

Electric Flight

INTERNATIONAL

JUNE 1998

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**FREE
PLAN**
JET TRAINER
FOR ELECTRIC
DUCTED FAN

Dortmund

THE WORLD'S BIGGEST MODEL SHOW

Cricket

KIT REVIEW OF A NEW TRAINER
AND A FUN AILERON MODEL

Nieuport 12

PLAN REVIEW
OF THIS BIPLANE FOR 400s



GUIDANCE FOR BEGINNERS
HELICOPTERS AND AUTOGYROS

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Electric Flight

INTERNATIONAL

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Editorial

**The customer is the most important person in any transaction.
Are you getting the models you want? Are you in the right place?**

Buying trends

There is another show - Intermodellbau Dortmund - in this issue, it is probably the world's biggest model shop and model show. There will be more in the next issue, Sandown, UK and Toledo, USA. These are all great entertainment for visiting modellers in the non-flying season and good reading for those for whom it would be too long a trip to visit a show.

There seem to be more model shows than there used to be - and they are bigger. They are enormous markets, almost no brand and no type of model flying is not represented. Dealers compete for your custom. You can get some "very good deals" at model shows.

They are not only confined to the 'non-flying season'. At many Fly-ins and Model Flying Shows, traders are present. At the last 'Wings and Wheels' at North Weald in the UK - which used to be a flying show and is still primarily a flying show, there were about 80 traders last year and not many of them were selling ice cream or hamburgers. A lot of modellers go there not only to watch flying demonstrations but to buy.

Older model builders will remember when the only source of model components was the local model shop - and there were a lot of them - even a small town had at least one. Now they are less common, it takes a big town (or several small ones) to support a model shop. There are reasons. Retailers will tell you that there are fewer modellers and I'm sure they are right - but those still flying models are spending much more money. Equipment is so advanced and of course it costs more. Some equipment like RC gear actually costs less in real terms (the

early proportional RC gear cost almost as much as an economy family saloon). The cheapest 'engine' used to cost ten times as much as the model kit you bought for it; now a basic electric motor may be less than one tenth the price of the model you buy to put it in.

We do things differently now. We buy models that are already built or very pre-fabricated. Someone is earning a living building models for those who can afford to buy and I am pleased for both parties. My grandma would never have gone out to purchase a steak and kidney pie that someone else had made - times have changed. Look at the model reviewed in this issue by Jon Tanner. There is no 'building' to do but he had to install equipment and cover it. This is a very cost effective way of owning a high performance model. Some kits need even less work on the part of the buyer.

Buying

This is what it is all about. We all buy. What do we buy? Where do we buy? All model flying areas have become more specialised and there are more of these specialist areas. That is why some model shops have disappeared. They would need

big premises and need to carry enormous stocks to satisfy all their potential customers. Very few can afford to do this. They either specialise and customers come a long way to visit them or they are located near a conurbation big enough to support a big shop.

Mail Order

If you do not live near to a model shop that stocks components for your own specialist sphere of interest you will need to buy by mail order. Many shops survive this way and some companies sell only by mail order. Similarly, some modellers purchase only by mail order.

Selling trends

The sub-heading may say 'selling' but it is buying habits that have created it. There are many dealers whose major occupation is shows/fly-ins/flying displays every weekend of the summer months. 'Model Exhibitions' were once just that, now they are very big markets. There is space for all these different ways of buying and selling and both sides need to adjust - "The times they are a-changing". (The editor does not claim credit for that aphorism.)

Think about it

If you want to be able to visit your local model shop in order to see first the goods you wish to buy, you will need to spend more time and money there. If he does not have the strange model you want, ask him to get it - that helps both of you.

If you like to go to shows to see the variety offered by ten or even one hundred dealers before you buy, that is fine too. You may have to do it this way one day.

You may prefer to purchase by mail order and in fact you may be helping both types of dealers

mentioned in the last two paragraphs. Mail order may maintain a reasonable level of trade for each of them.

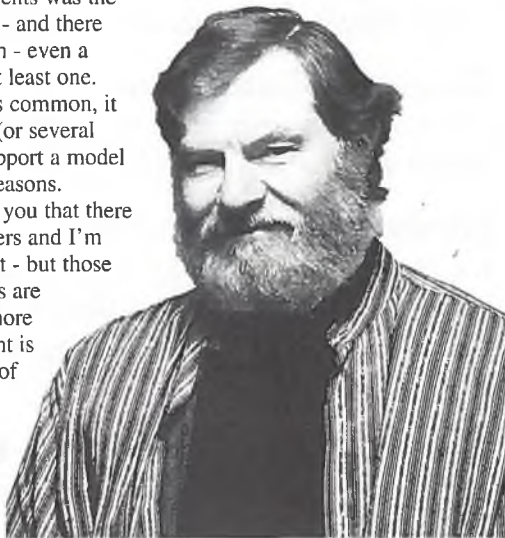
It is you the customer who has created this market. Some of you may wish to disagree with this statement but if the majority of you had not bought the way you did for the last few years it would not have developed this way. Think positive - you can get whatever you need now, you just get it at a different shop or you buy it in a different way.

Information

Manufacturing will continue anyway, the goods will always be available. You need to decide where you want to buy, it is possible that all these systems will not only survive but grow. The important thing is INFORMATION and it is the customer who needs it and I believe WANTS it. This is why we report shows, this is why we report new products in columns like 'Current Affairs'. If you know of something you want - ask for it. If you want something you don't see - search the magazines (preferably this one) or search the websites. If you have something to sell - ADVERTISE it. The only ones out there who will not be happy - buying or selling - are those who do nothing about it. **EFI**

EDF

Last year this editor asked on these pages if anyone would like an Electric Ducted Fan meeting this year, somewhere in the UK. The only reply was from the guy who suggested it in the first place - Chris Golds - so I did not organise one. BUT, Brian Gaskin has booked his club field for one on June 7. See the 'Diary Dates' page. I know at least two guys who will be there with some very impressive EDF models.



ELECTRIC FLIGHT

Interested?

Then, newcomer or expert, why not join the British Electric Flight Association and enjoy these benefits.

- Quarterly Magazine, 'Electric Flight U.K.' which features product news, technical articles, construction techniques and projects by some of the leading exponents in their fields.
- Technical Help - all members are entitled to use our free technical help service.
- Events - a full program of competitive and fun-fly events are held throughout the year.

UK Membership cost only £17.00, so why not join today? (Overseas subscriptions also available) For a membership application form, please send an S.A.E. to:- the Membership Secretary, 123 Lane End Road, High Wycombe, Bucks. HP12 4HF U.K.

FANFARE

- MAIL ORDER - SPORTS ELECTRIC FLIGHT FANS AND GEARBOXES

Fans

Morley 'Jet Elec' Fan	£15.00
Adaptors & Fittings	
for Speed 400	£6.00
for Super 400 + 410/12	£3.00
EJT Fan for 400 / 480's	£25.00
EJT Fan for 540's	£30.00
EJT Cobalt Fan	£35.00

Motors

W.E.P Turbo 10 +	£55.00
Fanfare 'Silver' 16T	£30.00
Fanfare 'Gold' 550 size, 22T	
BB with big brushes	£40.00
Speed 500 E Race	£16.00
Speed 500 PB	£10.00
Speed 600 7.2 BB SP	£18.00
Speed 600 12v Turbo	£20.00
Speed 600 8.4v Race	£18.00
Speed 650 9.6v BB Race	£35.00
Speed 700 / 7-14	£15.00-£45.00
Speed 400 4.8, 6, 7.2v	£5.50-£7.00
Power Plus 410/12	£12.00
Speed 480PB	£16.00 - BB £22.00
RE380 ..£4.50 - LRP Super 400	£43.00

MAX CIM BRUSHLESS MOTOR

NEW - neodym magnets - extra torque.
With 21 cell controller£280

Connectors - Cable - Fuses
Capacitors - Nuts & Bolts - Wheels
Silicone Grease - Electrolube Cleaner
Bits & Pieces

GEARBOXES

Master Airscrew 2.5, 3, 3.5:1	£15.00
Superbox	£38.00
MG 2BB CNC for 400's & 540's	£30.00
MG Twin 400 / 480 BB	£35.00
MG Twin 550	£48.00
Mini Olympus	£7.50
Olympus	£11.00

Motors & Gearboxes

Speed Gear 400 FG3	£18.00
Speed Gear 400 4:1	£35.00
Planeta 400/35/3.7:1	£33.00
Speed 600 FG3	£18.00
Speed Gear 600 2.8:1	£43.00
Speed Gear 480 4:1	£47.00
Speed Gear 700 2.7:1	£60.00
Speed Gear 700 Neodum	£78.00
Mini Olympus / RE380	£11.50
Olympus / RE540	£18.00

Props

M.A. Folding 12x8	£12.50
15x12	£13.50
M.A. Wood Electric 10x6/10x8	£3.50
11x7/11x9	£3.75
12x8/12x10	£4.00
13x8/13x10	£4.25
Plastic Folders 8x4 1/2	£3.80
7 1/2x5 1/2	£3.50
6x6	£6.50
Selection of Graupner & Aeronaut Folders	
Slimprops 8x4 / 9x5	£3.50 / £4.50

DSB CHARGERS

DX15 Composite Pulse Charger	
4-8 Cells - Discharge facility	£99.00
Speed One Charger	
Pulse/Peak Detect 4-8 Cells	£23.00
Speed Ex Digital	
as above with Discharge	£50.00

Post & Packing - Small items up to 1 motor 50p/ Motor & fan Unit - £1.50 and more - £2.00

FANFARE, 18 HILLSIDE ROAD, TANKERTON, WHITSTABLE, KENT, CT5 3EX.
'Sports Electric' Helpline - Phone/Fax: (01227) 771331.



JES JETI - Electronic Speed Controllers

FVK Modell are now importing the Jes JETI Range of electronic speed controllers in the UK.
Available in two ranges, with BEC or OPTO.

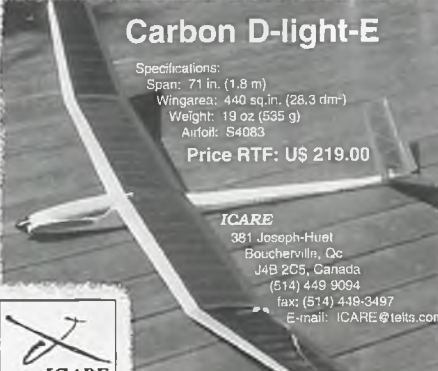
The Jes 05 to Jes 50 Range of Controllers, caters for 5 Amp to 50 Amp, and operate on 6 to 10 Cells. With BEC and Brake facility. (Individual model specifications may vary).

The Jes 40 to Jes 150 Range of Controllers, cater for 40 Amp to 150 Amp and operate on 8 to 30 Cells. With or without Brake. These OPTO Units feature galvanic separation so Do Not have the BEC facility.

Supplied with leads.

For full details and price list contact:

FVK Modell, Brian Anderson, 206 Hilda Park, Chester le Street, County Durham, DH2 2X. ENGLAND
Tel 0191 3887649.
e-mail Address: Brian.Anderson@Onyxnet.co.uk



Carbon D-light-E

Specifications:
Span: 71 in. (1.8 m)
Wingarea: 440 sq.in. (28.3 dm²)
Weight: 19 oz (535 g)
Airfoil: S4083

Price RTF: US\$ 219.00

ICARE
381 Joseph-Huet
Boucherville, Qc
J4B 2C5, Canada
(514) 449 9094
fax: (514) 449-3497
E-mail: ICARE@telus.com

Web page: <http://www.jonclon.pat/~icare/icare.htm>

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Current Affairs

Every month, there are more new models and components. Every month you have even more to choose from.

Alpha Jet

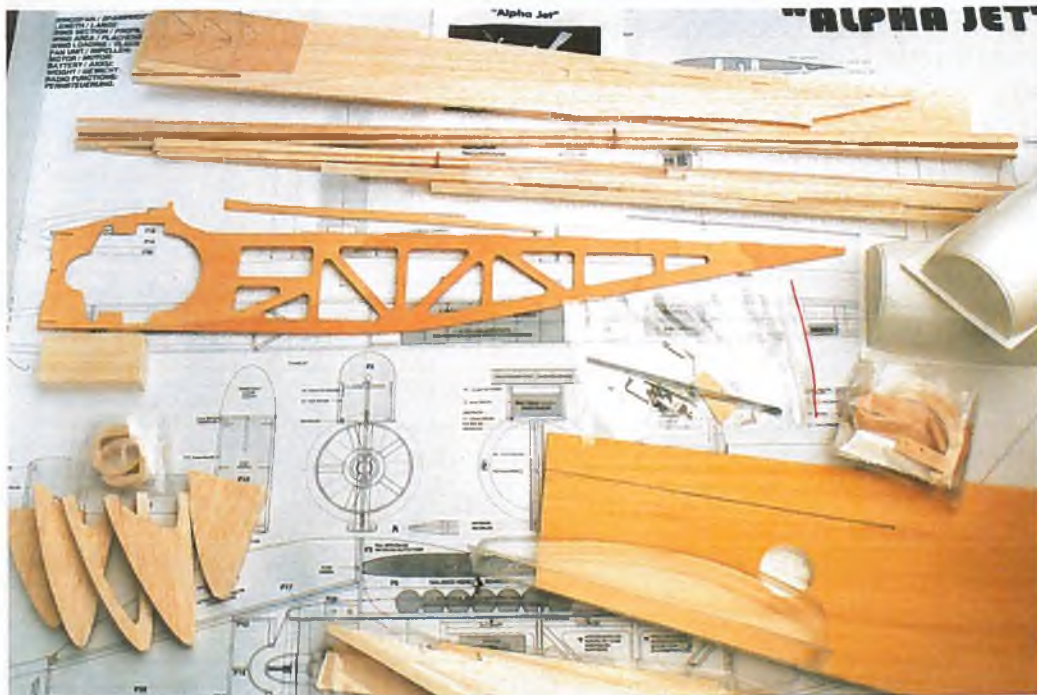
The photo displays the contents of the kit box. There may appear to be a lot of parts to this kit but it is really a simple model to assemble. If you refer to the photo in the Dortmund show report, with the exception of the nose, all the 3D parts of the fuselage are plastic mouldings and the wings are veneered foam. It was originally designed by Kurt Grosse and has been modified for production by Oliver Wennmacher of WeMoTec. This is a robust model but light enough to fly well on a low cost 20 turn 500/540 motor and 7 cells or is very lively with a rare earth motor with up to 10 cells. The recommended fan unit is the WeMoTec Eco Fan Pro but Eco Fan II is suitable if the 20 turn 500 motor is used. (The 'WeMoTec Eco Fan II' is what used to be the 'Electro Jet Technologies 540'.) The kit is available from WeMoTec in Germany, tel/fax: 02161 898492 or in the UK, tel/fax: 01270 588921.

Model Specification:

Span	1200mm (47")
Length	1150mm (45")
Wing section	RG 14 mod
Wing area	25.2 sq.dm (391 sq.in)
Wing loading	57g/sq.dm (17oz/sq.ft)
Motor	MG 20T, HP 290-20-6, Ultra 930-6
Battery	7-10 cells, 1700-2000mAh
Typical weight	1.45-2kg (51-70 oz)
Control	aileron, elevator, motor

Speed Controllers

Miller Technical Services (MTS) has developed a new controller to join its existing



▲ Alpha Jet kit components.



▲ MTS Minuteman speed controller.

range of motor controllers. Called the 'Minuteman' this is a 6 to 14 cell speed controller that can run at up to 25 amps for the duration of Sanyo 2000s. Functions include: Auto set up with visual indication. BEC up to 10 cells. Transmitter motor arming. User selectable brake and BEC Timed auto cut-off with Tx rearming. High Frequency 2.4kHz. Lost signal auto cut-off. Weight is approx 30g. Size is 40 x 25mm. Product test soon. Available for £34.95 add £1.00 for P&P.

Available from M.T.S. Miller Technical Services, 26, Beckett Road, Worcester, WR3 7NH. Tel/fax: 01905 453273. Email: jonathan.miller@virgin.net

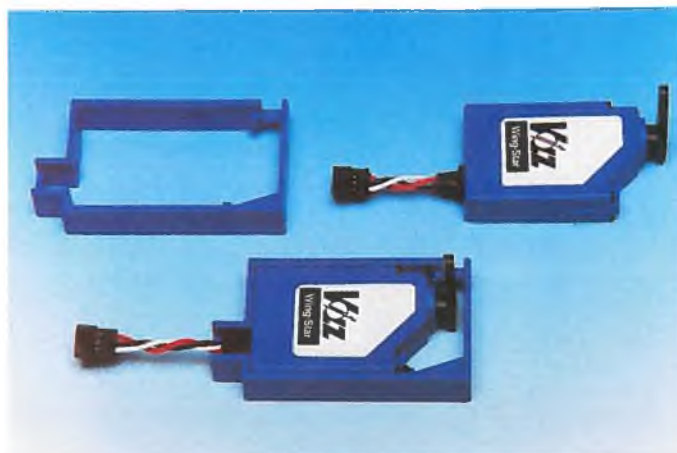
Volz servos

You have seen several times in show reports in this magazine, previews of a new slim servo from Volz. At Dortmund we were able to see a complete servo and it is in fact TWO new servos, the 'Wing-Star' and the 'Wing-Maxx'. The following is quoted from the MAS press release.

"New for 1998, these very slim servos are made exclusively for use in wing and fin, providing the shortest and most direct

drive to the control surfaces. They measure only 10 mm thick including the installation system. Two patents have been applied for: one for the case, another for the sophisticated wing/fin installation system.

"Both servos have ballraced bronze gears, and despite their extremely slim profile, are very powerful. They are supplied complete with mounting frame, aerodynamic covers, output arms and screws, instruction sheet, and VMS microconnector



▲ Volz Wing-Star servo in and out of its mounting frame.

Specification:

	Torque	Speed (40°)	Voltage	Weight
Wing-Star:	1.8 kg.cm	0.15 secs	@4.8V	23g (0.8 oz)
	2.1 kg.cm	0.12 secs	@6.0V	inc. mount
Wing-Maxx:	3.0 kg.cm	0.10 secs	@4.8V	23g (0.8 oz)
	3.5 kg.cm	0.07 secs	@6.0V	inc. mount

- together with a receiver adapter to match the buyers own equipment. The newly developed gear train reduces the number of gear stages from 5 to 4. This minimises backlash and increases efficiency, resulting in similar performance to our existing contest-winning Micro-Star 3 and Micro Maxx servos. Deep-toothed gear flanks and glass reinforced housings, make the installation very robust. The mounting system is a completely new design and is equally suitable for moulded models, veneered foam surfaces, or traditional built-up structures. Locking tabs locate the servo in the frame, which is then secured by simply inserting 2mm screws. In addition, pre-cut ply strips are supplied, so that when necessary, the recess within wing or rudder may be

reinforced. Both servos utilise the same reliable, high-performance 4-wiper potentiometer, proven in thousands of Volz servos. Motor and amplifier are all new, and like all Volz metal gears trains, the gears carry our unmatched 5-year warranty."

Dimensions: The complete installation system measures 29.7 x 48.6 x 10mm (1.17 x 1.91 x 0.39") externally.

Available early in July from: Volz Modellbau, Lilistrasse 83c, D-60367 Offenbach/Main, Germany, tel: 069 887070, fax: 069 88 76 35, polling 069 82 36 36 20. In the UK and Eire, contact Eddie Wild at: MAS Ltd, PO Box 707, Loughborough, Leicestershire, LE12 5ZT, UK. Tel. 44+ (0)1509 646415, fax. 44+ (0)1509 646415, email: volz@dial.pipex.com **EFI**



▲ Volz Wing-Maxx servo mounted in a mounting frame in veneered foam wing.



Starburst

Duncan Hutson is a three times National Champion (scale) and has placed second and highest placed Brit at world level. He knows what makes a good model. Duncan has gone electric. Duncan Hutson Models manufactures scale IC kit models and last year introduced the SE5A kit for electrics. (See 'Current Affairs' in the November/December issue of EFI - a kit review will be published soon.) Duncan has introduced another electric into his range with 'Starburst'.

Information below is from 'Duncan Hutson Models':

"This kit is specially designed for the sport flier. It is simple to build, easy to fly and features very quick nicad change CAD designed and all parts CNC cut to give slot together, self-aligning assembly. The top of the fuselage is all pre-formed with the front half including the canopy being removable to gain access to the nicads. A light-weight two wheel undercarriage

is included with tailskid enabling take-offs and landings from tarmac or reasonable grass flying sites.

◀ Very neat equipment layout in 'Starburst'.

Performance is extremely good on a Speed 600 motor with 7 x 2000 nicads and a typical flight time of 10-12 minutes incorporating all normal aerobatic manoeuvres. As well as the items mentioned the kit also includes a large CAD plan, full building instructions, "Starburst" logo, control horns, quicklinks, control tube & cable, hatch catch and all nuts, bolts etc."

Span: 1465mm (58")
Length: 825mm (32.5")
Weight: 1.3kg (3 lbs)

Price: £52.50 available from F2A, Gliders and West London Models or direct from Duncan Hutson Models, 33 Hartlebury Way, Charlton Kings, Cheltenham, GL52 6YB (plus £3.50 P&P).
Tel: 44(0) 1242 572451,
Fax: 44 (0) 1242 574975.

◀ Duncan Hutson Models 'Starburst'.

Letter from New Zealand

TOM CHARLSWORTH

Flying electric in New Zealand is like flying anywhere else. Club fly-ins can be plagued by terrible weather and non-flyers who complain about the noise.



I recently heard that a local and very successful electric flyer had said he would give up getting EFI as it always had articles about me and my models.

He seems to be missing the point that for the last eight years I have been promoting electric flight, both in Free Flight and RC. New Zealand is roughly the area of the UK but has only a population of about 3.5 million. Yet with all that space we are losing flying fields due to noise. Some people like to live out of town in 'Lifestyle' country homes and so do not wish to listen to noise i.e. IC models - on weekends or summer evenings.

Nationally, our numbers are dropping due to would-be aeromodellers of tomorrow being attracted to all the consumer durables available, to have time to build models. Then where do they fly them? As modellers, we don't want

▲ At the 'Auckland Soar'.

to lose the power flyers, as they are part of our great love of flight. They also to date outnumber us, but times are changing, so I am striving in my small way by contributing to EFI, an alternative in quiet electric!

