There was no rain. Well, not strictly true. I saw two days when it rained in my time out there. There was a windy season and that meant blowing sand and dust but I do not remember it stopping us from flying very often.

We had a control-line circle right outside the clubroom and we would fly there every evening. We did get the odd noise complaint from the footballers. They claimed they couldn't hear the referee's whistle. They were told to get a bigger pea! Football was played on a hard gypsum surface, not grass. Footballers got horrible grazes when they fell and these took ages to heal.

Team Racing in front of the club in Aden. Left to right: Ray, Mick Biddick, Jock Reid with Roy as pit crew.

Free-flight and radio-control was flown out at Sheikh Othman airfield, an abandoned desert airfield. We used to book a three-ton truck to get the club there. Because of the heat we would leave the clubhouse at about 4 a.m. and get to the field as dawn was breaking. We would fly until about eleven and then come back to camp.

Quite often we would not bother to go to bed and just spent the night building and nattering until it was time to go. Some of the club members were married and lived in married quarters; they did their building at home. The rest of us worked in the club. It was a very close-knit group. We spent most of our off duty time in the club and if one person decided to go to town to the model shop several others would go along as well. Likewise we would go to the pool or the camp cinema as a group.

There were two shops in Steamer Point that sold modelling equipment. Engines were dirt cheap compared with the UK and we could buy O.S. and Enya engines as well as Frog and Davies Charlton. One little incident

sticks in my mind. One morning I was off duty and was running up an Enya 60. No silencer in those days, of course. An R.A.F. police Land Rover pulled up and the 'snoop' said something, but of course I couldn't hear a word over the engine.

It was not a good idea to upset 'snoops' too much so I stopped the engine and he asked me to stop running the engine as the Medical Officer who was running the families clinic in the nearby Family Centre couldn't hear anything through his stethoscope!

Needless to say, I did.

Bending brass tube

I needed to make an extension for the silencer on my SC 30 FS as the existing pipe was aimed directly at the wing hold down bands. Now one can buy flexible tube or silicone tube but I wanted it right then.

Looking through my stock of materials I found some 1/4" bore brass tube. Now anyone who has tried bending that knows that it will kink instantly. However there is a technique which I knew of from my days as a maintenance fitter, although I had never tried it myself.

You will need a small gas torch and a lot of small pieces of lead. Lead shot is ideal. You will also need some safety goggles. Plug one end of the tube with some hard wood. And stand it upright. Play the gas torch at the lower end of the tube and feed the lead down into it. Move the torch up and down so that the lead melts without any voids or gaps. Done this way it is unlikely that the lead will spit out of the top but keep you face away from the top of the tube.

All-night building session before going to fly free-flight in the dawn. Bob fast asleep.

When the tube is nearly full, stop and allow it to cool completely. Do not try to cool the tube artificially. The tube can now be bent, preferably round a former. There may be some very slight kinking on the inside of the bend but nothing serious. Once you are satisfied with the shape, all you have to do is melt the lead back out.

At one place I worked they had some material called Cerrobend. This was just like lead

A street in Steamer Point. There were two shops selling modelling supplies in the town.

My brass tube extension, with the gentle bend formed by filling the tube with lead.

ABOVE LEFT: *This is my best side! You need a left and right side or you can flip the picture.* **ABOVE RIGHT:** *The picture with all the background removed.* **BELOW:** *The picture glued to the canopy. This is the right side view, or course.*

but would melt in boiling water. Unfortunately I never acquired any for myself. I see that one can now buy 'Bendalloy' and that does the same thing.

Safety notes. Always use goggles and gloves in case the lead spits. It can do this if there is any moisture around. By applying the heat to the tube low down and feeding the lead down the tube you should avoid any trapped air which might also cause a spit back.

Put yourself in the cockpit

I was building a semi-scale profile control-line model and decided to put myself in the cockpit! This is a well known technique used on Peanut scale models and small indoor R/C models.

You just need two photos, one from each side, preferably taken against a clear blue sky. These days getting them to the correct size is easy. I will tell you how I did mine.

It helps if you have a reasonable photo program. I used Photoshop Elements 2, but others can do the same thing. Select the portion you want to used and then use 'Invert' so that you are selecting the background. Using Brightness, increase to maximum and then reduce contrast to minimum. If you have a pale blue background you can skip this stage.

