

# Aero Modeller

INCORPORATING  
**MODEL AIRCRAFT**



**HOBBY MAGAZINE**

**JANUARY 1977**

**30p**

**U.S.A. & Canada \$1.25**



*Build a Coupe d'Hiver  
Superstar 1 - Kit Review*

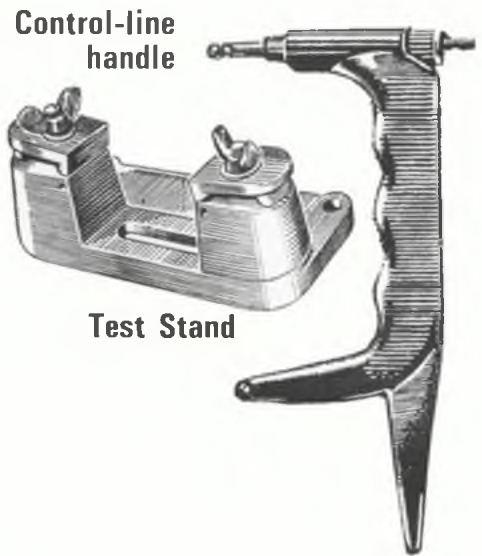
# QUICKSTART



**DART**  
.5 c.c.



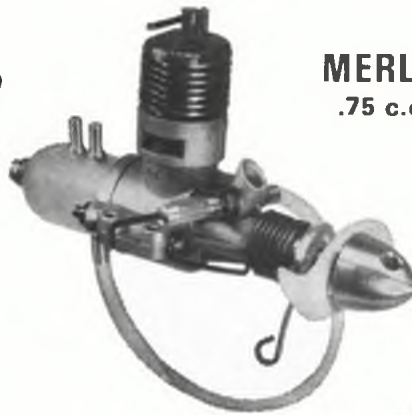
**WASP**  
.8 c.c.



**Test Stand**

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# SOLARBO



Designing a model was probably much more fun twenty-five years ago. Top-class contest modellers were ready to try unorthodox layouts, and win National team status with them. There's only one more or less orthodox model in this Austrian AI team, for example – and the most unorthodox one of them all (second from right) won that particular world championship, flown in Yugoslavia.

Ossie Czeppa's design, and the model next to it, established a world-interest in long-moment-arm 'stick' fuselages (the small streamlined nacelles were necessary to conform to the then current 'fuselage formula'). Tailplane area was only 7 per cent.

Model on the extreme left was less successful. The fuselage was cranked so that the tow hook could be positioned to get the towhook position near to the *actual* c.g. The effect on towline stability was probably the opposite of that hoped for.

The smaller photo shows the British team gliders at the same meeting. Much more conservative! And, strangely enough, much more like the modern design 'formula'. Both teams even then were using Solarbo balsa (with the Austrian 'sticks' rolled from 0.5mm ply). Designs may change but modellers the world over know that the 'standard formula' for balsa is Solarbo!



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# Aero Modeller

INCORPORATING

MODEL AIRCRAFT

January 1977  
CONTENTS

Volume XLII No. 492

|                                     |    |
|-------------------------------------|----|
| HANGAR DOORS                        | 17 |
| 'SWALLOW'                           | 18 |
| BETWEEN THE LINES                   | 20 |
| GOLDEN WINGS CLUB                   | 24 |
| 'SETTING IT UP'                     | 25 |
| 1976 CANADIAN NATIONALS             | 26 |
| SMAE PRIZEGIVING                    | 28 |
| AIRCRAFT DESCRIBED—Grumman Guardian | 30 |
| SCALE MATTERS                       | 34 |
| TOPICAL TWISTS                      | 37 |
| KIT REVIEW—OMP 'Superstar 1'        | 38 |
| THE FREE FLIGHT SCENE               | 40 |
| ENGINE TEST—OS 15 R/C               | 44 |
| READERS' LETTERS                    | 46 |
| CLUB NEWS                           | 47 |
| CONTEST CALENDAR                    | 48 |



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## Comment

Off with the old, on with the new—as 1977 approaches with the biggest challenges ever known to British industry, economy and social structure, the SMAE has voted to make its changes too. Associate membership at a nominal fee has been re-activated to expand the present 4,800 which by any comparison is a poor figure for British population density. The Air Training Corps is to have its representative vote and the joining fee has been thrown out. So the doors are wide open for sports fliers to play their part in strengthening the voice of the *Society of Model Aeronautical Engineers* in 1977. It's a voice that needs to be stronger, as the lessons of 1976 have shown.

While the SMAE maintains its membership fee rate for 'full' members, who qualify for the regular newsletter and contest entries at standard rates, it has increased its 'Airfield Policy' indemnity to £250,000. This high figure reflects the kind of demand that modellers are liable to face, and from 1st January, all renewals and new memberships of our *MAP Modellers Accident Plan* will also have their indemnity extended from £100,000 to £250,000. For this protection, the annual fee is increased by a nominal 25p to £1.75, a small charge indeed for a scheme that meets any requirements likely to be raised anywhere—So for 1977 the message surely is: JOIN UP!

## on the cover

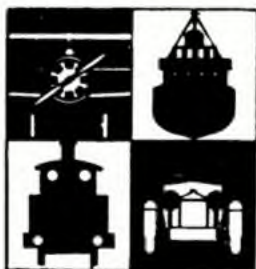
No doubt about it, a modern Coupe d'Hiver model can look pretty sleek — as typified by Ian Dowsett's 'Swallow' design (plans of which are featured on page 18). Adding greatly to the appearance is Ian's choice of colour trim—and that fluorescent pink on the fins and prop must make the timekeeper's job somewhat easier. (Dave Linstrum photo)

## next month

Just about the most successful team-racer to emerge in 1976 was the very simple design by Danish fliers Petersen/Geschwendtner—and this model forms the plans feature. In addition, learn how to make your own spoked wheels for those larger scale models and how to obtain a good paint finish by using aerosol spray paint. These plus the informative, useful features plus news and views on free flight, control line and scale topics all add up to another interest filled issue—on sale 21st January 1977.

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# 46th Model Engineer Exhibition

JANUARY 4—15th 1977

(not open Sunday)

## At Wembley Conference & Exhibition Centre

LOCOMOTIVES, BOATS, AIRCRAFT, TRACTION ENGINES, MILITARIA, WOODWORK, CRAFTS

### WHERE?

The Model Engineer Exhibition is moving to Wembley, and will be the first public exhibition to be held at the superb new Wembley Conference and Display Centre. If you've been through Wembley recently, this is the huge circular building on Empire Way, between the Empire Pool and the Squash Centre on one side, and York House and the London Esso Hotel on the other, all within a stone's throw of the famous Stadium.

As we have previously mentioned, the display area occupies two floors; these are at the rear of the Centre, reached through the main front entrance or, at extra busy times, through a second entrance at upper floor level, reached via a pedestrian walkway. Automatic ticket desks are expected to be in use at the main entrance, which should reduce queuing time to a minimum, any brief wait would be under cover.

### WHEN?

The opening dates are Tuesday January 4th to Saturday, January 15th 10am-8pm daily, except the last day, when the Exhibition closes at 7pm. It is not open on Sunday the 9th.

### HOW . . .

Much to go in? Admission at the door for adults will be 50p children over 5 and still at school 30p, prices inclusive of VAT. Under 5s not yet at school are not charged.

Pre-booking tickets are available and avoid waiting. Single price for small parties of up to 10, adult 45p, child 25p. Parties of more than 10, adult 40p, child 20p. Teachers in charge of parties free in ratio of one per 10 in party. Family tickets are also available (in advance only) at £1 25 for two adults and two children plus 20p per extra child.

Visitors arriving after 7pm will be entitled to entry at 30p. Season tickets are not normally available but the Exhibition Manager may be prepared to make specific arrangements in special circumstances.

### TRAVEL

Rail travel to Wembley is available from Euston and Marylebone but most travellers by public transport will probably use the Underground service; both Bakerloo and Metropolitan lines (via Baker Street) serve Wembley Park Station, which is five minutes' walk away, along the same road. Wembley Central Station is a little further away and has a limited Underground train service, but is an alighting point for some Birmingham/Euston main line trains. By road, Wembley is easily reachable, lying only a minute or two west of the North Circular Road. Local permanent signposting to the Wembley complex exists over quite a wide radius, and although peak-hour traffic on the main roads in the vicinity can be quite heavy at times, it really is quite simple for drivers unfamiliar with London to reach the Exhibition without driving through the more confusing parts of the city.

There are extensive car parks adjacent to the Centre, and most people are glad to pay the modest charge for the convenience of parking close and without the worry of meter time running out. Coaches coming to the Exhibition only should make this clear, preferably by displaying a poster in the front window, otherwise they may be directed to the Ice Show coach park which could

mean that the coach could not be driven out until the end of the current performance

### CATERING

Wembley has extensive new catering facilities in the Centre itself ranging from a tea/coffee bar to alcohol bar on the Exhibition upper floor to a snack and light refreshment bar and an attractive restaurant on the next floor. Prices and quality will, we believe, prove attractive, and group or party arrangements can be made in advance by writing to the Catering Manager Wembley Conference Centre, Wembley, HA9 0DW.

### COMBINATION TICKETS

Details are given elsewhere of facilities available for combination rail and accommodation 'packages' offering two nights in a choice of hotels plus rail fare and Exhibition entrance. These represent good value and offer an opportunity of, in effect, a three-day trip which could be used to take in that long-promised visit to, say the Maritime or Science Museum etc, as well as a West End theatre or even the Oxford Street sales.

Clubs and families may like to know that details are being finalised for combination tickets covering the Exhibition and the adjacent Ice Show; this year it is 'Sleeping Beauty on Ice' and these Wembley spectacles have a well-deserved reputation for quality and entertainment value. Unfortunately, it will not be possible to offer reduced combination tickets for Saturdays, but there are three Saturday performances of the show if the families want to go there while the modellers spend the time in the Exhibition.

### OTHER ATTRACTIONS

With cinema and theatre facilities available in the Centre, film shows, talks and demonstrations of interest to Exhibition visitors are being arranged. What is on, and when, will be displayed on a board at the MAP stand and tickets will be available (at nominal cost only) to ensure that enthusiasts can reserve a seat at the feature of their choice without wasting time in queues. Full details are still to be finalised, but it is expected that talks and demonstrations on such subjects as lost wax casting, woodworking, boiler-making and the like will be taking place, plus railway and aviation films. These are in addition to the many demonstrations which will be taking place on some of the 132 stands, including lathework, brazing, milling, and other workshop practices, lapidary, enamelling, wargames, miniature weapon-making, cart making, wood turning and machining, boatbuilding - a real feast of how to do it.

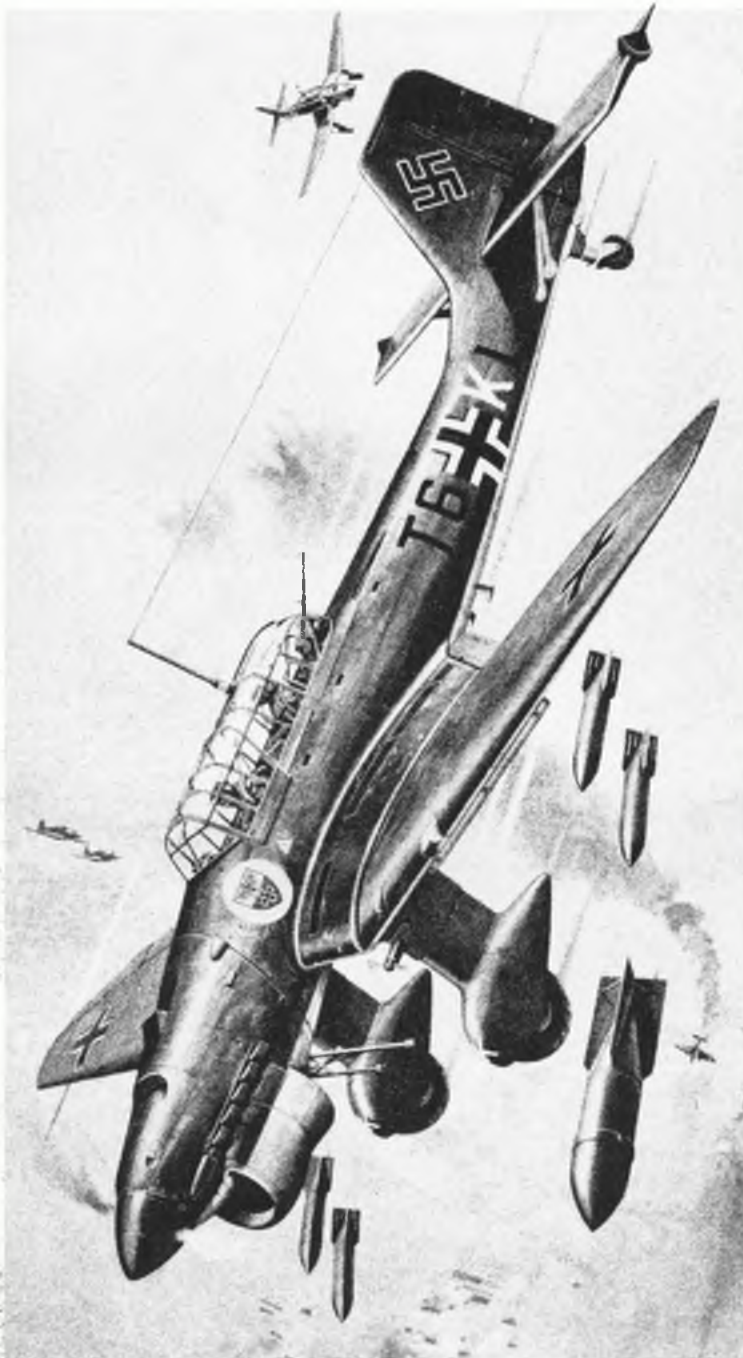
There is this year a special Woodworker 'show within a show' where expert advice on hand and power tools, and all aspects of carving, machining etc, will be displayed. This time, too, the demonstration area for electric flying models is at floor level, and this will permit the operation of R/C vehicles from time to time.

Many standholders have booked space for the first time, adding to the variety and choice of tools etc; they include model retailers, small gauge model railway suppliers, small lathes, specialist tool merchants, and so on.

Lots to see, lots to learn, lots to buy - you just can't afford to miss this 46th Exhibition!

Advance bookings and details from the Exhibition Manager,  
M.A.P. Ltd., P.O. Box 35, Hemel Hempstead, Herts. HP1 1EE

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#### Technical Details

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|----------------|---------------------|
| Date of Origin | 1933                |
| Wing span      | 45 ft. 3 ins.       |
| Length         | 36 ft. 5 ins.       |
| Height         | 12 ft. 8 ins.       |
| Top Speed      | 242 m.p.h.          |
| Engine         | 1,100 h.p. Jumo 211 |
| Range          | 370 miles           |



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| Digimac III, Ni-Cad complete with 2 servos   | £85-00  |
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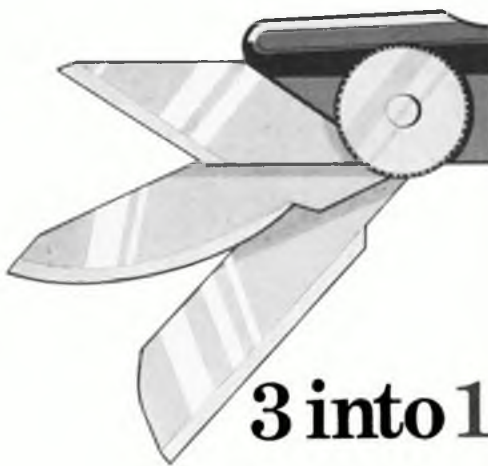


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The Cox JU-87D Stuka 6400



The Cox Combat Mustang 7700

## The Cox JU-87D Stuka 6400

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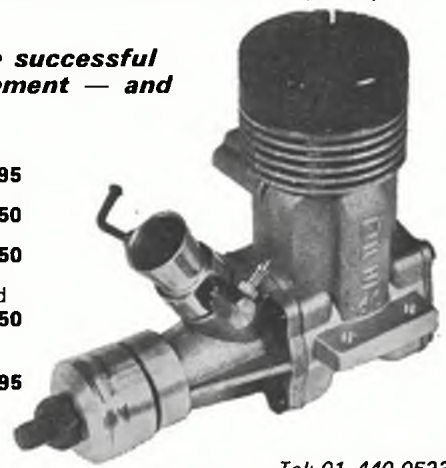
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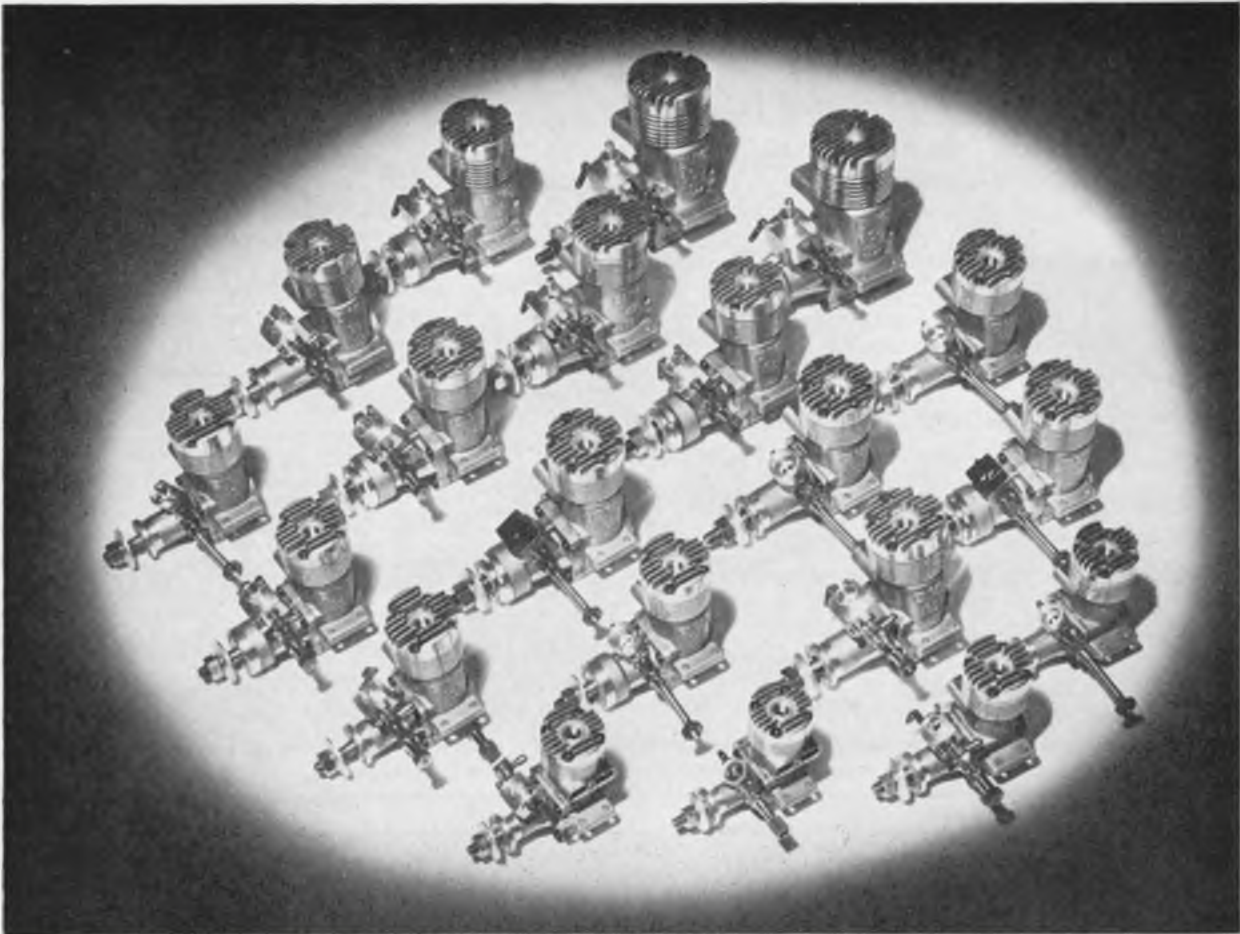
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## Heard at the HANGAR DOORS

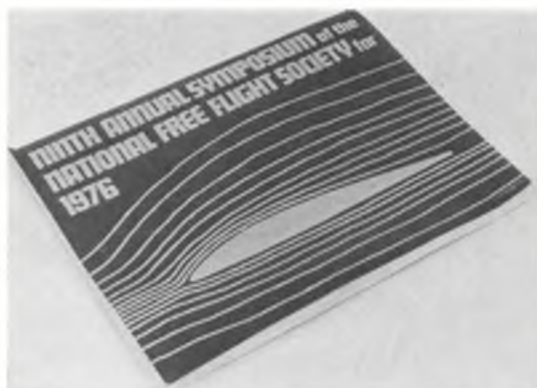
'A GOLDEN opportunity to fight galloping anti-aeromodelling legislation has been presented to all of us this year by the *Society of Model Aeronautical Engineers*' stated John Jones, Council delegate for the S. Eastern Area. He was speaking after the Society's Annual General Meeting, where the bold step of introducing an Associate membership fee of £2.00, was undertaken. In order to demonstrate conclusively to the authorities the vast strength of the aeromodelling movement, it is naturally essential that modellers unite - and being members of the National Body is the logical starting point.