Our NZMAA magazine 'The Fliers World' ignores electric flight. I submitted an article years ago on electric flight, and what we were doing; I wanted to know if there was any interest or activity in electric flight among other NZ aeromodellers but it was not published. Since then I have written in EFI and a number of electric fliers in New Zealand have contacted me.

This time, my news is nearly all about other electric flyers. I am sure the editor would welcome any further information on electric flight activities from other 'ELECTROMODS' in NZ.

Other guys

A fellow keen 'cobalt only' friend and club member Brian Harris has been kind enough to give me information on his three latest very successful models:

Vintage Slicker

This model is 60" (1525mm) span and provides 3 sq.ft

(28sq.dm) of wing area. The wing section was changed to an E193 to allow for the increased wing loading of 13-14 oz/sq.ft. Power is a Keller 22/9 driving a 11 x 7 fixed prop, direct drive with slight undercambered blades. Flying: the run up is short and climb out is vertical on a freshly charged 7 x 1700SCR pack. The glide in good conditions is a worry, and keeping the model down an effort!





▲ Brian Harris holding up 'Vintage Slicker', and 'Now Hear This' by the tail. 'Flick About' is in the foreground.



▲ Steve Payne, Cambridge MAC and his Playboy at local park. The model is silk covered and was originally IC powered. Now it has a Speed 700, direct drive on eight 1700 SCRs. Nice on wheels or floats.

Flick About

Brian wanted a model to throw in the car to suit any occasion, not just to be able to have a fly but capable of thermal aerobatic and fly-for-fun events. This is it:
span: 52.5" (1334mm)
area: 2.625 sq.ft. (24.4sq.dm)
wing section: RG 15
wing loading: 15 oz/sq.ft

motor: Mega Mini 7
energy: 7 x 1700SCR
prop: Aeronaut 8 x 5 folder
control: elevator, aileron & crow braking
speed control: Kontronik Opto 40-6-18

Performance is crisp with good penetration. Glide is intended to stretch flight time up to 10 - 15 minutes in calm air. Flight envelope is similar to IC powered models.

Now Hear This

For about four years Brian had a Keller 80/6 600 watt, 10 to 18 cell motor. Initial intention was for an electric powered slope soarer. One was built and went



very well but he chickened out using it on the slope as the loading was about 24 oz/sq.ft. and being very clean it went like a bullet. Consequently cross wind slope site landings were a concern. 'Now Hear This' was intended as a power model to establish the capability of this power plant.
span: 59.5" (1510mm)
wing area: 3.8sq.ft (35.3sq.dm)
wing section: E205
wing loading: 21 oz/sq.ft
motor: Keller 80/6
energy: 14 x 1700 SCR
prop: 11 x 7 (slightly undercambered)
control: aileron, elevator, rudder
speed controller: Graupner
power mos 56

The performance is well beyond expectations. The model is stable and flies very flat with excellent climb. Flight time can be stretched by climbing to 400/500 feet, levelling out and looking for some lift.

The next move

Brian says he is preparing to build a low drag scale model of similar proportions and wing loading but may purchase another 14 cell motor as 'Now Hear This' is so much fun.

Suchi

When I first saw the free plan for 'Suchi' in EFI I wasn't impressed. At our first fly-for-fun in September when one turned up built by Carl Brown of North Shore MAC I saw what it could do, I was very impressed. The photo shows the result with cosmetic improvement to the cockpit area - raised and faired into the wing. Great climb, very aerobatic, fun on the slope in light conditions and it thermals! What more could you wish for in small 400 powered fun flyer? I use 7 x 500ARs and 7 x 600AAs.

▲ In September our club held its second water-plane meeting at Lake D, one of the nearby lakes. Most models were IC powered but I took along my seven year old 'Lanzo Bomber' on floats and a 'Quaker Flash'. Friend Steve Payne arrived with a large electric Playboy which went well. All present had good time despite the rising wind and showery conditions.

Fly-ins

Late November 'Auckland Soar' sponsored a 7 x 7 electric fly in. As we had intended to be in Auckland that weekend anyway I went along. The weather for the last month had been showery and very windy, and seeing that the forecast was the same - winds gusting to 40 knots plus, I brought along only Suchi as it behaved rather well in normal winds.

No records were broken that day, but it was good to meet and talk shop with old and new faces. There were about 20 very keen fliers with models from 400s through to cobalts. In the cobalt range Astros seem popular in the area, while we in the Waikato seem to favour motors of European origin like Kellers and Megs.

The meeting was attended by members of North Shore MAC, Whenuapai, Hibiscus Coast, Auckland FF, Christchurch MAC and one very keen Englishman by the name of Les Stithbury who drove about 130 miles down from Kerikeri (far North) just to attend for the day! He is also lucky enough to 'follow the sun', 6 months in Devon, 6 months in NZ! He's on the right side of the photo. Only three brave - or foolish fliers entered the champagne fly-off, without champagne. I landed first due to far too much wind!
EFI

Jet Trainer

Free Plan



Lee Abbott, Brian's grandson and Chief Test Pilot for Gaskin Jets brings back a twin.

DESIGNED BY: BRIAN GASKIN

Get started in EDF with this easy-to-build, low cost 51" span trainer and sports model.

Getting started?

This will make an excellent introduction into EDF - Electric Ducted Fan models - and it is so versatile. It will suit several methods of building, flying and power requirements. You make the choices which will be interdependent with your other choices - let's look at them.

Building

How do you want to do it? Brian built this model (as he does with so many of his) around the wing from a 'Silver Streak' chuck glider. This is a very low cost, not very convincing model of an airliner, that you find in many model and toy shops for about £7.50. You plug it together and chuck it. Brian realised that the wings were the size of many 'cut foam' wing cores and the right price. He skins them with 1/16" (1.6mm) sheet balsa, adds a leading and trailing edge (or ailerons) and has a very serviceable foam core wing of about 51" (1295mm) span. It is already swept but if he needs a straight one he merely adjusts the roots. The core can be cut for shorter span wings or balsa tips

added to increase the span. You may even have a 'mothballed' Silver Streak that junior has finished with - requisition it!

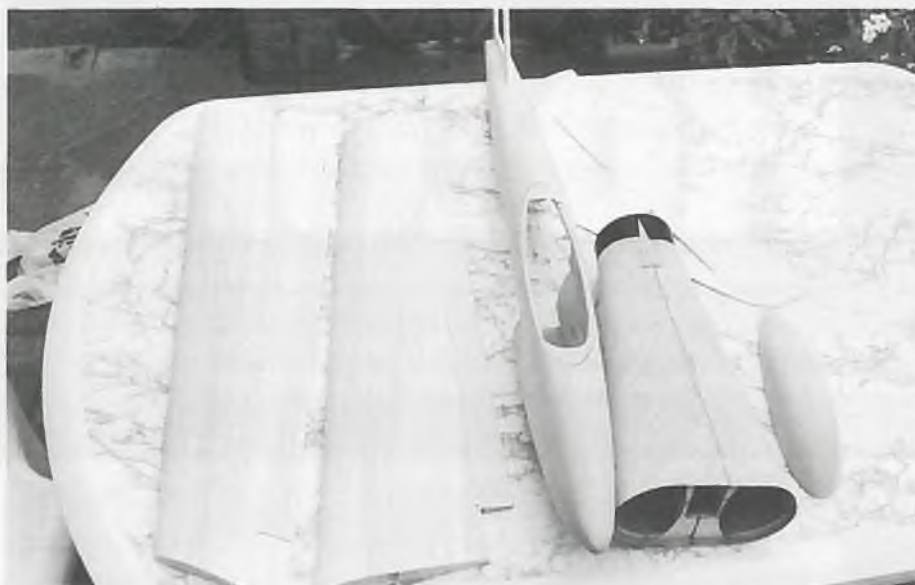
If you have problems procuring this glider, or prefer a built-up wing, this option too is provided on the plan, choose or let circumstances choose for you. You can of course cut your own foam cores if you wish.

▼ Ply inlet duct wrapped round a former not quite the same shape as the one on the plan.



▼ You can see the shape of the fuselage blends into the duct of the single.





▲ Another view of the duct.

◀ All the foam/balsa/ply components of the single ready for covering.

Power

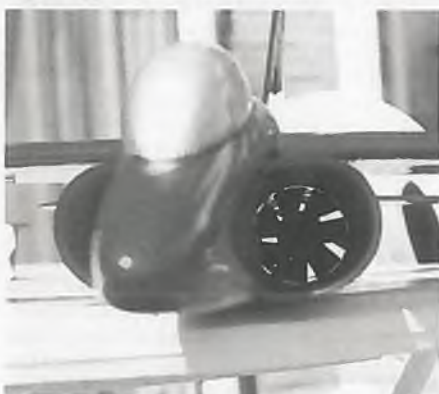
You will notice as soon as you look at the reverse side of the plan, that you not only do you have a choice of wing construction but of single or twin fan units! Brian has built both. His single uses a Speed 480 Race motor and his twin uses two Speed 400s.

Brian's models are built to accommodate the 'Gaskin 400' fan unit, available from him for £8.00 each and run well enough on Speed 400 motors. If you wish to use a hotter motor like the Graupner 480 Race or LRP 400 or Kyosho AP29, you will need to drill out the hole in the fan (for the motor shaft) to 1/8" (3.17mm).

Speed 400 6V motors may be run on 7 or 8 cells. Speed 400 7.2V motors may be run on 7 to 10 cells. Be cautious if you use more than 8 cells with Speed 480 Race motors. The original Jet Trainer uses Sanyo N-800AR cells. Be sure that the nicad box will accommodate the size of cells you wish to use.

Gaskin 400 fan units must be the cheapest available and are quite sufficient for the purpose of powering this model but there are others. If you wish to use any other EDF units with 400, 480 or 500/540 motors you may need to adjust the diameter of the rolled 1/64" (0.4mm) plywood ducts. It is a versatile and adjustable model!

▼ A 'Gaskin 400' assembled in a twin.



Flying

We hope that this is not your first aileron model. This is a light EDF model and hand launches easily, you will not need a bungee. Models like this are not easy to grip for hand launches so Brian has provided a 'dummy fuel tank' similar to that used by many jets. It makes

for an excellent finger grip. EDF models, like real jets do not start to work until they are moving so keep it level after launch until the speed has built up. Try to keep it flying fast too, you will soon discover how slow to not fly. Without the 'blown'

tail surfaces provided by a prop, response to control is slow at low airspeeds.

If you need another plan and cannot obtain a back copy of this issue of EFI. Plan MW 2671 is available from Electric Flight International (Plans Service), Traplet House, Severn Drive, Upton-upon-Severn, Worcestershire, WR8 0JL.

Tel: +44 (0) 1684 594 505.

Fax: +44 (0) 1684 594 586.

E-mail: general@traplet.co.uk

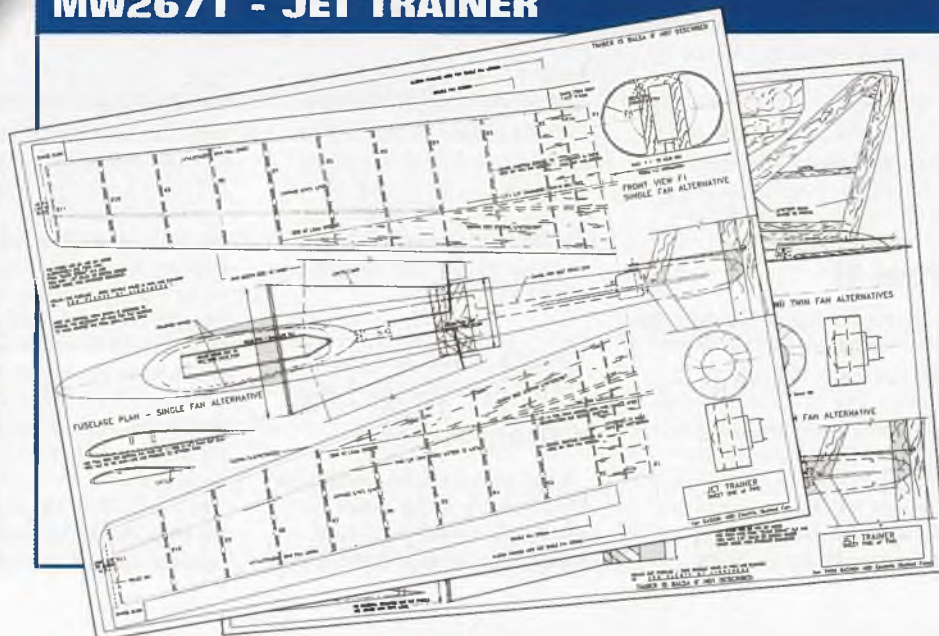
The plan is price code F which at the time of going to press was £5.50/\$9.50 plus post and packing of £2.00 for UK orders, £4.00 for Europe & Worldwide orders or shipping and handling charges of \$6.80 for USA orders. For more information on Traplet Publications plans service see our advertisement in this issue.

Gaskin 400 fan units are available from: Gaskin Fans, 157a Main Road, Sutton-at-Hone, Kent, DA4 9HW, for £8.00 each.

Have fun, try more EDF models, try more fan units, try multi fan models, fly safely. **EFI**

◀ The single assembled.

MW2671 - JET TRAINER



Quiet Rotors

MIKE GOULETTE

A mixed selection of interesting rotorcraft this month, with a successful autogyro, a new Pixel, bee stings and a potted history of electric helicopters.

Juan to Watch

It is always a relief to get the first flight of a new model safely completed and it is also particularly satisfying when it is your own design that has flown successfully. I was very happy and relieved, therefore, when the Quiet Rotors gyrocopter took to the skies for the first time recently. The model, now called 'Quiet Juan' has two 30" (762mm) diameter rotors and is powered by a Mega S7 on 12 cells turning a 12 x 6 Graupner grey prop. The motor is only drawing just over 20 amps at full chat but it provides plenty of power for what is basically a pretty draggy machine. It will tootle around quite happily on half power providing you keep the speed up, however, the drag rises rapidly at both ends of the speed envelope and you have to be careful not to get on the back of the drag curve at slow speeds as it needs height to recover from the equivalent of a stall in a conventional aircraft. It will hover quite happily in a breeze and looks very pretty just sitting in the sky. Our esteemed Editor has loaned me a geared Speed 700 kindly provided by Gliders of Newark, to try in it to see if it will cope with a cheaper drive train. All being well, QJ will be published here in EFI later this year, I just need to find time to draw up the plans properly!

Pixel III

Alexander van de Rostyne has now completed and flown his latest variant on the Pixel theme. This uses conventional micro RC equipment and a Speed 300 motor and flies extremely well. Alexander is sending me some pictures for the next column but in the meantime I have included a



▲ Alexander van de Rostyne's latest Pixel III. A very attractive looking helicopter. More details next time.



▲ 'Quiet Juan' makes a slow pass for the camera.

photo from his newly updated website ([Http://WWW.planet-internet.be/Pixel/](http://WWW.planet-internet.be/Pixel/)). It is a pity that there is not a commercial helicopter on the market that is similar to this, Alexander has had hundreds of people wanting to buy copies of this and his earlier Pixels.

Floats Like a Lead Balloon, Stings Like a (honey) Bee

I had an interesting letter from Paul Brooke on the subject of the dreaded Honeybee. Paul bought one of these machines

about eight years ago when they first appeared in the UK. He built the model as specified in the Pidgin English handbook but on first running it up to speed ready to lift off, some of the parts flew off at high speed. Paul repaired it but was defeated by the poor quality of the swashplate and the tail rotor bevel gear. Over several subsequent years he machined new parts for the model, reassembled it and got it a few inches off the ground before it all flew apart again.

In a final fit of desperation, at the back end of last year, he repaired and rebuilt it all again



▲ 'Quiet Juan' at rest.

and made a new tail drive using a separate motor connected to fixed pitch tail blades. Unfortunately it was all a waste of time, as Paul says: "The dear little Honeybee will not fly. With sufficient input power to achieve lift, the mechanics fall apart and are just too flimsy to support the rotational forces. I finally have to admit defeat and give up, half knackered from mental exhaustion and frustration. I have achieved a slight momentary hover on several occasions but no flight over a period, on and off, amounting to seven or eight years. Just enough excitement to spur me on to the next round, with 100's of fun hours spent remaking and rebuilding".

It all sounds like dedication above and beyond the call of duty to me Paul, however, thanks for sharing your experience with us. I am still waiting for some tortured soul to give me a Honeybee to play with, maybe they are all being used in NHS therapy classes!

A History of Electric RC Helicopters

The following potted history of Electric helicopters was drawn up by Kiyoomi Kataoka from Japan and published on his web site at <http://agusta.ms.u-tokyo.ac.jp/agusta.html>. Kiyoomi has done an excellent job of tracking down some of the more obscure helicopters from around the world, although I was surprised to see that he missed our favourite, the Honeybee! I



▲ Kiyoomi Kataoka's Vario Silence in a Heim Agusta body shell.

will try to follow up on some of the more unusual models over the next few months, for now, however, here is Kiyoomi's table which I have reproduced as he published it. The first half of the table is for Japanese helicopters and the second half is the rest of the world. Kiyoomi says that the table is still under construction so, if you have any additions or corrections please let me know and I will pass them on to him.

Kiyoomi has a Vario Silence which is fitted in an Augusta A109 body and for which he has just acquired an Aveox 1817/3Y brushless motor and that leads me nicely in to the next item....

Just Like London Buses

You wait ages for one electric motor to arrive and then two come at once! I had ordered an Aveox 1415/5Y for my Vario Silence back in January, however, Aveox had lost some staff and were very busy so I did not get it until the Toledo show in the USA in April. During the same week, Ian Mander from F2A Supplies got me a Kontronik Heli motor, which is designed for the Mikado Logo (see above) from the Dortmund show in Germany. So I now have two motors and a large hole in my



▲ Kiyoomi's Silence with the Aveox motor installed.



wallet. Unfortunately I forgot to order a metric front end for the Aveox so I will have to make a new motor mount for it. The Kontronik should however drop straight in so it will probably fly first. I will report on the comparisons in a future column and, of course, on the performance of the Silence. I also hope to try the motors in the Moskito Sonic that I featured here last year. Ian Mander tells me that he is discussing with Mikado the possibility of importing the Logo so this should be an interesting year for big electric helicopters.

◀ Aisonic's micro helicopter in a Bell 222 shell.

Year	Name	Maker	Rotor Diameter	Voltage (cells)	Motor	Total Weight	Body, Features
1981	Skylark EH-1	Ishimasa Japan	1020 mm fix. pitch	9.6V 600mAh	Mabuchi 540 twin		Bell 47 aluminium chassis
1985	Master EH	Aisonic Japan	500mm fix. pitch	8.4V 600mAh	Mini-trix long (280 class)	500g	Jet Ranger aluminium chassis
1987	EH 550	Aisonic Japan	500mm fix. pitch	8.4V 600mAh	Mini-trix twin (280 class)	550g	Bell 222 aluminium chassis
1988	EH650 Hummingbird	Aisonic Japan	520mm fix. pitch	8.4V 600mAh	AM30 (380 class)	650g	aluminium chassis mini gyro
	EH650 Hummingbird long rotor	Aisonic Japan	620mm fix..pitch	8.4V 600mAh	AM30	650g	Canopy or Jet Ranger, aluminium chassis mini gyro
	Tobuzo MH202	Yuji Product Japan	625mm fix. pitch	7.2V 600mAh	Mabuchi RK-370PD twin (280 class)	550g	Aluminium Chassis
1991	Convert	Kyosho Japan	530mm fix. pitch	8.4V cable	Kyosho AP29 (380 class)	440g	Simulator system
	Convert EX	Kyosho Japan	585mm fix. pitch	8.4V 600mAh	Kyosho AP29BB (380 class)	640g	Canopy or Hughes 300
	Baron Whisper	Kalt Japan	950mm	9.6V 1100-1700mAh	Mabuchi RX540VS (540 class)	1150-1350g	Canopy or Huey Cobra
	EP Concept	Kyosho Japan	912mm	8.4V 1000-1700mAh	Kyosho AP36 (540 class)	1250-1350g	Canopy or Jet Ranger, Hughes 300
	Hirobo's Shuttle E-conversion	Puma Japan	(Shuttle)	20 cells 1700mAh	Astro Cobalt 40-8T		Pinion gear, motor mount, 24 V controller
1996	EP Concept SR Gyro Saucer	Kyosho Japan	912mm	8.4V 1700mAh	K speed heli (540 class)	1400g	Canopy or Jet Ranger, Hughes 300
	Baron	Keyence Japan	1250mm	20 cells 1700mAh	Astro Cobalt 40-8T	3800g	
	Alpha Electric Hyperfly	Kalt Japan	580mm	7.2V 1100mAh	Kyosho AP29HP	700g	No tail rotor 6 min
1991	Hirobo's Shuttle E-conversion	Speed Models Swiss	(Shuttle)	20 cells 1700mAh	Geist 45/9		
1993	Silence Electro	Vario Germany	1500mm	24-30 cells 1700mAh	HV 355 or Ultra2000-7H	4500-5000g	6-8 min Canopy or many FRP bodies
1994	Logo	Mikado Germany	1500mm	30 cells 1700mAh	Ultra2000-7H	4500g	8 min Canopy or Jet Ranger FRP body
	Falco Electro	Vario Germany	1340mm	24 cells	Ultra1600-8H 1700mAh	4300g	Canopy or many FRP bodies
1993	Trainer E	Graupner-Heim Germany	1155mm	24 cells 1700mAh	Ultra1600-8H	4000g	Canopy or Ecuriel FRP body
1994	Uni-E Trainer	Graupner-Heim Germany	1320mm	28 cells 1700mAh	Ultra2000-7H	5000g	
	Eco 8	Ikarus Germany	1060mm	6-12 cells 1700mAh	540 class sport type	1300g	8-14 min flight, Canopy or Jet Ranger
	Eco Lite	Ikarus Germany	760mm fix. pitch	6-8 cells	540 class performance type	1150g	2 channels no tail rotor
	Eco 16	Ikarus Germany	1200mm	14-24 cells 1700mAh	Heli 16 (Plettenburg?)	1650-2050g	13-17 min. flight, Canopy or Jet Ranger
	Heli 24 (E-motor with pinion gear for Shuttle)	Mega Czech	(Hirobo's Shuttle)	24 cells 1700mAh	Heli 24	(400g)	6-8 min.
1996	Bingo	K. Pustka, Germany	1270mm Flybarless	16 cells 1700mAh	Ultra1600-8H	2750g	8-12 min.
	Moskito Sonic	Robbe Germany	1350mm -1470mm	24 cells 1700mAh	Robbe 600/8 or KE536/7 Pro		Canopy or Hughes 300
	Heaven	Gensmantel, Germany	1060mm	7-24 cells 1700mAh		1300g	
1997	Aluso	VoJo-Heli-Top, Germany	1140mm	10 cells 1700 mAh	Plettenberg 270/12/10H	1780g	Metal Chassis

The Wrap Up

Next time I will have details of Karel Pustka's 'Bingo' which looks like a very interesting mid size electric heli kit from Germany. Until then, keep in

touch via email to mikeg@globalnet.co.uk or snail mail to Traplet Towers. **EFI**

► **Karel Pustka's 16 cell kit model, the Bingo.**



Diary Dates

If you wish your events to be included sent details to the editorial office by post, fax: 01684 594586 or E Mail: efi@traplet.co.uk Include wherever possible: name of event, date, location, type of event and contact names and numbers. In the list below, unless otherwise stated, the event and address is in the UK.