Save the pictures and then open a plain page in your word processing program. Now insert the pictures. Take a cut out shape of the canopy or cockpit. Click on the first picture. This should bring a frame round it. Place the cursor on one corner and hold the left mouse button down. You can now drag that corner in and out. This will reduce the size of the picture until the pilot's head fits the cut out frame of the canopy.

Just cut this out and stick it onto your profile model's canopy or a piece of scrap sheet balsa profile pilot if you have an open cockpit and then fuel-proof the picture.

Taming a brute

Recently we have had a couple of incidents where a propeller change has made a huge difference to the model's flight performance. The first was my Big Ship, a 130% version of the Little Ship. This model has a wing span of 58" and about 600 sq. in. of area and is quite light.

Due to a slight building error I had about 1(too much negative incidence on the tailplane. As a result the model kept rearing up as soon as I applied any power. I was using a wide blade 9 x 6 on the SC 30 FS so I changed this to a narrow blade prop of the same size. This tamed the problem until I could alter the tail incidence.

Strangely enough, the next example was with a real Little Ship. This one is electric-powered and fitted with a brushless motor turning a 10" prop. It has been flying for years using NiCads but the owner decided to go the LiPo route.

On his first flight with the new setup he couldn't control the model, it was all over the sky and every time he opened the throttle it tried to turn on its back. The massive amount of extra thrust and the torque were far too much for the model.

I gave him an 8 x 4 prop and that cured the problem. Now he flies round in the same way as he used to but for about half an hour instead of the previous ten minutes.

One of the old dodges used for trimming free-flight models was to fit the propeller backwards. This reduces the power dramatically while still allowing the engine to be set at full r.p.m.

A club member, who shall remain nameless, wondered why his model just would not fly properly. In the end we spotted that he had fitted his prop on the wrong way round. ■

AMI AVIATION MODELLER INTERNATIONAL PLANS SERVICE

R/C SPORT POWER

AMI July 2004

DANCING GIRL

Plan price £12.50. Plan No.255

Semi-scale R/C model based on the diminutive American 'Cosmic Wind' racers, this 53" (1346mm) span fully aerobatic machine suits .46 cu.in two stroke engines, or .52 four strokes. Four function radio required.

AMI April 1996

MILITARY COMBAT PAIR

Plan price £12.50. Plan No.122

For something diffferent, try streamer-chasing aerial combat with these profile fuselage R/C stunters. Quickly built and expendable. Plan shows two different fuselages and common wing.

AMI Nov 1996

ROTACK

Plan price £11.50. Plan No.161

Twin rotor autogyro for engines of about .25 cu.in. and three function radio controlling rudder, elevator and throttle. It's great fun!

AMI March 2003

TRISHA

Plan price £12.50. Plan No.224

An easy to build and friendly to fly 60" (1524mm) span sport/trainer for .15 to .25 two strokes or .20 to .30 four strokes and 3/4 channel R/C. Can also be flown with electric option using Speed 600 motor.

AMI June 1997

DUCK SOUP

Plan price £13.50. Plan No.044

Something very different for those in search of a real break with convention ! A 62" span pusher canard model for .45 2-strokes and 4-function radio. Has first class flying characteristics and flies as though "on rails".

AMI Jan 1999

HAZY DAZE

Plans & Patterns price £13.50. Plan No.087

Vintage style fun flyer, using 2-3 function R/C, or can also be flown free flight. 64" (1626 mm.) wingspan model suits .10-.15 cu. in. motors and highly detailed plan comes complete with pattern set for the major components.

AMI Sept 2002

OL' SAM

Plan price £13.50. Plan No.140

Vintage style 66" (1676mm) wingspan sports R/C model for rudder/elevator/throttle controls. Easy to build and great for those calm summer evenings. Recommended power range, .30-.40. Two sheet plan

R/C SCALE ELECTRIC

SOPWITH PUP ELECTRIC

FSM Nov/Dec 1999

Plan price £11.75. Plan No.173

Geared 400 size motor powered sport scale model of the ever popular British WW1 Scout aircraft for 3-function R/C. 36" (914mm) wing span.