For several years the Society has been painstakingly building up funds to provide the sort of service to aeromodelling of which we all dream - such as a permanent office with full-time professional staff, perhaps having its own legal department, and being capable of representing the rights of every aeromodeller. Realisation of all these dreams now stand in the balance - and to tip the scales in our favour it needs *your* support.

Despite annual increases in the cost of full SMAE membership (which incidentally, remains at £4.50 for 1976), membership has steadily grown to some 4,600. Now that a sports flier class of membership has been agreed upon, lets see the total of both 'full' and 'associate' members top 15,000 or 20,000 or even 30 thousand. Yes, it is quite possible - even easy - if you give the SMAE your support.

Convinced? Then write to the Membership Secretary at 22 Blackheath Rise, Lewisham, London, for further details. And if you are still uncertain of the need for a National

For the dedicated free-flight contest flier there can be no finer publication than the annual National Free Flight Society Symposium Reports. This, the ninth such publication, is now available from 5461 Diamond Hts. Blvd., San Francisco, California 94131. Cost of air-mail copies to Europe is \$9.50.



Organisation, then think of all the flying sites lost in 1976, the ridiculous 36in. wing span limitation insisted upon in Northampton, the Noise Pollution Act . . . do we need to continue?

ANOTHER NEW feature of the 1977 *Model Engineer Exhibition* is that there will be the opportunity to learn more about your own interest - or that of other people - by attending lectures in the purpose-built lecture halls. In addition to talks on lost wax-castings, boilermaking, wood working etc., the SMAE has organised the following lectures:

January 6th - *Microfilm Techniques and Indoor Flying*, by Laurie Barr, from 6 pm

January 7th - *R/C Soaring with Variable Camber Wings*, by Sean Bannister, from 6 pm

January 8th - *Free Flight Techniques* by Mike Fantham and Martin Dilly, from 2 pm

January 11th - *C/L Speed Techniques* by Mike Billinton, from 6 pm

January 12th - *Current Developments of the R/C Pylon Racer*, by Phil Greeno, from 6 pm

January 14th - *Microfilm Techniques and Indoor Flying*, by Laurie Barr, from 6 pm

January 15th - *Free Flight Techniques* by Mike Fantham and Martin Dilly, from 2 pm

If the title of this book seems familiar, it is not surprising. 'Basic Aeromodelling' was the title of a most successful series written by Ron Warring in the late '60s - and this new publication consists of an updated compilation of these features. Available from Argus Books Ltd, PO Box 35, Hemel Hempstead, Herts HP1 1EE, price £2.95.



In addition, films will be shown throughout the period of the Exhibition (January 4th - 15th, but not Sunday), including those with an aeromodelling content. *Free Flight Scene* contributors will be in attendance (at the SMAE stand) on both Saturday dates - January 8th and 15th - so drop in for a chat. If you wish to talk to them on any particular subject, then send a post card to the Editor, so that the necessary models and/or information can be provided to answer your query.

**JIM KLOTH.** It is with deep regret that we have to announce the death of this most prolific American modeller, on 28th October 1976. Jim, a diabetic, had been ill for more than 12 months but had shown a good improvement, and in fact he intended to represent USA in FAI team race at the '76 World Champs. Unfortunately this had to be cancelled at the last minute, and eventually the toll of two heart attacks took their effect.

Jim was a truly avid modeller; he flew most classes of control line - with the exception of speed and stunt, as well as free flight gliders, power models, Old-Timers and 'peanut' scale. Perhaps he is best known to *AeroModeller* readers for introducing C/L Goodyear racing to this country via his feature on his *Shoestring* and *Grey Ghost* designs, plus further articles aimed at developing interest in this class.

Ever active (he was out flying his 'Old Timer' models the weekend before he died), he was also a keen collector of diesel engines and enthusiastic correspondent: he will be sadly missed by his many friends, and pen-friends, around the world. Our deepest sympathy to his wife Marion, and daughter Carolyn.

### CORRECTION

In December *Micro Mold* advertisement, incorrect prices for the Cipolla Jnr. 0.09 c.u. in. engines were quoted. Correct prices (inclusive of silencers) are: Standard engine £7.40, R/C engine £8.10.



**Ian Dowsett's modern style Coupe d'Hiver class model has a performance to match its elegant looks!**

THE SIZE of Coupe d'Hiver models has varied greatly over the years and as the class has minimal dimensional restrictions, this has produced many individual approaches some of which have been highly successful. I must admit to being influenced by French designs – especially by the size of some of their winning models. *Swallow* is a large Coupe and incorporates a rear end consisting of triple fin and dihedral tailplane, which I believe has given very good stability when used on some Wakefield models. Certainly *Swallow* is very tolerant of being launched 'off

wind' in rough or blustery weather, righting itself and continuing to climb well, even when given a poor launch.

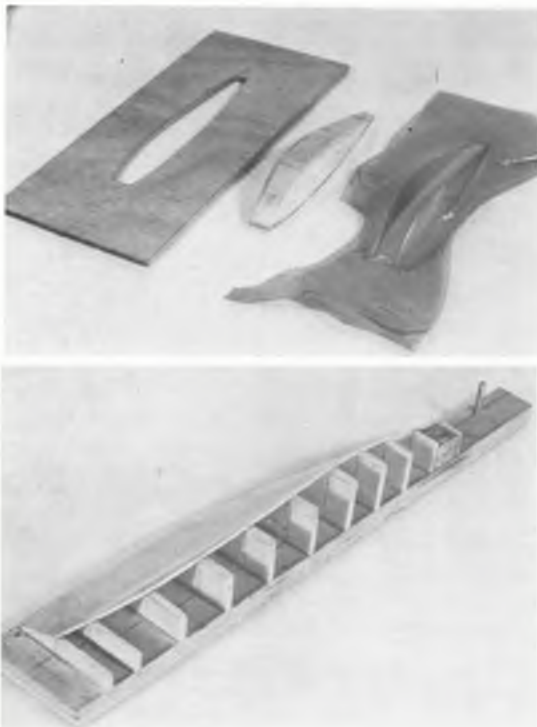
Another attribute which is a must in these days of highly competitive flying is the ability to remain in, and climb well when launched into, a thermal. I like to use bubbles or a mylar strip whenever I can, to confirm what I think the weather is doing. When launched into rising air *Swallow* settles quickly into a trim, tight, climbing turn for the duration of its power run. Being trimmed right/right (i.e. turning right under power and right under glide) she eases off very smoothly as the prop folds, and consistently remains within the thermal.

This model flies well as either an 80 gram or 100 gram model, but you will have to be very careful in your wood selection for the 80 gram version – and also have to forego some of the metal work. I prefer the 100 gram model again, *à la* French: it also has a two piece wing allowing easier transport when you travel to France for the 'Coupe Comp'.

If you have facilities for metal turning, then the prop hub and nose block as shown on the plan make a very neat system, but for those that are not so fortunate an alternative version is also provided. Both work equally well, but I prefer the added sophistication of the former.

The wing and tailplane construction is quite straightforward and both are built directly over the plan (I first cover the plan with thin polythene sheet). Use P.V.A. glue for all joints except for the attachment of the wing joining tube, for which I use a rapid-set epoxy. The fuselage is made from both hard and soft  $\frac{1}{8}$  in. and  $\frac{1}{16}$  in. sheet as indicated on the plan: if possible weigh the wood that you intend using. It is surprising how those extra grams creep in if you don't, and get lost if you do! Start the fuselage by cutting out the sides, butt join the front and rear portions (hard and soft!) then glue the vertical stiffeners, ply motor peg doubler and  $\frac{3}{8}$  in. fillets. When thoroughly dry, sand the fillets to the shape of the fuselage sides as per plan, then

Above left is shown the method of producing the 'cockpit'. Firstly a balsa mould is made, slightly deeper than necessary, and has the grain filled with dope. Then a piece of 6mm ply has a clearance – sized holes cut in it, and a sheet of acetate stapled around the perimeter. Heat the acetate in front of a fire and push the mould through the plywood to produce the result shown at right. If you prefer, send 50p to the designer at 2 Warren Drive, Eastcote, Ruislip, Middx for a nicely finished item moulded in blue-tinted acetate. At left is the jig, as drawn on the plan, used for forming the propeller blades.

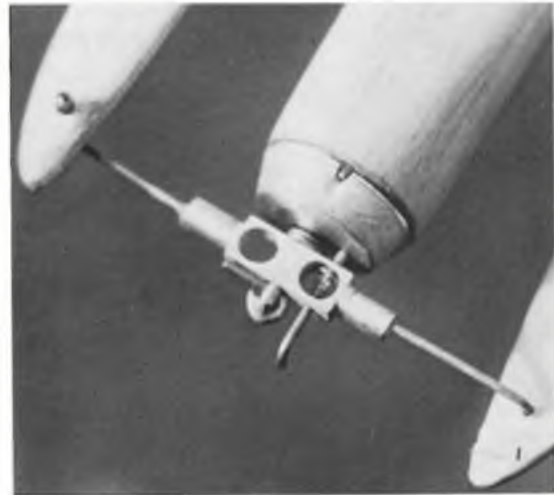


glue on the front top and bottom. For these joints I use PVA glue as this allows time to ensure that the fuselage is quite square. *Hot Stuff* or *Zap* used at the extreme ends of the PVA glue joints helps maintain this squareness whilst the PVA sets. Finally add the rear sheeting and fuselage 'bump'. When dry, sand to shape ensuring that the nose diameter is as shown on the plan. A plywood or aluminium nose former may be epoxied on at this stage and also sanded to shape. All fixing hooks are made of 22 swg piano wire, and are epoxied into place.

I like cockpits to *look* like cockpits, and so have moulded mine out of acetate sheet, as in the photos. That shown on the plan is made of  $\frac{1}{32}$  in. sheet; it is easier to make and of course does not affect *Swallow's* performance! Do not fix the wing mount and cockpit to the fuselage at this time, but read on!

One of the most critical parts of a good rubber model is the propeller, mine is based on the one used by Louis Dupuis and it seems to work on this model very well indeed - definitely a case of "if you can't beat them, join them!". The jig for moulding the props is shown on the plan, and should be given several coats of dope all over as the next stage is to soak two  $\frac{1}{16}$  in. sheet prop blanks in water and bind them to the jig until perfectly dry. They are then epoxied together and quickly bound back on the jig to set. Do not forget to put a thin piece of polythene sheet between the jig and the prop blanks, or you will end up with quite a thick jig! The prop blank is then shaped as on the plan and covered with Jap tissue and given three coats of dope. Repeat for the other prop blade.

The model is covered in Jap tissue and given two coats of thinned dope (50% dope, 50% thinners). When completely dry, assemble the model including prop assembly and rubber motor (8 strands of 6mm x 1mm),

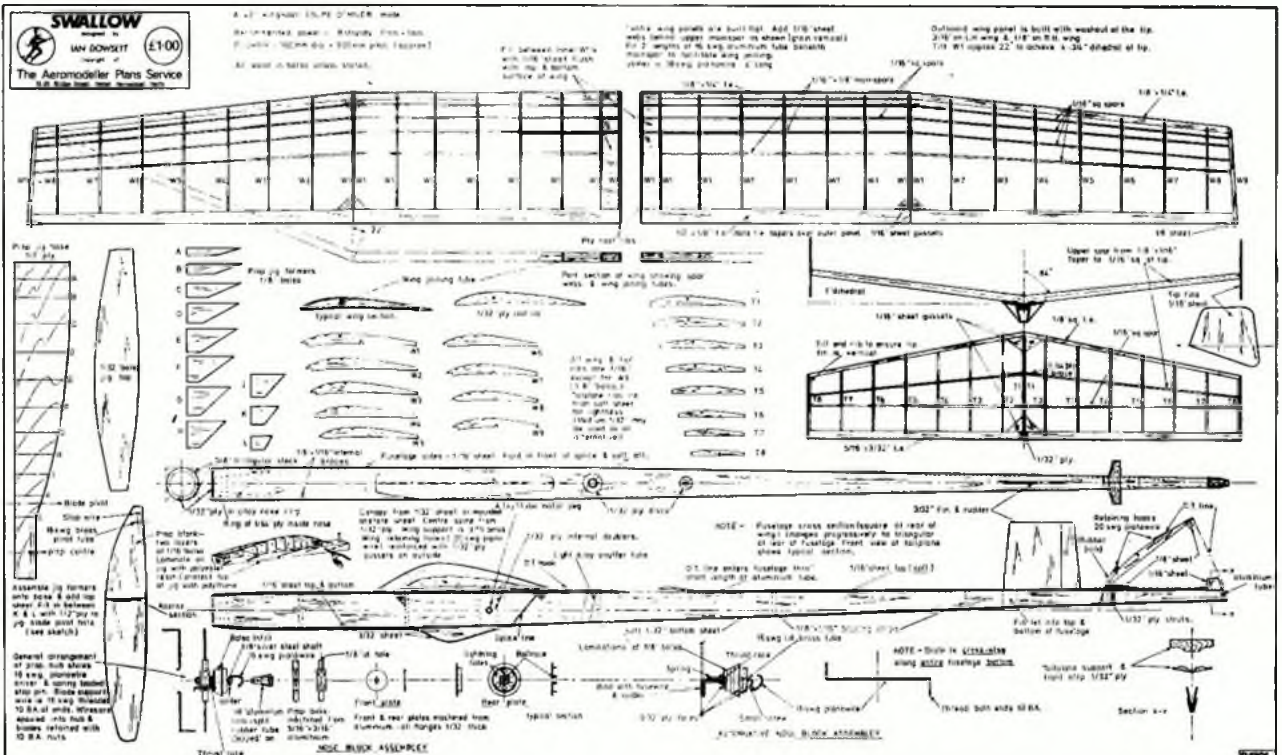


Close up of the front-end reveals Ian's preference for an all-metal nose block assembly - but the plan shows a simpler alternative. Note how noseblock is pegged for accurate relocation.

making sure the motor is 10 grams or less or I shall be the first to complain! Now is the time to fix the mount etc. to the fuselage; the reason for leaving attachment until this stage is so that you can get the centre of gravity in the correct position (with respect to the wing). You may move

*Continued on page 36*

FULL SIZE COPIES OF THIS 1/7th SCALE REPRODUCTION ARE AVAILABLE AS PLAN NO. D1301, PRICE £1.15 (INCLUSIVE OF POSTAGE AND VAT) FROM AEROMODELLER PLANS SERVICE, P.O. BOX 35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS HP1 1EE.





# BETWEEN THE LINES

by Dave Clarkson

Top three team race pairs at the Dutch Criterium consisted of some familiar faces! At left are the Metkemeyer Brothers (third with 8:24.2) who had a rather less successful season in '76, Petersen/Geschwendtner who placed second with 8:15.01 and at right Gurtler/Baumgartner, the eventual winners with 8:14.6, making a welcome return to the 'No. 1' spot. Petersen/Geschwendtner have had a remarkable run of successes recently, and have recorded several sub-four-minute heat times. Plans for their racer appear in the next issue . . .

### A BIT OF A CHANGE

For the next two months this Column will be originating from Poland, more particularly from a small town in the South of Poland between the historic city of Krakow and the industrial centre of lower Silesia, the city of Katowice. The small town in question is Oswiecim better known perhaps as Auschwitz. Yes! my faithful readers, Clarkson has been sent to Auschwitz – but I hasten to add, not for a holiday in the Camp; just to follow my chosen profession of Chemical Engineering.

Next month I hope to be able to report on how aeromodelling works in Poland, for both Krakow and Katowice have model clubs. The Krakow club is mostly R/C but having a noted modeller in the guise of '74 Indoor World Champion Ryszard Czechowski as instructor, whilst the Katowice club is a C/L club having as leading members Andrej Rachwal (15th in Speed at the '76 World Champs) and Ziemniak/Galkowski (20th in Team Race at the '76 World Champs). The Katowice club is also notable for having its own purpose-built C/L flying circle. Not bad, huh! Onco again I have fallen on my feet.

### CONNECTORS AND LINE ENDS

It has always been a bit of a surprise to me that, despite laying down a lot of safety requirements (e.g. pull-tests etc) the SMAE, unlike the AMA in America, has never given guidance in printed form concerning acceptable methods of making line-ends. I am sure that most people would agree that possibly 50% of line breaks occur due to line-end failure, therefore approved methods for making up line-ends would appear to me to be an essential if safety standards are to be improved. Obviously the AMA think so, for at the '76 US NATS my team race model and lines were given a heavy 'going-over', and particular attention was paid to safety-checking the lines and line-ends. Luckily the FAI rules have no line-end and connector requirements, for I suspect that those on my T/R model would not

have passed the full AMA requirements. Perhaps, for the experienced modeller, guidance on what connectors to use and on how to make-up line-ends is unnecessary, however the large majority of C/L fliers are not highly experienced and may well appreciate proper advice on this matter.