May 30-31

Panonia Cup, Oberpullendorf, Austria.

May 31

Cumnock Electric Fly-in. Contact: Keith Reid, 01290 550055.

May 31

Diamond Jubilee Cabbage Patch Nats. Including CL electric Aerobatics and Speed. Contact: Brian Lever, 3 The Park, Peakirk, Peterborough, PE6 7NG.

May 31

Hayes Fly-In at Sudbury. Contact: Dave Chinery, Tel. 0181 573 4687.

June 6-7

ADS Fly-in, UK. Electroslot (plus Open and 100" Thermal). Contact Norrie Kerr, Tel. 01224 734652.

June 7

BMFA F5B League, Oakington, Cambs. Contact: Mike Proctor, Tel. 01904 489386.

June 7

BMFA Southern Area Electric Fly-in, access off A272 Winchester to Petersfield road. Scale, Vintage and AULD. Contact: Andy Palmer, 47 Lovage Way, Horndean, Hants, PO8 0JG.

Tel: 01705 591228, or Eddie Clowes, 2 Chalmers Way, Hamble, Hants, SO31 4LR. Tel: 01703 452931.

June 7

Isle of Axholme MFC Fixed Wing Fly for Fun Day. Epworth Agricultural Showground, North Lincs. 7 miles from junction 2 of the M180 (A161). Proof of insurance required. associated trade welcome. Contact: Steve Fields Tel. 01427 873346.

June 7

BEFA League, Electroslot & Electroslot 400, Ossett, West Yorks. Pre-entry preferred. Contact: K Gill, Tel. 0113 2402632 or email: micgill@lineone.net

June 7

Electric Ducted Fan meeting, Bickley club, Farmingham, Sutton-at-Hine, Kent. Contact Brian Gaskin, Tel: 01322 865701, Fax: 01474 854474.

June 13-14

River Valley Flyers Electric only Fun Fly, Wis. Rapids, WI, USA. June 13-14, Land of Lincoln Electric Fun Fly, Springfield, IL, USA.

June 20

Aberdeen Aeromodellers Longest Day Fly-in. Various fun competitions from 5pm. Contact: Les Adams Tel. 01224 734652 or email: lesadam@aol.com

June 20

NDRCC 2nd Annual All Scale Fly In. Warren Field, Frisco, Texas (just North of Dallas, see map at our website or the District VIII website). The event is open to any current AMA/MAAC member with a scale airplane of any size and any form of propulsion! We ask that no profile

models, trainers, sticks or obvious non-scale airplanes be brought. The landing fee is \$10/pilot for as many planes as you wish to bring!

Contact: Doug, Wk: (972)301-1307 Hm: (972)394-4332, visit our website at: <http://www.freeyellow.com/members2/aeroclassics/FlyIn.html>

June 26 - 28

MARCEE 98. The Great Minnesota Area Electric Fly, USA. Contact: Stevepauley@worldnet.att.net

June 27 - 28

BEFA International Festival of Electric Flight, Middle Wallop, Hants. Scale, Vintage, AULD. Contact: Gordon Tarling, tel/fax 01895 251551. Saturday 27th only, BEFA League, Electroslot, Electroslot 400 & E400 pylon.

June 28

Chester MFC All Electric Day, Rooder Racecourse, Chester. Open Duration, Vintage, Scale and Aerobatic competitions. Enter on the day. Extended sports flying. Vendors pre-booking only. Contact: C R Filtness, 26 Raymond Street, Chester. Tel: 01244 378476.

June 28

Mossmorran Electroslot and AULD 400 (plus Open Thermal). Contact: Colin Sparrow, 01505 850242, email: csparrow@clara.net

June 28

Electric Fly-in. Raydon Airfield, Ipswich. BBQ & raffle, clubhouse & toilets. Contact Gary Western, 01473 729279 or 01473 652462.

July 3 - 5

Popular Flying Association, International Air Rally & Exhibition, Cranfield Airfield Beds. Contact: PFA at Shoreham Airport, Sussex, BN43 5FF, UK. Tel. 01273-461616 or Fax. 01273-463390.

July 5

Cumbernauld Fly-in. AULD 400 and fun events. Contact Dougie Eustace on email: 106006.220@compuserve.com

July 5

Ebor Electric Fun-Fly, Knavesmire Racecourse, York. No competitions, just come and fly for fun. Contact: Mike Proctor, 01904 489386, or Eric Leadley, 01904 422615.

July 5

BEFA Fly-In and carrier event at Sunbury. Contact, Dave Chinery, 0181 573 4687.

July 5

Malvern Soaring Association. Open, 100S and Classic glider competitions plus Electroslot 7 cell, at Fish Meadow, Upton-upon-Severn, Worcs. Contact: Nick Neve, Eynhallow, The Purlieu, Upper Colwall, Malvern, Worcs, WR14 4DJ. Tel: 01684 561160. Pre-entry by June 29, 2 frequencies, £3 per event, include SAE if confirmation and map is required.

July 5

BEFA League, Electroslot, Electroslot 400 & E400 pylon.

July 11-12

Wings and Wheels Model Spectacular. North Weald Airfield. Market and airshow. Contact: Designation Limited, P O Box 102, Malvern, Worcestershire, WR14 1XJ. Telefax: 01684 562038, mobile: 0836 297168.

July 11-12

Mid-America Electric Fly, Walled Lake, MI, USA.

July 12

BMFA F5B League, Oakington, Cambs. Contact Mike Proctor, 01904 489386.

July 19

Ipswich RCMC, BEFA League, Electroslot and E400 competition, £3 entry with 3 frequencies and insurance required. BBQ & toilet on site. For details and location map send SAE to: P. Wainwright, 35 Humerduy Lane, Ipswich, IP4 3NR. tel: 01473 447237.

July 25 & 26

INTER-EX 1998. Oistrach, (near Bodensee) Germany.

July 31 - Aug 2

Electric Flight Festival, Neuhausen, Germany.

August 2 - 9

F5B World Championship, Neuhausen, Germany.

August 1-2

Scottish Soaring Nationals, UK. Electroslot and 30 Minute Electric (plus Thermal soaring events). Contact: John Walker 01292 560341 or Colin Sparrow, 01505 850242, email: csparrow@clara.net

August 2

BEFA Fly-In at Leamington Spa.

August 2 - 9

F5B World Championships, Neuhausen, Germany.

August 2 - 4

USA AMA Nats.

August 8 - 9

Fort Wayne ElectriFly, Texas, USA. Contact: Pat Mattes, Yoder, IN, USA. email: Pat-Ingrid-Mattes@Juno.com

August 8 - 9

Eastnor Castle 1998 Model Spectacular, organised by the Border Counties MAC. Model Flying by leading professionals plus model cars and boats. Racing. Entertainment Saturday night. Camping and toilets available for the weekend. Disabled parking and toilet on site. Contact: John W. Ashton Tel: 01568 613163, Email: BCMACjwa@aol.com Web Site at <http://members.aol.com/bcmacjwa/>

August 9

BEFA Fly-In at Woburn Abbey.

August 15-16

Family and Model Craft Show at Plumpton Racecourse, 4 miles from Lewes, Sussex. All Enquiries to: Dave Bishop of DB Sound, 17 The

Square, Tatsfield, Kent, TN16 2AS. Tel 01959 577550. Mobile: 0850 752061.

August 16

Greenacres MAC Electric Fun-Fly 98. Walsall Airport, Off Bosty Lane, Walsall, West Midlands. Signposted from Junction 9 M6. Entry £2 per Tx. Food and refreshments on site. Trade stands welcome. Contact: (01922) 404658 or 448873.

August 22 - 23

Haverfordwest Model Club's annual show, Scolton Manor. Contact: Adam Pollard, 6 Castle High, Haverfordwest. Pems. SA61 2SP. Tel: 01437 762633.

August 22 - 23

2nd Annual MARCEE/St Paul RC E-Fun Fly, USA. Contact: Stevepauley@worldnet.att.net

August 23

Anglia MFC Electric Fly In, Stow Maries, near South Woodham Ferrers, Essex. Contact: Alan Bedingham (01268) 457615.

August 29-31

BMFA Nationals, Scampton. F5B and BEFA League, Electroslot, Electroslot 400 & E400 pylon. Contact: BMFA HQ.

September 6

Montrose Electric Fly-in, UK. Fun events. Contact: Ian Guthrie, 01674 672268 (business hours).

September 6

North London MFC Electric Fly-In at Baldock, Herts. Contact: Brian Downham 0181 363 7528.

September 13

Ebor, York. BEFA League, Electroslot, Electroslot 400 & E400 pylon. Contact Eric Leadley, 01904 422615 or Mike Proctor, 01904 489386.

September 15

SAM Champs at the AMA National site in Muncie, Indiana, USA.

September 19 - 20

KRC, Queen City Airport, Allentown, PA, USA.

September 20

BMFA F5B League, Owthorpe, Notts. Contact Mike Proctor, 01904 489386.

September 20

Pillerton Fly In, Pillerton Hersey, Warwickshire. Fun fly, carrier take-off and landing competition, AULD after lunch. Contact: John Lewthwaite, Home Farm, Pillerton Hersey, Warwick, CV35 0QQ.

September 20

Linithgow, UK. Electroslot (plus Open Thermal). Contact: Colin Sparrow, 01505 850242, email: csparrow@clara.net

September 20

Battle of Britain Fly-in, UK. Bring your WW2 aircraft. BBQ & raffle, clubhouse & toilets. Contact Gary Western,

September 25 to 27

Lleyn Model Aero Club 'Bring and Fly' all flying model types. Contact: Frank Pilling, Crud y Gwnt, Abersoch, Pwllheli, UK-LL53 7HR. Tel: 01758 712673.

September 27

Pillerton Hersey, Warks, UK. BEFA League, Electroslot, Electroslot 400 & E400 pylon.

October 4

Mossmorran Electroslot (plus F3J Thermal). Contact: Colin Sparrow, 01505 850242, email: csparrow@clara.net

October 11

BMFA F5B League, Owthorpe, Notts. Contact Mike Proctor, 01904 489386.

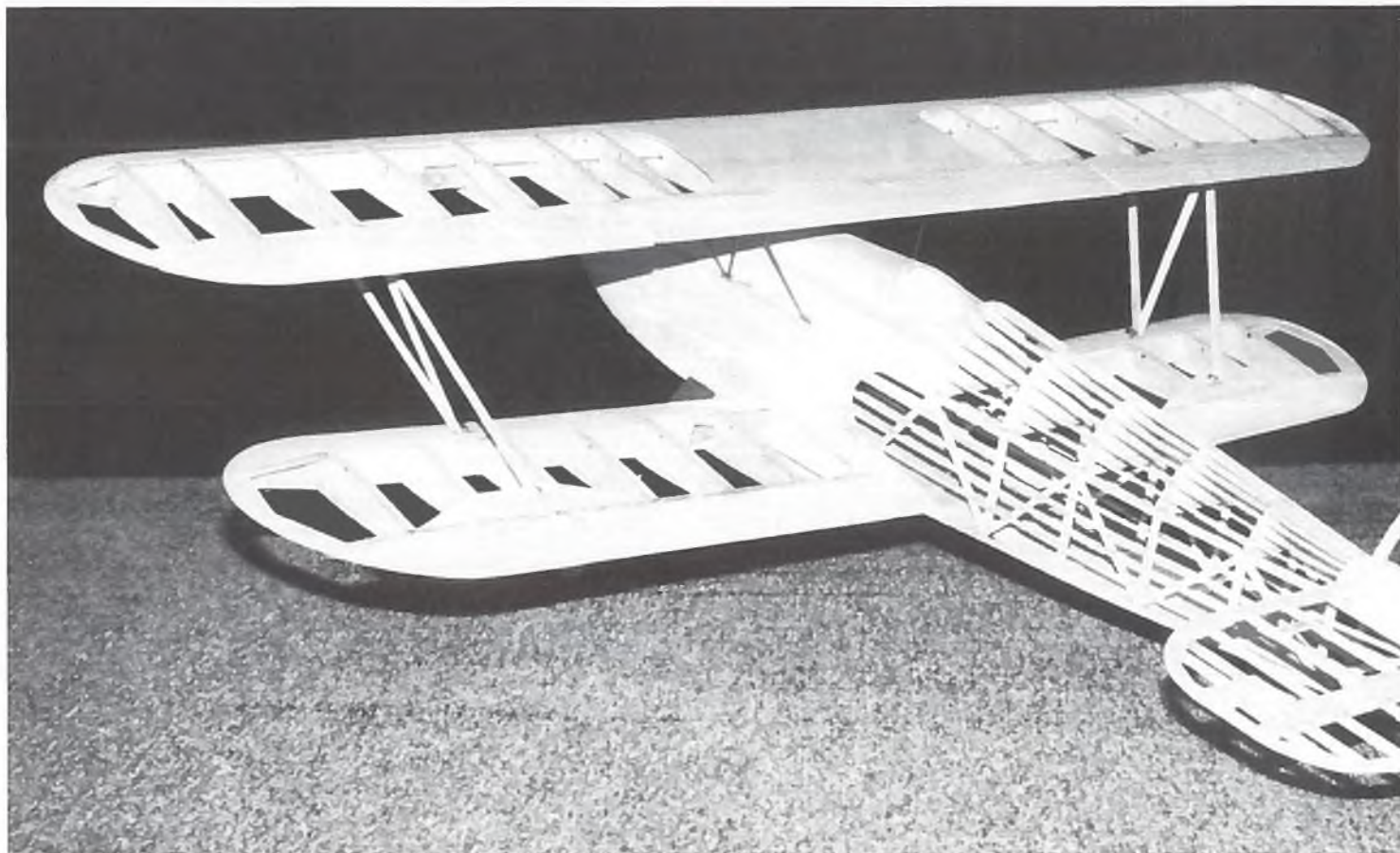
November 15

BEFA Technical Workshop, Leamington Spa, UK.

Quiet Scale

MARTIN IRVINE

Progress with the Hawker Fury and how to vacuum form your own components.



I had hoped to have had the Fury pretty much covered and ready for test flying by now but work seems to keep getting in the way.

Bending the landing gear was interesting. I ordered a SIG tempered landing gear blank and am fortunate enough to have access to a shear, so that trimming to the final shape was very easy. Hacksawing and filing dural landing gear doesn't take long but it isn't a lot of fun. Then I went to the sheet metal bending brake (curious word) - lined everything up and proceeded to break the blank, (aha, now I understand).

In my haste, I hadn't thought of the sharp edge that was on

this brake and so got a nice straight stress break after bending perhaps 30 or 40 degrees. Of course this wouldn't have been a problem with a radiused edge. I tried again but used the "traditional" method of bending these blanks - put it in a vice and whale away at it with a mallet. This worked fine so when the second blank arrived, that's how I completed the undercarriage.

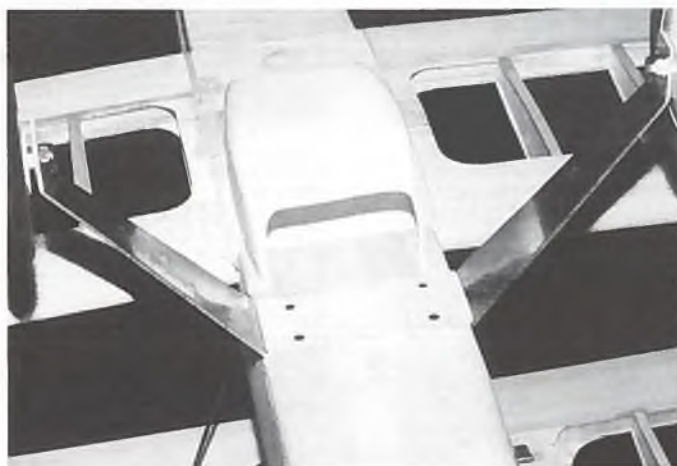
The undercarriage is bolted to a 1/4" (6.4mm) plywood plate with 6-32 bolts and blind nuts. This allows removal during covering, (and repairs if they are ever needed).

One of the photos shows the interplane strut attachment mentioned in the last column. It is a little more obtrusive than I had

originally hoped but still fairly discrete. The big advantage is that there won't be any fumbling around for small screws and

washers as the bolts stay in the fittings, just loosened off for strut removal.

You can see that the spinner is



vacuformed and I have made a backplate for it but I am still figuring out an easy and accurate way of centering the spinner to prevent wobble. I suspect that at its weight and speed I needn't worry too much but it will bother me if it is not VERY close.

(My PZL I/II that was in EFI #1 had a fibreglass spinner and one of my proudest moments in modelling was running up the 28 celled Astro 60 and watching the tip of the spinner track perfectly from lowest throttle to

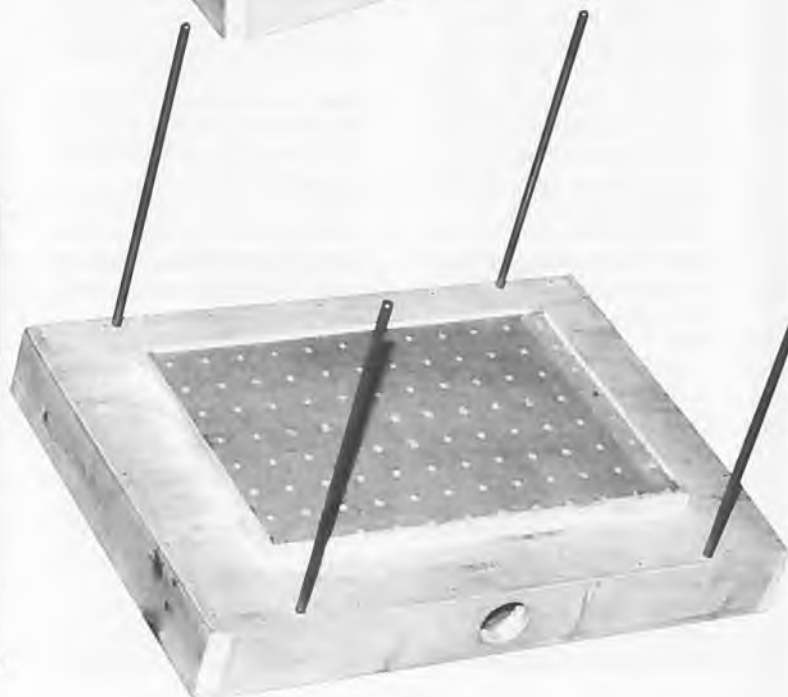
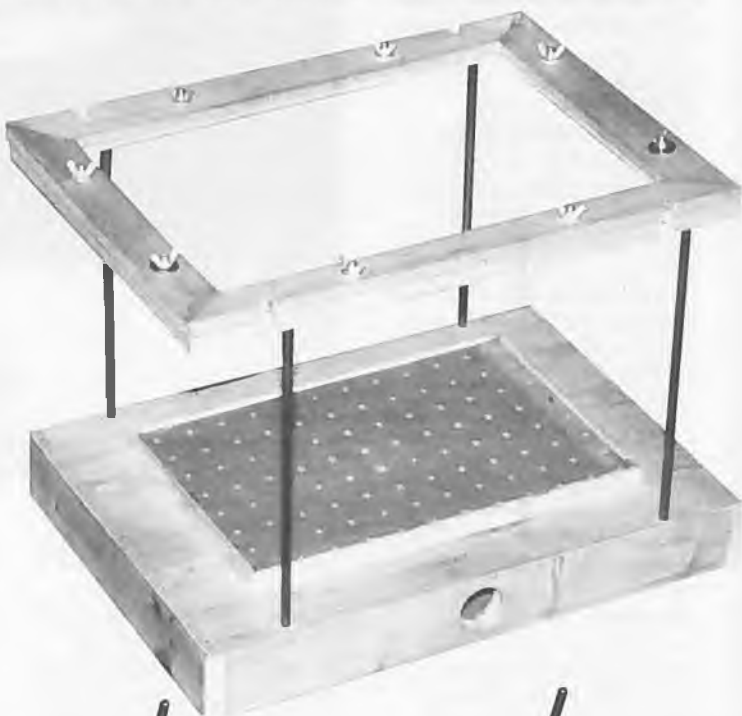


and think, "It's perfect. I can't imagine it fitting/working/looking any better". They don't happen often, but I savour them when they do.)

The airframe as it sits in the photos weighs 41 oz (1162g). This is a little more than I had guessed it would be at this point but not too far out. I had forgotten about the weight of the ailerons, the vacuformed parts, the tail struts and the bolt on axles (which turned out to be a lot heavier than I had anticipated). I am revising my weight estimate up 4 oz (113g) to a finished airframe weight of 52 oz (1174g). This is still a finished weight under 7 lb (3.2kg) even if I choose to go to 20 cells.

Vacuum forming

I vacuum molded the spinner and the radiator for the Fury out of .040 (1mm) styrene plastic. I have used this method for non-structural parts for a number of years and find that any effort expended in making a mould is usually more than repaid by the speed and most importantly,



full. For me, the most satisfying part of this hobby are those very occasional times when I can look at a part or an assembly



reproducibility of the vacuform method.