AMI March 1996

SKYBIRD 40

Plan price £12.50. Plan No.174

Snappy sportster, which is simple to build, with constant chord wing planform. Offers sparkling performance on any engine in the .35-.40 range. 4 function radio normal, but could be flown with only two function gear operating aileron and elevator. Wing span 53". (1346mm).

AMI April 1997

CHAMPION

Plan price £14.75. Plan No.027

Here's a really big aerobatic trainer, right in the large model class. 96" wingspan, smooth flier, designed for 28 -42cc motors like the Champion spark ignition. Features conventional wooden fuselage structure and foam core wings. Utilises Scale Sopwith Pup cowl. Four function radio. Big, two sheet plan.

AMI Nov 2001

SUNDOWNER

Plan price £10.00. Plan No.236

Moulded cowl £15.00

66" (1680mm) span shoulder wing R/C sportster for 4-function R/C equipment features simple square-box basic fuselage with rounded top-deck and foam core wing construction. Power range is .30-.40 two stroke, or .40-.56 four stroke

FSM Sept 2004

B.Ae NIMROD

Plan price £19.50. Plan No.258

The R.A.F's maritime recce / anti submarine patrol aircraft, modelled by renowned electric scale expert Chris Golds. 86" (2185mm) span model flies on four Speed 400 electric motors, driving pusher props. Full step-by-step written instructions.

AMI Aug 1998

RAY'S BIRD

Plan price £14.50. Plan No.157

A big, super stately 72" (1829mm) span high wing sports R/C model for rudder, elevator and throttle controls and .40-.60 cu.in. motors. Ideal for those who appreciate a steady, no- drama flight pattern. (Two sheet plan).

AMI April 1997

MEAN MACHINE

Plan price £12.50. Plan No.133

Designed by David Boddington this is a compact, 49" span aerobatic model for .32-.46 2-strokes and 4/5 function radio. A lot of fun for those who want more out of their model flying than straight and level stuff!

AMI Sept 1996

EL FORTE

Plan price £12.50. Plan No.058

46" span fighter style delta wing for .35-.45 motors and three function radio. One piece airframe employs completely conventional balsa/ply construction. Pusher engine installation.

FSM Mar/Apr 1998

De HAVILLAND VAMPIRE

Plan price £17.50. Plan No.041

Electric powered ducted fan replica, 930-6 size motors and fans such an Wemotec/RK720/ Turbo 1000 etc. Wing span 59" (1500mm) for 4/5 function R/C. (Two sheet plans).

AMI Sept 1997

GROIN STRAIN

Plan price £11.25. Plan No.084

An ultra simple, ultra aerobatic fun-fly model for .20 - .36 motors. 47" (1194 mm) wingspan for four function radio control systems.

AMI Feb 1996

FAN PHANTOM

Plan price £11.25. Plan No.060

Semi-scale replica of the McDonnell Douglas F-4 Phantom, designed for ducted fan operation with .21-.25 cu.in power. Requires four function R/C. 28" (711mm) wing span.

R/C SPORT ELECTRIC

AMI June 1997

SOU'WESTER

Plan price £10.00. Plan No.179

Electric powered duration style R/C model for three function R/C gear on rudder, elevator and speed control. 58.5" (1485mm) span, for speed 400 type motors

AIRCO DH2

FSM Jan/Feb 2001

Plan price £11.75.

Plan No.003

Sport-scale model of the early British WW1 fighting scout aircraft.1/9th scale model spans 37.5" (953mm) and is electric powered using 400 size motor and three function controls on rudder, elevator and speed control. One-piece airframe.

AMI Nov 1997

INTERCEPTOR

Plan price £15.00. Plan No.094

A 72" (1829mm) wingspan, sports parasol with the air of a 1930s "fighter". Suits four function R/C systems and engines around the .40 size.