So I shall throw in my bit! Firstly line-ends for 2-line control system (how many sports fliers fly mono-line?). Sixty thousand modellers cannot be wrong, so I simply repeat below the AMA requirements: **Method 1**—Approved for both single strand and stranded lines.

The wire binding may be sealed additionally with a dab or two of '5-minute' type epoxy.

**Method 2**—Approved for multi-strand lines only.

Some American modellers I spoke to regard Method 2 as being more prone to failure than Method 1, so maybe there is a case for standardising on the former.



Figure 1

Now, notice something? Eyelets! These protect the line from frictional contact with the connector and therefore eliminate line wear – one of the major causes of end failure. Eyelets are not currently a normal Model Shop stock item (amazing isn't it?) but I am told that a UK manufacturer has started up production and that distribution



Figure 2

### METHOD 1 - Single or multi strand lines

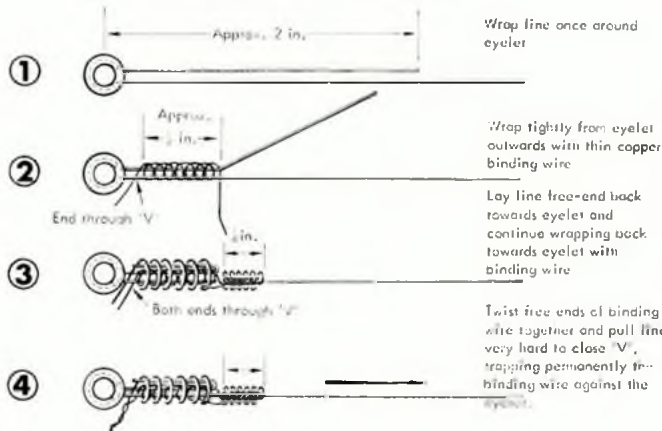
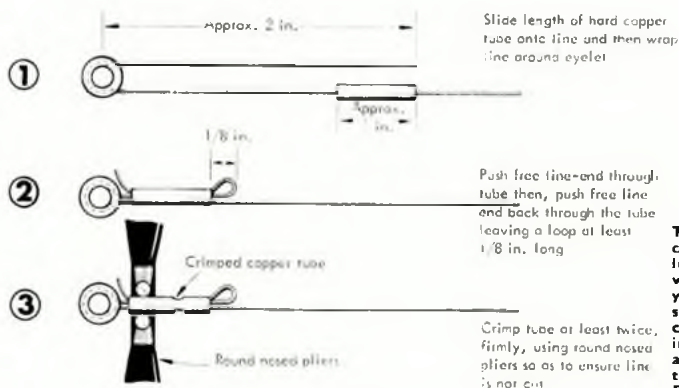


Figure 3

will be effected by a new company, 'North West Model Supplies'. If you can find them, buy and use eyelets – they are safe. Otherwise use horseshoe shaped lengths of annealed small-bore copper tube as in Figure 1.

Frankly, I also use other methods too, but cannot really recommend them. I suspect that the vast majority of line-ends used in the UK are not of the types that the AMA approve. Maybe all those model fly-aways in combat at our '76 Nats became a little bit more understandable?

Now to connectors. A great source of connectors is your local angling shop, but be careful, besides good connectors, you can also buy bad ones too. The most useful types you can buy in the angling shop are 'split-ring' links and swivel links. These generally come in three sizes; only use the smallest variety for '049' size models. Medium sized ones are fine for up to '19' size models. Also, if you decide on 'swivel links' then, please DO NOT USE THE SWIVEL (Figure 2).



**METHOD II - Multi strand lines only**

The swivel part of any 'swivel link' is almost definitely the weak point, and for this reason the use of swivels in the USA have been banned by the AMA. Personally, I dislike split rings, and do not use them because I have had them open-up after some use (as shown in Figure 3). A split ring in this condition can very easily allow the line to work its way out - result, no connection! The nice thing about the link part of 'swivel-links' is that a length of rubber fuel tube can be pushed over the link once the line has been connected, thus ensuring that accidental un-linking becomes impossible.

If you want the ultimate in safe connectors, then many model shops now stock 'Pylon Brand' line connectors. In my experience these are without equal for security and strength, but are a pit pricey. Not perhaps surprising really, the Pylon Brand connector looks just like a luxurious version of the recommended fishing link. How much is your model - and peace of mind - worth?

**CONGRATULATIONS**

In 1974 Kelly Henocq went across to Dayton, Ohio in the USA and won FAI Combat. Now in 1976 Graham Hayes went and revenged the Bicentennial by winning possibly the biggest combat contest in the USA after their Nats, the Aero-Challenge Combat Contest in September near Chicago. Needless to say, Graham's win was in FAI Combat and his host (and our US Combat correspondent) Gary Frost followed up his win in Slow Combat at the '76 US Nats by winning Fast Combat. It will not surprise most of my English readers to learn that Graham used G.15 powered 'foamies' - models constructed by Graham in the USA using some scrap foam he 'found' at a Drag Strip. Besides the models, good ground work by Gary and 'Hermit' Jones did the trick. Graham reports that, despite not being the quickest there, the relatively fantastic manoeuvrability of his 'foamies' compared with the American models, made it easy. So Graham returned with a giant pot, which by sheer size alone, makes any UK trophy appear insignificant. Congratulations Graham!

In case some of you have never heard before of Graham Hayes, this year he spent most of his time pitting for John Berry ('76 unofficial Combat World Champion) in Goodyear and FAI - team race. Another 'unknown' combat flier from Manchester who has gone and won a 'Big one'. I suppose Fred Meijer's (Holland) win at Derby to some extent has destroyed the myth of British invincibility at FAI Combat, but the Americans must be feeling more than a bit depressed about their chances at the next (first?) Combat World Championship.

Below: Pylon Brand also market a 'leadout set' consisting of heavy duty multi-strand wire for the model's leadouts, plus nylon tip guides, a pair of eyelets, copper tubing and a crimping tool. Neat, strong and safe. At right is a very neat starter box used by the German speed team - meters give visual indication of battery voltage and current consumption of the glow plug while voltage is readily adjustable.



These Pylon Brand connectors are 'de luxe' items and well worthwhile if you want absolute strength and security when attaching your model to a set of lines. Distributed by Irvine Engines, they are available through most good model shops.



**NORTHERN AREA FAI RALLY - RAF Rufforth, 17th October**  
Cold and windy but without the downpour that ruined the Elvington meeting the weekend before. Despite the title, Goodyear was run - a 500 lap event run by the Wakefield Club and I thank Ian Hutchinson of Norwest for his report on this. No combat was run and Junior Stunt was a very local affair so my report is confined to team race, where there was a smallish entry comprising mostly Norwest and Wharfedale clubs with a most welcome Scottish entry. Two up races up to the final were run because of the wind. Despite this wind (and the cold), times were quick - notably by Heaton/Ross:

|                                      | Semis  | Final  |          |
|--------------------------------------|--------|--------|----------|
| 1. Heaton/Ross (Norwest)             | 4:10.5 | 8:31.5 | Bugl     |
| 2. Langworth/Williamson (Wharfedale) | 4:28.5 | 9:49.5 | Bugl     |
| 3. Daly/Howard (Norwest)             | 4:28.8 | 10:59  | Rossi/FI |
| 4. Horton/Haworth (Wharfedale)       | 4:30.6 |        | ETA 15   |
| 5. Lorimer/Sutherland (Scotland)     | 4:30.6 |        | Rossi/FI |
| 6. Davis/Broadhead (Wharfedale)      | 4:32.5 |        | Bugl     |

In the heats UK team members Davis/Broadhead pulled out another 4:13, but UK heat record holders Clarkson/Daly suffered backing-off compression with their 4:03 model and motor so failed to record a time - those Swedish copper 2-part contra-pistons are not without problems.

**Wakefield 500 Goodyear Race.** As its title suggests, the race was over 500 laps with a minimum of ten pit stops required. Two heats were flown by each team, but there was no final, placings being taken from the best of these heat times.

The first heat did not get going until just after midday, as each team waited for someone else to fly, so as to be able to see the 'state of the game'. Owing to the number of entries this method of 'flying when ready' nearly came unstuck in the last heat, which gives food for thought for next year's event.

One of the earlier heats brought Daly/Howard's Rossi, Clarkson/Daly's HGK, and Berry/Hayes' Cox Conquest: at last it was a chance to see a direct comparison of the performance of three of the top-rated glow motors. As so often happens, it was a complete anti-climax: all three motors cut on, or soon after, take off and for one reason or another all were put back into the air after adjustment so a true account could not be taken from the results. When all three were going, the Rossi had a small edge for speed over the HGK and the Cox trailed only slightly behind the two of them. It was at the pit-stops that the HGK showed its true form - with no separate liner,





A new manufacturing company 'Chadpalm' have hit upon an excellent idea - that of kitting several of the more popular Aero Modeller Plans Service designs. As this spread of contents from their stunt Spitfire kits shows, they have gone to considerable trouble to provide an excellent value-for-money product. Apart from pre-cut ribs etc, the tailplane is cut from 1/4 in. balsa, a finished tank is supplied, plus pre-formed u/c legs, wheels, all hardware, plus a Humbrol 'Authenticard' for colour details, building instructions - and of course our plan for Geoff Pentland's design. All that for £16.75.

thus reducing chances of distortion, one got the impression that it would have started by just blowing on the prop! The Cox on the other hand was having its first outing, so no true information could be taken but it still looks most promising for the future. At 90 laps the HGK retired when the model developed a crack, setting up vibration which in turn kept tripping the fuel cut off. The Cox left the race at 204 laps leaving the Rossi plagued with problems to finish with a time of 32:8

As a full list of results show, most of the teams ran true to form with the experts dominating the top half - except for Berry/Hayes and Clarkson/Daly who were unable to fly again for the second heat. The exception to this domination was the novice team Rosser/Rosser who realising the problems of the other novice's, performed a steady race which in turn rewarded them with a 24:58

At the end of the first round, seven out of the top dozen teams decided to stay with their first heat times and not fly a second time, leaving five others to do something reasonable'. Culloden/Broadbent were unable to improve on their first heat time of 26:27 having to retire at 176 laps while Sykes/Crabtree knocked nearly nine minutes from their total.

By this time dusk had fallen, so Daly/Howard who had a poor first heat time and Hutchinson/Leigh who had broken their model at a pit stop after only completing 227 laps, were joined by the reversed role team of Howarth/Horton for the last heat. All three teams were going steadily until about half way when dusk turned to darkness, and all the models had to be flown at a greater height in order for the pilots to see them against the lighter sky! The pitmen had their share of the problem as it was impossible to see when the model had actually touched down and they just had to wait for it to come round to them. To add to things Howarth/Horton started with a poor setting, Hutchinson/Leigh found that their pressure refuelling



system blocked up half way, and Daly/Howard had a plug blown on them. Had it not been for that plug change their time might have put them into first place instead of second.

From the entry it is interesting to note that out of 21 teams, nine of them were novices and of those only two failed to record a time. Eleven teams were from Norway, and of those five were novices

It is pleasing to see so much determination by these novices who have mainly been encouraged by John Horton's league list, thank you John and thanks to all those event organisers who go out of their way to see that newcomers to racing are made to feel welcome

| Team                   | Best Heat Time | Other Heat Time | Status  |
|------------------------|----------------|-----------------|---------|
| 1 Horton/Howarth       | (1) 22:47      | Reverse team    | Experts |
| 2. Daly/Howard         | (2) 22:52      | (1) 32:08       | Experts |
| 3. Allcock/Chambers    | (1) 23:25      | None            | Experts |
| 4. McMahon/Myska       | (1) 23:54      | None            | Experts |
| 5 Rosser/Rosser        | (1) 24:58      | None            | Novices |
| 6 Morrell/Sewell       | (1) 25:40      | None            | Experts |
| 7 Hutchinson/Leigh     | (2) 26:05      | (1) 227 laps    | Experts |
| 8. Goddard/Temporal    | (1) 26:05      | None            | Experts |
| 9 Culloden/Broadbent   | (1) 26:27      | (2) 176 laps    | Experts |
| 10. Heaton/Ross        | (1) 27:20      | None            | Experts |
| 11. Sykes/Crabtree     | (2) 29:24      | (1) 31:08       | Experts |
| 12 Howarth/Horton      | (1) 32:00      | Reverse team    | Experts |
| 13. Stubbs/Coppock     | (2) 32:04      | None            | Novices |
| 14. Wilkinson/Morrison | (2) 34:31      | (1) 233 laps    | Novices |
| 15. Fitzsimons/Needham | (1) 34:40      | None            | Novices |
| 16. Tipper/Cohen       | (1) 37:33      | None            | Novices |
| 17. Davis/Kidd         | (1) 41:58      | None            | Novices |
| 18 Atkinson/Ichofield  | (1) 45:25      | None            | Novices |
| 19. Baldwin/Gibbs      | (1) 324 laps   | None            | Novices |
| 20 Berry/Hayes         | (1) 294 laps   | None            | Experts |
| 21. Jarvis/Stubbs      | (2) 245 laps   | (1) 120 laps    | Novices |
| 22 Clarkson/Daly       | (1) 90 laps    | None            | Experts |

#### SPEED NEWCOMERS TO THE FORE (or rather '40')

The SMAE Control Line Technical Sub committee has just accepted a new speed class, aimed at beginners to this form of flying to take effect from 1st January 1977 on a provisional basis. If you want to see it become a permanent class, then it's easy - give it your support.

To be known as Class 6N, the event will be restricted to those competitors who have never achieved more than 80% of the record in any handicap speed contest - other of course than this new class. In addition, a newcomer can continue competing in Class 6N for one calendar year after first winning the class. The only rule restrictions, apart from the general SMAE rules, are that two .018in. diameter lines must be used, and the engine must have a capacity of 0.40 cu. in.

This event will be encompassed within the SMAE Handicap Speed events, and initially an arbitrary speed of 150 mph will be used as the 'record' for the basis of the handicap.

With such a wide variety of engines available (names that spring to mind are Webra, OPS, Irvine, O.S., K&B, and H.P.) plus all the options such as full tuned pipes, mini pipes, open exhaust, as much nitro as you dare/can afford/can handle, then there is plenty of scope. As speeds of rat-racers in the USA are claimed to be around 150mph, then there is every chance of some good action in this class. For good advice on suitable models, then keep reading this magazine! (Hint, hint).

Left: Switzerland's Louis Bilat with his Kingfisher style speed model with which he established a new record for his country at 246.5 km/hr but this was only good enough for third place at the Dutch meeting. Below is Dutch flyer Bruno van Hoek with his Fox 35 powered 'Grondel-Nobler' aerobatic model, attractively finished in a nice shade of turquoise.



### CLARA PREPARES FOR LIFT OFF

Graham Bryant, driving force behind the formation of a Society purely for team racing, has penned the following:

"The response to the proposal concerning the possible formation of an Organisation for team-racing enthusiasts, known tentatively as *Control Line Aircraft Racing Association*, or "CLARA" for short, has been fairly good. Certainly sufficient to warrant the go-ahead, as it were. It may be significant that many well-known "names" have not as yet responded, and I would make the point that if you really want to be counted in, then please write to me. I cannot automatically assume that certain people will want to become members.

As far as those who have written in are concerned, I hope to be able to circulate forms etc, as soon after 1st January 1977 as possible, so as to build a record of the membership. One of the questions on this form will be "How much are you willing to contribute as an annual membership fee" (There's always a snag!) This fee will be nominal, and will be used first and foremost to cover the cost of postage, duplicating etc. Sensible suggestions only, please. If, as in the case in one or two instances, someone has written on behalf of a Club, then these people will receive sufficient forms for re-distribution to all those concerned. This will save on postage.

It is also hoped to be able to produce a magazine at regular intervals, which will contain news and views of contests, development, foreign news etc., and if anyone has any ideas for items for this magazine, please let me know.

Lastly, I would like to thank everyone who has written in about CLARA, particularly those who offered help. You will be taken up on that, lads! Here's hoping that CLARA will prosper, and that everyone who intends being a member will benefit by it."

Address to write to is 31 Woodridge, Birchfield, Birmingham B6 6LW - it can do nothing but good.

### DUTCH CRITERIUM - Utrecht, 2/3rd October 1976,

by Glen Alison

An entry of only 10 in aerobatics this year, probably due to considerations of expense after the World Championships which were held at the same site in July. However it was a mixed group of fliers from Germany, Austria, France, Belgium, England and Holland, with no obvious merits to pre-judge the contest. The weather was fine with a light but fairly turbulent wind which at times upset fliers trying to position their manoeuvres in relation to it. The contest was won by team race ace Bert Matkemeyer with his ST 46 *Trianic* design just in front of the two Liber brothers from Belgium in 2nd and 3rd spots. Ted Fowler took his *Green Machine* to sixth place, a fine effort making the journey worthwhile. The model with best potential at the meeting was Harold Pokornys *Genesis*, which could turn incredibly sharp squares smoothly, but lack of experience by the pilot kept it in a low position.

Eighteen flew in team race this year, including two from Britain; in fact Tribe/Tribe reached the semi-finals with a 4:19.5. Not good enough for the final though, with qualifying times of 4:13 down to 4:01. It was a classic final between Gurtler/Baumgartner (Austria), Petersen/Geschwendtner (Denmark) and the Matkemeyer brothers (Holland). The speeds were so consistent that nobody was able to overtake during the whole race and it was won on pit stop efficiency by the Austrian team with 8:14.6.

Liber of Belgium got a badly lacerated thumb when his motor started in reverse when pitting the model. Not realising this in the heat of the moment he released it and caught his hand in the propeller as the

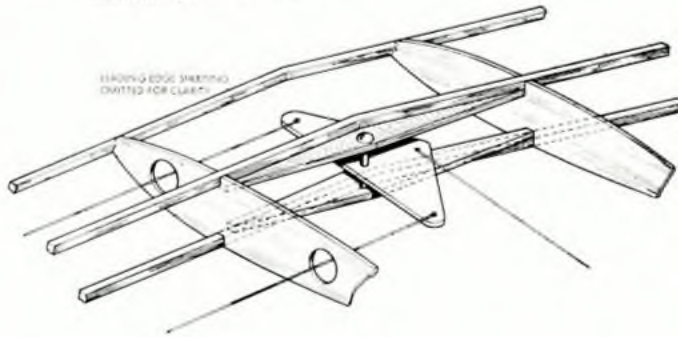
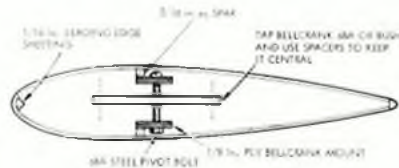


Figure 4

model ran backwards into the grass centre of the circle. Unfortunately a tangle in the centre caused Floris to crash his beautiful new model fitted with his own modified Bugli. It was widely thought that the model might win as it had a good time of 4.04 in the first round - fastest heat being 3.58.9 from Petersen/Geschwendtner.

Speed was won by Ingo Schmidt from Germany, with a time of 250km/hr - just 0.1km/hr faster than Emil Rumpel in second place! Schmidt uses a Miebach tuned Rossi FR with a 6 1/2 x 5 1/2 in Punctilio prop, combined with an E.D. Power Pipe. A centrifugal fuel switch is fitted and the model is very similar to the *Kingfisher* design with long inboard wing. His speed is even more remarkable because on the timed run the motor cut at 9 1/2 laps thus doing a 1/2 lap glide. Third place Louis Bilat recently established a new Swiss record of 246km/hr, and bettered this by just 0.5 km/hr.