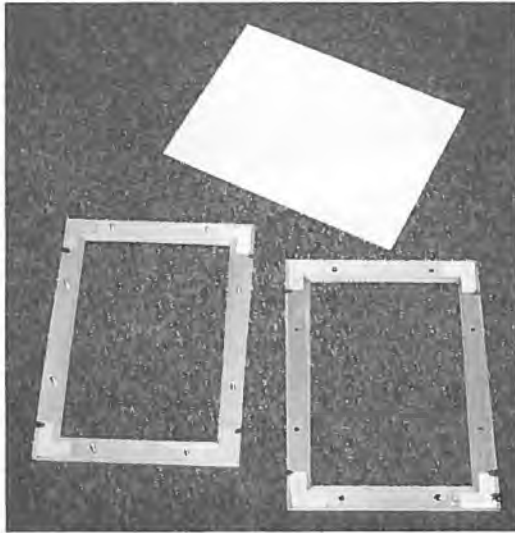
A number of years ago, I built a 60 size Me 109. There are 12 identical exhaust stubs to be made. I could have carved them from balsa and sanded and filled, and sanded and filled... Instead I carved one stub from basswood, split it down the centre and vacuformed up a full set in 20 minutes. Dave Platt nailed it on the head when he advised: "Always substitute technique for skill".

Vacuforming is technique.

The photos show a simple vacuformer that I have used for a number of years. It uses an electric oven for heating the plastic and a household vacuum cleaner as a vacuum source. It's very simple and works well with .040 thick and less. This covers nearly everything most modelers need to do.

The base is made of 1 x 2" (25 x 50mm) on edge with a top and bottom of plywood. The pegboard in the middle is on a slightly raised platform. This is open underneath to the box, but is well supported as it will have to resist the vacuum (well - atmospheric pressure but you know what I mean). The hole in the front is for the vacuum cleaner attachment. The four guide rods are 1/4" (6.4mm) spring steel push fit into holes in the 1 x 2s. The dimensions of the box are determined by the largest piece of plastic to be formed and the size of the oven. The pegboard must be 1/2" (13mm) less all around than the frame. In the example below it will be 10 x 14" (250 x 355mm). This is the largest size I can form.

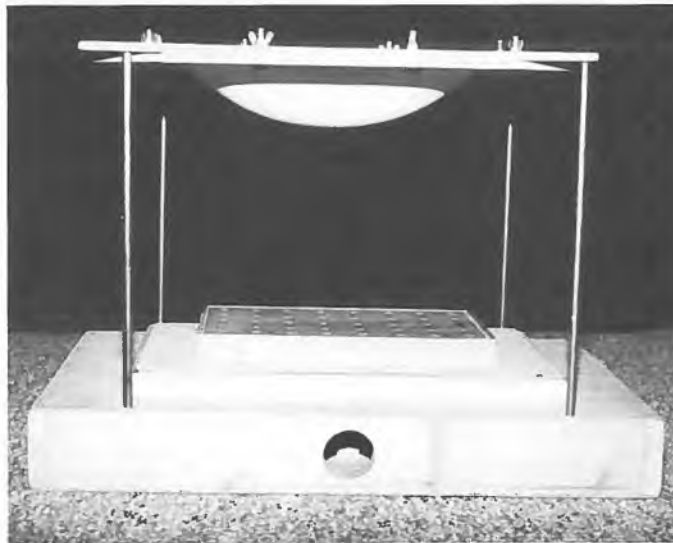
The carrier looks like a pair of picture frames that bolt together with wing nuts and the plastic trapped in between. It sits on top of the guide rods in the oven with the plastic clamped in place. Its dimensions are determined by the size of the largest plastic sheet available. I can get 48 x 96" (1220 x 2440mm) sheets, so 12 x 16" (305 x 406mm) is the largest non-



adjust the length once you start depending on the heat available. The item to be molded sits centered on the pegboard. It can go nearly to the edge.

Attach the vacuum cleaner to the box, test to make sure things are working and turn on the broiler.

After a few minutes (DON'T get distracted) the styrene will soften and sag a bit and then tighten as it heats up. It will then start to sag again. The next picture shows how far you can let it sag. I usually let it sag a little less than this but anything between 1 and 2" should be OK. (Note: that this shot also shows a sub box that fits on top of the



wasteful sheet I can use. We need 1/2" all around for clamping so the inside dimension of the frame is 11 x 15" (280 x 380mm). The frame is some old molding that is about 1 1/2" (38mm) wide mitred together at the corners. Small bolts are sunk into the underside with washers and wing nuts clamping it together on the topside. Notches were cut in the side so as to locate the rods quickly while it is inside the oven.

I have been non-specific as to wood sizes because this sort of thing can be built with scraps of wood. Hardwoods and plywoods are more stable, but any dry straight timber will be fine.

Forming

For molding, I empty the oven of all racks and place the vacuum box in the bottom. The plastic is clamped in the frame and sits on the guide rods. These are cut to bring the plastic up to about 3 or 4" (75 or 100mm) beneath the broiler. Every oven is different so you may have to

take over. Turn off the broiler and lift the box out of the oven. By the time it's out, it will have cooled enough to turn off the vacuum cleaner and pop out the form.

The last photo shows a few parts, still the sheets as they came out of the former. Canopy molds should be finished very well. I like basswood with finishing resin wet sanded to a good finish. I have tried epoxy finishes but it seems to mark up the final product.

For opaque plastic (usually white) the mould needs little preparation. For the radiator I experimented a bit. I used some thick sheet and block and just sanded smooth - no finish. There are glue lines and it's pretty crude but a little sanding touch up and any grain or minor flaws are gone.

If you want to form thicker styrene or polycarbonate (Lexan) there is a little more to building a suitable set-up. You will need a stronger vacuum, perhaps two stage or with a vacuum tank. There are several books on vacuum forming for hobbyists that deal with this sort of thing. One is "Vacuum Forming" by Douglas E. Walsh, published by Vacuum Form, 272 Morganhill Dr., Lake Orion, MI, 48360, USA.

If watching the soft plastic suddenly and instantly form into useful airplane parts doesn't make you want to cut more plastic just to see it happen again, you're not having enough fun!

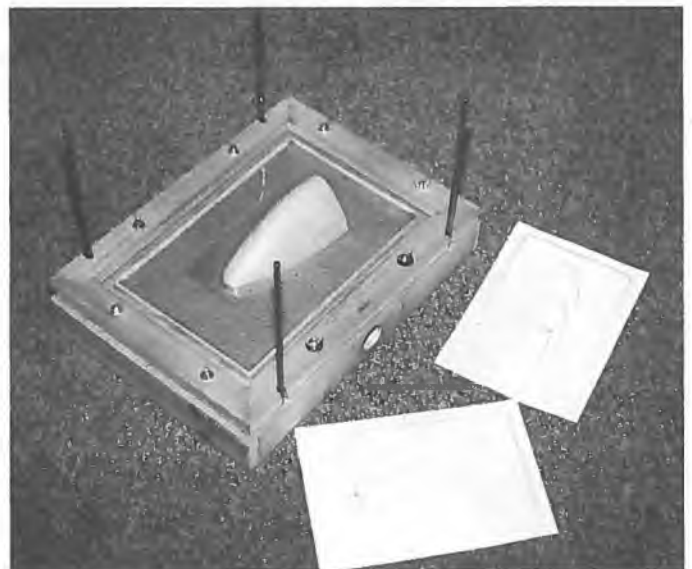
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Nieuport

REVIEW BY: **MARTIN IRVINE**

Designer Martin Irvine describes for you how to build a 38" scale model for geared 400 motors of this classic WW1 biplane.

This little Speed 400 Nieuport was inspired by a similar gas model built for "Texaco Scale". This is a wonderful Vintage event with power restricted to Cox .049s. Bob Aberle in the USA has suggested a similar version for Speed 400s and this model would qualify, although I can't imagine it being terribly competitive!

The full scale N.12 was a very average machine based upon the earlier N.10. Both showed a distinct family resemblance to the more famous N.11 "Bebe", a delightful single seater. The N.12 was used by several coun-



▲ **Motor mount. Note the screw and washer landing gear hold down. Batteries are removable through the bulkhead. Held in place with Velcro.**



▲ **Hatch construction. 1/16" sheet with 1/8" and 1/4" bracing.**

try's air services and was built in both France and Great Britain.

I have always had a soft spot for early clear doped linen aircraft and enjoy covering with tissue and dope, so this is a very "traditional" model.

There's not much earth shaking about this design but there are a couple of points that may be useful in other designs.

The top wing is built a little stronger than necessary so that it can take the flight loads of the lower wing. This is because the two lower panels are kept in place only by the wing root pins, a rubber band and the inter-plane struts. This makes the panels very easy



▲ Radio access through the hatch opening.



▲ Cabane fitting. Flattened brass tubing and a 2-56 socket head bolt.

12

to build and transport. It also simplifies the fuselage construction and equipment placement. It also means that the undercarriage can be left attached to the fuselage which helps during transportation and assembly at the field.

The wing struts have clip on tops and a ball link bottom. This is quite secure, very tidy, quick and doesn't require tools.

The plan shown here is more accurate than the set used to build the original model. There is no change to anything important but the outline is better. For reference I used the drawings from Aeromodeler/MAP/Argus/Nexus available from Nexus, or from Bob Holman in the USA.

Fuselage

The basic sides are made from 1/8" (3mm) spruce longerons and 1/8" sheet infill. Build both sides, one over the other, with small pieces of wax paper protecting the glue joints. Be sure to put in all the diagonals as



▲ Top of interplane struts. 1/32" wire core clipped into rigging couplers. Tissue roundels.

▶ Ball link fitting on the lower end of the strut.

this stiffens and strengthens the structure considerably. Note the 1/16" (1.5mm) sheet added to the inside of the fuselage sides. This can hardly be considered a doubler as it is so thin but it does function as a base for radio installation.

The fuselage cross section is not rectangular but a trapezoid. It is narrower at the bottom than it is at the top, except at the ends where it does form a rectangle. In fact, in plan view, the lower longerons go straight from the motor bulkhead to the leading edge of the stab. When assembling the sides over the top view, the "anchor" points are the square motor bulkhead, the square stab bulkhead and the trapezoidal observer's bulkhead.

The motor mount shown is for a Graupner gearbox. The strength comes from the triangular braces so don't leave them out!

The bottom hatch is made from 1/16" sheet and 1/8" sheet strips. I found that with a snug fit and the corners held by the landing gear strut fairings, no other fixing was required.

The top formers are marked for the stringers. I have more luck doing final cuts for the stringers once the formers are in place. This is the best way to avoid wavy stringers.

The cabane mounts are ply sandwiches epoxied to the top of the longerons. This means that the 1/16" spring steel wire cabane can be removed for finishing.

The tabs on the top of the struts are brass strip bent around the wire, soldered and drilled for 2-56 socket head bolts. These screw into blind nuts mounted in the top wing.

The photos show a detachable tail held on with a pair of 2-56 bolts. This is not necessary but you can add it if you wish.

The landing gear fits into slotted ply cross pieces and is held in place with small screws and washers.



▲ Ball link clipped into the lower wing socket.

Cowling

This is a lost foam cowling. The basic method was written in detail in 'Quiet Scale' in the March/April 1995 issue of EFI. The quick explanation is as follows:

Mount a rough cut cylinder of foam on a



◀ Lower wing root fitting showing how the elastic holds the root tight and the wire pins locate it for incidence setting.



▲ Clear covering over the centre section. Note the plywood mounting plates.

3/8" dowel and sand to shape. Cover with low temperature film and then put two layers of 6 oz cloth on with epoxy. Sand thoroughly, brush another coat of epoxy on and wet sand out. Dig out the foam and trim the cowl to the shape shown in the plan. I covered my cowl with chrome Micafilm but this could be done with paint too. Mount it with small screws into mounting blocks glued to the motor bulkhead.

Wings

The top wing airfoil is from a Proctor Antic. It has a very scale-like top curvature while the undercamber on the lower surface is slight but noticeable. It is a much thicker section

than is scale but this allows a more substantial structure that does not require functional bracing, as would be the case with a scale section.

The bottom section is a Clark Y. This is thick enough to do the job structurally, but thin enough to look OK.

On the top wing, the cabane mount is a strip of 1/8" ply, 1/4 (6mm) wide under the spars. This is drilled out for 2-56 blind nuts.

The dihedral braces are 1/32" (0.8mm) ply in front of and behind the spars. (1/32" will take the mild bend easily.)

The dihedral shown, (and used on the prototype) is just 1/2" (13mm) under each upper tip and 3/4" (19mm)

under each lower tip. This is sufficient for gentle flying, touch and goes, etc.

If you drop a tip, it will take a bit of altitude to recover but it is close enough to the original's zero dihedral to look the part in the air. If you want "snappier" performance, I would suggest doubling the dihedral to 1" (25mm) on the top and 1 1/4" (32mm) on the bottom.

The tips are laminated 3/32" (2.5mm) balsa using the form shown at the wing tip. This visually thins the tip and adds some effective dihedral.

The top interplane strut ends plug into DuBro rigging ends. These are small lengths of 2-56 threaded brass rod with a small hole drilled through the end. A 1/16" hole is drilled in the spar at the point indicated and the rod is threaded in and CA'ed. The spar is reinforced with a piece of 1/32" ply front and back.

The interplane struts are made from 1/32"

▼ Tail skid and rudder hinge. Just observable is the threaded head of the hinge pin. This is slotted for a small screwdriver. Hinge knuckles are Ny-Rod.



wire bent as shown for the top attachment and soldered to a ball link at the bottom. This pops into a ball cup bound and CA'ed on top of the lower spar. The cup hole is faced with a small piece of 1/64" (0.4mm) ply with a hole cut in it for the ball link. The wire is faced with 1/16" balsa on both sides and sanded to section.

The lower wing is attached to the fuselage with a pair of 1/16" wires and held tight to the fuselage with an elastic band. I mounted the two hooks inside short lengths of 3/8" (9.5mm) OD brass tubing which engage two lengths of 3/8" ID tubing mounted in the fuselage sides.

with thinners. Afterwards, the basic covering has several coats of dope. These markings are very easy to cut out with an "Olfa" cutter from a stationary store and doping them in place is the easiest thing imaginable.

Unfortunately, tissue is not the most durable covering and if you look closely at the photos, you will see a few patches, (sigh).

▼ **360 square inches (23sq.dm) of wing area!**

Flying

Check the balance point! Nose heavy airplanes don't fly well but tail heavy airplanes don't fly long.

The first flights used a Graupner Speed 400 7.2V motor geared 1.85:1 with a Graupner 8 x 4 Slim Prop and 7 x 450 cells from a company called Periflex. All up weight was 26 oz.

The model will take off from short grass with this set up. Point the nose into the wind, (hopefully not more than 5 or 6 MPH), and open the throttle. Hold up elevator for the first bit of the take-off run to avoid a nose over. After perhaps 40 or 50 ft, ease off the elevator and let the tail rise. A few more feet and you're in the air.

Control should be gentle at all times as there isn't a lot of dihedral or power. If you take the attitude that you are guiding a free flight model for the first few flights, you can explore the performance available at altitude.

Stalls are quite benign as might be expected with such a low wing loading and wide wing.

I have also tried up to 8 x 600SCRs which gave more poop, but with a hefty weight penalty. On 7 cells with the 7.2V motor a Graupner 9 x 5 Slim Prop didn't seem to improve things very much.

With the 6V motor and 7 x 500ARs the performance improved greatly, and I would really recommend this set-up. I use the 8 x 4 Slim Prop and take-offs are half the distance. With the extra power, flying can be a little more aggressive, (but that is a relative term!).

This power system worked really well in this little plane. There are a whole lot of WWI airplanes that would be great candidates for 3 channel geared Speed 400 motors. A couple of years ago, editor Stephen had an SE5 as a free plan. How about a Pup, or 1 1/2 Strutter, BE 2c, or an AW FK8? **EFI**

Tail

The stabiliser is very straightforward.

The rudder is made with a laminated outline and is hinged in a somewhat unusual manner.

The hinge is made from 6 pieces of Ny-Rod inner snake, each 1/4" long. The hinge pin is a 1 1/2" (38mm) length of DuBro threaded rod, cut so that there is about 3/16" (5mm) of thread. The rest of the rod is filed or sanded down so as to be a slip fit in the Ny-Rod. Put the 6 pieces on a piece of the left over rod and line up the fuselage and rudder. Now, carefully, use thick CA to spot glue every other piece to the rudder and the others to the fuselage. Carefully remove the rod and add some thin CA to each piece of Ny-Rod. Now a small piece of light cloth on each piece of Ny-Rod will make the hinge permanent.

The hinge pin has a slot cut, like a screw head, in the threaded end. Now, with the rudder in place, push the pin in from the bottom, with the thread engaging last. A small screw-driver will turn the hinge pin in the last 3/16". This is an easily removable hinge that is very strong and rigid. With this type of rudder, I have never felt secure using commercial hinges.

Undercarriage

This is a simple 1/16" wire assembly clad with 1/16" sheet.

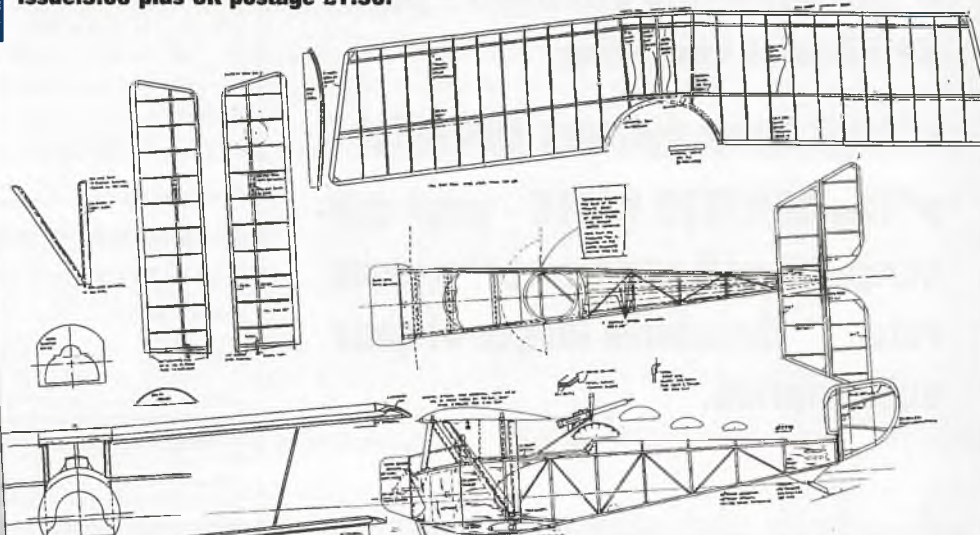
Covering

I covered my Nieuport with Peck Polymer domestic tissue and dope. All the markings are cut from coloured tissue and attached

MW2670 - NIEUPORT 12

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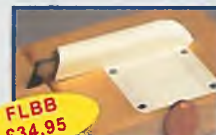
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Intermodellbau 98

Dortmund

REPORTED BY: **THE EDITOR**

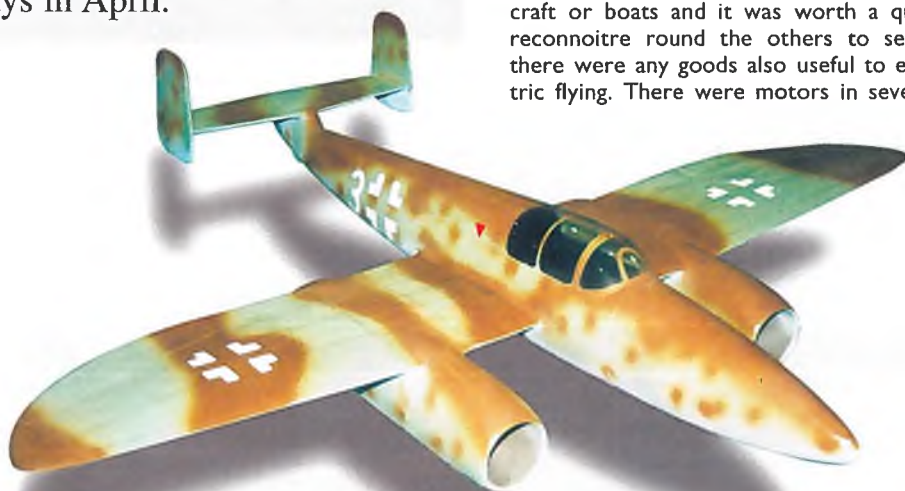
The biggest model shop in the world is in Dortmund every year - for just five days in April.

Tens of thousands of modellers visit the 'Intermodellbau' at Dortmund in Germany. This show caters for modellers of aircraft, cars, boats, railways, etc., whether we make them or use them or both. The big manufacturers display all their new models and lot more in their ranges. The DMFV is a national model flying association and they exhibit hundreds of models of many types, classified into the major areas of interest like: vintage, gas turbine, scale, glider etc., and of course many models can fit in several categories - like a 'vintage scale electric ducted fan jet' - well, there are five places that could fit! Most visitors probably go for the market, hundreds of dealers selling at competitive prices all the items mentioned above plus all the peripherals like machine tools, hand tools, books, magazines and all the components that may be used in several of the disciplines.

Take a motor

Or rather, for instance - take motors. Some manufacturers of electric motors have developed them specifically for model flying. This applies only to a few leading brands at the front of the pack. The same could be said about certain model car racing motors. Some other motors are more suitable for use in boats and yet more are

▼ A Köhler 'Newtor' Brushless motor installed in a model.



▲ A Heinkel He 280 built by P. Pfeiffer for two Speed 400 6V motors in parallel on 10 x 1200mAh cells and his own 56mm (2.2") diameter fan units. The model is light at 1100g (39 oz) so the thrust of 260g (2.55N or 9 ounces) is sufficient for lively flying.

suitable for model locomotives. These are specialist applications and use of specialist motors 'elsewhere' may be unwise.

On the other hand, some motors are found to have suitable applications in very diverse fields. The 'Slow Fly' models that had so much space in the Sinsheim report in the last issue use small, very small and "Is that big enough for a micro servo?" size motors. Many of the not-so-small motors

▼ Where the prop is attached to a 'Newtor' Brushless motor.



weighing say 10 to 20 grams in Slow-Fly models are clock motors with the option of many gear ratios, most of them not suitable to our purposes.

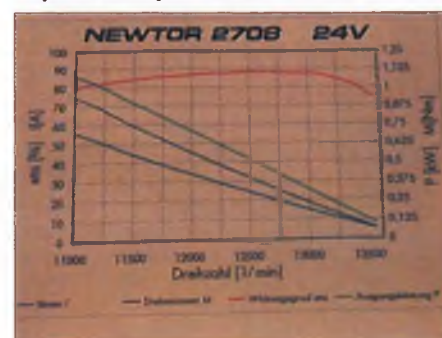
Items such as these might be suited to several halls. Each hall specialised in say aircraft or boats and it was worth a quick reconnaissance round the others to see if there were any goods also useful to electric flying. There were motors in several,

more machine tools outside the aircraft hall than in it and even model supermarkets in some others.