AMI Aug 2001

JOLENE

Plan price £12.50. Plan No.096

Low wing sports aerobatic design for 4-function radio systems, featuring simple fuselage structure and constant chord wing. 60" (1524mm) wingspan design suits .25-.30 size motors

AMI Aug 2004

PIXEL

Plan price £12.5. Plan No.254

Styled on the Keil Kraft rubber powered 'Pixie', the delightfully shaped Pixel is an R/C sports flier for geared 400 size electric motors and three function radio on rudder, elevator and throttle. Wing span 50.2" (1275mm)

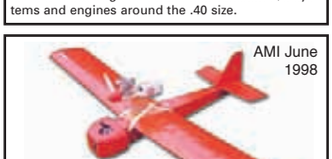
FSM Feb 2003

KIRBY T31-M MOTOR TUTOR

Plan price £13.50. Plan No.219

An elegant 72" (1830mm) span motor-glider for Speed 600 electric motors and 4-channel R/C.

AMI June 1998



SKY EYE

Plan price £12.50. Plan No.170

Purpose designed model for aerial photography, uses simple, practical layout. Plan shows camera installation in nose pod. Wingspan 72"(1829mm), for 45-50cc motors.

AMI Feb 1999

WARRIOR

Plan price £11.25. Plan No.213

A 52" (1321mm) wingspan profile sport scale model of the Italian SIAI Marchetti SF260. Uses veneer/foam construction and builds into a one-piece model. For four function R/C systems and .32-.40 cu.in. motors.

AMI Feb 2001

TROOPER

Plan price £11.50. Plan No.197

A 48" (1220mm) span sports model with a touch of the 1930's trainer, designed for geared 400 electric power and 3-function R/C

FSM May 2003

PFALZ E.1 EINDECKER

Plan price £12.50. Plan No.229

An electric powered model of Germany's 'other' WW1 eindecker fighter, it's easier to build than the Fokker. This 67" (1702mm) wing span model is designed for 600 size motors - the prototype used a Robbe Planeta geared 3.75:1, driven from an 8.4v. power pack.

FSM Sept/Oct 1999

MORANE SAULNIER TYPE N

Plan price £11.75. Plan No.114

A 42" (1067mm) wing span sport scale model of an early WW1 fighting scout, designed for geared 400 size electric motors and three function R/C gear on rudder, elevator and speed conrols.

AMI Aug 1999

PIGLET

Plan price £11.25. Plan No.143

Handy sized 36" (914mm) span slope soarer with a fast and furious performance on 2-function R/C driving aileron and elevator controls.

FSM Mar/Apr 1998

YOKOSUKA MZY-7 'OHKA'

Plan price £11.75. Plan No.216

Something completley different. The Japanese WW2 rocket kamikaze, designed to be aerotowed to height before firing Estes rocket motors. 38.5" (980mm) span foam wing. Aileron, elevator and rocket fire control functions, plus tow release

FSM Mar/Apr 2001

D.H. 103 HORNET

Plan price £22.50. Plan No.052

80" (mm) wingspan sport-scale replica of the hottest production piston engined fighter ever. Suits engines .40-.53.

FSM May/June 1999

NIEUPORT 11 ELECTRIC

Plan price £11.75. Plan No.130

A 33" (838mm) wing span sport scale model of the French WW1 fighting scout, designed for geared 400 size electric motor power and 3-function radio operating rudder, elevator and speed controls.

AMI Feb 1998

PATRICIAN

Plan price £12.50. Plan No.147

Here's a fine sailplane for slope soaring, flat field or cross country work. 112" (2845mm) wingspan model features flaps and requires a minimum of 4-function radio control.

AMI Dec 1998

HOWARD DGA-6 'MISTER MULLIGAN'

Plan price £14.00. Plan No.119

A 1/8th scale, 46.5" (1180 mm) scale model of the 1930s American racing aircraft. Practical lightweight airframe, with basic fuselage box-frame around which the scale stringered fuselage shape is developed. Construction shown for all-wood engine cowl and wheel spats. Suits .20-.25 cu. in two stroke motors, or .25-.30 four strokes and four function R/C equipment. Two sheet plan.

FSM Sept/Oct 2000

MILES MAGISTER

Plan price £13.50. Plan No.250

1/7th scale, 57.75" (1466mm) span model of the WW2 RAF trainer aircraft, designed for .40-.50 size motors. Both conventional wood and foam core wing construction shown.

CONTROL LINE

AMI Oct 1996

FIFTY FOUR

Plan price £11.25. Plan No.064

An attractive vintage style control line stunter for 2.5-3.5cc diesels or glow motors. Wing span 37.5"(953mm).