### STUNT NEWS by Glen Alison

New Rules for Stunt League Table

At the recent annual general meeting of CLAPA, the *Control Line Aerobatic Pilots Association*, it was decided to amend the rules regarding the Stunt League Table because of the greatly increased number of competitors per event nowadays. Under the old system this had the effect that any improvement in flying skill by those who normally came lower than 10th place did not show up in the results, because they all scored 1 point. Now, instead of getting 10 points for winning a contest a flier will get 50, then 49 for 2nd, 48 for 3rd etc. - so that problem will not occur again until we get 50 entrants per contest. In addition to the above the number of contests to count in the final score has been reduced from eight to seven, thus the maximum score to aim at will be 350.

### Bellcrank Mounting

The illustration in Figure 4 shows a strong method of bellcrank mounting as the item is supported from both above and below - the line tension force is transmitted directly to both spars and then to the leading edge sheeting. This gives a good force distribution on the pull test which is when any structural weaknesses are most likely to show up. Give it a try - it could be the saviour of your next model. . .

Bob and David Masters from East London, South Africa, preparing Bob's speed entry at the Utrecht World Championships. The model is to Renzo Grandesso's 'Assy Killer' design, the original of which was supplied from Italy. Bob Masters reduced the span and altered the tip shape in making his model for the Super Tigre X.15. When adding to Jo Halman's report on the Speed Championships, the Editor stated Bob had a back injury. This was inaccurate. Bob was recovering from a major abdominal operation and had shrapnel in his knee which had been troubling him. Hence his nomination of Amato Prati of Italy as a proxy flyer, due to his own physical disability. We regret any impression that may have been interpreted from our report concerning the model and its operation. Incidentally, David tells us that his Rossi engine used crankcase pressure and CFS, not pipe pressure as tabled in the results.





Are you between 10 and 16 years of age? Then don't delay, join today

FOR THEIR first control-line model, nearly every beginner chooses a profile fuselage design – not a bad thing either, being both quick and cheap to build, as well as very strong. However, there is one aspect of these models that does cause trouble – and that concerns mounting the fuel tank.

Actually, with a little forethought, it is very easy to instal the fuel tank on a profile fuselage, but so many people – keen to get the model in the air – skimp this final detail. Result is that numerous elastic bands are wrapped around the fuselage, which apart from being untidy, is far from satisfactory. For a start, you will soon discover that diesel fuel rots rubber bands very quickly, and secondly that the oily exhaust soon makes the tank very slippery indeed!

Fortunately, there are solutions to this problem – and most of them are quite easy, even for the beginner. Simplest of all perhaps is to take some neoprene fuel tubing which has an internal diameter less than that of a 6BA (or similar) bolt that, so the bolt may be threaded into it securely. In this instance (see photo) the fuselage is drilled to accept four bolts, and the tank is retained securely by the neoprene 'straps'. Remember to cut the neoprene shorter than actually needed so that it stretches a little around the tank and holds it tight.

Neat installation of a fuel tank on this profile-fuselage model. Note how the polythene tank (an R/C clunk-type) has been strapped in place with neoprene fuel tubing threaded onto 6BA bolts. Quick, easy and cheap!



work. Ask your metalwork teacher for some brass sheet offcuts.

As an added refinement when mounting your tank, insert a piece of rubber (such as a piece cut from an old car inner tube) between the tank and the fuselage. This will prevent the tank from scratching through

its life easy and keep the fuel tubing as short as possible, and free of kinks. If you use a transparent fuel tubing, then you will be able to see whether air bubbles are forming and stopping the engine. Could save a lot of wasted time and frayed tempers on the flying field. . . .

Remember too that our engines can vibrate quite a lot and that parts on your model can mysteriously fall off – so wherever possible use lock nuts and washers, and re-tighten those bolts or screws after every flying session. If the woodscrews that you have used to hold the tank in place have worked loose, then put a dab of epoxy glue in the screw holes and start again.

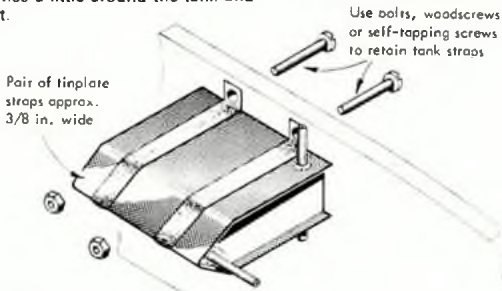


Figure 1

Using the same principle, a pair of tin-plate straps approximately 3/8 in. wide can be substituted for the neoprene – and bolts, self tapping screws or wood-screws used to retain the straps, see Figure 1. An ideal source of tinplate can be found in the dustbin – old tin cans are perfect, as are oil cans. Take care when cutting up those cans though – the edges are very sharp. If you do not have any tin-snips, then an old pair of scissors work well. . . .

If you can use a soldering iron, then another alternative is to solder brackets to the metal tank, either top and bottom, or at each end. Figure 2 shows how – but make these brackets from fairly thick tinplate, or better still brass sheet, for strength. If you crash your model, the tank will try and fly forwards, and weak mounting points will break off. Also take care when soldering that you do not melt the solder of the tank seams and cause a leak – and remember that soldering tinplate tanks requires quite a large iron – a 65 watt iron seems fine for most

your paintwork – which would allow the fuel to seep into the wood and weaken it – and also help absorb some of the vibration.

And while on the subject of mounting tanks in control line models, do make sure that the centre line of the tank lies on the centre line of the engine – and as close to the engine as possible. The engine has to suck the fuel around to the carburettor, so make

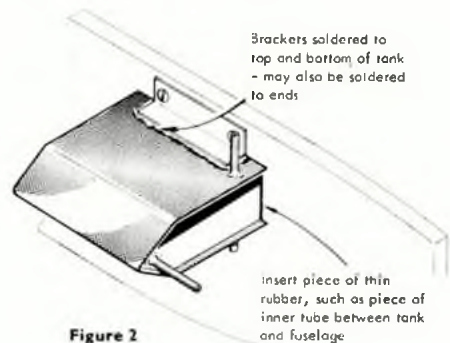


Figure 2

Dear John Bridge,  
 I am between 10 and 16 years of age and would like to become a member of the 'Golden Wings Club'. With this application I enclose postal order (International Money Order) for 50p to cover cost of enamel club badge, two coloured transfers and membership card.  
 NAME IN FULL.....  
 ADDRESS.....  
 YEAR OF BIRTH..... SCHOOL.....  
 NAME OF ANY OTHER CLUB OR CLUBS TO WHICH I BELONG (if any).....  
 Send to: GOLDEN WINGS CLUB, AEROMODELLER, P.O. BOX 35, BRIDGE STREET, HEMEL HEMPSTEAD, HERTS HP1 1EE.

1/77 15p in the £1 Rebate plan purchase coupon for Golden Wing Members 2.W. No.....



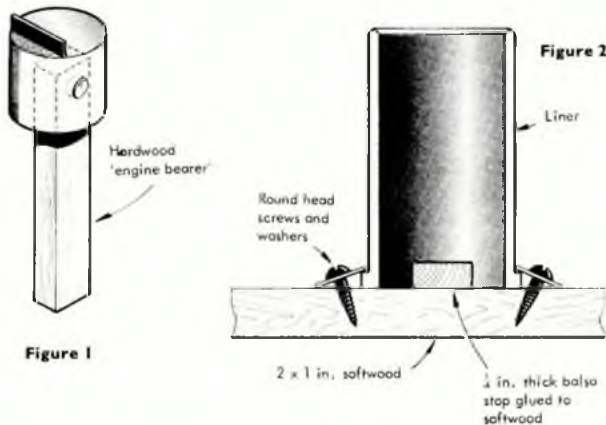
# "SETTING IT UP"

*Useful advice on engine preparation by Ted Fowler*

FIRSTLY, let's make it quite clear, this is *not* a 'hot-up' feature. The intention was not to produce an engine of higher performance, just one of a good, sustained power output – with a long, reliable operational life. To a stunt flier, consistency

45° should be enough. Thoroughly wash and dry the piston – using a hand cleaner such as Swarfga, applied with a tooth brush and washed off with hot water.

Make a handle from a piece of hardwood engine bearer with a hole in the



is the most important factor of an engine's characteristics and that has been achieved with a variety of engines, using this approach.

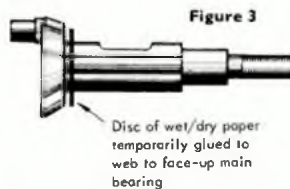
Certainly, correctly running-in a new engine will achieve virtually the same effect – but the word 'correctly' is the important one. Opinions on this subject differ, but ideally you should run-in a motor so that the piston/liner reach a perfect fit at operating temperatures. This takes time, lots of fuel and lots of noise. The following method provides 'stress relieved' components with a good 'free' fit.

Firstly dismantle the un-run engine, then use an X-acto blade (or similar relatively thick modelling blade) to trim off any casting flashes from inside the crankcase and transfer passage. Now place the piston and liner – separated – in an oven at a temperature of 300-400° F for a total of twelve hours, allowing to cool right down every two hours. This hot-cold cycle is most important; try and co-operate with the cook-in-your-life, so as to avoid heating the whole oven for such a small component. With luck, a couple of weeks of domestic cooking should see the process completed!

This done, remove the sharp edges from top and bottom of the piston using a flat-stone or 600 grade wet/dry paper, glued to a piece of wood – one or two strokes applied at an angle of

end (see Figure 1) like a con-rod, and attach to piston with the gudgeon pin. Fix the liner to a piece of wood – around 2 x 1 in. using a couple of wood screws as shown in Figure 2. This gives a firm hold with no stress.

Gently test to see if the piston will



still fit inside the liner – it is quite possible that it will not. Solution is to put thin oil on the top edge of the piston, and to add a little jeweller's rouge or very fine grinding powder, obtainable from a supplier of home made jewellery, where it is sold for polishing stones in a tumbling machine. Gradually rotate the piston while introducing it into the liner. When the piston reaches the stop, remove, wash and thoroughly dry.

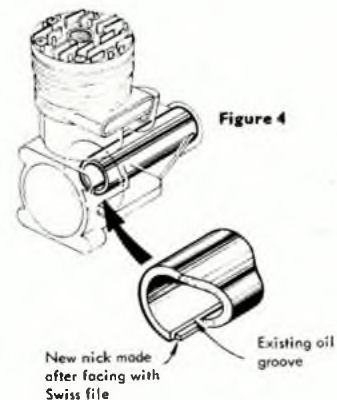
Try the fit now. There should be even rotary resistance and the piston should slide into the liner with a light push of the finger. If not, repeat the oil/grinding powder treatment once again – but wash, dry and test fre-

quently. If this action is overdone you have got an instant-clapped motor! It will be noted that the top 1/4 in. of the liner is raw and new: the piston is travelling (relatively) slowly here – and so we have a nice tight fit for compression. When the 'bang' occurs there will be no leaks, and the piston will be pushed down the nice, easy-going sleeve.

The above naturally only refers to lapped pistons – the story is a bit different for a ringed piston. For this situation, lap in the piston as previously described, but without the ring being fitted, and continue until a relatively 'easy' fit is achieved. Refit the ring and gap it at about .005 in. After the ring has been run-in (in-use) check the gap again, and if it exceeds .006 in. then discard the ring and gap a new ring by that much less so as to obtain a run-in fit of about .004-.006 in. (measured cold). All this really depends upon the material used for the ringed piston.

Now for the rest of the engine. The small-end and big end bearings may be run in by hand, using the oil/jewellers rouge mix as before. A smooth fit, *not* a sloppy one is required. If the motor is a plain-bearing unit, then the main bearing can be faced-off using wet and dry paper stuck to the front of the web – see Figure 3. In addition, nick the new face coincident with the main bearing's oil groove (Figure 4).

Run-in the main bearing (plain bearing engines again) using a power drill on the shaft and drop in some 'Brasso' down the venturi. About 90 seconds should smooth things up satisfactorily – do this latter operation without the piston and con-rod being fitted of course . . . and protect the thread on the crankshaft to prevent it from being damaged in the chuck.





# 1976 Canadian



Top left, APS Nig-Nog with HP40 RR by Gerard McHale of Vancouver; right, John MacDonald's F/F Scale winning Avro 504 seaplane. John also won Glider and was 2nd in C.d.H. Above is Bruce Batch's Fox 45 Sterling Piper Tripacer with Roberts C/L system being readied for scale. Bruce, from Spokane, also entered R/C scale with another Tripacer.

THE REPORT by Dave Clarkson last month (*Everything is bigger in the USA*) had a special meaning for Jonathan and I as we covered similar distances at the same time, but much farther North and in Canada. Our journey was to Calgary (with a 3,200 mile diversion to aeronautical indigestion at Oshkosh) where MAAC staged the Canadian Nationals in the wide open space of Alberta. It was a complete contrast to the crowded, mammoth event way off in Ohio which Dave described so well. Western Canada has several very large, modern cities but they are spaced far apart, and cannot hope as yet to support a Nats with the volume of the Eastern Provinces. Even so, this Nats became a pleasant and refreshing meeting with a pace and support that made it seem like one of those fondly remembered *Northern Heights* galas, but with 1976 standards. Everyone had a chance to see what was going on elsewhere, and the superb South Calgary airport triangle of runways allowed simultaneous and separate C/L F/F and R/C interests to operate leisurely. Twenty five miles away the best supported events for Thermal Soaring, were enjoying a 'Sod Farm', which turned out to be lawn turf producing establishment. They were despatched that far off to avoid frequency clashes, and not for any other ulterior motive. It seemed ironic that the collection of over 100 soarers should be banished further into the depth of the vast countryside!

Host clubmen from Calgary itself are largely R/C orientated with the exception of the ubiquitous John Bortnak who is always in Canadian F/F or C/L news. Edmonton appears to be the dominant centre and when all the dust (and rain) had settled, the bulk of the fine trophies went in that direction. The allrounder - almost a forgotten following elsewhere, is still to be found here. Russ Gulay and Mel Klimchuck seemed to be locked in a permanent duel for who could enter most events, while Remy Dawson took home a place trophy for all of the six control line classes he entered. Not that the competition was easy in any way. On the contrary, events like Carrier Deck were a revelation. Europeans have no conception of the potential. Our own HMS *Flycatcher* would be a superb centrepiece by comparison with Canada's HMS *Prudham*, if only the throttle and elevator control techniques could be imported. Never have we seen such slow control line. Basically the art is to use just one short burst of power in each lap; but there's much more to the tricks of staying airborne with a heavily angled model than mere words can describe. Perhaps one day, a North American expert could show Britishers how, and so revive flagging enthusiasm.

Similarly, we relished Canadian skills in scale. Sister magazine *RCM & E* has already carried our report on the high standards of R/C which produced the 1976 World Champ for Canada. Control



Left: 'Old 'uns run better, are lighter', is a growing theme and this O.K. Cub 19 proved the point in Mel Klimchuk's 13 ounce 340 sq. in. Dixielander power winner. Mel won 6 of the F/F events. Below, Golden Wings member Jonathan Moulton flew Satellite with Starstream reserve to collect High Point Jr. Trophy after 6,000 mile trip.





# Nationals

by Ron Moulton

line and free flight scale have the same keen following and at Calgary, the winners were top class. John MacDonald who led free flight scale had actually spent the previous year in the UK, and took part in our Nats as well as Old Warden where he made many friends. In fact, John was the first modeller we recognised.

Like most of the participants John was camping on the airfield, making the Nats part of his vacation, enjoying what modellers like to do most, if perhaps in spartan conditions by Canadian standards. Canadians are never backwards in voicing their views and the visitors from places as far apart as Vancouver, Winnipeg, Regina and Edmonton were quick to seize on lack of local organising personnel and camp ground facilities. But as events progressed, all pulled together under overall director Gordon van Tighem, and never more so than when one camper caught fire and burned out. Luckily the family escaped with minor burns. Less lucky was the R/C flier who was shot down by calls for help over the Citizens Band radio which brought in the fire brigade and police. Incidentally, 'camping' means an equipped Dormobile type or a pickup truck with a pick-a-back sleeper unit. A refrigerator is just as likely to be carried as well as a stove.

Back to the contests (of which we totted up over 40 events!). Stand-off radio controlled scale was perhaps the most impressive. Twenty-two

entries included Hazel Sigafoose and Maxey Hester who had flown up by Beech Bonanza from Montezuma, Iowa. Hazel lost her chance when the clipped wing Cub did what all Piper tail-draggers do at least once, and ground looped. This wouldn't have been bad – quite scash in fact, except that she had prototype plastic wing fixes which were destined to go into new Sig kits – and you've guessed it – they broke up. Meanwhile Maxey beat the field with the new 40 Smith Miniplane biplane. Hope readers will excuse the plug for an R/C design but this really is one to look forward to when kits are distributed.

Free flight had a disappointing (under 17% of total entries) support when one considers the past record of Canadian International achievements. The trend is clearly to R/C, and especially to R/C gliders. Electrics and even helicopters are virtually unknown so far on the flying field, although on the dealers' shelves. The Canadian wants for very little in his model shops: Calgary has three enthusiast shops plus supporting stores for plastics etc. and it is typical. Although prices are elevated because of import taxes, the Western Canadian enjoys a prosperity that more than compensates. Additionally, the weather conditions in summer at least are exceptional for aeromodelling, in spite of the heavy rains they experienced this year.

One aspect stands out and that is the friendliness of the cosmopolitan modellers who made our visit doubly enjoyable – thanks MAAC.



Top left, Free flight rubber scale winning Cougar by Mel Klimchuk of Ukrainian Air Force (Edmonton), great fliers both. Right Bill Lepak motor starts ST15 in his Mustang F/F power. Bill collected three 3rds. Above Scott Harley and his Carrier Deck 'Condor' with ST35 and Roberts system showed how to fly really slow, placed 3rd.

Below: Edmonton die-hards for scale modelling with their Piper Cub and Flying Flea free flight scale entries. Right, C/L stunt winner from Post Falls, Idaho, U.S.A., Mike Bryan, who flew a Fox 40 SIG Chipmunk weighing 43 ozs. Several Western States entrants placed high.





## Society of Model Aero ANNUAL PR at the Holiday Inn, Leicest



Pictured above is Chris Batty of the Bristol and West Club receiving the Model Aircraft Trophy for winning the Open Rubber event at the Nationals - highlight of a very successful year for him.

Above: the SMAE's treasurer David Brawn is not only good at looking after the pennies, he also flies a pretty mean glider - helping the Biggles club to win this trophy for Team Glider.