New motors on the 'Airworld' stand were the 'Moki' brand with rare earth magnets. Colour, lighting and display fooled my camera so you do not see them here but they looked similar to motors from eastern Europe.

'Newtor' Brushless motors manufactured by Köhler had been shown before but this was the first time they were displayed so that I could photograph them. I think the range has grown too. These are brushless but even more different, in that what would be the shaft in a conventional motor is fixed to the model in these and the case rotates, so the prop is fixed to the case -

▼ The top line on this graph is "efficiency", between 80 and 90% from 11,000 to 13,300 RPM.





▲ This 'Own design' free flight model by Walter Zahn uses a motor and 5 x 50mAh cells all strapped on with transparent tape. Wing span is 480mm (19") and weight 49g (1.7 oz).

◀ This yet unfinished model of an Ultra-light is similar to a few new trainers. It is being built by Uwe Meyer and is anticipated to weigh about 2 to 2.2kg (4.4 to 4.8 lbs) when finished. Power is a Speed 650 Viper with 4:1 gearbox and 14 x 10 prop, on 10 cells.

an electric rotary and probably easier to cool.

New for us?

We have been visiting German model shows for months now during the 'closed flying season' and in the next issue I expect to have reports for you from shows in Toledo, USA and Sandown, UK.

All these shows have spread the new models a bit thin over this year, so far. Don't misunderstand that last sentence! During the last six months we have seen so many new models, it's just that a lot of new models spread over - the Stuttgart, Nürnberg, Sinsheim and Dortmund shows, seems like not so many new ones per show.

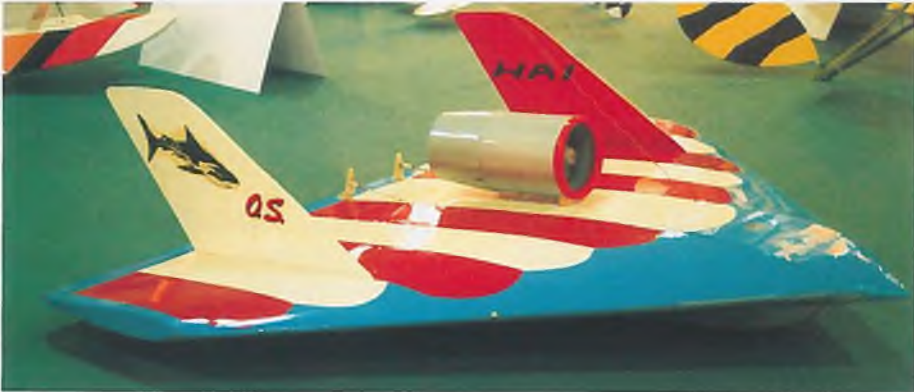
So what is new? Ducted fans and EDF models is where this writer expected to see so many new introductions. There were not



▲ The space intended for a diesel engine in the 'Käpitan' is now occupied by a Speed 400 with 2.33:1 gearbox running on 10 x 600 cells.



▲ This could be an electrified vintage rubber model. Information is thin but it was built by Leo Busmeier, has a wingspan of 1750mm (69") and weight of 1540g (54"). It uses a 3:1 gearbox and the prop looks like a Graupner Moskito so it probably uses a 550 motor and 7 cells.



▲ The logo on the fin suggests that this colourful delta built by Ralf Lubbe was once powered by an IC engine but now it uses a 75mm fan unit running on a Speed 480 Race motor. Wingspan is 1m (39") and weight is 1420g (50 oz).

▼ Older fliers may remember this 1100mm (43") span Graupner 'Käpitan' from 1958, built here by Armin Leiteritz and weighing 950g (34 oz).



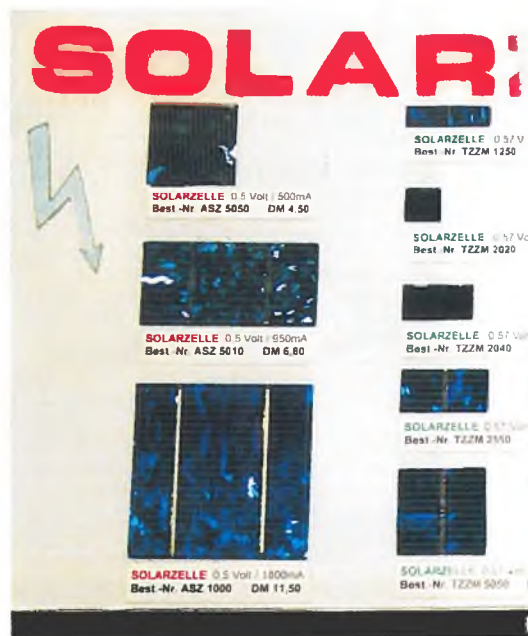


▲ Kontronik speed controllers may be programmed in sequence from the Tx but a much easier way is to use this 'CPS' (Computer Programmer System). Software may be obtained from Kontronik at a modest cost and you connect your controller to the computer via this CPS interface (the triangular circuit board).



▲ The controller is programmed and pre-set. You screen-edit any pre-sets to suit your requirements and the controller follows suit.

▼ The Jépé (Jean-Paul Schlosser) all moulded carbon/epoxy fan unit and the Aveox brushless motor that he prefers to use.



▲ Solar cells have not made much impact on electric flying but still have their uses. This is the range that 'Lemo Solar' offer.

▼ The shroud and stators of the Jépé unit; note the long tail pipe for use in the F-16.



► The all moulded F-16 'Agile Falcon' on the WeMoTec stand. It is intended for use with RK 530-E or RK 740-E fan units and has a true to scale wingspan of 1180mm (46") and length of 1480mm (58"). Veneered foam wings of 1380mm (54") span are also available.

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▲ Piper Cub by FVK, with moulded fuselage and built up and ready covered wing. Several versions are available: the J3 in yellow, the J4 in military green or the PA 18 in white. It is for 400 motors and the wing span is 1m (39").



▲ Andrew Fok of UPI (USA) demonstrates the size of the all moulded Airworld DH 88 Comet Racer for a pair of geared 600s or direct drive Moki series 'S' motors.



▶ Amongst the gliders on display were a lot of the very elegant two-place 'Fox'. Some were 5m span, this was the smallest at 1.5m (59"). To save space at shows Modellbau Rippin bag many of their popular kits and hang them from the show stand framing with this 'coat hanger' built into the packaging. The stand looks a bit like a clothing store! Your editor purchased one, it has a long nose but - "Yes, I do intend to fit an electric motor."



EFI • SHOW REPORT

► The latest version of the X-Models 'Thermik Star', a thermal soarer with ailerons, comes like this, built-up, covered and with all the components you need, even a servo cable for you to extend that of the elevator servo which you may fit in the fin if you wish. It cannot take more than a couple of hours to equip. A power package is available or you choose your own. Fit this and your RC gear and you are ready to fly. We have one for review.

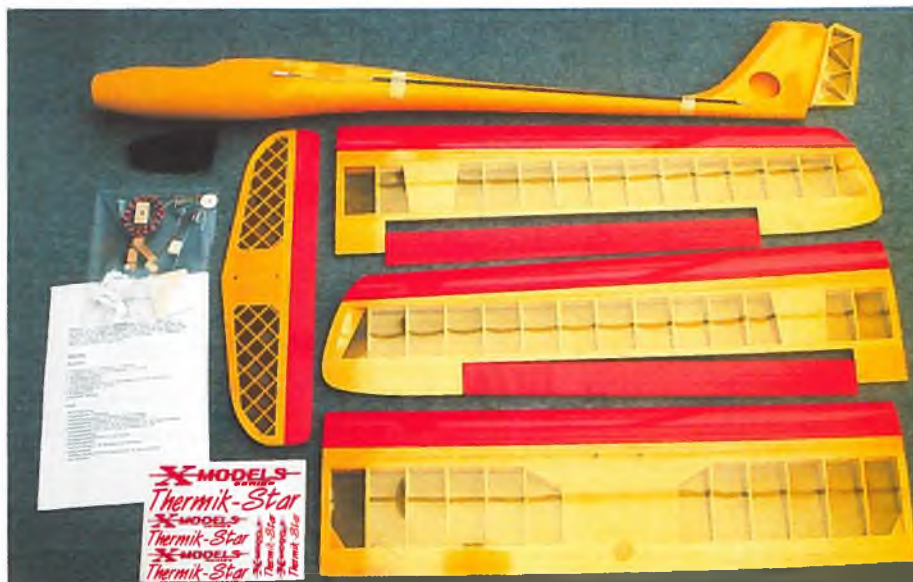
many at Dortmund but look at previous shows. At Nürnberg there were the Graupner Comet, Simprop Dornier 328 Jet, Aeronaut DH Vampire and Kyosho T-33/P-80. At Sinsheim was the Glöckner F-86 Sabre (bigger version of their 1997 Sabre for bigger fan units). Of these, only the Dornier is available as this is written.

At Dortmund there was an Me 262 with no price tag and another Vampire without much meaningful information. Last year there were two Me 262s that have not yet been put into production.

New and at last available was an 'Alpha Jet' on the WeMoTec stand (see 'Current Affairs'). On the same stand were two very beautifully finished F-16 models and a Fouga Magister. The Alpha was selling fast at 229 DM and a few F-16s sold at 799 DM. The Magister is still short of a few internals but should be available soon and will use the WeMoTec RK 720-E fan unit and an Ultra 930 or similar motor.

Jean-Paul Schlosser showed us his very new production F-16 at Dortmund last year and demonstrated it most impressively at the 'Jet World Masters' at Wroughton in 1997. This year he had his own all carbon/epoxy fan unit on display and some dazzling video minutes of it in his F-16 displaying how fast it flies and how competent a pilot is Jean-Paul. **EFI**

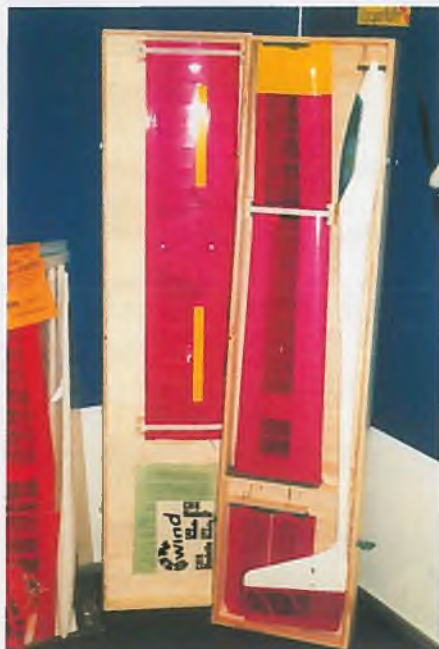
▼ The Jépé Spitfire construction is similar to the Fw but the 'power train' for optimum performance is slightly different. Specified is: a direct drive Speed 600 and 7 x 6 Master Airscrew on 8 or 9 x 2000mAh cells - or Speed 700 and 8.5 x 7 Aeronaut prop on 10 or 11 x 2000 mAh cells. Weight is 1.3 to 1.7kg (46 to 60 oz) and flying times are 6 minutes flat out or up to 14 if you are cruising. A bungee launch is recommended. Available from Jépé in Holland, tel/fax: +31 (0)1492 554196, or in the UK from ModellHaus, tel/fax: +44 (0)161 439 9083.



▲ Jépé, Fw 190 A, has a moulded fuselage and veneered foam wings and is intended for a direct drive Speed 700 and 10 or 11 x 2000mAh cells or a Speed 600 geared 2.5:1 with 8 to 10 x 2000mAh cells. Recommended props are Master Airscrew 9 x 6 or Aeronaut 8.5 x 7. Wingspan is 1090mm (43") and weight is 1.5 to 1.7kg (53 to 60 oz). A bungee launch is recommended.



▲ For model filers without the time to build there is a smaller Silent Dream. This is what you get in an FVK 'Mini Silent Dream' kit box, a fuselage, a tail, two wing halves plus aileron servo covers. Control is aileron, elevator and motor (no rudder) and a direct drive or geared 400 or 480 motor is recommended for this 1.5m (59") span model.



▲ CHK Modelle displayed this 'Sun Wind' in its 'transporter' case (available as optional extra) and recommend it for use as an F3J glider or electric.



▲ CHK 'Sun Wind' with folder fitted prompts the question again - "Should we have an F5J category?"



▲ Vought A-7 Corsair is prop driven and not fat enough for a fan unit. This model is all balsa, already built up ready for covering for IC or 600 to Ultra 930 power. Available in Germany from PAF, tel: +49 (0)2273 940 666, fax: +49 (0)2273 940 667 or in the UK from F2A Supplies or The Electric Aircraft Company.



▶ 'One Design' was on the PAF stand, is intended for 2.5 to 4cc IC engines or Speed 500 size motors, is aerobatic and looks fast.

▼ Andreas Bleicher built this 3.2m (126") span, 3.4kg (7.5 lb) ASH 26E and installed a Lehner 2725-8 motor with Reisenauer Micro 4:1 gearbox, RASA 17 x 11 prop and 10 cells.



▲ Big gliders? This EMS kit of a DG 800 was built by Horst Landgrebe, weighs 4.5kg (10 lbs) and has a wingspan of 4m (157") and flies on 16 cells with its retractable power pod.

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P EF0698

Cover Story

Ryan STA

WRITTEN BY: THE EDITOR

How practical is it to convert a kit for an IC model to electric power?



Stan Craythorne is better known in UK electric flying circles for his vintage models. There is a reason for this and it is not just the obvious one: "He builds a lot of vintage models!"

The reason behind this is more subtle. Stan has a philosophy about electric flying. Like many of us in the UK, he believes that for power flying to survive by still being accept-

able to the rest of the population - it needs to be quiet. The obvious way is for newcomers to start electric but it is more important that established flyers with IC models CONVERT to electric.

Stan has found (as I am sure have so many electric devotees) that IC builder/pilots just do not believe that any electric 'power train' can replace their IC engine and fuel tank. He reasons that the easiest way to show the IC pilots that electrics can do it is to replace IC engines with electric motors in the same aircraft.

He has therefore always used kits or plans for IC models, equipped them with electrics

and flown alongside IC pilots at his local club. The obvious route a few years ago was to use the most viable models, those with a low wing loading. Very few IC pilots fly 'powered gliders' and so many of the pilots he knew flew vintage or at least 'traditional' sports models. So Stan built a few vintage models and often took the award for 'Best Vintage Model' at electric fly-ins.

Stan has built other "not so vintage" well-known designs like the 'Astro Hog' and the subject of this month's cover photo, a Ryan STA.

The kit

This is a SIG kit and was purchased from UK importer PEGASUS who bring in so many kits from the USA. Stan wished to make as few changes as possible to this kit. "I wanted to put an electric motor straight into a scale model intended for an IC engine. The front cockpit is covered over in this model when it is used for racing and this is right over the CG so I thought this was the place to put the battery pack." This is over the wing mainspar too so there is no need for changes to construction or the need for a tough plywood floor to carry the 24 x Sanyo RC-2000 cells that weigh just over 3 pounds - 1.4kg.

Weight

This more than any other feature is the concern of most converters of IC models. Vintage models are well able to carry it. Builders from plans change wood weights and delete heavy no-longer-necessary structures such as that for the engine. Many vintage models converted to electric finish weighing less than the IC powered originals. This is not easy to achieve with models built, as prescribed, from kits.

Stan took note of the specification for the STA, which recommended an Enya 61 turning a 14 inch prop at 7000 plus RPM. What he





wing loading
of this electric Ryan is
32oz/sq.ft (98g/sq.dm), not excessive for a
model of this size and type. The IC original
weighed 8.5 pounds, this electric one weighs
11.5 pounds - 5.2kg.

Electricalc

needed was a motor that could do the same. He checked performance figures and decided to use a Keller 100/9, Master Airscrew electric wood 14 x 8 prop and 24 x 2000mAh cells. The motor is about the same weight as the engine so the only additional weight would be the battery which would effect the wing loading but not the balance (CG). The

One of the problems of one's 'own design' models or converting an IC kit like this is that the builder may have doubts about his choice of power train. Stan used 'Electricalc' software to check. This estimated an operating current of 28.8A at 25.8V, a 759 ft/min climb rate, max speed of 58 MPH and stall speed of 21 MPH. We will need to see it fly before we

know how close are these estimates but check the static test in the 'model data'. As the motor 'unloads' in the air these are probably very close.

Construction

The fuselage looks as if moulded but it is all ply and balsa. The Rivets you see were painstakingly applied (450 of them!) with blobs of unthinned 'Solarlac' paint and a cocktail stick. The engine cowlings is a part that is moulded and is where some detail is still missing. Stan is still looking for pipes with a tight enough bend, to simulate the exhaust stubs.

The wings of the original were fabric covered and so is the model - with Solartex. The fabric tapes capping the wing ribs, cut with pinking shears, are there too. Regular pinking shears provided tapes with out-of-scale serrated edges so Stan cut them then carefully moved the tapes half a serration out of sync and cut again. They now look about right.

Flying

Spring is here, England is cold and waterlogged. By the time you read this, the model will have flown and will almost certainly be at the Blackpool & Fylde MAC Fly-in on May 24 for its first 'public' outing. If you are fortunate enough to see a copy of this before then, try to be there. **EFI**



Model Data:

**RYAN STA, 1/15TH SCALE
BUILT FROM A SIG KIT.**

WING SPAN:	1830mm
LENGTH:	1530mm
WEIGHT:	5220g
PROP:	14 x 8
ENERGY:	24 x Sanyo RC-2000
MOTOR TEST,	current 30.5A
STATIC:	voltage 25.6
RPM:	7300

A Scale View



WRITTEN BY: **ROBIN FOWLER**

We all have our own views about scale models. Keen scale modellers often disagree about what details, if any, you can ignore.



▲ Spitfire MkIX in SEAC colours. 36" (914mm) span. 500 motor on 7, x 800mAh cells. Suffered tip stall problems because the tips were too thin - therefore too fast to enjoy!

(Editor's note: Puzzled by this article's title or its introductory caption? We all have our own opinions about the 'accuracy of outline' of scale models and just how fine 'detail' should be. Here is one man's view and it is an opinion that is worth reading - because if you do not recognise the name - he is an accomplished Aviation Artist. He has a very good 'eye for detail' and recognises what is worth recording and what is worth emphasising. When you have read his opinion, look at his models, do you agree with his views? He is the guy holding the model of the Curtiss Hawk.)

► Fairey Hendon (behind) 50" (1270mm) span. It uses two 6 volt 400 motors on Mini Olympus gearboxes with 9 x 8 props and 6 x 2000mAh cells. Weight is 3 lb 4oz (1475g) and flight times are over 10 minutes. The Armstrong Whitworth Whitley at the front has a 48" (1220mm) span. Power is two Speed 400 7.2V motors on 7 x 800mAh cells and 8 x 6 props. Weight is a little under 3 lb (1350g) and flight times 4 to 5 minutes.

Scale?

In general terms 'scale' can (at least by the average modeller) be taken as anything between sport models adapted to resemble a full size aircraft - to the finely detailed models built to stand up to close scrutiny and even measurement to check their accuracy. It all depends on where you stand on the "I

look up to him, but I look down on him" scale - if you remember the sketch on TV some years ago starring the two Ronnies and



▲ Prototypes 2 and 3 of the Bulford Kits Islander. (Whatever happened to him?) These were my introduction to electric flight in 1995. Wingspan is 37" (940mm), 2 x Speed 400 motors on direct drive on 5 x 1000mAh cells and 5 x 4 props.

John Cleese. These last (Scale 1) take many hundreds of hours and much skill to produce, while models like the first ones I mentioned can often be flying in less than fifty hours, and to a 'real' scale man be the object of scorn - or at best be less than worthy of the term. My personal notch is at the bottom end in terms of time expended, but as near the top as possible in terms of adherence to scale





▲ Grumman Tigercat with a wingspan of 55" (1400mm) powered by a pair of 540 motors on Olympus gearboxes turning 11 x 8 props on 7 x 2000mAh cells. Weight is 4 lbs 3oz (1900g) and 4 lbs 7oz (2013g) with undercarriage. Flight times are 4 to 5 minutes.

outlines and sections as is achievable by scaling up three-view drawings in published books. I try not to deviate from the nearest approximated line I can get to by scale rule and calculator, but the finishes I apply tend to be very slap-dash. So long as it looks right on a low fly-by I am content, not being willing to spend vast tracts of time in finishing a model which may turn out to be in the air for seconds rather than hours.

My philosophy long ago caused me to abandon the old rule which had most designers sizing up the tail feathers by ten percent or more, since I found this to be 'safe' but normally unnecessary. It presumably made it easier to fly a badly balanced model whereas a model with the centre of gravity in the right place could dispense with the added weight at the 'wrong' end.

My philosophy is that it doesn't have to cost an arm and a leg to fly scale models.

Mine are affordable to anyone who can afford to get into radio flying at all, and average about £45 plus batteries and radio. Another advantage, particularly with Speed 400 warbirds is that they fit into my Nova saloon's boot (3 or 4 of them at time!). **EFI**



▲ Curtiss Hawk 75A, built from a plan in another magazine. Wingspan is 42" (1067mm) and it is equipped with the cheapest 540 motor and Olympus gearbox. Flight pack is 7 or 8 x 1700SCRs, it uses an 11 x 8 prop and flies for 7 to 8 minutes.



▲ A Hawker Fury before the decor was added, wingspan is 39" (1m). Power here is a direct drive 15 turn 540 buggy motor on a 7 x 6 prop and 7 cells. Three minute flights caused re-engining over the winter to a geared 600 - test flight awaited!

◀ Bristol Beaufighter in its first incarnation. Final configuration is two 6 volt 400s on Mini Olympus gearboxes and 6 x 2000mah cells and 9 x 8 props. It started life at 2 lb 13 oz (1276g) but now in its second rebuild it is pushing 3 lb (1360g)! Flight times are in excess of 10 minutes. This last is a very successful power train which gives the Beaufighter about a 25 degree climb out angle for as long as you like from a fairly effortless hand launch. I reckon I've cracked the props thing now - Forget those rigid glow motor capable props - go for blade area on a gearbox set-up!

Sharon
the thermic hammer

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**Simba 10 Zellen Hotliner
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Simprop Selection

kit review

REVIEWED BY: **JON TANNER**

Another experienced pilot gets into electrics - but this time at the exciting 'hot' end.



▲ Author after another successful flight - very pleased as well!