AMI Nov 1998

TIMBERLEENA

Plan price £11.50. Plan No.200

A 60" (1524 mm.) span, high performance slope soarer, featuring tough balsa and plywood construction. V-tail model can be flown with just elevator and ailerons or with a "mixer" for "rudder/elevator" tail surface control, can easily handle strong wind conditions but is also quite a "floater" for use in light winds. Highly aerobatic.

FSM Aug 2004

STITS PLAYBOY

Plan price £14.50 Plan No.260

Build this classic and cute little homebuilt aircraft from the 1950's era. 47.5" (1270mm) span sport-scale model can be flown on .20-.30 cu.in two stroke engines or .30-.40 four strokes. Four function radio control system required

FSM April 2003

POLIKARPOV I-152

Plan price £24.50. Plan No.227

A 1/6th scale 67" (1702mm) span model for 120 and larger four stoke engines, designed for 4 channel R/C. Five sheet plan.

AMI Sept 1997

WILD BOY

Plan price £11.25. Plan No.212

Control line aerobatic model with attractive radial style cowl for .09 (1.5cc) motors.

AMI Aug 1997

MINI DRAKE

Plan price £10.00. Plan No.126

A 63" (1600mm) span power-assisted sailplane for free flight or 2-function R/C, using a 0.75-1.5cc motor or electric equivalent.

FSM Apr 2002

FLETCHER FD-25B DEFENDER

Plan price £11.75. Plan No.059 Canopy £15.50

A 54.5" (1384) span model of a 1950s counter-insurgence ground attack aircraft. Features simple constant-chord wing and requires a .30-.40 size two-stroke motor and minimum 4 function radio. Optional scale flaps also shown on plan

AMI June 2003

ZLIN 50 L/M

Plan price £13.50. Plan No.251

Graham Smith's 54" (1372mm) span sport scale aerobat suits .40-.46 two-stroke or .52 four stroke engines. 4-channel R/C operates this 1/6th scale model.

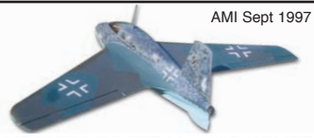
AMI Dec 1995

FROG PROFILE MOSQUITO

Plan price £11.50. Plan No.066

The kit for Frog's once popular control line profile scale D.H. Mosquito has long since ceased to be available, but control line fliers can still get the plan. 36"(914mm) span model suits two 1-1.5cc motors.

R/C SCALE GLIDERS



AMI Sept 1997

MESSERSCHMITT Me 163B KOMET

Plan price £12.50. Plan No.123

A 44.5 inch (1130 mm) wingspan scale slope soarer (PSS) design for 2-function radio control systems.

FSM Mar/Apr 1998

MILES HAWK SPEED SIX

Plan price £19.50. Plan No.115

Magnificent 1/4 scale model of the 1930 Kings Cup air racer spanning 99" (2515mm). Requires 4-function R/C and .90-1.20 cu. in. motors.

FSM July/Aug 2001

ALBATROS DII

1/4 Scale Plan No.007. Price £22.50
1/5 Scale Plan No.009. Price £22.50

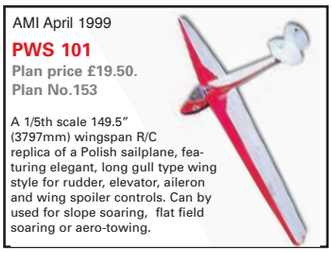
Classic German WW1 fighter are available in 1/4 and 1/5th scales. Larger model spans 83.7" (2125mm) and suits 25cc motors, while the 1/5th scale version spans 66.9" (1700mm), for .90-1.08 cu.in motors.

AMI June 2001

STUNTFIRE

Plan price £13.50. Plan No.191

Semi-scale control line aerobatic model based on the Supermarine Spitfire. 59" (1500mm) wingspan model suits .40-.60 motors.



AMI April 1999

PWS 101

Plan price £19.50. Plan No.153

A 1/5th scale 149.5" (3797mm) wingspan R/C replica of a Polish sailplane, featuring elegant, long gull type wing style for rudder, elevator, aileron and wing spoiler controls. Can by used for slope soaring, flat field soaring or aero-towing.