Top left: Sean Bannister receives the PAA Trophy for his R/C thermal soaring success from Mrs Joan Crampton, wife of the SMAE's Vice President Squadron Leader John Crampton, DFC, AFC and Bar, AFRAeS RAF (Ret.). Below is Mike Billinton who once again won the Model Aircraft Trophy for topping the Class 6 (0.40 cu. in.) C/L speed class at the Nationals. Below is J. Walker in the process of receiving the Keil Power Trophy, whilst at bottom left is Ken Collins with the Arthur Mullett Memorial Cup - awarded for outstanding service to the Society, which Ken deserves for his efforts as membership secretary. At right, South Eastern Area Chairman John Jones (left) presents retiring secretary George Lynn with an engraved carriage clock in recognition of his sterling service.





nautical Engineers Ltd  
**AWARDS GIVING**  
 held on 13th November, 1976



John Newnham, pictured above, looks pleased above with the Gold Trophy (for C/L aerobatics) he receives from Mrs. Crampton. Looking on is Dave Stapleton, the SMAE's records officer.

Above, SMAE Chairman, Jack Hartley (right) congratulates Laurie Barr on being awarded a Fellowship of the Society - an honour richly deserved.



Top right: Terry Manley wrested the Super Scale Trophy away from Eric Coates this time, but no doubt the question of free-flight scale champion will be keenly fought again next year! Below is Martyn Cowley, appropriately dressed in leather flying helmet, as he accepts the Plugge Cup on behalf of the Biggles club. Underneath is Martin Radcliffe with the fruits of his labour in the 10cc C/L speed class. Bottom right is John Cooper, yet another member of the Biggles Club, with his award for winning the FAI glider class at the Nationals. At left - yet more success for the Biggles men - Steve Marriott collects the Farrow Shield.





AIRCRAFT DESCRIBED NO. 231

# GRUMMAN GUARDIAN

drawn by **A. Keiller**

FOLLOWING the success of submarine attacks against Allied shipping in the early stages of the Second World War, the United States Navy realised that this weapon could once again prove a major threat, so as early as 1942 a successor to the anti-submarine warfare *TBF Avenger* was being considered. At the same time other designs which were being developed, and showed signs of successful conversion to this role were considered, but none of these actually reached operational status before the end of the war.

A mock-up, designated XTB2F-1, was built – but it showed that the resulting aircraft would be too heavy for use from the *Midway*-class carriers, the largest aircraft carriers then under construction. This approach was therefore abandoned, and efforts were then made to modify the *F7F Tigercat* to a torpedo fighter role, the conversion being classified as the XTSF-1. Sadly this project was cancelled when it was found to be too large to operate from *Escort*-class carriers.

More encouraging was the *Guardian* prototype which emerged following a suggestion of the *Bureau of Aeronautics* in 1944, concerning fitting a piston engine in the nose of the *Avenger* plus an auxiliary jet engine – the Bureau having recently compiled a wealth of information on both German and American jet development.

The XTB3F-1 which eventually emerged featured a Pratt and Whitney R-2800-34W piston engine with a Westinghouse J30-WE-20 turbojet, fed via wing root air intakes. First flight of this prototype took place in December 1946 – but the jet engine was not used on this or any subsequent flight, this being due to previously experienced troubles, mainly with the inlet ducting collapsing (titanium was employed, but methods of joining this then-new material left a lot to be desired). In addition, the engine had a poor reputation for reliability. The aircraft was not fitted with any defensive armament, as the extra thrust anticipated from the jet engine was expected to keep it out of trouble.

Three of these Grumman composites were originally ordered in February 1945 – two designated XTB3F-1 to be equipped with P&W R2800-34W piston engines and a Westinghouse J30-WE-20 jet, whilst the third (XTB3F-2) would have a P&W R-3350-26 engine and a 24C-48 jet. However, just five days after the first prototype flew, a stop work order was issued to Grumman. Problems with jet engine development plus changes in the US Navy requirements (the dive bomber and torpedo bomber approach had been abandoned) resulted in the main all-purpose, attack role aircraft being chosen as the *Douglas BT2D*.

Fortunately for Grumman the original order was amended a few weeks later to convert the two remaining



**Top:** Grumman AF-2W Guardian seen fitted with the under-fuselage radome a feature which created stability problems and necessitated the addition of the distinctive tailplane mounted sub-fins.  
**Left:** an AF-2S touches down on an aircraft carrier deck. Both photos U.S. Navy.

## SPECIFICATION

**Powered by:** 2,400hp Pratt and Whitney R-2800-48W fourteen cylinder piston engine driving a Hamilton standard constant speed propeller.

**Wingspan:** 60ft 8in.

**Length:** 43 ft. 4in.

**Gross weight (-2W):** 19,777lb.

**Gross weight (-2S):** 20,500lb.

**Max. Speed (-2W):** 232mph

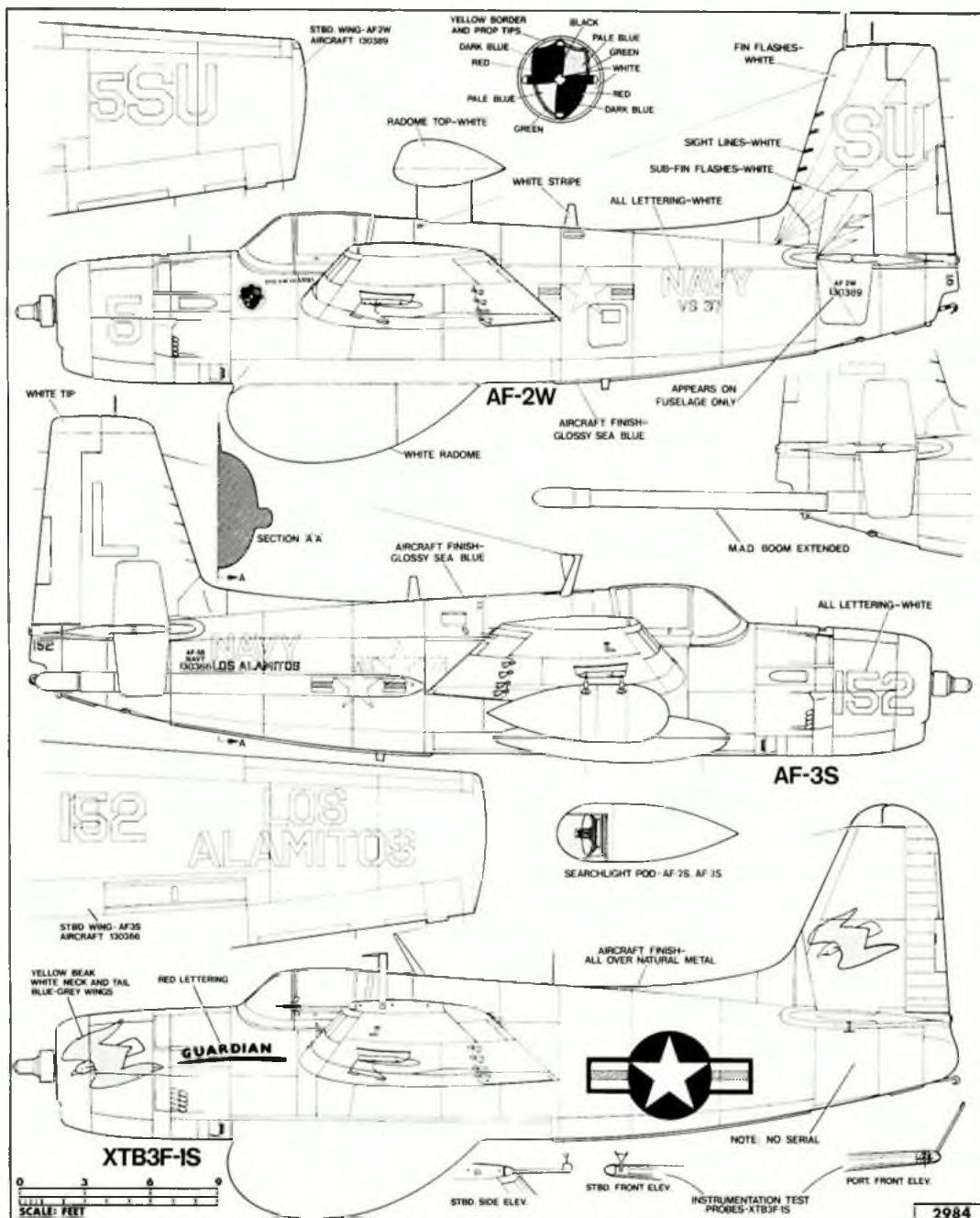
**Max. speed (-2S):** 234mph

**Service ceiling:** 24 000ft.

**Range:** 1,500 miles

**Max. armament (-2S):** Two 2,000lb. bombs or one 2,000lb torpedo or four 1,600lb. depth charges or two 1,600lb. depth charges and 6 5in. rockets.

**Accommodation (-2W):** Pilot and two radar operators.  
**(-2S, -3S):** Pilot, navigator bomb-aimer and radar operator



aircraft to 'hunter' and 'killer' anti-submarine warfare types. These two aircraft were re-designated XTBF-1S and XTB3F-2S, both being fitted with Pratt and Whitney R-2800-46W engines, while the jets were removed completely. The original prototype was used for spare parts until it was removed from the register in March 1949.

In this new role, the unarmed 'hunter' aircraft (1S) was equipped with anti-submarine radar and a four-man crew, whose duty it was to pin-point the target for the 'killer' (2S) half of the team, which was heavily armed with a variety of stores, including depth charges, bombs, 5in. rockets or a 2,000 lb torpedo.

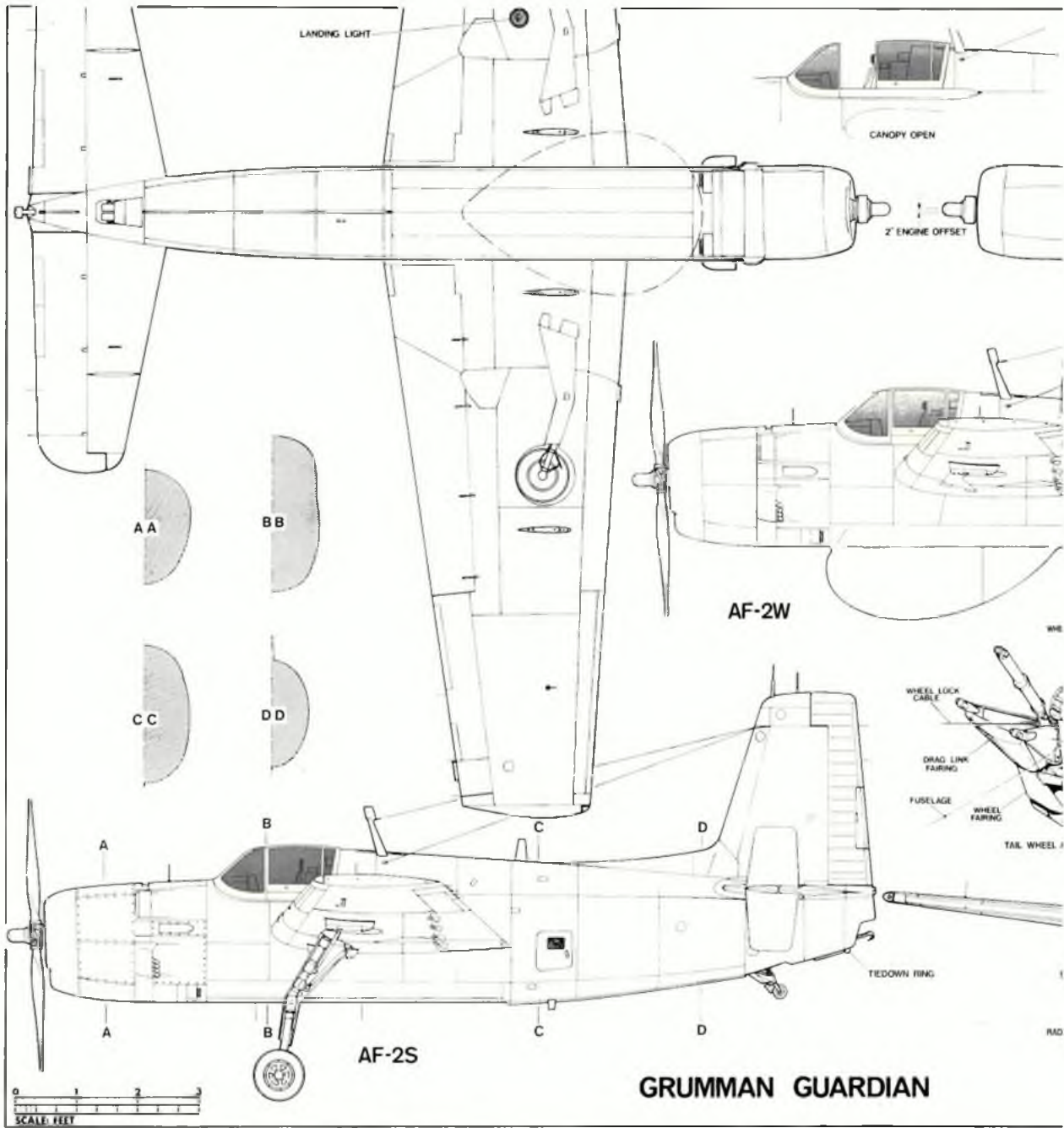
Development of the 2S version continued at a slow pace due to a variety of hold-ups, through until 1949, when now fitted with a Pratt & Whitney R-2800-48 engine, it crashed. Attention was switched to the 1S model, but more delays occurred when landing trials brought several deficiencies to

light. By this time a new specification for production aircraft had been established, and the XTB3F-1S was 'retired' in 1951.

With all the necessary modifications finally agreed, the design was ready for production – the 'hunter' aircraft being re-designated the AF-1S and the 'killer' the AF-2S. Then in May 1949 these type numbers were changed yet again to AF-1W and AF-1S respectively – only to be changed once again in July of that year to AF-2S and AF-2W.

Designing an efficient radome for the AF-2W search mission variant created a stability problem, this being solved by the addition of sub-fins to the tailplane (similar to those seen on the AEW version of the *Douglas Skyraider*) and these fins were also retained on the AF-2S.

A total of 386 Guardians were produced for the US Navy, before the aircraft went out of production in March



## GRUMMAN GUARDIAN

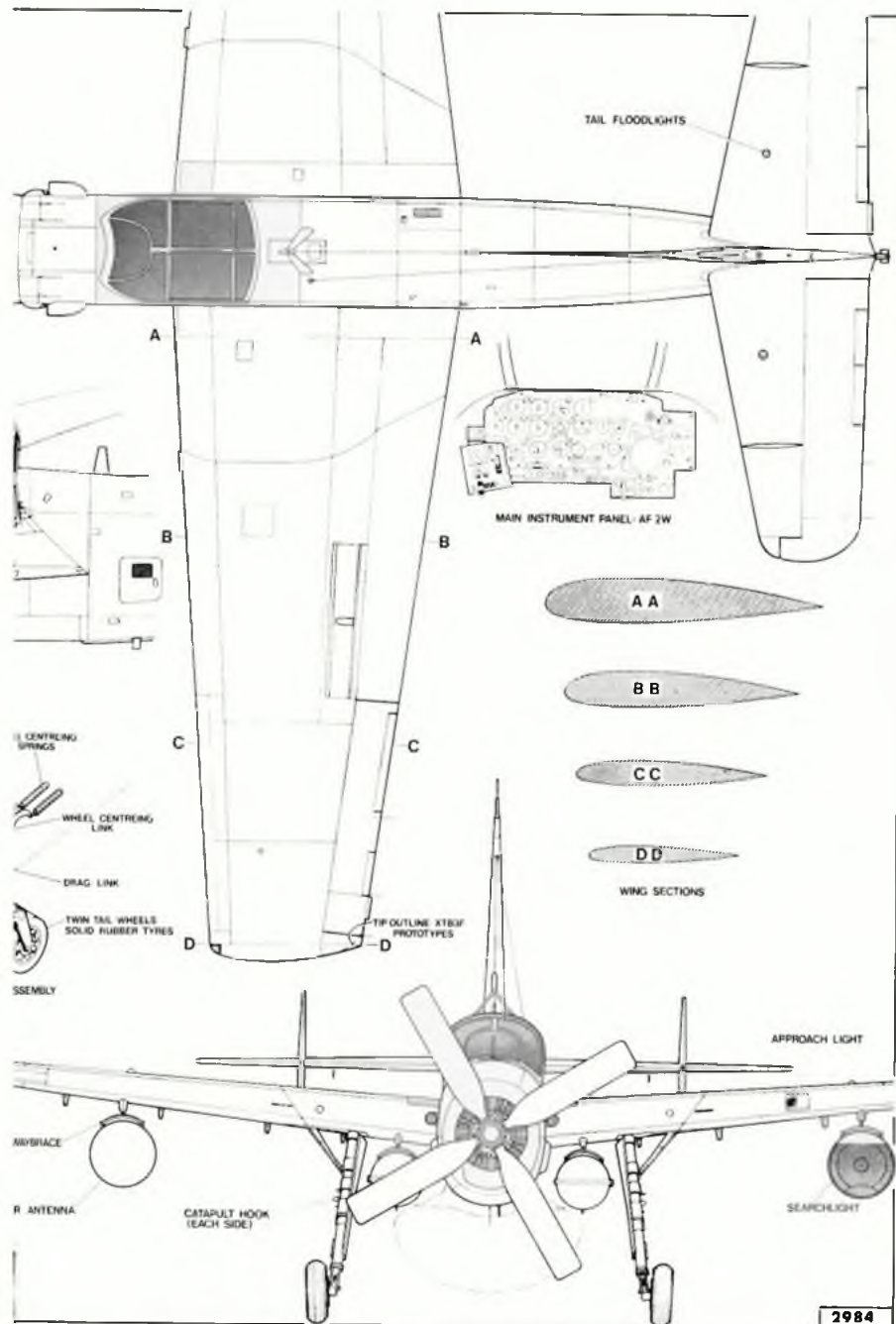


REPRINTS OF THIS FEATURE TOGETHER WITH SCALE DYE LINE PRINTS FROM THE ORIGINAL ARE AVAILABLE AS PLAN PACK 2984 PRICE 60P (IN OF VAT AND POSTAGE) FROM AERO MODELLE SERVICE, P.O. BOX 35, HEMEL HEMPSTEAD HPI IEE.

Left, the Guardian XT83F-1S which featured instrumentation test probes on each wing tip — see drawings on preceding page. Photo: via Richard Hill.

Right, Grumman of which only 40 eventually built. T a modified AF-Magnetic Anor boom. Photo: via





1953, - the first of these equipping VS-25 at N.A.S. North Island in 1950, although carrier operations did not commence until early 1951.

Of these aircraft, 193 were of the AF-2S type equipped with search and early warning radar in the belly radome, plus a radar relay transmitter pulse analyser, electronic counter measure receiver and homing equipment. The attack aircraft, of which 153 were made, also carried tracking equipment, consisting of a wing mounted radar and searchlight housed in identical pods, plus a receiver for maintaining sonobuoys. Internal storage catered for a single 2000lb torpedo, or two 1600lb depth charges, or two 2000lb bombs while any of these stores could be duplicated and carried externally beneath the wings.

A final line of development was the AF-3S, of which 40 were built. This was basically an AF-2S modified to accept a Magnetic Anomaly Detector boom on the starboard side of the fuselage - this MAD gear being a device which could detect changes in the earth's magnetic field, caused by submarines or other ferrous objects.