▲ Low parts count in the kit produces a fine model in little time.

Why?

I remember with awe the first time I saw a high performance electric glider, it was, well awesome. The idea of an electric model climbing vertically to become a mere speck in the sky, with a motor run of a few seconds had my mouth dropping. At this point in my life I was flying IC powered models and thoroughly enjoying them, a glider like that was for 'others', even though deep down I wanted one.

How long ago was that? Some ten years (I think) and since then it's been helicopters for me, but my thoughts occasionally go back to watching that model (flown by Howard Faure), particularly when flying electric helicopters. To be honest electric heli's fly and will fly well, but there is a penalty and that is duration. I suppose that makes me a bit of a 'petrol head' in that oodles of power produces great fun, excitement and adrenaline, the 'WOW' factor!

So there I was ten years older deciding to have a go at an electric glider, so what do I want? Something, sleek, quick to build, good



▲ A slower fly past with some spoiler, I later increased the spoiler throw to about 40°.

quality, sensible size (about 5' wingspan) and above all, fast and powerful! What did I end up with? A Simprop Selection - 66" span with epoxy glass fuselage, one piece pressure moulded wing and removable T tail. What did I put in it? A Simprop Power-Speed-Motor 7/14, S90-BEC-P speed controller, RX 2000 receiver and three TECH HT-5210 mini servos.

That just left the all important question of, "How many cells?". Perkins' catalogue (the Simprop UK Distributor) quotes 7-14 cells, the motor specified 8.4 - 16.8V and the speed controller 6 - 14 cells without using the BEC (Battery Elimination Circuit). Before deciding, it was a question of what charger I had available. I had one which would fast charge up to 10 cells from a 12 volt source so 10 cells was the first option. Then fortune smiled on me as I acquired a robbe Infinity charger, so then anything up to 30 cells could be charged. I was happy to use a separate Rx battery pack (the BEC will only operate with up to 10 cells) OK a bit more weight but more power! In the end I settled on two 12 cell Sanyo 2000 packs.

Putting it together

The quality of the Selection simply amazed me. The one piece epoxy glass fuselage was seamless, the access holes were all cut, the tail plane mounting surface was finished and



ction

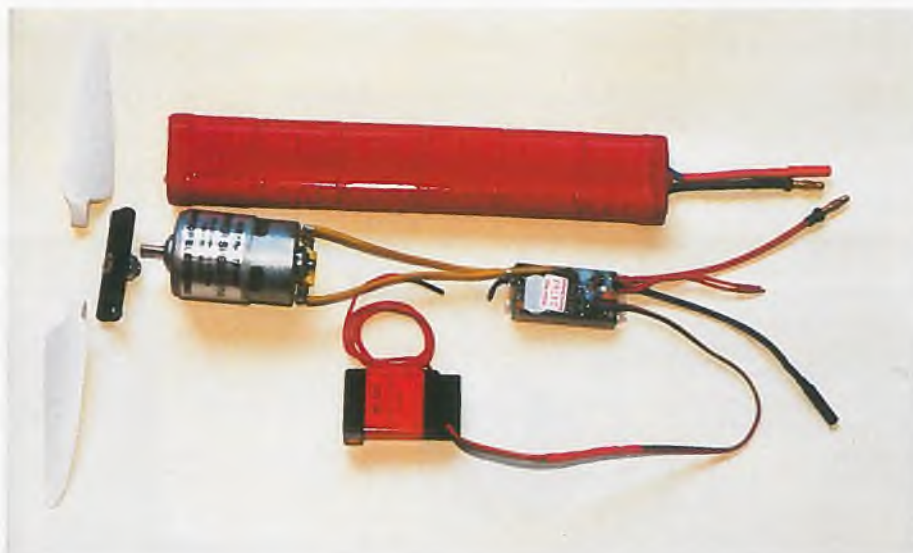
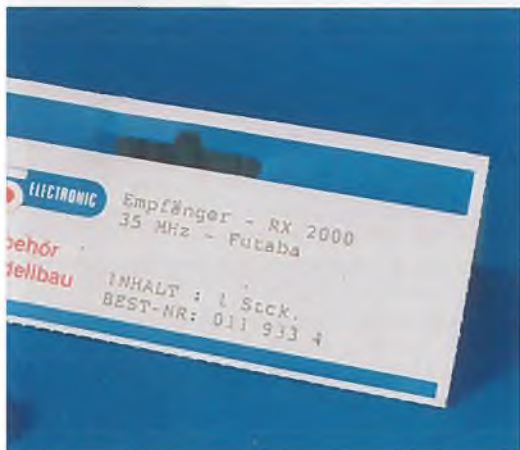


the fixing hole ready tapped. Then there was the wing. This was the first time I had closely examined a one piece pressure moulded wing. It's obechi veneered, including the edges by the top and bottom veneers overlapping and then sanded. The pre-drilled hardwood mounting blocks were moulded in for the wing bolts. The leading edge for the ailerons and false trailing edge were also in place with the cut line pre-cut. That just left the tailplane which was pre-cut balsa, plus the various ply parts to fit everything together.

The actual job of putting the model together, it is hardly building, didn't take long. The plan is almost self explanatory as it uses detail drawings for most of the assembly. Unfortunately the instructions and data sheets are all in German but having built a few models in the past it was easy to work everything out.

Cutting out the ailerons was simple and a bit of sanding had them ready. The ply parts needed cleaning up, particularly the front formers which were glued in to the nose of the fuselage which - they were chamfered to fit snugly. When fitting this former, I bolted in the motor and then fitted the prop to help alignment with the front. An extra fillet of glue then made sure it wouldn't move. I liked the idea of the tail plane fixing as it uses a piece of hardwood inset in the balsa which provides plenty of strength and something

▼ **Simprop RX 2000 seven channel receiver fitted neatly in the rear half of the fuselage.**



▲ **Complete airborne power package, I soldered the speed controller leads to the motor and used gold connectors from Weston UK for the battery connections.**

hard for the fixing screw to bear against. I also liked the simple removable battery tray which allows you to match the C of G to suit the chosen hardware and battery packs.

I have to admit that I wasn't so keen on the ply plates which are glued to the under face of the wing seating which are then drilled and tapped for the bolts. There is not much of a surface to glue to and tapping the ply

was also going to be a bit tricky. In the end I used the ply plates but chamfered them to fit the moulding. I then cut down a couple of the correct sized blind nuts and fitted them to the ply, finishing off with a good epoxy fillet - in practice I think this modification was entirely unnecessary.

I chose Fibre Film for lightness and added strength for the covering, it takes a while to



▲ **Three of these metal geared TECH HT-5210 mini servos were used.**

▼ **The Simprop Power-Speed-Motor 7/14 draws 21 amps at maximum efficiency.**





▲ Elevator servo tucked in the tail provides a direct linkage, note the use of ball joints.



▲ I used wood blocks for mounting the aileron servos, note the offset arm to give differential throw which also assists for spoiler throw.

use but is worth the effort. This left the radio. The wing servos were easy as the holes were pre-cut, as was the servo lead holes through the wing. I used hardwood blocks screwed to the servos which were glued in place in the wing as I'm not used to the idea of gluing servos direct to the wing core. I used a similar method of fitting the elevator servo in the tail. The Rx ended up

half way down the fuselage with a couple of extension leads for the wing servos. With the motor in place, the speed controller sat as far back as the leads would allow and the Rx battery behind that. The battery tray was then slid in with a battery pack



▲ Snug fit with the airborne components under the simple battery tray. I later used Velcro strips to retain the battery packs in position.

and positioned for the correct C of G. Final job was the radio set up. The plans showed quite a bit of differential aileron throw using both top hinging and off set servo arms. I was advised to set the radio up for a spoiler effect as well, and as much as possible! So with all this done, a test that everything worked correctly (especially programming the speed controller - which was easy to do) and it was off to the field!

Wow

Heart in mouth adrenaline flowing, a brave man to launch the model, open throttle stick, motor comes on, launch (no need to run) and without any input from me, it's in a near vertical climb! My immediate feeling was "Yikes have I bitten off more than I can chew?" After about 7 seconds it was high enough, any more and I would have difficulty in orientation! Then power off and entry to gliding was very untidy, but in the glide it was fast, very fast and also very responsive. Fortunately I'd dialled in some dual rates and quickly selected these at which point I started to settle down and get used to this sleek model. On its maiden flight there was no lift so it was a series of power climbs and gliding back down. I felt it necessary to find out how slow it would fly and the answer is that with a 'clean wing' it has a high stall speed which caught me out in down wind turns. The good thing is that recovery was positive once speed was gained. I also learned that adding power is best done with the wings level and at flying speed - adding power near the stall

proved interesting!

Now that I'm a bit more used to it, the exits from power climbs are getting better. Fast aerobatics are great, the roll rate is terrific and axial, the elevator looks tiny but is also powerful. Pulling huge loops are great fun, a full power climb, at the top shut down and complete the loop for a fast exit past the pits at what looks like mach 1, whistling as it goes, making everyone look! With such an efficient wing (I'm told the sink rate is something like 20:1), making use of lift is something I am learning about. What little I've learned so far has taught me the subtleties of the need for smooth turns maintaining speed. I'm sure it will handle any wind off a slope.

The last part of any flight is the landing and so I'd better mention that exciting lesson. With a clean wing, it is fast and seems to go on for ever, feed in up elevator, carefully to bleed off speed and it will plonk down in the grass. With the ailerons kicked up, the landing speed is greatly reduced and the glide angle is more acute. In this mode the model can also be

flown down through a series of gentle stalls with careful use of the elevator, it's a matter of lining up the model, flicking up the ailerons, keeping the wings level and playing the elevator. Lastly is flight duration, on a calm evening with no discernible lift I've averaged 20 minute flights with a fully charged pack.

Summing up

Well I'm addicted, I get a nervous buzz from flying the Selection, more so than I do with helicopters! OK that is because I am very familiar with heli's and have plenty to learn about the Selection. The point is that the Selection is very exciting to fly, it is very clean, both in terms of looks and flight and it's quiet! It may not be the cheapest way of entering the world of electric models, but it has certainly opened my eyes to the practical applications, power and ease of electric flying. As an electric starter package, you need some experience, perhaps more than I had, but it is still in one piece and I get one heck of a kick out of flying it. I think I may well be tempted by more electric power... **EF**



▲ Front bulkhead needed chamfering for a good fit, plus a fillet of epoxy front and rear.



▲ A bit more colour added to the tips makes orientation far better.

The Simprop Selection is available in the UK through J Perkins Distribution, 90-96, Greenwich High Road, London. SE10 8JE. Tel: +44 (0) 181 692 2451.

Specifications:

SPAN:	1683 mm
LENGTH:	945 mm
WING SECTION:	RG 14
WING AREA:	26.4sq.dm
WING LOADING:	46.8-63.5 g/dm ²
WEIGHT BARE:	580g
FLYING WEIGHT:	1400- 1900g
MAX. WEIGHT:	2100g
WING INCIDENCE:	+1°
POLYHEDRAL:	1°/3°
RADIO:	3 Channel with separate aileron servos.
MOTOR:	Simprop Power
SPEED:	660,7/14.
NICAD:	7 - 14 cells



▲ Hardwood triangle inset in the tailplane for good security. The rear hole takes a locating peg while the wire hook on the elevator locates in the pushrod ball end. Very simple and effective.

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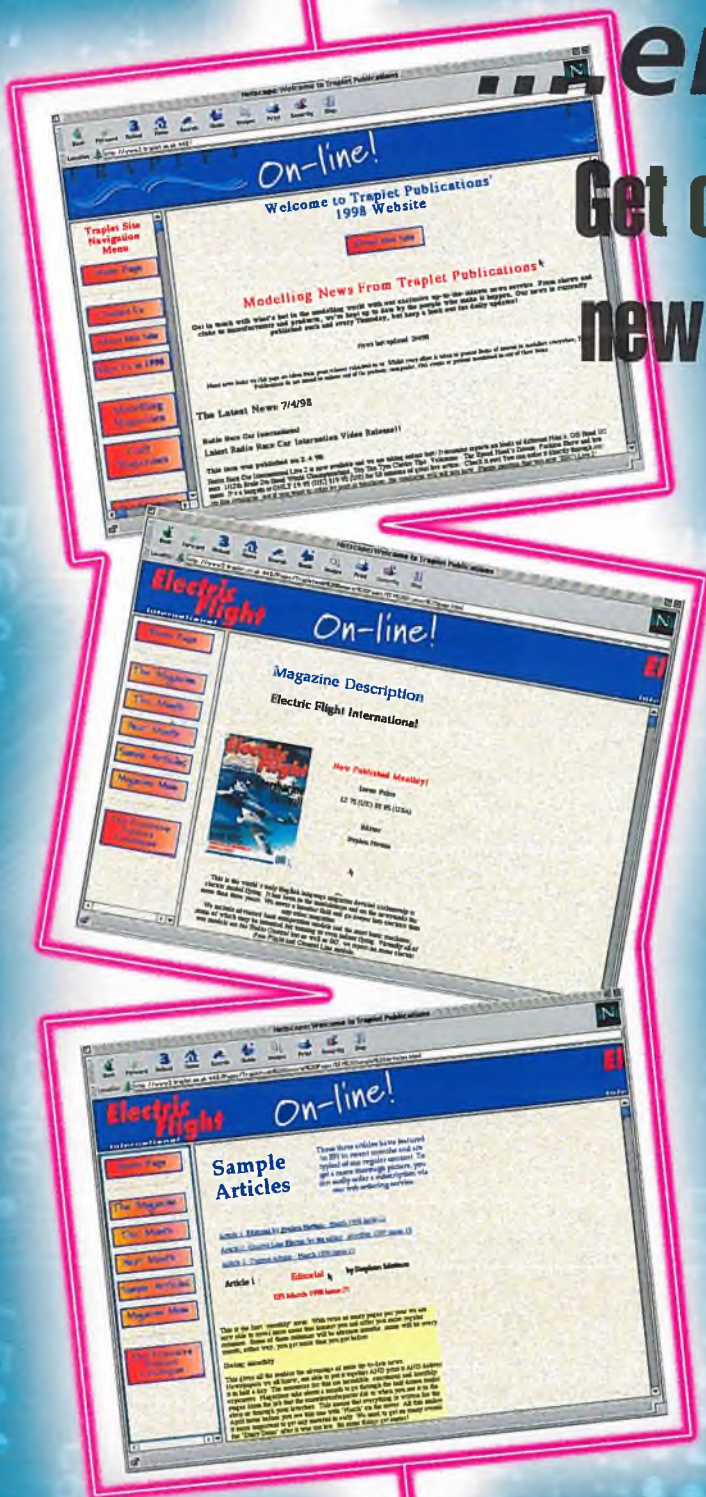
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EF1000



The Light Fantastic

CHRIS GOLDS

In the hunt for more power, Chris tests another motor and discovers what tubes do to thrust.



◀ **A Brian Gaskin pod with a hand-made 4 blade fan.**

was quite staggering. OK, the Plettenberg was running on 10 x 500 cells (the 480 on 8 x 600 'cos 8 is the practical limit for a 480 motor) but I know an aeroplane in re-heat when I fly one! Continuous loops and rolls - even gaining height - at the beginning of the run - were possible and the Hunter had changed from demure to over-sexed all in one go!

So the chart contains two sets of Plettenberg figures, on 6 cells and 10 cells for comparison. With this much thrust

available - about 25 ounces (700g) from the Hunter, I decided that the next model which was well into build, a TORNA-DO F3 with swing wings, should be modified to accept a pair of Plettenbergs right from the start.

The mods were updated wiring and carbon nylon reinforcements to the swing wing pivots because I felt that with much more performance, much more 'G' would be pulled.

The F3 will appear as an EF1 plan in the not-too-distant-

▼ **Brian's White Lifter modified with 4 blade fans, giving a very healthy performance increase.**

Being so old, I well remember an article in RCM&E (I think) by a Swedish model aerodynamicist called Loof Lirpa which had me fooled right to the end - even though I was saying to myself "ang on a bit - that sounds really daft". I have long wanted to do an April Spoof and I have received some very funny replies to my effort in the April Issue. So at least some of you are reading my stuff.

First from Kit Milford of Long Ditton in Surrey with a multi-font computer print-out and a promise of info about a thrust balance when he has saved up for a first class stamp. Next from Geoff Sleath of Heage in Derbyshire who pointed out that he gets a 73 per cent increase in hand-launch thrust by squeezing not the cells but his launcher's delicate parts! It is nice to know that I am not the only barmy one in EDF.

To business

I refer you back to LF No.2 and my description of variations of thrust using a WEMOTEC 480 MINI FAN with a combination of intake/exhaust tubes and lips/no lips. I have turned the description into a chart to illustrate the differences more clearly. More about the Plettenberg figures later.

Mrs. Christmas said "of course you should have a PLETTENBERG HP 200-20-6, 'phone Stephen immediately". I do not argue with my Commanding Officer, so within a couple of days I was in possession of said NEODYM motor which looked very neat and smart. I fitted it in place of the Speed 480BB Race in the Hunter and bench ran it. WOW! The model shot across the workbench with me in hot pursuit! In the air, the difference



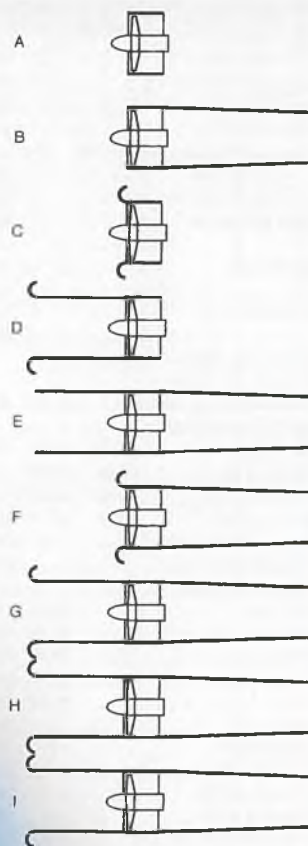


Fig. 1. The nine configurations tested, all with the WeMoTec Mini Fan 480 EDF unit, with the Graupner Speed 480 BB Race or the Plettenberg HP 200-20-6 motors and with or without: the intake lip, an intake tube, a tapered tail tube.

future. So no more about it here except to say that it is thrilling to fly especially with the wings swept back to full-size angle of 67 degrees sweep where it becomes a bit nose-heavy and quite difficult to see in orientation. One thing of note: RAF F3s are painted in a low-visibility grey which is very effective in its "disappearing act" as I know to my cost when I used to fly Hawks painted in the same colour and flown on intercept sorties for our students.

I searched the car acrylic spray shelves in my local shops and eventually got just one can of LF156 CERAMIC BLUE made by HOLTS of Dupli-colour fame. I phoned

Fig. 2. Thrust measured in 'units'. Tests A to G used the Speed 480 BB Race and 6 cells. Test H used the Plettenberg HP 200-20-6 and 6 cells. Test I used the Plettenberg HP 200-20-6 and 10 cells.



HOLTS-LLOYD in Cheshire, sent them a cheque and by return of post received the two more cans I needed.

What splendid service that was - I sent them a photo of the finished model showing their paint in use.

Some more from that inveterate experimenter, His Fanness, the Brian Gaskin of Kent - the man whose fans got me into this mess! He has been playing with four bladed props (two props cross mated) and has had considerable success in terms of thrust. In one photo you will see Brian's mated 5 x 5 CAM props fitted to his 'White Lifter'. Another photo shows the whole model modified to accept the four-bladed prop/fans. He reports a performance increase of about half the take off run, double the rate

▲ A sort of MiG with Rupert Bear tendencies but with a stunning performance.



▲ A sample page from the Gaskin sketch-book tasting of Luftwaffe Secret Projects.



▲ A Gaskin home-made pod using ply and balsa.

of climb and one third up in top speed - for the same motors (Speed 400 6V) and cells (9x 800AR).

Flushed with success BG decided to go Big Time at last! Which means that he found in his sewing box a 20 turn '540 Force' motor to which he mated a four blade marriage of two 5.5 x 5.5 CAM props with a spinner. He made a duct using 1/64 (0.4mm) ply around a suitable cardboard tube (which once contained a magnificent print from a well known aviation artist!). Brian achieved a test run of - on just seven sub-C cells - 38 and 3/4 ounces (1100g) of thrust for seven seconds reducing to 32 ounces continuous. WOW! You can see the unit in a photo and a sort of Focke Wulf/MiG thing to carry it in - another photo. Brian tells me that it goes like "boiled rice", no need to chuck it as it pulls away from your hand and gives about 4 minutes of fun flying on seven cells.

Finally in another photo you can see the delicious thought process by which BG develops his ideas before turning them into real flying machines. Another person to whom I raise my flying helmet!

Let us all see your concept/design/build/fly EDF model; there are lots of you out there beaver away and the hobby needs to see your projects - so write to me! PLEASE!

Continuing in my bid to educate you lot out there with classical literature references to our special part of the hobby, Oscar Wilde must have been thinking of us when he wrote "Lady Windermere's Fan"!

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DERECK WOODWARD Over Here!

The ball's rolling - quietly! By mid March, e-mail messages showed that folk are interested in sports electric flying and this column is the place to be seen in, if performing like an aircraft is what you're after, but quietly. It's great to hear from folk - remember that the models and info have to come from you to benefit others.



Flying columns need flying shots - this is a tad different. This Flair "Black Magic" (in orange), with Graupner Speedgear 600, 8 cells and 12 x 8 Master Airscrew is Phil Tryhorn's second model. Despite thick fog, Phil wanted to see her fly, so Dave Pylor launched her and Eric Leadley spent a few minutes circling hard in 40 yards visibility. Phil went home happy to see his new model fly - and the other two retired with shot nerves! The venue York Racecourse, in case anyone hasn't figured that out.

Amptique

The Big Event in March was flying Sue's trainer. After ten years of chasing me out to fly with no sign of following - two electric meetings in 1997 and Sue bought herself an "Amptique" kit from "Spirit of Yesteryear"! Definitely "minimal modelling", with not a curve on the airframe apart from the prop blades, "Amptique" flies well, has wheels for decent take-offs and landings and an impeccable reputation as a trainer.

Anyway, Sue was in California on a business trip. The weather was ideal test flight calm, so the pristine "Carolina Blue" and yellow "Amptique" went along with the fleet and I had a ball! This model is ideal for training - slow enough to allow a novice to figure out what is happening, stable enough to get out of funny attitudes, satisfying to fly.