AMI Sept 2003

MESSERSCHMITT Me 109

Plan price £11.500. Plan No.294

A 43" (1092mm) wingspan sport-scale model of the famous German WW2 fighter. Designed for ,25cu,in size two-stroke engines and up to four function radio control equipment. Minimum controls are aileron and elevator.

AMI Dec 1996

CURTISS JN4 'JENNY'

Plan price £17.50. Plan No.038

81" wingspan 1:6.4 scale replica of the classic American biplane. Easy to fly with all the character of the full size. Suits .52 -.75 motors and four function radio.

AMI June 2002

Mr. BRICKHAUS'S OPUS

Plan price £12.50. Plan No.141

A proven contest winning control line aerobatic design, by respected US aerobatics expert Allen Brickhaus. 690 sq.in. wing area model utilises foam wing construction and is designed for .61 size motors

FSM Jan/Feb 1999

VI DOODLE BUG

Plan price £11.75. Plan No.206

The V-1 "Buzz Bomb" of WW2 replicated to 40" (1016mm) span, for Estes rocket power or PSS, with aileron, elevator and rocket fire function controls.

FSM Mar/Apr 2000

MITSUBISHI ZERO

Plan price £17.50. Plan No.113

A 63.4" (1610mm) span scale model of the famous Japanese WW2 fighter aircraft. Plan shows flaps and retracting undercarriage, including tailwheel. Suits .45-.60 cu.in motors

FSM Feb 2004

FOKKER D.VII

Plan price(either scale) £26.50.
1/4 Plan No.241 1/5th Plan No.242

WW1 fighter aircraft modelled to both 1/4 and 1/5th scale by Australian R/C WW1 scale expert Gary Sunderland. 1/4 scale version spans 82.5" (2095mm) and is designed for 30cc (1.8 cu.in.) two-stroke engines. 1/5th scale model spans 65.7/8" (1673mm) and suits 15.cc (.90 cu.in.) four stroke engines. Three sheet plans.

R/C GLIDERS & SAILPLANES

AMI May 1997

MINIKIN

Plan price £11.25. Plan No.127

Compact, 48.5" (1232mm) slope soarer for 2-function R/C operation on ailerons and elevator.

R/C SCALE I.C POWER

AMI Aug 1996

PIPER SUPER CUB

Plan price £16.50. Plan No.146
Cowl £22.50

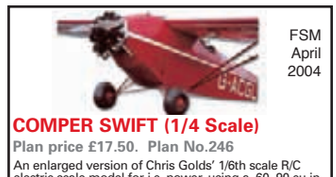
A great first-time scale model for novices and sport fliers who want real scale accuracy. 79" (2002mm) span 1:5.33 scale model suits .40-.60 range of engines. Two sheet plan. Glass fibre cowl available.

FSM Mar 2002

CURTISS P-40 KITTYHAWK

Plan price £11.75. Plan No.037

54"(1370mm) span sport-scale replica of the American WW2 warbird, designed for .52 size four stroke motors or .40 two strokes. Both foam core and conventional balsa built up wing construction shown. Model designed to take off from simple wire drop- off dolly, shown on the plan.



FSM April 2004

COMPER SWIFT (1/4 Scale)

Plan price £17.50. Plan No.246

An enlarged version of Chris Golds' 1/6th scale R/C electric scale model for i.c. power, using a .60-.90 cu.in. four-stroke engine or equivalent two-stroke engine. This is a straight blow-up of Chris' original and no proving prototype has been built - but it is a perfectly workable enlargement, showing increased wood sizes as appropriate. Wing span 72" (2835mm).

FSM July/Aug 1998

ULTIMATE 10-300

Plan price £16.50. Plan No.204
Glass fibre cowl £22.50
Cockpit canopy £15.50 Wheel pants £17.50

Fully aerobatic scale replica of the full-size competition machine. 55" (1400mm) span model suits .90- 1.20 cu. in motors and 4-function R/C. (Two sheet plan).

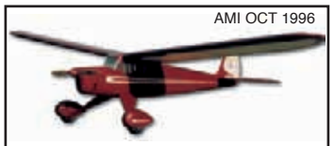
De HAVILLAND DH89a DRAGON RAPIDE

FSM Nov 2003

Plan price £24.00. Plan No.234

A 60" (1524mm) wing span replica of the famous biplane light airliner for two 400-size electric motors. All-wood conventional airframe, with blue foam for double-curvature fairings on the engine nacelles. Three-sheet plan, complete with detailed step-by-step written building instructions.