With a wingspan of 60ft. 8in., the *Guardian* was the largest single-engined aircraft of its period and the sight of an AF-2W particularly, with its huge belly radome and general ungainly appearance, must have caused much head shaking as it made its landing approach on one of the small escort carriers of the period.

During the Korean conflict, six *Guardian* squadrons were rotated to the Far East and carried out patrol duties in the Sea of Japan and the Yellow Sea, although it eventually transpired that there was no enemy submarine action carried out against the US fleet.

The only *Guardian* flying today is an ex forest-fire fighting aircraft, one of two previously operated out of Chino, California by the Aero Union Corp. These had been modified by increasing the size of the weapons bay by about 90% to accommodate dump tanks for the fire fighting chemicals, and removal of the sub-fins on the tailplane. Aero Union acquired a total of five *Guardians* but only two were operated as fire fighters.

Subsequently one of these aircraft was bought by a restoration group in California, who together with Aero Union employees restored the *Guardian* to its original condition, and the markings of VS-25 were applied: the aircraft is now flown mainly for airshows and fly-ins. The other four *Guardians* remain, engineless, at Chino, but it is hoped that of these maybe another could be brought into flying trim again.

1/32ND DRAWING EXCLUSIVE PLANS BY HERTS

Guardian AF-3S examples were machine was S carrying a Detector Richard Hill.



# SCALE MATTERS

by Alan Callaghan

It was way back in March 1971 that Eric Coates began his classic series 'Flying Scale Models' which gave so much practical information on the design, construction, finishing and flying of free-flight scale models. As it approached its thirteenth and concluding instalment, and being aware of the immense interest that his writing had provoked, we urged him to commence a regular feature for scale modellers – and hence the *Flying Scale Column* was born. Now nearly five years later, Eric has requested that he 'hang up his pen' – at least for a while – while he gets back to his favourite occupation: actually building scale model aircraft!

His practical advice and forthright comments have done much to popularise, and encourage scale modelling. It was clearly essential that Aero Modeller continue to cater for this enthusiasm – and who better to step into Eric's tread marks than Alan Callaghan, whom we welcome as our new regular contributor. Alan, who's interests also include control line aerobatics, is no stranger to scale flying, and has provided stiff competition at many Indoor meetings with his own designed aircraft.

THE FINAL Indoor Scale Meeting on the 1976 SMAE calendar was held at Cardington on 7th November, with the quite mild external weather conditions making the interior of the Shed fairly pleasant for this time of the year. Unlike the Indoor Nationals held earlier in May, which should have been regarded as the most important Indoor Scale meeting of the year, this meeting was extremely well supported. This resulted in contest director Dennis Thumpston having to enrol the services of four additional judges (namely Andrew Moorhouse, John Blagg, Peter Smart and myself) to cope with the flying schedules in Peanut, CO<sub>2</sub> and Open Rubber. It had been hoped to include also a section for electric power, but no entries materialized. As happened before with CO<sub>2</sub> in this country, the immediate availability of suitable power units does not automatically mean that there will be an instant abundance of builders with models ready and willing to take part in a contest. It seems to take quite some time for the scale modeller to try anything new, and so with most of the building season still lying ahead perhaps someone will show us how it can be done, indoors, in 1977.

It was very encouraging to see so few major accidents with the many new models being tested and flown for the first time. To those people who have not yet been to a meeting, Indoor Scale may create the impression of being a very gentle pursuit with super lightweight models delicately cruising

around. . . . Well this is quite right, but one must not forget that Cardington has a very hard asphalt floor and the flying areas are flanked on two sides by a massive lattice-work of steel girders as well as brick buildings and other equipment. Unless your nerves can match the qualities of the same girders etc., it is thus always preferable to trim a new untried model outdoors over grass, especially to establish in which direction the model is happiest to turn. Having done this the positioning of your launch will allow the most to be made of the available space and further minimises the element of risk to the model.

A case in point was demonstrated by Ron Green who eventually won the CO<sub>2</sub> event with a superb *Bleriot XI* painted in Swiss markings. Ron is perhaps better known for his indoor duration flying, and having been flying competitively only during the last eighteen months or so nevertheless managed to place 7th in the World Champs this year. One fairly standard indoor duration practice is to trim a model to fly to the right under power. This usually results in a very flat turn with the model in fact gently rolling upwards due to the torque reaction from the motor. This Ron tried with little success but with some fairly hectic chasing of the model as it headed for the girders, until one attempt to get it to turn left, running on the remaining gas in an almost exhausted Sparklet bulb, indicated a perfectly natural flight pattern in beautifully smooth wide

circuits. The main advantage of this type of scale subject for CO<sub>2</sub> power is that the very consistent level of thrust available from these motors can be carefully adjusted to overcome the very high drag factor created by the numerous undercarriage struts and bracing wires, as well as the highly-arched airfoil section, in a way which allows the model to be flown very slowly and therefore realistically.

Similar to this in character, but in the form of a much lighter model – Ron's model being just under 2oz. – was the semi-scale *Bleriot* of Bernard Aslett. This condenser paper covered model with an airframe weight of just 7½ grams recorded a flight time of 1 min. 7 sec. during which it reached an altitude of approximately 70 feet after Bernard upped the throttle slightly. The realistic and relatively fine-pitched propeller used, which was carved from a standard commercial 6 x 4in. wooden unit, obviously had plenty of 'bite' at the right power setting but the model was in fact one of the slowest flying at the meeting.

Placing second, Butch Hadland's CO<sub>2</sub> entry was a rare bird in the shape of a French *Potez VIII* training biplane in Persian Markings. Having been very thoroughly researched – an important but all too frequently neglected aspect of flying scale modelling – this 18in. span model was beautifully built down to an all-up weight of 1½oz. and powered by the Telco motor, in common with the greater majority of CO<sub>2</sub> models present. To have seen the way that this motor blended perfectly into the form of the completely exposed 6 cylinder Anzani engine would have set any healthy scale modeller itching to get back to the building board. As the final place results were so very close, it is possible that Butch would have taken first place had he not accidentally got some cyanoacrylate glue in one of his wheel bearings during a quick repair session following his first hand-launched qualifying flight. Because of this jammed wheel (those glues work!) the model was unable to ROG on successive attempts, which meant that an extra potential of 200 marks was lost. However, this did not prevent the *Potez* on the second flight from performing about eight touch and go landings on the other wheel!

Third place was taken by R. Lorente flying a nicely-finished *Aeronca Sedan* built, I believe, from a kit. This model returned the second highest flight score, but although it could ROG and land quite well the speed in



Another new Peanut scale kit from Peck Polymer (and available in the UK from The Modellers Den) is the Gypsy Moth. Superb balsa with all parts finely printed onto the sheet, excellent plans and the 'usual' Peck propeller/nose button assembly. Retail for £2.50.

Most unusual choice of prototype for Chris Edward's Peanut – a Lee Richards Annular Monoplane No. 3. Extremely stable and should be a really good performer when trimmed out.

flight was a shade too high to give a good scale impression. Being aerodynamically much cleaner than either the *Bleriot* or the *Potez*, and given the same power this is quite understandable, and indicates that if a high-wing cabin monoplane is to be chosen as a subject it should be built as light as possible in anticipation of being flown on a very low throttle setting to achieve the slowest speed and best scale effect.

Much appreciated by all concerned in this event was the large cylinder of CO<sub>2</sub> adapted from a fire extinguisher which was made available by The *Modellers Den*, together with the practical help and advice provided by Mr. Lee and friends from Messrs. Telco who were also flying some prototypes of a new Telco F/F sports model made in moulded expanded polystyrene.

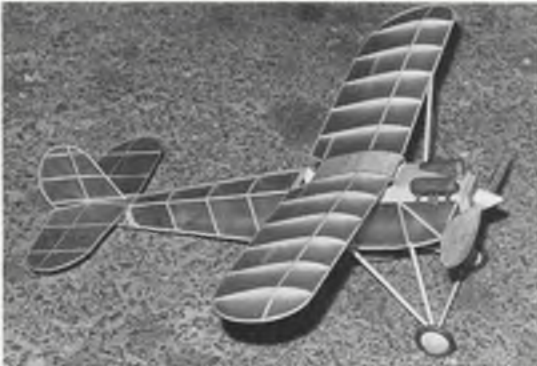
Being mainly involved with judging meant that I did not see as much of the Peanut and Open Rubber events as I would have wished. Peanut continues



to be dominated by Butch Hadland's *Lucey M.10* (free plan in the December 1976 *AeroModeller*) and Laurie Barrs *Fike Model E* with Rex Oldridge still proving that fully-rigged biplanes can give the high-wing ultra-lights a very reasonable run for their money if the approach is right. Peanut flying at this level is as much a test of patience and sensitivity in trimming for flight as of lightness and accuracy in scale

building. Laurie's model is not the lightest Peanut around, but as the results show it continues to be the one to beat when it comes to duration. Those who may think that these ultra-lights in full-size form are essentially modern day wonders may be interested to know that William J. Fike built his first aircraft in 1929.

Two other Peanut models present of particular interest were the Lee-



A 'Manhattan Formula' Ryan M1 built by B. Aslett from a Micro X kit – flies for around 4 minutes!

Ron Green's Telco CO<sub>2</sub> powered Bleriot XI weighs just 2oz, flies superbly, and features home-made spoked wheels.



Flt./Lt. Harry French produced this really attractive Beercat Racer, which weighs 12 grams in its yellow/white colour scheme.

Another Telco CO<sub>2</sub> motor is hidden within this 18in span Potez VIII built by Butch Hadland – total weight of this beauty is 1½oz.



To the discerning aeromodeller, an airbrush is a very desirable piece of equipment, but to the small-scale enthusiast it is virtually essential if an authentically-decorated model of minimum weight is required. Excess weight kills the performance of virtually all models – but the small free flyer is particularly vulnerable. With an airbrush a very light finish can be achieved quite easily. Even more useful is the detail that can be added with the variable spray control – areas can be 'shaded' to give more emphasis, weathering effects can be applied realistically, camouflage patterns sprayed without masking – indeed the only limiting factor is the operator's imagination or skill. Naturally, as with all precision-made items, they are not exactly cheap, but with the Sprite pictured here, you can be assured that it is a really high quality product. Made by De Vilbiss, whose name is a household word in professional art studios – it could hardly have a better heritage. Supplied in an attractive plastic case complete with connecting hose for fitting to a compressor, adaptor for use with commercial cans of propellant, spare seals and a most informative booklet, the outfit retails at £29.70.



Richards *Annular Monoplane No. 3* of Chris Edwards, and the American *Beercat* of Flt. Lt. Harry French. From what I saw of its test flights the Lee-Richards seems to be a remarkably stable subject with a great deal of potential – not to mention wing-ribs! – and one to look forward to seeing fully trimmed. The extremely neat *Beercat* in yellow and white weighing only 12 grams was also being flown for the first time and it looked very attractive in the air as it performed in right-hand circuits.

Honours were again taken in Open Rubber by Butch Hadland with his

big *Lacey* with Laurie in close pursuit with his Peanut *Fike*. Each returned similar flight scores with the *Lacey* being ahead on static. By one point Mike Reeves beat them both on his flight score using his reliable *Bristol MIC.*, but his lower static score unfortunately kept him in third place overall on this occasion. As a final point of interest both the *Lacey* and

the *Fike* are trimmed to fly in a very flat attitude in right-hand circuits, whereas the *Bristol* flies to the left with a very slight but more realistic bank. Perhaps this is why the extra point was awarded!

With well over 50 people in attendance we can say that if this kind of enthusiasm continues, then the Indoor Scale scene is alive and well.

|                       |                | Static               | Flying | Total |     |
|-----------------------|----------------|----------------------|--------|-------|-----|
| <b>Peanut</b>         | 1. C. Hadland  | <i>Lacey M.10</i>    | 35.5   | 116   |     |
|                       | 2. L. Barr     | <i>Fike Model E</i>  | 34.5   | 155   |     |
|                       | 3. R. Oldridge | <i>Isaacs Fury</i>   | 35     | 101.5 |     |
| <b>CO<sub>2</sub></b> | 1. R. Green    | <i>Bleriot XI</i>    | 390    | 440   | 830 |
|                       | 2. C. Hadland  | <i>Potez VIII</i>    | 390    | 420   | 810 |
|                       | 3. R. Lorente  | <i>Aeronca Sedan</i> | 206    | 430   | 636 |
| <b>Open Rubber</b>    | 1. C. Hadland  | <i>Lacey M.10</i>    | 81     | 90    | 171 |
|                       | 2. L. Barr     | <i>Fike Model E</i>  | 76     | 90    | 166 |
|                       | 3. M. Reeves   | <i>Bristol MIC</i>   | 66     | 91    | 157 |

## SWALLOW —continued from page 19

the wing mount backwards and forwards along the fuselage to achieve the correct CG position, but no more than 1/4 in. If more movement is called for, then weight must be added to nose or tail instead. When the correct position for the wing mount is found, epoxy to the fuselage and go flying – you have of course put your name and address on the model and got your D/T fuse and matches in your pocket? Then let us proceed:-

Trimming *Swallow* to perform well is relatively easy providing the CG is in the correct position. The model is designed to climb to the right under power and then to continue in a right glide circle of about 100ft. diameter. The warps (tip washout as shown on plan) built into the model on the building board will give you the required stability for a climbing right hand turn, and the rudder trim shown is that which I have found necessary on my model, but might need slight adjustment on your model to give optimum performance. Propeller thrust line should need no alteration from that shown. Initial test glides should be carried out on a calm day; no useful information can be gained on a rough, gusty day. Correct any tendency to dive or stall by placing packing under the trailing or leading edge of the tailplane, and adjust rudder trim if necessary to give a gentle, right-hand floating glide. When satisfied with the glide trim, start putting a few turns on the motor; start with 50 – 100 and generally work up to maximum turns for your rubber. If there is a slight tend-

ancy to power stall, this can usually be trimmed out with just a little extra rudder.

All that remains for me to hope is that you are satisfied with *Swallow's* performance as I am, and to remind you to light that D/T fuse every time before you launch. *Swallow* climbs well in thermals – just like its feathered counterparts.

Ian's models are always attractively finished and neatly detailed – and *Swallow* is no exception. The cockpit neatly covers the separate wing halves (a single wire dowel joiner is employed) – but ignore the hole seen in the photograph. The original used a rubber band passing through this to hold the panels together, since found to be unnecessary. Incidentally, do not overlook some form of canopy and fuselage blister – they are essential in order to conform to the cross-section rules.



# topical twists

by 'Pylonius'

illustrated by Sherry



## Not so Golden

Now I admit I am all for the quiet life, asking no more than somewhere at the back of beyond, or even further, surrounded by nothing but great volumes of hush, there to play contentedly with my silent, engine-less models. Not that such peaceful places are easy to find, though I have been advised to try jumping under a bus, but I have been encouraged by the work of ecologists and conservationists, eager like me to establish a noiseless paradise on earth.

But I have had some stirrings of conscience. It occurred to me that I may be just a wee bit selfish. After all, it takes all sorts to make a world, even those nasty pimply ones, and in wallowing in the land of hush I have not had due concern for the modeller who looks upon a model not as a piece of aerial poetry but as a purely mechanical device upon which to attach and surround with other mechanical devices, all giving out plenty of dramatic noise and fury.

What started off this line of thought was that chap on the November cover, sporting a perforated plastic helmet and with a tube running up his arm. This latter, which I thought at first to be part of a do-it-yourself blood transfusion kit, turned out to be part of the fuelling up process. Now what he is doing interests me, personally, like that which he is guarding against: a hole in the head, but take away from the team racers that very essential ingredient, noise, and the thing goes flatter than a D/T in a downdraught.

This goes for all forms of dramatic flying. Part of the glory of Concorde is its air shattering noise, and bungalows at the end of the runways are eagerly sought by engine lovers as well as professional complainers. Our large stunters, too, need a bit of aggressive roar to give them substance other than volumetric. Put one through its rugged routine in ghastly silence and the little boy will say, *Look, Mum, one of them acrobatic kites.*" As for the combat models, the only way they are identifiable as model planes is by the very modelly noise they make. Take that away and they could easily be taken for love birds, or two gliders in mid air collision.

Where radio models are concerned, the heavily silenced ones give me the creeps, however law abiding and ecological desirable they may be. A good healthy roar and you're flat on your face and safe, but when they come out of nowhere to shoot past your ear without warning you come over all goose pimply. Up to that point they are all too innocent looking – too much bite and not enough bark.

## In the Wake

Its an odd thing. Back in more primitive times when, to get to such far off places as the United States or China you had to take the old fashioned slow boat, the Wakefield event could be held on an annual basis with no trouble at all. Teams, or rather groups of individuals, would come sailing over the stormy waters to whatever part of the world there happened to be a large airfield and a large town in happy

"I knew we shouldn't have offered to hold the Wakefield here"

juxtaposition. But now the jumbo planes have shrunk the world to the size of a tour of the Lake District it is only possible to hold the World Champs at two yearly intervals at best, with the threat of a three yearly gap looming up. This is what is known to the head shrinkers (as opposed to world shrinkers) as a paradox, or just plain goofiness.

It is true that the Finns have offered to stage the World Champs on ice, but have received only frozen looks in return. The trouble with our shrinking world is that the flying fields have shrunk with it, in many cases altogether, although generally the banquet and razzamataz organisers of today do not like the flying side of things to steal the limelight. In fact, the grottier the flying field, with a high rate of lost models, the more readily will it ensure that all the banqueting bamboozle is not upstaged, and that the only sport to be enjoyed is the track suited marching and the flag waving.

Things were certainly a lot healthier in the old days when the Wakefield was invariably held in Britain, and people were dressed in the civilised order of blazer and white flannels and not monkeyed up in track suits. It is true that we are no great shakes at putting on banquets, setting up avenues of flags and all that jazz, but we do seem to have preserved a worthwhile flying field or two, and we don't mind losing.

## Shower Power

The latest form of power for model planes comes with the full blessing of the conservationists: noiseless, fumeless, solar energy. This is not the sort the telly kids get by whacking into their cornflakes, but seeps in via a spread of photo electric cells along the wing.

Normally we do not see enough of the old fiery orb in this cloud capped realm to get worked up about the latest energy therefrom; free power enthusiasts think more in terms of wind machines, water wheels and how to release the hydraulic inertia in a rainstorm. During the late summer though, we had more than our fair share of high energy rated sunshine, and I have lost several models and a kilo of useless rubber to prove it. And, energy wise, this is where we come back to cornflakes, for by far the best form of model powering comes via the winding arm, for which, of course, you need a goodly intake of protein. Just as long as I have the strength to wind up a Coupe d'Hiver motor, I will continue to disdain noisy, smelly glows and diesels, electric, CC<sub>2</sub>, jet and other forms of mechanical power, whether fed from the bottle or the one eyed monster above.



'Before and After!' The kit, which we learn is now packaged in a strong polythene bag (see before you buy!) with the foam cores still within their protective 'blanks', contain few parts – which is why the construction is so rapid. The only extra material needed is that for covering and of course adhesives – everything else is provided, including nylon reinforcement for the trailing edge and centre section – most important. Various alternative covering methods and materials are suggested, but we chose the most popular – gift wrap paper, which is cheap and decorative – hence the roses. They sort of grow on you. . . . Tips and tailplane were covered in white Solarfilm.