Flight one lasted around twelve minutes with power to spare so I decided to see how long her legs were. The motor is a silver label 540 from John Swain's "Fanfare", with a "Leisure" 3.7:1 box, an 11.5" x 7" Master Airscrew prop got the current draw up to 15A! That's plenty of power - she flies on a sniff of throttle and I may change the ratio to be able to utilise the throttle range better.

Well, off we go, with race tracks and horizontal eights around the patch - okay, I may have done the odd loop and occasionally flown low-ish (just so the wheels didn't touch). It was power on all the way until the BEC shut off electron flow at 19:50 - no thermal nonsense - and touched down on the tarmac I left at 20:15.

Not bad - I've had less from soarers when flights consisted of boring upward grinds followed by steady downward circles. If you're looking for an electric trainer, the "Amptique" is well worth a look, "Spirit of Yesteryear" are in Canada at 40 Holgate St. Barrie, Ontario, Canada L4N 2T7 and produce many vintage kits for electrics, as well as some of the old

► **Torsion bar gear on Ron Fikes' Lazy Bee increases ground clearance for grass field ops. Two tone colour scheme is smart, yet casual. But is that a folder prop I see? Next thing will be the thermal version!**



▲ **Mirror, mirror, on the wall - who's the coolest of them all? Ron Fikes leads off with his subtle Lazy Bee. Fully cowled motor, bolt on wing and torsion bar UC set off the outside, with a smart two tone colour scheme. Inside, a high battery placement with forced air-cooling and way-out crewmembers set the tone.**

"Astro Flight" kits. Don't know if they have an UK distributor yet, but they are one of the biggest ranges of wooden e-flight sports model kits around.

Love 'em or not -

You can't ignore Lazy Bees! Andy Clancy's little fat funster has been writing its own rules, like rolling circles without the benefit of ailerons, flying in gymnasiums, taking off from picnic tables, snow, ice and railway tracks. It took to water

like the proverbial duck and was more electric model than most electrics, even if it was a glow model to start with!

At first they all looked alike, then the custom models started appearing. Being able to completely hide our power units, the e-flight world has definitely produced the coolest Bee's and this month we'll look at one of them. Ron Fikes is a bit of an innovator from Palo Alto, out in California, and appreciates a smarter than average model.

At this point, Ron's "TLAR Electric Aircraft Products" bears

mention - its main product being pre-packaged airframe lightening holes. These are on a level with the Left and Right handed sandpaper produced a few years back by Philip Kent's Miniature Aircraft Factory and shall promptly not be mentioned again.

Anyway, first to go was the Lazy Bee's low-tech motor mount - it's rubber banded on. Great for the experimenter, but scores little by the Cool Pool. Ron's Astro 05G is fully cowled in - this works but lowers the thrustline, not good if you are





▲ **This is how Bee's usually come. Yours truly's short winged old nail (now defunct - massive pilot error) illustrates the standard UC and banded on motor, while CASA clubmate John Symborski made a 48" wing from an original kit before Clancy offered it as a factory option. John's is dressed up as an American school bus!**

infatuated with oversized props. The standard UC, as lifted from the Flying Flea, went in favour of a torque rod arrangement. This lifts the Bee's belly off the green stuff and gives a higher ground angle for shorter take-offs.

Inside, a ply tray raises the nicad to window level - most Bees fly with the nicad much lower for plenty of pendulum action. Vac-formed front windows make cunning airscoops to cool the flight pack, while missing back windows and an air deflector ensures hot air exits instead of wandering around inside (like my old 'lecky Bee). A bolt-on wing does wonders for the exterior, while the crew are escapes from Sesame Street. Finally, a smart - yet casual - colour scheme throws down the gauntlet in the stakes for the coolest custom version of a regular kit model.

So - what have you got to top this one?

Let's have a collection!

It's a well known fact that small model lovers build more and different models at greater rates. After all, if you can build a model a week, you can have lots. Another plus is that you can give the ones you don't like to the kid next door to play with (take the micro servos out first though!) and make another without much disapproval from the family bean counter. Try telling the wife you hate a model that cost \$5,000 and has been taking up

the house for a year and see what unpopularity feels like...

Anyway, one such burgeoning collection, seen in the rare setting of a modeller's tidy garden, is Eric Leadley's. These are right in line with this column - economical performers that can do far more than fly around in circles, but when not whizzing around, Eric dabbles in Electroslot and has won some "pots" over the years.

My favourite has to be his "Plankton" - an overgrown cousin to "Sushi", published in EFI way back. "Plankton" is the blue and yellow tailless

plank - surprise - and had the sort of gestation that makes me overlook its knife edge ability being minimal. First off, "Plankton" flew on geared and straight drive 600's before it acquired two S400's, with Eric's neat wing motor mount. Two dowels pass through the LE and end up at the mainspar webbing; the motor sits on these and is held in place by heat shrink tubing!

Two S400's hauled her up in fine style, but she needed nose weight. Figuring something more useful than lead was handy, our lad added a third direct drive S400 in the nose to make it a triple. You have to admit - there aren't many three motor tailless soarers around. It's on the plan too! Having flown a Lazy Bee with three S400 straight drives, I can tell you the sound is fantastic and the current draw of three 7.2V S400's in parallel is not all that bad for decent run times.

Eric's EDL Plans fly out of 3, The Glade, Ashley Park, York YO3 0LA, England, if you fancy some neatly drawn plans of good flying little electric sports (or even the odd very odd soarer!)

The Electricity Board

You aren't flying long without a charger! I followed the traditional path - bought a cheap seven cell effort. It was followed by the more upmarket

Hitec 635, that charges eight cells fast, nine in an hour and plays "Jingle Bells" when done! It's still working for a living, too.

At that time, I needed to charge ten cells at 5A. Research narrowed my choices to two - Astro's 110D and 112D. The 110D, for 18 cells, would "save" around \$40.00 and I thought I'd never go above a 16 cell model. Nevertheless, I bought the 112D, rated at up to 36.

A few months later, I watched Keith Shaw's MaxCim powered Me35 at KRC performing on 20 cells, mentally said "I want one" and heaved a sigh of relief that I had just saved myself around \$120.00. If I had bought the 110D charger, I'd no be looking at buying a 112D down the road - around \$160.00 minus the initial "saving" of \$40.00.

The moral - if you are a confirmed e-flier, get the tools to do the job. Yes, chargers are expensive but will work for years. I didn't get mine by using some change found under the Jag's carpet or borrowing the grocery money, I sold off some surplus gear - hard for a confirmed hoarder - and don't build high priced kits.

I used the two high end Astro chargers as an example. My 112D works superbly. All it does is charge batteries - no cycling (I discharge them with a model aircraft), no computer hook-up to record dozens of charge/discharge cycles (not as interesting as practising slow rolls). If those features interest you, there are other high quality chargers available, but as I am unlikely to own one, I cannot comment on them. What I do

▼ **Eric Leadley has plans - here's the models they build into. The "Plankton" tailless takes from a single straight drive 600 to three S400's and the tiny uncovered one at the front is a free flight "Eastbourne Monoplane", the rest being fine specimens of cruising, zipping and whizzing models for all tastes.**



suggest is that you stretch your imagination while examining your future charging needs.

You don't just run out and buy one

- A brushless motor, that is. I'll start by spreading the blame squarely between Keith Shaw, for demonstrating what can be done with vast controllable power, and Tom Cimato - for making the motors (and for all those dreadful e-mail jokes he sent me!).

Now remember that I learned how to build 48 ounce models down to 44 ounces so a cheap glow engine would give the same performance as an expensive one. Even though I owned an Astro 05G, I was still pretty parsimonious until I saw Keith Shaw fly his MaxCim powered Me 35 at KRC 97. After you've seen electrics that flop around like fish on dry land and you see one doing vertical eights like a control-line model and flying for ten minutes, it does things to one's conceptions.

So, I researched brushless motors. There were two when I started - Aveox and MaxCim.



▲ Something wicked this way comes! Dave "Turbo" D'Antonio has been campaigning this Balsa USA "Enforcer" for years. Built right from the 40 powered kit - except an Astro 40 on 21 cells provides the power instead of a glow 40. That "prop in a slot" pusher lets the whole neighbourhood know when "Turbo" is flying. Shows that straight conversion from glow to electric is practical.



Aveox make many different sizes, for competitions where motors run on or off, and tend to melt nicads when on. MaxCim make two motors, for folk who want long duration with smooth throttling. After I saw a MaxCim win the AIAA University challenge in 1997, powering a 15 pound, 12 foot span model for 18 minutes of power-on flight, I knew which was for me.

This must be similar to buying a Rolls! You don't just slap down cash and blast out of the showroom. We e-mailed back and forth, discussed what I was going to be flying it in, even what would follow - this is travel, first class, folks. Gear ratios, motor mounts, how to

handle larger batteries - Tom patiently answered all my questions. As I was writing this, my new system arrived. For the technically minded, it's a MaxNEO-13Y motor with a Max GR 2.5:1 gearbox. With a Maxu35A-21 controller, the system will take 21 cells and 35A continuous - my 20 cell, sub pound aerobat without raising a sweat.

Next month, I should have photos of my new system and a new device for building large nicad packs for those wary of soldering.

Brushless will never make the bargain basement, and hopefully the market will never be big enough to cause cheap rip-offs from the Pacific Rim to detract from the real thing. They are also a superbly flexible way to

▲ It's his fault! Keith Shaw, and his Me M35B with MaxCim brushless and 20 cells. Six pound model flies ten minute flights with well-nigh non-stop aerobatics. Model, like all of Keith's, is a lightweight one off. Maybe, if I can find a workable three view one day... Tom Cimato, who built the motor, was in on it too - but he hides a lot!

power a large range of models. Mine will fly first in a lightweight 65" Astro Porterfield Collegiate on 14 cells, while Keith Shaw uses a similar motor in his Me 35 - twenty cells and effortless aerobatics. They can even operate on less - this single motor could take you from a seven cell "Amptique" to a 20 cell Cloud Dancer 40 with nothing more than cell and prop changes!

Woodworking

Or whatever one does with carbon fibre! My WesTek Kolibri is to the point where I can start drilling holes all over the fuselage tube after learning about making a wing from two long CF rods and two 2" pieces, held together with thread and CA glue! Slowfly is making a big impact over here and the first moves away from the minimal frame wing and stick models are not far off.

I'll get brave and try to photograph my Kolibri - the mylar covering is so bright that it can hurt the eyes working on it under bright shop lights. Might have better luck with the complete model out of doors. I may get a chance to fly indoors in early April, even if mine doesn't fly there, I hope to bring you some sports e-flight shots of unusual types from this meeting.

On the "real" woodworking side, my "Thermic Traveler" is

approaching the covering stage. This is my most recent attempt to prove that I can fly a model round in circles and without the prop going around, and has been an enjoyable little building interlude. This kit came from Aveox, who surprised everyone by re-releasing the Midway Model Co. kits from a fair few years back. These were designed with really good lightweight airframes, to make good use of early electric technology, and should now really light up and fly great with the high power systems that have evolved.

Ironically really - the power systems we have now are far ahead of even a couple of years ago, yet old model structures still make the best use of electric power.

Out of electricity

A last thought from Bob Kopski, e-flight columnist for "Model Aviation" magazine and one of sports e-flight's greatest supporters.

"Electric fliers shower before going flying, not need one after".

As the March wind and rain blast at the office window, photos and words to 11159 Captains Walk Ct, N. Potomac MD 20878 or Trapplet Towers. If you just want to e-chat, I'm on the end of: Weekendpilot@juno.com **EFI**

Model Shack CRICKET

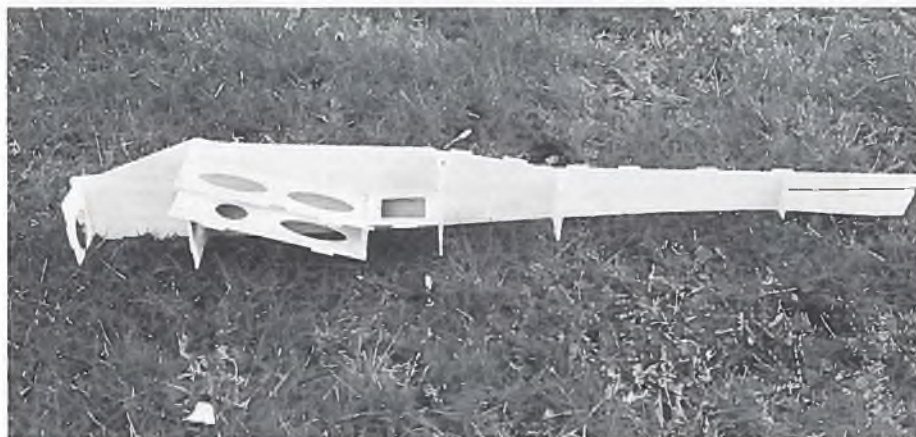
kit review

REPORT BY: **BOB DAVIDSON**

It's not very often that a kit reviewer gets the opportunity to review a kit where he continually runs out of superlatives but in this case **THIS IS THE ONE!**



▼ Fuselage side with battery box and formers attached.



This is also something of a scoop for EFI in that the kit was supplied directly to myself from the manufacturer so that this review should be featured in EFI long before any of the other model magazines have even heard of it. The model was designed by Dave Ridgeway and Simon Lancaster and is marketed through Model Shack at Ridgeway Craft Centre, Sheffield (see next issue of EFI for further details).

Now this is an electric model designed by an electric flier for electric fliers and what a difference that makes! The model is available in two versions:

1. Rudder, elevator and throttle with a dihedral wing.
2. As a full four function version with minimal dihedral and ailerons.

Of course I decided to build the aileron version. The original model was designed around the Master Airscrew geared motor and propeller and seven cells but the design is so flexible that almost any geared 600 or equivalent unit will fit or even a direct drive 600 works well. There is room in the battery bay for up to ten cells so the choice of propulsion units is very wide.

The kit and construction

This kit is something of a revelation! It consists of a lot of CNC parts and a pair of very light foam veneered wings. These have a wrapped leading edge and only need the addition of a trailing edge strip and wing tips before joining in the traditional way with a glass fibre bandage in the middle. The aileron servo on the original model was surface mounted on its side on the underside of the wing and as this is a review kit I followed the same route. This led to some complicated geometry in the control linkages but once worked out they function OK. The rest of

the kit parts are all CNC cut and go together like a three dimensional jigsaw. The fuselage is assembled on one side using the battery box, the motor mount and several formers. When the other side is added it is almost impossible to produce an out of line fuselage. Similarly the fit of the tail feathers is so accurate that a mistake in the construction is almost impossible.

The motor and gearbox

is clamped into place with a pre-bent strip of dural. The cowl is a plastic moulding which is screwed into place with four small self tapping screws and the wind screen fairing, also a plastic moulding, which also doubles as a battery hatch slots under the cowl and is retained by a rubber band across the leading edge dowels. The tail feathers being CNC cut really need no description and go together without any problems.

The model was covered with white Solar Film and the pre-cut decals added - looking very smart at this stage!

Flying! Flying!

The initial test flights took place at the end of March in almost perfect weather conditions. No wind but a hazy overcast which would make a white model difficult to see.

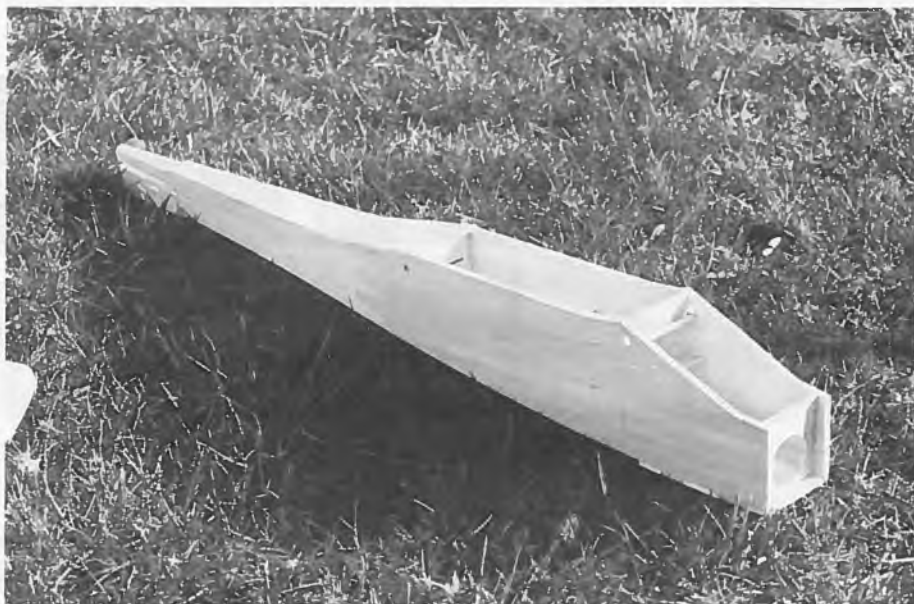
The first take-off was a joy! Straight down the strip and an easy lift once flying speed had been attained. A little right rudder trim was all that was needed to establish straight and level flight. Loops, rolls and stall turns were all available from level flight and the model could cruise round on about one third throttle for what seemed like for ever!

This really is an electric fliers model

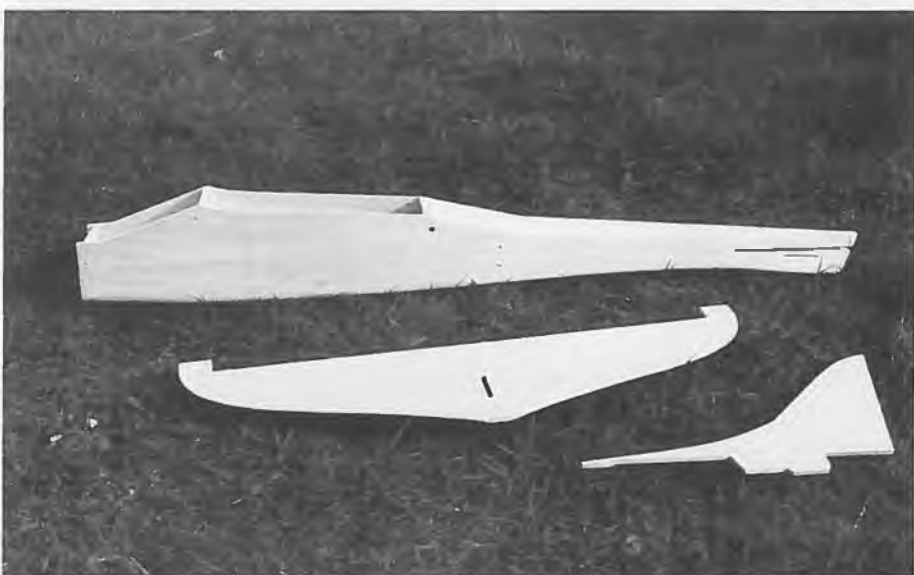
After about 6 minutes flying I lined it up for a landing approach. Just before touch-down I cut the throttle and the large 12 x 6 propeller turned over like a large rubber powered free-wheeling prop right down to the flair-out for landing. The next couple of flights were a series of low fast and slow passes for Dave's camera and with confidence growing I was able to fly the model very close to the camera with complete trust.

On the same day Dave was also flying the rudder, elevator version with a very - and I mean VERY basic direct drive unit. It was

► **Cricket on the right, is the four function, rudder, elevator, aileron and motor control version reviewed here. On the left is the rudder, elevator and motor control 3 function trainer and sports model.**



▲ Basic fuselage complete.



▲ Fuselage and tail.

swinging an 8 x 4 propeller on 8 cells and it flew like a club trainer with plenty of power for in excess of 7 minutes but without the noise normally associated with a 25 or 30 IC engine. This must be the way to go! If anyone is wishing to enter electric flight or if an experienced electric flier

wants a model which will really perform with a basic direct drive or will perform even better with a fairly simple geared system, then this is the model for you! The performance is simply outstanding. The looks are stunning. It is designed by a Brit. You have got to buy one. **EFI**



Tailless can be simple -

REPORT BY: **THEO GORDIJN**

Tailless models "flying wings" have a lot of features to recommend them for electrics. Theo continues to tell us why.



Important

One thing you just have to get right for flying wings is the Centre of Gravity (CG). After wing shape and wing section the CG can make all the difference to the life expectancy of the model and the happiness of the owner/pilot.

We know that a forward CG position makes a model easy to fly (unless it is ridiculously far forward) but it does not give us the best performance. A rearward CG provides better performance and manoeuvrability (control) but you can 'overdo it' and the trouble starts.

My goal is to have a rather lively elevator response to obtain a better glide angle, also



▲ A modern foam/glass/carbon Wing spotted at White Sheet!

◀ For a model like this the methods in Fig. 5, Fig 5b and Fig. 5c have to be repeated a few times to cover the complete wing.

allowing sufficient control with small movements of elevator surfaces. A too far backward CG can be handled by a good pilot but continuous corrections prevent optimum performance. Don't overdo it as I have done too often!

Try to find the best position by starting at a safe forward CG and make small changes at a time. (15g ballast changes don't effect a 1500g model much, even with 250mm distance between ballast and CG). Even when you go beyond the best CG position, the model can be saved by a good pilot. Putting it back to where it was before allows you to feel THIS is the right place.

When the CG is wrong only an automatic stabilising device can help. So if you like a gyro or optical gadget you can go beyond my limit. The idea was 'Simple Tailless' so let us keep it that way. Small elevator throw helps to prevent over-controlling but does not make an unstable model, better really but don't depend on it.

Where must (can) the CG be?

Simply - between 17% and 24% of the Mean Aerodynamic Chord (MAC).

Problems:

- What is the MAC?
- What size is it?
- Where is it?

part 2

I'm not talking to real scientists. I'm talking to modellers: The MAC is the chord (width) of an imaginary wing with similar span to our model and principally similar aerodynamic longitudinal stability features (stall behaviour). We don't consider yaw and roll yet.

The MAC can be calculated, size and position but because so fewer of us can still understand the method, I'll skip that. The average geometric chord (C) is not the same as the MAC (see fig. 3).

C and MAC can be the same but only in a wing where the chord (C) is constant along the span (see fig. 1 and fig. 2). Figs 3 and 4 show two drawing methods of finding MAC for a simple straight tapered wing.

When your projected wing is an irregular shape like the one in fig. 5, things get a bit more complicated. Try this method for yourself and you will see that repeating this enables you to find MAC for any wing shape.

Just divide your wing into rectangles, parallelograms and trapeziums, apply fig. 5 method several times and Hey Presto! I know that this can be too much for some modellers who are unsure about handling trapeziums etc., but there is an easy and quite 'fun' way that I'll get to later.