AMI OCT 1996



MERCURY 3

Plan price £20.00. Plan No.116

96 ". of sheer elegance for free flight or R/C assist and engines of .60-.90 cu.in. Rudder and elevator control surfaces shown. A real beauty.

AMI JULY 1998

WOODBURY GORSE BASHER

Plan price £11.25. Plan No.214

A high performance Open Rubber free flight contest model with a string of competition successes. Features geodetic wing structure and diamond section fuselage. 52.5"(1334mm) wing span.

FSM May/June 1998

SE5a

Plan price £24.00. Plan No.183

Practical 1/5th scale 64" (1626mm) span replica featuring accurate rib-for-rib airframe structure. A good size model, without being too big for transport. 4-function R/C required. Three sheet plan set.

FREE FLIGHT SPORTS

AMI Dec 1995

VANNUS & VANNUS MINOR

Plan price £12.50. Plan No.208

A tailless free flight sports model for .049 i.c. motors or equivalent electric power -spans 42" (1067mm). Smaller version spans 28" (711mm), designed for Cox .020 or KP01 electric power.

FREE FLIGHT SCALE

FSM SEPT/OCT 1998

BRISTOL M1C MONOPLANE SCOUT

Plan price £11.75. Plan No.019

A 46.5" (1181mm) span free flight scale model of the British WW1 scout aircraft for 1.5cc motors. Can be converted to R/C.

FSM Nov/Dec 2000

GLOSTER GLADIATOR

Plan price £17.50. Plan No.078

The RAF's last fighter biplane, a classic of it's era, modelled to 1/7th scale with a wingspan of 54.5 (1384mm). Suits .46-.60 motors.

AMI Feb 1997

SALAAM

Plan price £12.50. Plan No.165

A 50" span scale like free flight biplane with all the air of a pre WW2 R.A.F. patrol flying boat. Designed for two .75cc (.049 cu. in) engines or similar.

AMI JAN 1998

LOCKHEED C-130 HERCULES

Plan price £13.50. Plan No.111

Four engined free flight ... and it works! A 54" (1393mm) span electric powered model for four KP01 motors. Basic fuselage is foam block

FSM June 2008

FAIREY GANNET A.S.1

Plan price £19.50. Plan No.065

A 1/8th scale 81" (2057mm) span model of the Naval search aircraft. Flaps and retracts shown, plus bomb doors, extending radome and tail hook, plus optional folding wings. Minimum of 4-function R/C. (Two sheet plan)

AMI Jan 1996

ODDIE 94

Plan price £12.50. Plan No.137

A 39.5" (1003mm) span sports free flight model in the style of dawn-of-aviation craft, for engines like the Mills .75 diesel. Simple open frame construction.

FSM March 2003

FOKKER SPIN (SPIDER)

Plan price £11.75. Plan No.136

A 1/8th scale free flight version of Anthony Fokker's 1913 "Spider". 54" (1375mm) span model for 1.5cc diesel engine.

DE HAVILLAND CLASSICS

FSM Sept/Oct 1997

De HAVILLAND DH 60 MOTH

Plan price £19.50. Plan No.054

An 80" (2032 mm) wingspan, 1:4.33 scale replica for .90 - 1.20 cu. in. motors and four function radio control systems.Two sheets .

AMI Feb 1996

GLORIOUS GLADYS

Plan price £10.00. Plan No.076

A free flight sports biplane, loosely styled on the famous Gloster Gladiator biplane fighter. Spans 32.5" (826mm), for 0.75cc (.049)motors.

FREE FLIGHT CONTEST

AMI May 1998

THIRTY SOMETHING

Plan price £10.00. Plan No.201

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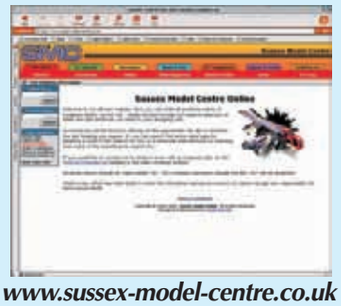

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