IN THE CONTEST world, it is rare for any one design to be completely different *and* superior to its contemporaries – and even more rare for it to be commercially available in kit form. True, in some countries kit models are regular contest winners, but this tends to be because the modellers have 'taken the easy way out' and flown these models not because they are better, but because they are readily available. Design stagnation such as this is a pity, but it does happen.

Just one short season was necessary for competitive combat flying to change completely – and that was almost entirely to the efforts of Richard Wilkens. In 1975 his *Blasta* design was 'the tops', but over the winter he produced the same model with all polystyrene wings and simplified tips, named it *Superstar I* – and had an instant winner. This, he then improved upon by reverting to the larger wing tips of the original *Blasta*, hollowed out the core of the wings – and presto the *Superstar II* was born. And every combat flyer knows how successful that was – and still is!

It was thus with more than a little interest that the *Superstar I* kit was examined, and what a contrast to the 'traditional' kit it proved to be. For a start, there was no 'box' as such – the foam blank from which the cores were cut serving to contain all the bits and pieces, as well as protecting the wings themselves. Clever. All parts were provided – including a metal tank kit – but nothing was die

cut, nor in fact needed die-cutting. Examination of the very clear instructions (both written and sketches) plus the informative 'notes' sheet made it very clear that here was a very simple, yet cleverly thought out design.

To say that 'construction got under way' would be a lie – assembly would be a more accurate description. In essence, the model consists of a central ply/balsa/spruce rib which is the heart of the model – the wings being glued on either side, the tailplane slotting into its rear, and the engine pod slides over the front. Such an important item must be made accurately, but as it consists solely of several flat strips, this is no problem – indeed it must be virtually impossible to assemble *any* part of the model incorrectly. The instructions are not only precise – they are a wealth of information, make every stage abundantly clear, and should be a model for virtually every other manufacturer to emulate. For once the builder is rewarded with the feeling that the designer has actually made a model from a kit himself. . . . .

As there are so few parts to assemble, a description of the building sequence is unnecessary – the photographs reveal all. The only surprising omission was the fact that while a tinplate tank kit was provided for diesel engine operators, there were no parts supplied for a pacifier pod for a glow engine installation – and surely many, as this reviewer, will be using a *Superstar I* as their first introduction to glow

Key to the construction of the whole model is this central rib – built up from strips of balsa, ply and spruce. Note the detail point such as the plywood bellcrank 'stops'. The tailplane unit slots between the two spruce strips seen in the bottom right hand corner of the picture.

In order to provide clearance for the bellcrank movement, some of the foam must be removed. This was easily achieved with a warm soldering iron – the foam melts at a rapid rate, but the operation is easy and far from critical. Note how the bellcrank mount passes through the centre rib for extra strength.



Although a metal tank kit is provided – ideal for use with a diesel engine – we chose to use a glow engine/pacifier set up. Whilst parts for the pacifier pod were not provided, details were. The pod shown here consists of ½in balsa sheet sides with thin cardboard wrapped around and fuel proofed by swilling Tufkote around the interior and pouring out the excess. We understand that future kits will have these parts supplied. The ½in plywood full depth joiner fits into slots formed in the pre-shaped foam blanks.

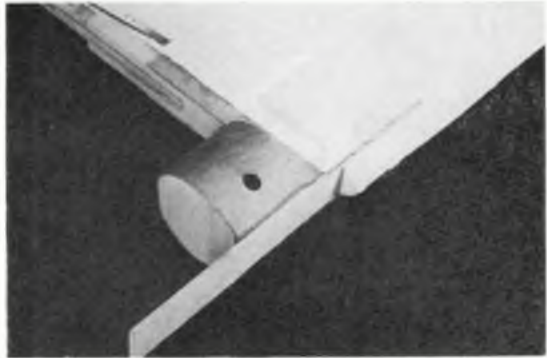
combat flying. However, details are provided, and the materials consist only of a little ½in. sheet balsa and a piece of thin card.

Not surprisingly, the model was soon completed – using five minute epoxy and quick drying PVA as adhesives, there is no excuse for a single evening's labour not resulting in a finished airframe.

The tailplane was hinged to the elevator and covered with Solarfilm – using the very neat, quick system recommended – and glued to the spruce centre rib strips; then the question of covering arose. There are several options available – ranging from all Solarfilm through to brown paper, but it was decided to use gift wrap paper as it was 'prettier' than brown paper, cheaper than a plastic film covering (gift wrap costs just 16p for two pieces – with plenty of spare left over for Christmas presents!) and it was a technique new to this reviewer.

In fact, it proved very straightforward and very satisfactory. Firstly, just the tips were covered in Solarfilm, then the gift wrap was cut to size, allowing generous overlap at leading and trailing edges. The paper was thoroughly soaked in a bowl of water, the excess being drained off and then laid over the wing (still without motor pod) which was pre-pasted with wallpaper paste. The covering went on easily, and any wrinkles/air bubbles etc. were simply removed. Whilst the top surface was still wet, the model was turned upside down, resting on a couple of pieces of scrap balsa block to lift it clear of the building board whilst the procedure was repeated on the underside. That done, it was left alone for 24 hours while the moisture evaporated and the adhesive set. Very easy, very cheap – and quite adequate.

After the motor pod was added (checking the CG) the whole was fuel proofed by a coat of Ripmax Tufkote, brushed on. Unfortunately, the colour dye in the covering paper ran somewhat, so instead of red roses on a white background, this model now features not-quite-such-red roses on a pink background! As the paper seemed just a little porous still, the outboard wing was sprayed with hair lacquer as suggested – and it works too! Smells nice and holds the 'setting' perhaps . . . . ? The inside of the pacifier pad was fuel proofed by pouring in Tufkote, swirling it



around and pouring out the excess.

The engine selected was that favourite of the combat flyer – the Super Tigre G15 glow, and reasons for its popularity soon became clear during the running-in process. Not only does it have a good power output, but it is also remarkably easy to handle. After only 15 minutes of fast but rich running on a 25% castor fuel, it would hold a steady peak setting on the Bartels 7 x 3½in. prop. As a point of interest, the fuel tank had to be raised at least 2in. above the spray bar in order for the engine to run without a pressure fuel system – the venturi is really huge on these engines, and there is virtually no 'suck'.

Lacking any experience of operating an engine on a pacifier tank, the opportunity was taken to try it out on the bench first. With more than a little trepidation, the pacifier was filled via a plastic syringe (obtained from Michaels Models) – it is quite alarming to see the pacifier swell as it 'consumes' some 80cc of fuel! Using a bulldog clip to pinch off the fuel tubing, the motor was generously primed through the exhaust. A few flicks, the motor fired and ran on the prime . . . . then the clip was released. Instant no-go! The needle, set still for 'normal' running was much too rich now, and it became clear how a free-flight power enthusiast favours the flood off system for stopping an engine. Soon though a setting was found and all seemed quite straightforward, although it was evident that a slight 'tweak' on the needle had a great effect on the running, despite the S.T. needle having a very fine thread.

With the motor now sporting a 7 x 4in. Tornado nylon prop and ready for 5% nitro fuel, it was bolted to the Superstar for 'field trials'. A read-through of Richard Wilken's text in the June '76 *AeroModeller* gave much valuable advice on setting the engine properly, and by this time confidence was growing.

Except that is for a nagging doubt about the pilot's ability – previous experience of 'modern' combat flying being limited to PAW 249 powered *Warlords* and such like. However, these fears proved groundless – the *Superstar* was far more manageable than expected. Almost docile, in that it would go where you put it and respond instantly to any flick of the wrist, without being over sensitive. If you want really sudden action, then move the centre of gravity further back, but if built as shown, then the model is eminently 'safe' – a very wise policy. Actually flying the craft gave a lot of pleasure without feeling that it was 'getting away from you' – but the performance is there for those who want it. With a reputation like this model has, it is superfluous to add our own comments. Until you fly one, then do not criticise. Fly one and you will simply not be able to.

Perhaps readers should be reminded that this design does not have hollowed out wing cores, and thus while slightly heavier than a *Superstar II*, is much stronger. It will not disintegrate on 'ditching' like its more advanced

*Continued on page 49*



Bill Burkinshaw editor of the SMAE's 'Model Flying' newsletter performs the re-fuelling operation via a large capacity plastic syringe purchased from Michaels Models of Finchley at £1.25. It proved ideal for inflating the pacifier fuel tank.

## THE FREE FLIGHT SCENE

this month: **Mike Fantham**

Since the formation of *The Free Flight Scene* back in the April 1975 issue, those ever-active enthusiasts Martin Dilly, Michael Warren and Bob Bailey have rotated the duties of keeping our readers abreast of developments, news and information concerning their sport. Sadly, Michael Warren finds that increased business pressures now mean that he can no longer devote sufficient time to meet his commitment and has asked to step down, making way for his clubmate and our new contributor, Mike Fantham. Michael's commonsense, practical, approach to modelling and contest flying has done much to encourage others to 'have-a-go' and we are naturally sorry to lose his services. Fortunately he has agreed to submit reports in the future, and we look forward to seeing his words in print again - and his name in the contest results too!



AS THE NEW recruit to the triumvirate who write this column, perhaps I had better introduce myself. I have been involved in the sport of model flying for 11 of my 26 years and have flown free flight competitively for the last 10 of those years. Most types have received my attention to some extent, but I always think of A/2 glider (F1A) as my main class, with Open Rubber, Coupe d'Hiver and Wakefield following in that order. I have also flown hand launch gliders, both indoors and out, as well as FAI Power. Microfilm flying fascinates me, and I wish that I had not stopped when I did, just short of the 30 minute barrier in 1972. Maybe next year! My interest occasionally strays to radio control, where I fly both slope aerobatic and thermal soaring gliders and a full house aerobatic power model (not all at once!), when the free flight activity permits. I would like to have tried control line seriously, and had a go at combat, but then you cannot do everything.

### EUROPEAN F/F CHAMPIONSHIPS - Homburg-Miesau Germany 10/13th September 1977 - ...orper Hassle-Ad Homburg

Regular readers will be aware of the problems experienced by our European Championship team before the journey to Homburg; the glider team being eventually fixed with just three weeks to go!

To re-cap briefly, the team's problem began at the selection stage when the two-day Team Trials at Easter had to start a day earlier than previously published. The change was forced on the organisers with two weeks to go and they decided to try and notify as many people as possible, via the 'grapevine', this being the only method

available. This meant that a competitor could, and did, turn up on the "first day" to find the contest half over.

It is easy to see with hindsight that the problem might have been avoided if the "grapevine" had been used to warn people that there would be an *ad-hoc* contest on the first day, which people could have "missed" to save time and money if required, followed by a one day Trials meeting of say five flights run on the second day, that being the day common to both sets of published arrangements. If this type of problem is going to arise in the future there should be a published phone number to enable flyers to confirm details at the last minute.

In spite of all the troubles, teams were sent to Germany: Ian Kaynes, Graham Walker and Bob Wells in Wakefield, with Brian Baines, Peter Williams and myself in glider. The European Championships at Homburg are just for glider (F1A) and Wakefield (F1B); an International Power (F1C) event is also run but the European Championships for Power were held in Yugoslavia in July, with no British Team in attendance.

The teams travelled to the event in three cars, with a ride on the Dover-Dunkirk ferry leaving some 300 miles of mainly motorway driving on the other side, before arriving in Homburg on the Friday evening. Unfortunately, the accommodation was split between a college and a youth hostel some miles apart, with no common focus of activity in the evenings, however both were more than adequate with good food and facilities.

The flying site at Miesau, about five miles from Homburg, was the subject of much discussion before and during the journey to Germany. I had spoken to several people and heard stories of power lines, motorway, river and railway among the local hazards; people usually added that it would be "alright if it was calm". My first sight of the *Flugplatz* confirmed fears about the nature of the place, and the presence of a 10 - 15 mph wind made it seem almost inadequate. There were power lines less than 200 yards upwind of the starting poles, and more power lines downwind of the launching area, but we were assured by the organisation that flights which touched these could be re-taken. We flew from an area about three hundreds yards square on three grass fields, the surrounding fields being ploughed or under small crops. There was in fact a clear run of about 1½ - 2 miles in one direction over open farmland, and this was claimed to be the normal wind direction. Unfortunately the wind was not in the normal direction, and a thick wood less than a mile to the north looked ready to catch some of the taller maxes.

Saturday morning was given over to test flying and the contest proper started with a fifty minute glider round after lunch. Conditions were overcast, cool and generally uninspiring with a fair breeze

**Heading pictures:** left is Bjorn Soderstrom (Sweden) who placed second in F1B at the European Championships. Model features short nose and triple fins with very neat tissue decoration. At right is Hans Seelig of West Germany who placed second in the International Power event with shoulder-wing design featuring sheeted flying surfaces. Seen at left is our own Peter Williams who placed second in the A/2 section of the Euro Champs - he also leads the British F/F team trials in this class, and is currently seventh in the Wakefield stakes. Quite a year!





**European Champion for the Wakefield class is now Roberto Artoli of Italy – he also placed 6th at the World Champs. The model features egg-box structure on all flying surfaces, aluminium front fuselage and outrigger prop with wide blade roots.**

toward the trees. There were patches of quite strong lift available, however, and Zach of Austria put his elliptical tipped model into one for the first max of the contest, a perfect three minute flight.

We watched with interest as it D/T'd into the forest! Peter Williams had drawn to fly first and did so in every round. Brian Baines went second with myself third. We decided to maintain this order, unless one of us got ahead of the others, when he would have first choice. We all maxed in round one although I had to leave my best model in a very thick patch of shoulder-to-shoulder Christmas trees on the front edge of the wood. Pete and I maxed in Round 2 but Brian's model developed a stall and was down at 100 seconds. By this time Peter had a model in the trees near mine, and we set off together with good compass lines to do a joint search. Five minutes in the Christmas trees on parallel courses had us covered in scratches and spiders webs but happily plus one precious A/2. The first thing of note we found on Pete's line was Reda's Micro-bus, I looked inside just in case, and there was his model which must have been picked up as it landed!

Meanwhile our Wakefield flyers were proving that the conditions were quite difficult, with only Bob Wells clearing two minutes; just 40% of the Wakefield flyers maxed in round 1. The second and third rounds gave Graham Walker two maxes whilst Ian Kaynes and Bob Wells managed one apiece. The thermals seemed short lived at times, or were we flying in some sort of wave lift from the upwind hills? My third glider flight was typical, starting well and looking good for the first minute, it then came down and hit the power lines, eventually landing at 2:20. I naturally decided to re-take the flight, as allowed, using my second model and had a similar but shorter second attempt giving a score of 1:20! I was unhappy as we left the field that evening.

Our first job when the flying finished was the recovery of Ian Kaynes' Wakefield from its 40 foot perch in a pine tree. The job started in daylight with some old nylon line and a convenient stone and finished much later, in pitch darkness, after the loss of several stones and most of the line. Recovering models from trees is always frustrating, especially in the dark, when you cannot see the tree, and the guy with the torch seems to be pointing if every place *except* at the aeroplane, and people keep standing in the carefully coiled pile of spare line and . . . . .

The second day brought a steady drizzle during the morning, but Pete Williams continued to max in glider, with the rest of us flying in a mediocre way in conditions which we had never imagined possible in Central Europe at that time of year; the weather was typically English but with less predictable lift!

Conditions improved for the two rounds after the lunch break, and our last twelve flights gave us 8 maxes. The position became clear in glider with only two flyers having perfect scores after six rounds. Our own Peter Williams and Gottfried Zach of Austria ran out their towlines side by side for the last round. Good luck wishes were exchanged and the heat was definitely on. The minutes passed, Graham Walker's portable thermistor machine confirmed our feeling that the temperature was dropping slowly. It was over twenty minutes before any indication appeared; the bubbles looked good, a model flying overhead looked good and both contenders towed. Zach had a good launch, but Williams towed too fast and unlatched his hook early for a disastrous low launch, which put him in second place. As often happens when it comes to the crunch, Peter was beaten by the systems on his model – a normal launch would probably have produced the extra 44 seconds required for victory. However we must congratulate Pete on his achievement second in Europe is a great result.

So the contest ended with a second individual and third team place in glider, a far-from-disgraceful fifth place in Wakefield, and everybody feeling that they could have done better as we packed the models away and headed for the evening meal and prize giving. The ceremony and celebrations were held in a hall near the flying field, it was good to see Pete Williams collect his trophy, one of the modern sculpture type that resembles a monkey's first attempt at welding . . . . nice though! I had an interesting chat with some of the English speaking participants, who all complained about the field but concluded that it was used partly out of tradition and partly because there were willing organisers and accommodation available. I feel that this event would come nearer to its rightful place as second only to the World Championships if it were held on a better field.

**Croydon's Dave Hipperson now lies fourth in the Wakefield free-flight team selection Trials after making some eight flights.**



It is difficult when flying in an event to get a chance to look closely at the other models. The overall impression was that there was nothing new to be seen, although perhaps the power models being flown looked a little sleeker – Seelig had a shoulder winged model with a fully cowled Rossi and sheeted surfaces. In glider, the first three models had sheeted wings, but more importantly all looked well worn and thoroughly 'flown'. The Wakefield winner had a model featuring eggbox structure in wing and tail, classic Italian style, plus aluminium front fuselage, short nose and wide root outrigger prop.

The Swedish Team Manager was keen to point out the very short nose movement used on Bjorn Soderstrom's second placed model, the prop blades folding back well under the wing. Circle tow is now the 'norm' in glider, and I would guess that most flyers had such a model available, especially in view of the power lines upwind, which made us think that we might be in for the first posthumous max if anyone





**Gottfried Zach of Austria— the new A/2 glider European Champion. He uses this elliptical-tipped design with sheeted, plug-on wings — and interestingly enough, no circle towhook . . .**

made contact. Some continental flyers seem to circle tow at the slightest provocation even when it is apparently unnecessary, perhaps they feel they need to work for their maxes. The use of the offset hook-system made towing in circles look less controlled for some entrants.

On the ground-equipment front, there were the usual continental array of mylar streamers plus a sprinkling of bubbles, but I believe we were the only team using a chart recording thermistor, kindly loaned by Jack North. We also had Graham Walkers' simpler hand held device with a meter readout of temperature variation.

I feel I can speak for the whole team in saying that we were proud to go to Germany, and not too disappointed with our results. I know that I would go again given the chance.

**F1A Glider:** 1. G. Zach (Austria) 1244; 2. C. P. Williams (G.B.) 1201; 3. W. Kraus (Austria) 1175; 4. G. Zojceski (Yugoslavia) 1171; 10. M. Fantham, (G.B.) 1034; 19. B. Baines (G.B.) 949.

**Teams:** 1. Yugoslavia 3303; 2. Austria 3263; 3. Great Britain 3184

**F1B Wakefield:** 1. R. Artioli (Italy) 1191; 2. B. Soderstrom (Sweden) 1176; 3. L. Stoianov (Bulgaria) 1160; 10. A. R. Wells 1102; 25. G. Walker (G.B.) 1007; 30. I. W. Kaynes (G.B.) 971. (G.B.)