Why?

Why are we keen to know the size and position of MAC? What we need is the position of the Aerodynamic Centre (AC) of the wing.

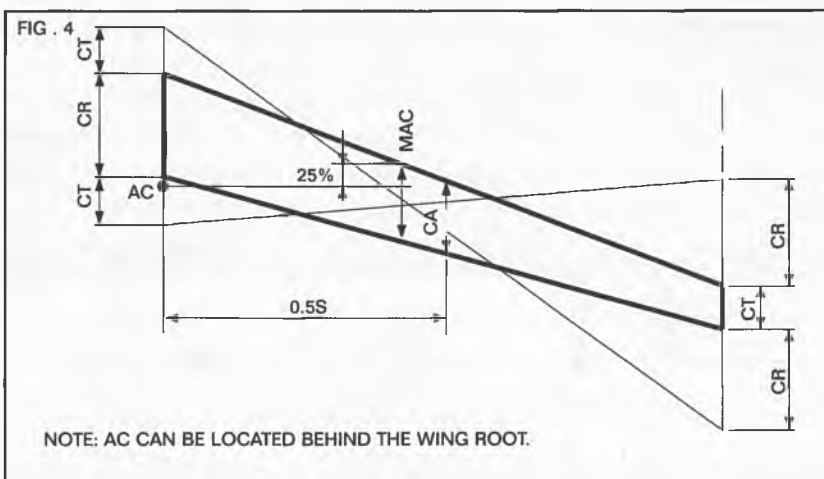
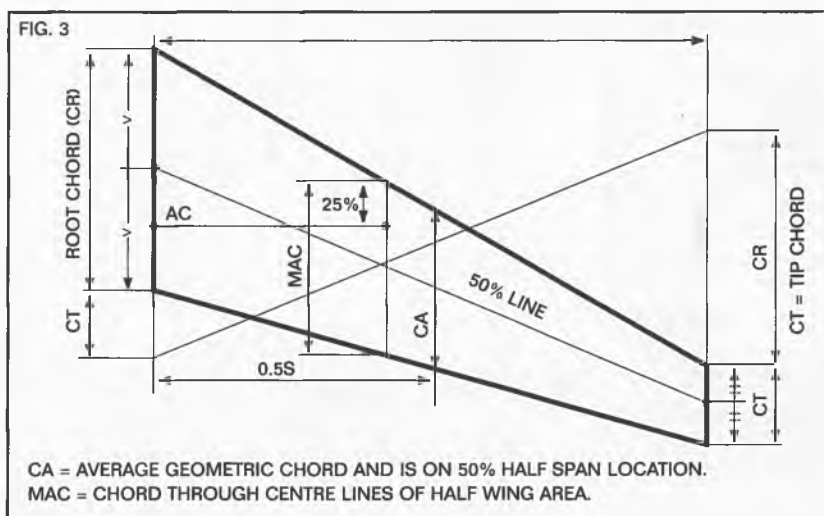
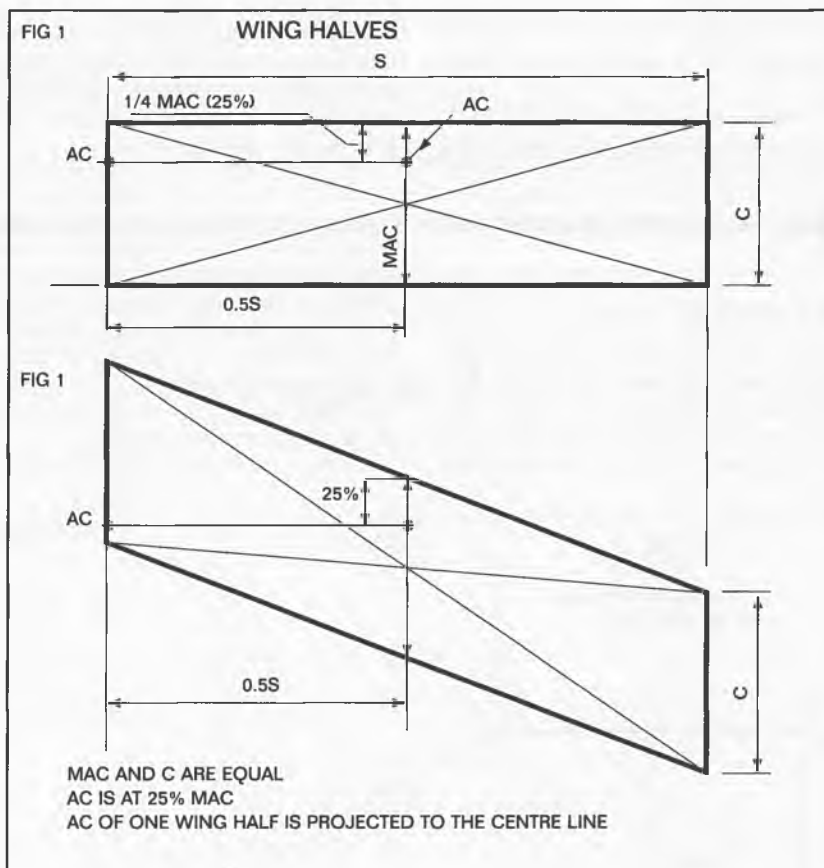
To simplify it for us we can say that AC is the point at 25% MAC. I know that you scientific ones out there know better and that lots of things like airspeed, angle of attack, Reynolds number etc., have to be considered but for most of us, uncomplicated modellers/designers who don't have time to argue about 1% either way, 25% MAC is close enough.

Sermon

It is unimportant where the CG is relative to the root chord of the wing! It is very, very important where it is relative to the AC! Don't let an 'Expert' tell you this is not true.

Ready to fly? For those first flights put the CG at 18% MAC. This is 7% forward of the AC which is on 25% MAC. In order to know how much 7% is we have to know the size. That is why we try to find it.

After some test flights we start (slowly)



moving the CG until we decide that we know where it should be. I usually stop at 23% or 24% because that is where it starts getting tricky.

The distance between the AC and CG (7% to 1%) is the 'static margin' sometimes called the 'safety margin' of the model. For gliders, usually 1% to 3% is good, for powered models usually a slightly higher margin is chosen (2.5 to 5%).

The easy way

Now for the "lazy modellers" method, also called the "wind vane trick" - we use thin corrugated card (old boxes). The best is the micro type which is 1.5 to 2 mm thick. We need a flat piece, not warped or bent. With

the corrugations 90 degrees to the flight direction now make a half wing of your model. Don't make it too small, at least 250mm half span. Insert in one of the corrugations/holes a piece of straight piano wire and go outside to face the wind. (See Fig. 6.)

The wind needs to be constant and smooth. So keep away from trees, bushes, houses and get into the open field (a beach is best). Note: A fan (ventilator) does not work - the air is much too turbulent.

Wind is the cheap solution. When the wind is good three things may happen.

- Wing flaps over, refuses to keep the leading edge into wind.
- Wing behaves like a wind vane, is stable, possibly oscillating a little.
- Wing is undecided, keeps flapping over

or is more or less stationary in all positions.

When (a) happens move your piano wire forward to get the (c) condition, if (b) occurs try more backward positions until (c) is reached.

Position (c) cannot be found perfectly. This method we are using is not ANALOG but DIGITAL, i.e. we make changes in steps. (This sounds like electronics but it is not.) We will find one corrugation is a bit (a) and the next is a bit (b). Because (c) is in between those positions, it is good enough to know these limits.

THIS IS THE POINT AT WHICH OR BEYOND WHICH THE CG SHOULD NEVER BE.

Because we still don't know the size of MAC we must calculate C (geometric average chord) by dividing the wing area by the wing span.

Put the CG at 10%C in front of point (c) for the maiden flight and slowly try to find the optimum more rearward position.

You will see that this is not a very scientific or delicate method to find AC (more or less) but it helps to find a safe 'first flight CG' (first fright?)

Now it is time to test the model. Every time you move the CG, retrim the elevator neutral too. When you find that to reach 23% MAC you need a bit of down trim related to the original reflexed section you know that the section was more stable than you needed.

However, the fact that now a part of the wing has a less reflexed or even not reflexed section is a very good thing. Please understand that the whole wing does not need a stable section. When the centre section is unstable (but generating more lift) and the outer part of the wing provides sufficient stability, we have a good wing. You might consider a slightly less stable section next time for less drag and faster flight. I'm not sure if that will benefit the bungee launch or thermalling.

Note:

With elevons, down trimming of the elevator function causes wash-in. This is not very nice as I have found out trying aero-towing for the first time (it was my wing's maiden flight too).

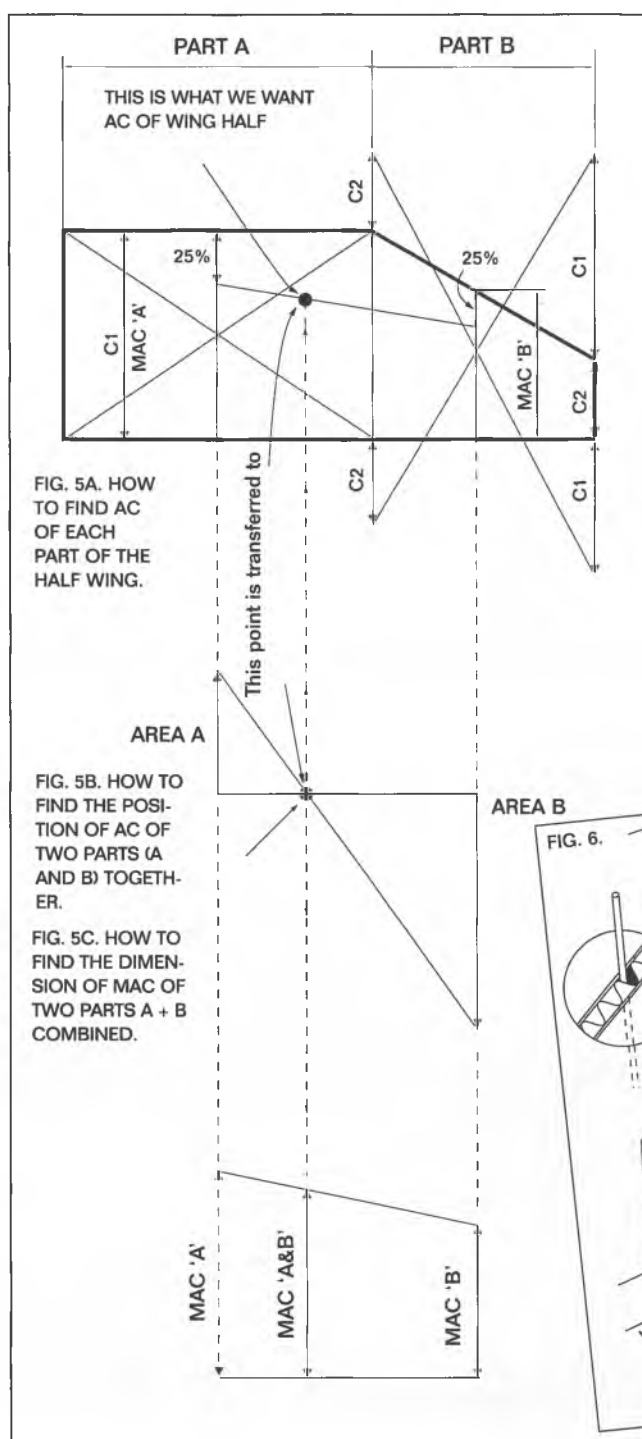
When the elevator is in the centre of the wing, down trimming gives washout which is good. Up trim should then be done with the ailerons. For this reason I don't use elevons on my '1995' designs.

Final word

When using elevons, don't consider differential aileron! Having elevator action on your ailerons you have the differential in your hands. Try it if you don't believe me.

Footnote

I have just heard that the German 'PUL' fullsize tailless powered glider recently crashed beyond repair doing CG tests! So be very careful and as you approach the CG's 'good spot' don't move CG more than 0.5mm each test flight! **EFI**



Other pilots' models

COMPILED BY: **THE EDITOR**

This your page. You want to know what others builders and pilots are doing with their electric models and they are sure to be interested in yours. There is a broad variety of model types here this month. Send photos and details to the EFI editor at the "ALL CORRESPONDENCE..." address on page 2.



Phantom

Geoff Leigh gets to most of the UK fly-ins and he always has something interesting to fly. He goes for models that are a 'bit different' or ones that few others have built. He sometimes inserts electric motors where the designer did not intend - say in PSS models, or in scale models of originals that used a different mode of power.

This time he has built an electric ducted fan scale model of a jet, not so different in itself - but how many EDF Phantoms have you seen? It has a wingspan of 32" (813mm) and uses a WeMoTec Eco Fan Pro, Ultra 930 motor and 12 cells. This writer has not seen it fly but Geoff says that it flies for 3 minutes flat out or flights may be stretched to 5 minutes. He describes it as "...quite fast with a good glide." I look forward to seeing it fly this year.

Great Lakes Biplane

This is a scale model too, built by Jan Hafnor of Oslo, Norway, from a Bob Holman, USA, plan. It has a wingspan of 1200mm (47") and weighs 2825g (6.2 lbs). Power is a Plettenberg 320K motor in a Kruse 2:1 toothed belt reducer, driving a Master Airscrew 'Scimitar' prop on 10 x 1700mAh cells. Radio is JR 3885, uses four functions and the model uses four servos and a Kontronik speed controller. Flight times are about six minutes.

Jan spread the building over nine months which he would not have done if he had realised what fun this model is to fly. He says that it will roll, loop and fly continuous knife edge or if he throttles back - "On half power it will float on forever".

Avro Lancaster

Mal Tomlinson operates 'ModellHaus' in Stockport, UK. He manufactures some kits and he sell other brands but he also builds models for himself. One that he has built for himself is this 84" (2134mm) span Lancaster. Wishing to build a Lancaster this size, Mal started with a Chris Golds plan

◀ **Geoff Leigh and his Phantom F-4.**



▲ The 'Great Lakes Biplane' almost finished and out for its test flight.

for four 21 size IC engines, published by 'another' plans service. This plan had taken into account the difficulties a pilot may have with IC engines like asymmetric thrust if a motor cuts. For this reason the motors had been re-spaced closer to the fuselage which lost a bit of true-scale appearance. Closer to scale was the very deep wing thickness which did not suit electric power. The fuselage is "...just a wooden box with foam infill and an epoxy/glass skin..." but it looks very convincing.

After a few difficult flights Mal decided to build another wing. The second wing is what you see in this photo of the model. Engines were relocated to scale and the wing section changed to one of the NACA four figure ones that work so well on models. It is white foam with a plywood spar/shear web and an obechi veneer skin. This new 'thin' wing is 2" (51mm) thick! The model was transformed beyond belief. It takes off after a 70 yard/metres run and handles easily, in fact with this section it glides too well! Flaps have not been fitted to the model and it 'floats' too far on landing approach. Weight is just under 15 pounds (6.8kg) and it flies for 3.5 or 5 minutes on 24 x 1400 or 1700mAh cells. The motors are four 'Mega Mini 7s' with APC props. The colour scheme is how 'Tiger Force' Lancasters in India were finished in

► Yak 15 shown us by builder Colin Prior.

◀ Jan Hafnor's 'Great Lakes Biplane', finished, cowl fitted and with its pilot. So there is a use for your daughter's redundant Barbie doll.

1945 for use against Japan but hostilities ceased before they were used in anger.

Yak 15

This is another British model waiting for the flying season and is almost certain to have flown by the time you see it here. Colin Prior brought his scratch built model of a Yak 15 to the BEFA AGM at Leamington Spa this year. Wing span of this early Russian jet, is 60" (1525mm) and length 55" (1400mm) and power is from a Robbe Proline 536-4 motor on 14 x 1700SCR cells, driving a WeMoTec RK 740-E fan unit. The fuselage construction is almost all balsa, built one half shell at a time, stringers and planking over formers, with a rolled ply tube between to provide inlet and exhaust ducting for the fan unit. The wings are veneered foam, each half made in two pieces to accommodate the leading edge kink. The airframe is finished in the all white Russian winter colour scheme and weighed 2.5 lbs (1140g) before the fitting of any RC gear or EDF units. **EFI**

▼ Mal Tomlinson's Avro Lancaster.



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In a Learner's

By Steven Goff

Part 2 of our guidance for beginners - from a young flier who is still on the steep part of the learning curve and clearly remembers what he needed to know - last year.



▲ Choose your first model very carefully. Seek advice from experienced electric fliers. Take notice of the manufacturer's directions and try to confirm this with pilots of a similar model.

Hopefully, after reading last month's article, you will have been inspired enough to go in search of your ideal flying site. Whether you have been successful in finding a local RC Club, or bribing the farmer with that bottle of Whiskey, at least now you have somewhere to launch and land your model, and with any luck, not making little craters along the way. So, task one completed, it's now time to look at the model itself. If you have been reading EFI or similar for sometime now, you may have already chosen your 'dream machine', but for many of you out there, the thought hasn't even crossed your mind yet. 'Can I actually do this?' might be one of the thoughts but by now you should have conquered these doubts and be looking forward to a prosperous flying season.

"Suits you sir..."

Choosing your first model is like choosing a brand new car. There are so many of them out there and with every other

salesman offering you something different, it can be a difficult decision. New car owners are less fussy about spending large amounts of cash on the latest 'Super Turbo X739' than we modellers on a £100 model. Why are we so fussy? What is it we have to take into consideration which will swing us from one design to another. Well, as with most things in life, it usually comes down to "Do I have the time?" and "Do I have the money?"

Quick build models are always so inviting to the beginner, with most of the construction work being done for you, having only to join the wings and tailplane, slot in the radio and motor of your choice, and race down to the field before the weather changes its mind. Named ARTF (meaning 'Almost Ready To Fly') these are usually more expensive than their kit counterparts. So if you are rolling in cash, but have very little time (or experience) to be messing around with a scalpel, these could be the models for you.

But! - what if you have loads of time on your hands (i.e. those of you who are not mar-

ried!) but very little in the money box? Well, your next option would be a kit. Although easier on the pocket, you will have to possess the skill of a heart surgeon, the knowledge of a master craftsman, and the patience of a dead man. That is of course, if the instructions are in Japanese.

Most of the kits out there labelled: 'A beginners model' will have excellent instructions, clearly drawn plans and very high quality CNC (Computer Numerically Controlled) cut components. All that is required on your part, is a little time and patience, and if all goes to plan you could produce exactly what is printed on the box.

"I'll take what's in box number three."

"So exactly what kind of kit should I be looking for?" is a question I'm not going to even try to answer. What I will do is guide you in a direction, depending on your preference, time and money.

It is argued that a beginner should start with a full function model - i.e. Aileron/Rudder/

Elevator/Throttle, so that he need learn only once. I learned to fly (and I'm still learning!) on a simple Rudder/Elevator/Switch cabin type trainer. This is excellent for a no-nonsense, easy on the pocket, entry to electric flying. Because it is a small Speed 400 model it doesn't eat batteries either, so I could expect nice long 10-15 minute flights, which I now get regularly if I'm not spiralling to the ground, looping or any of the other tricks I picked up recently.

For something like this set-up, you would require only two servos (for Speed 400 models the lighter the better), a speed controller or switch, a pack of 6-8 AA, cells and a suitable radio and motor/prop combination.

The model I am currently flying with (my little Galaxy Models 'Scamp') cost only £33.99, the gearbox (1:1.85) and motor cost £19.99, two Hitec HS80 micro servos (although I could have used mini) came to £49.99, a Skysport 4 transmitter and Hitec receiver cost £79.99 and a 7 cell battery pack (home

Shoes

made) came to £8.05. The switch was also home made so parts were the only cost here, and that was only around a tenner.

So the grand total of that little introduction to electric flight comes to: ...eek - £202.01. Now, that is not much to pay for almost an entire set up which has lasted me a year now, with no lasting damage to the model (it was converted to a two piece wing by a tree, and removable tailplane thanks to the ground). Remove all the internal workings and you can pop them into another model, and now you have only the cost of one more kit to worry about.

"Houston we have a problem..."

One fateful day, you will eventually crash your model. It happens to the best (and worst) of us, and although it's easy to say don't worry now, I wouldn't blame you if it brought a tear to your eye, to dig your pride and joy out of the ground. Funeral costs for models are very low, they dig their own grave (usually a few feet deep, requiring the aid of a spade to remove them!) and even scatter their own ashes. Incidentally, bringing your plane back from the dead is just as easy, and this is where kit builders have a little bit of an advantage.

Remember back to when you were gluing in those wing ribs? Do you remember how you reinforced the wing join? If the answer to these questions is "yes", then you stand more of a chance at successfully repairing your model, because you understand how it works. Don't get me wrong, ARTF flyers are just as capable of performing a little magic with a scalpel, but for the beginner, if you didn't actually put the model together yourself, it can be a little daunting knowing where to start. So, another advantage can go down on the 'Kit' tick list.

Conclusion

So, now we should have some idea what we will be aiming for. It was not my

intention to recommend Kits to you, as I'm sure with some simple guidelines you are capable of choosing what suits your requirements. The best advice I can give you, is to read the kit reviews in EFI, and maybe make a list of all the models you liked the sound of. Don't be afraid to ring up suppliers or manufacturers to ask them a few questions, remember, they are trying to promote their product, so them offering you a little advice is in their favour.

There are still many types of model out there, which I haven't covered. One type is the traditional 540 style 'can' motor. It is my belief, that for a beginner, he would be best suited to trying his hand at the excellent range of Speed 400 models. Also, as I have mentioned, these little flying machines are easier on the pocket, lighter, smaller, simpler and generally take less time to construct.

540 style planes are an excellent step up, in the flying ladder. They perform well, much like sport models, and once again there is a wide choice out there, of which model to go for. The first model I ever bought was a large (88" span) glider that used a 540 motor for the power plant. I was very disappointed with this, not only with its flying performance (or lack of it!) but the sheer time and effort it took to build it. I'm not saying all gliders in the 540 range show poor results, far from it, there are so many excellent models out there using this system. The problem was not the motor it was using, it was the plane itself, simply too heavy for it to perform.

At the end of the day, it is your choice, and we can only share our knowledge and opinions with you, and hopefully help you get the most out of this exciting hobby.

As before - those of you with Internet access can contact me at: steve@goff.powernet.co.uk Feedback from beginners in particular, will be greatly appreciated. I would like to hear your views and opinions, and please tell me about your progress. **EFI**



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