**Teams:** 1. Italy 3330; 2. East Germany 3320; 3. West Germany 3198

#### 5. Great Britain 3080

**F1C Power (International contest):** 1. B. Huyben (Holland) 1225; 2. H. Seelig (West Germany) 1187; 3. P. Maurer (Switzerland) 1071.

### WORLD CHAMPIONSHIPS

The December meeting of the FAI (International Aeronautical Federation), may decide to change the World Championship cycle from two years to three. Reasons for the change of frequency vary from problems of finding venues and organisers, to the simple economical fact that poorer National Aero Clubs cannot afford to send teams to so many events. It should be remembered that there are currently five World Championships meetings every two years: Indoor, Control Line and Scale alternate with Free Flight and Radio Aerobatics. The introduction of Thermal Soaring in 1977 and addition of Combat to the Control Line category extends the problem. Free flight will be one of the first World Champs to be affected. Denmark has offered to host the next event at Roskilde in July 1977, and this is up for approval at the meeting but is of course linked to the change of cycle.

The way things are, most organisers would vote for a three year cycle and the participants for a two year cycle. We understand that USA, Sweden and France have each tabled varying proposals for a change. The subject is of critical importance to free fliers and could effect enthusiasm for the three classes Wakefield, A/2 and power.

### FREE FLIGHT TEAM TRIALS — First Weekend

Although the World Championships date is tantalisingly uncertain (we go to press just five days before the decisive CIAM International Aeromodelling Committee meeting in Paris) the SMAE has already run the Autumn '76 Trials for a '77 selection. It has been decided that the results will not count towards any team selection for 1978 or later.

With this unsatisfactory, "it might be all for nothing", atmosphere abroad, we duly assembled at Sculthorpe in Norfolk for the first meeting over 25/26th September. It was difficult for some of us to feel enthusiastic about the event, and even the weather (cold, wet and misty with a moderate wind just like the '74 Trials) did not help generate any sense of occasion.

The contest was run in 40 minute rounds following a Power (F1C), Wakefield (F1B) and Glider (F1A) sequence, with a 10 o'clock start on the Saturday morning.

Bad visibility led to the cancellation of the first round in each class, but then the rain stopped and the first Power round got under way in better conditions after the lunch break. Six of the sixteen power flights achieved the required three minute duration but several people had been clocked off out of sight with lower scores in the variable visibility, while the models went on to max. The first Wakefield round which followed immediately, produced a similar situation with only four maxes from 32 flights. At this point proceedings were stopped and a protest was received from some of the flyers who had been "short changed" with scores less than their airborne times. A jury of three "impartial" glider flyers, who were drawn at random and who had not yet flown, agreed that the rounds that had been flown should be declared void, and a fresh start to be made on the Sunday with four rounds in each class.

In contrast to the dismal Saturday, Sunday dawned bright and clear and with an 8-12 mph wind straight down the 2 mile main runway, conditions looked perfect. The contest ran smoothly and if anything the wind strength reduced through the day to give very pleasant flying weather, even if the thermals were a bit patchy at times. It was not always easy to use the available lift and scores, especially in Wakefield, were lower than I would have expected in the conditions. The four rounds flown in each class produced nine perfect scores in Glider, four in Power and one in Wakefield.

At the end of the Sunday's flying it was pointed out to the organisers that they ought to run a fly-off to determine positions to count toward the Senior Championship scores, for which the first Trials is an eligible event. This was eventually organised and only Peter Williams and myself took part, both having "still air" type flights with his 2:30 being one second better than my own effort.

Scores after the first weekend were:-

**F1A Glider (59 entries, 52 flew, 9 perfect scores)** B. Baines (RAF MAA) 12:00; J. Cooper (Biggles) 12:00; M. Fantham (Richmond) 12:00; J. Hanson (Liverpool) 12:00; C. James (Crookham) 12:00; C. Parry Jnr. (Biggles) 12:00; B. Spooner (Croydon) 12:00; C. P. Williams (Richmond) 12:00; A. Young (Croydon) 12:00

**F1B Wakefield (37 entries, 33 flew):** 1. I. Kaynes (Croydon) 12:00; 2. D. Digby (Croydon) 11:52; 3. B. Kenny (Vulcans) 11:30 4. J. Woodhouse (Croydon) 11:16; 5 (equal) J. Barnes (Liverpool) and D. Hipperson (Croydon) 11:11.

**F1C Power (78 entries, 18 flew):** 1 (equal) M. Cowley (Biggles), P. Harris (B'ham), R. Johnson (St. Albans) and S. Screen (B'ham) 12:00; 5. J. Allen (Brighton) 11:57; 6. A. Jack (Tynemouth) 11:49.

### FREE FLIGHT TEAM TRIALS — Second weekend

The second weekend of the Team Trials was held at Sculthorpe on the 16th-17th October. Weather on the Saturday resembled the Sunday of the first weekend with only a light breeze and bright sunny conditions. Once again the lift was not so reliable as conditions suggested it should have been, and the number of perfect scores in each event dropped steadily until the day closed with none remaining in either Power or Wakefield and only Messrs Spooner, Williams and Fantham left in glider. The contest was still wide open in all three classes, with stronger winds forecast for the Sunday, only thirteen seconds covering the top four in power, a minute covering the top eleven in Wakefield and several near misses waiting to overtake the three full scores in Glider.

On arrival at the airfield on the Sunday morning we found parts of the runways and peritack marked out with dayglo plastic cones and were told that the speed stage of a Car Rally was to take place later in the day! The airfield had been "double booked" and the Free Flight sub committee, who were running the event, were placed in the unenviable position of having to try and salvage the contest from this shambles. Times were checked with the Rally organisers and it appeared that some rounds could be run before the cars arrived, so the first glider round was started. The wind was about 15 mph by this time and the lift was not too well defined at least that was my

impression as I was not one of the fifteen who scored max, my 1:18 dropped me from first to 11th. Peter Williams maxed after a fairly long tow to keep his perfect score but the other overnight leader, Brian Spooner made only 1:17 in the same patch of sink that I had used.

As the models were retrieved a group of cars arrived at the field and started burning rubber up and down the concrete, the Rally had started even earlier than forecast and the Contest organisers were placed firmly on the spot. No amount of looking at maps and wind direction checking could find them a safe place to fly from, since the motoring event was taking up a large area of the field. The thought of a model coming into contact with 100mph car was sufficiently terrifying to tip the balance in favour of abandoning the event and further checks with the Rally people led to a meeting being called at the back of a hired van used for "control". The assembled throng of flyers was told that the contest was suspended and that the remaining three flights would be flown at a later date. A fair amount of criticism was voiced at the fact that such a "double booking" of the field should have occurred and many suggestions were put forward as to what should be done. Ideas ranged from taking the results as they stood, to scrapping the whole thing and starting again at Easter '77 if necessary.

Nobody felt happy as they left the field, the only good point being that we had an early start for home and a drive in daylight for a change.

Oh yes the models. . . . In power the seven-second run has been with us for a year and the event has become as much of a thermal chasing game as the rubber and glider classes have been for years. The transition from the rapid climb to the slow glide has become even more important with the shorter run and this is where the poor scores are often caused. The standard among our top flyers is quite good with Stafford Screen's model being particularly impressive. In Wakefield the models are showing signs of the falling quality of the rubber that is available these days. As to model design nothing new is happening. Leader after eight flights, Alan Jack, is using a model with rolled balsa fuselage and elliptically tipped wings of moderate aspect ratio similar to the aeroplanes that Ron Pollard and Joe Barnes are flying. In glider most development seems to be going into refinements in circle tow hook design and associated flying techniques. Sufficient people are circle towing now so that it is often a good idea not to, unless you can find a large area to yourself where you can concentrate on looking for lift and not on avoiding other people. It is often safer to wait on the ground for the right time to launch and avoid some of the ghastly line tangles that go on. Results after the two weekends are:

**F1A Glider** (34 flew at 2nd Trials): 1. P. Williams (Richmond) 24:00; 2. A. Crisp (Biggles) 23:58; 3. J. Bailey (Bristol & W) 23:51; 4. J. Cooper (Biggles) 23:32; 5. E. Drew (Bristol & W) 23:29; 6. C. Batty (Bristol & W) 23:21.

**F1B Wakefield** (29 flew at 2nd Trials): 1. A. Jack (Tynemouth) 22:25; 2. B. Kenny (Vulcans) 22:22; 3. D. Digby (Croydon) 22:20; 4. D. Hipperson (Croydon) 22:10; 5. B. Kershaw (Wigan) 22:05; 6. J. Cooper (Biggles) 21:50.

**F1C Power** (13 flew at 2nd Trials): 1. J. Allen (Brighton) 23:46; 2. R. Johnson (St. Albans) 23:39; 3. M. Cowley (Biggles) 23:35; 4. S. Screen (B'ham) 23:33; 5. T. Smith (B.A.C.) 22:28; 6. P. Harris (B'ham) 22:24.

#### SOUTH BRISTOL GALA

This event saw a return to the scene of the 1976 National Championships for a meeting which featured R/C thermal soaring and control line as well as free-flight events.

The weather was as near perfect as could be wished, with the wind never exceeding 5-10mph, and being less than this for most of the day. The variable nature of the drift caused some problems, flyers finding their models drifting out of the 'drome when a wind change put them at the downwind end of the main runway! A move to the middle of the airfield solved this at the expense of violating the published rules about parking on the runways. A further move was made before the fly-offs which had to be run at four o'clock, half an hour earlier than planned, presumably because the organisers made a mistake in guessing when darkness would fall; use your Christmas diaries next year Gents!

The contest started at 9.30am and with almost flat calm conditions surprisingly few people were flying their vintage precision entries. This event requires a total score of five times the first flight, and 'dead' conditions are perfect. Another surprise was that a few people

started flying gliders early; with no signs of lift about and no forecast of bad weather to come, scores of less than 2:30 resulted. Most of the early activity was in the Open Rubber and Open Power classes whose models can make the required three minute "maxes" without thermal assistance. The thermals did not "switch on" until about 11.30am and after a slow start, the main activity in the thermal-catching classes got under way. Glider developed into the normal tactical event with people playing the waiting game until some obvious sign of lift became available. At times one flyer would entertain the waiting throng with a display of circle towing upwind; Dave Greaves marked a useful-looking thermal with a vigorous catapult launch followed by a nice loop, only to be the only one *not* to make the max among the flock of models that were placed in that patch!

The good conditions during the day led to large fly-offs and the weather promised a fair comparison of model performance in the final flight. Towards the end of the day the weather cooled and became overcast; it was getting quite dark by the time the fly-off participants were assembled.

The combined FAI fly-off featured models of all three classes and they finished with F1A, FIB and FIC first, second and third. My 6 inch chord glider took first place; development started from a *Wichita* about eight years ago. I felt some slight assistance from the air as I did one circle in it before getting a good catapult launch and 2:57 score. Dave Greaves was second with 2:50 from his triple finned *Wakefield*, similar to the one he used to win the *Pierre Trebod* but with twelve strands of FAI Supplies rubber driving the Bob White prop. Roger Baggot was third flying a power model.

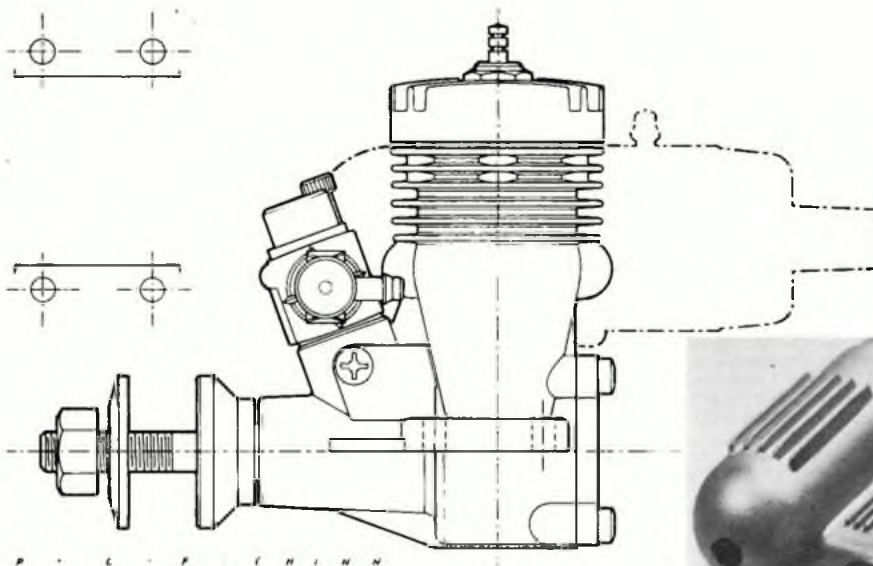
Chris Batty took Open Rubber with the model he used to win the Nationals and top the results in the *Farrow Shield*. The Open Glider fly-off featured a large "real open model" rather than the A/1's or A/2's normally flown. John Watkins had a thirteen foot open model weighing three pounds and having four times the area of an A/2. The monster made a very good 2:50, but Pete Scrivens must have had a "sniff" of something to get 2:59 from his standard *Lively Lady* for first place. Open Power was dominated by flyers from the Midlands with the winner Dave Reader flying an 800sq.in. model powered by a K&B 40. Hand launch glider had a close two man fly-off with Pete Bayram winning by eight seconds flying one of his indoor models.

The day ended with a prize giving, winners receiving nice transparent acrylic plaques and a mixture of money and goods extending to third place. This was a good contest with the normal fairly low pitch organisation of a club Gala; in all a very pleasant day.

**All-in FAI** (28 entries, 8 in fly-off - 5 x 3 mins.) - 1. M. Fantham (Richmond) M+2:57; 2. D. Greaves (B'ham) M+2:50; 3. R. Baggot (B'ham) M+2:32. **Open Rubber** (14 entries, 9 in fly-off - 3 x 3 mins.) - 1. C. Batty (Bristol & W) M.+7:34; 2. A. R. Wells (Anglia) M+5:57; 3. D. Hipperson (Croydon) M+5:39. **Open Glider** (35 entries, 15 in fly-off - 3 x 3 mins.) - 1. P. Scrivens (Cheltenham) M+2:59; 2. J. Watkins (Wolves) M+2:50; 3. M. Fantham (Richmond) M+2:44. **Open Power** (19 entries, 9 in fly-off - 3 x 3 mins.) - 1. D. Reader (Walsall M+5:30; 2. R. Monks (B'ham) M+5:25; 3. S. Screen (B'ham) M+5:11. **Hand Launched Glider** (13 entries, 2 in fly-off - best of 5 of 9 x 1 min.) - 1. P. Bayram (Richmond) M+0:55; 2. M. Cowley (Biggles) M+0:47; 3. J. Wilding (Walsall) 4:55. **Vintage Precision** (10 entries) - 1. J. Mayes (S Bristol) 1.06%; 2. G. Ferer (Leicester) 1.55%; 3. D. Brawn (Biggles) 2.12%.



Third placed in the A/2 glider class at the Euro Champs (and second at the '75 Pierre Trebod) Austria's Werner Kraus.



## ENGINE TEST

by Peter Chinn



# OS MAX 15 R/C

### SPECIFICATION

**Type:** Single cylinder, air-cooled, glowplug-ignition two-stroke with crankshaft rotary valve and bushed main bearing. Throttle type carburettor. (Also available in standard version with 2 venturi inserts and spraybar type needle valve assembly.) Silencer included.

**Bore:** 15.2mm (0.5984in.)

**Stroke:** 13.7mm (0.5394in.)

**Swept Volume:** 2.486cc - 0.1517cu.in.

**Stroke/Bore Ratio:** 0.901:1

**Measured Nominal Compression Ratio:** 9.0:1

**Checked Weights:** 116 grammes - 4.1oz (stand. eng.)

130 grammes - 4.6oz (R/C model)

37 grammes - 1.3oz (OS-702 sil.)

### GENERAL STRUCTURAL DATA

Pressure die cast aluminium alloy one-piece *crankcase/cylinder-jacket/front housing* unit with cast-in phosphor-bronze main bearing and detachable pressure die cast *rear cover* secured with four Phillips screws. Hardened and ground counterbalanced *crankshaft* with 9mm o.d. main journal, 6.6mm i.d. gas passage and 4mm o.d. tubular crankpin. Drop-in hardened steel *cylinder-liner*. Lightweight lapped Meehanite *piston* with flat crown, straight baffle radiussed at base and two skirt transfer ports to match similar ports in cylinder liner. Hardened tubular fully-floating *gudgeon-pin* with brass pads. Machined duralumin *connecting-rod*, unbushed with oil hole at lower end. Pressure die cast aluminium alloy finned *cylinder-head* with cast-in brass thread insert for glowplug and 2.5mm wide squish band. Head secured to main casting with six Phillips screws. Soft aluminium 0.4mm head *gasket*. Machined aluminium alloy *prop driver* keyed to flat on crankshaft and with hardened steel *shim washer* between crankcase nose and prop driver to prevent excessive wear when using electric starter or pusher prop. Pressure die cast aluminium alloy *carburettor body* seating on synthetic rubber seal in intake boss and secured with two Allen cap-screws. Ground steel *throttle barrel*. Plated brass *jet assembly* Nylon *throttle arm* (Standard engine supplied with 6.0mm and 6.5mm i.d. venturi inserts and spraybar type needle-valve assembly.)

### TEST CONDITIONS

**Running time prior to test:** 1 hour.

**Fuel used:** 5 percent nitromethane, 25 percent Newton R castor-oil, 70 percent methanol.

**Glowplug used:** O.S. No. 8 (platinum filament, medium reach)

**Air temperature:** 19°C (66°F)

**Barometric Pressure:** 1018mb (30.06in Hg.)

**Silencer:** OS-703 expansion chamber type. Outlet i.d. 6.0mm. Outlet area: 28sq.mm.

WITH THE CLOSE of the year 1976, the Ogawa Manufacturing Company Ltd. of Osaka, Japan, celebrated their 40th anniversary as model engine manufacturers. They have now been producing model engines for longer than any other maker. 1976 has also seen the "coming of age" of one of their most popular engines: the O.S. Max 15.

The O.S. 15 first appeared in late 1955 and it was with one of these engines, a Max-I 15, that a British free-flight modeller, Ron Draper, did much to put the O.S. name on the map, so far a Europe was concerned, by winning the World Free-Flight Championship in 1956. In 1958, the Max-I was replaced by the Max-II model and, four years later, this, in turn, was succeeded by the Max-III 15.

The last test report to appear in *AeroModeller* on one of these engines was more than ten years ago in the October 1966 issue, so to celebrate the O.S. 15's 21st birthday, it seemed fitting to run a test on the latest model, an entirely redesigned motor which was put into production just over a year ago.

As with the Max-III 15 that it replaces, the new engine (it is now simply known as the O.S. Max 15) is obtainable in two versions: standard and R/C. The standard engine comes equipped with a 6mm i.d. machined aluminium venturi insert which is retained in the intake boss, in the usual manner, by a spraybar type needle-valve assembly and gives an effective choke area of 10.5sq.mm. This is suitable for control-line stunt where maximum suction is of primary importance to ensure a steady fuel supply through sharp manoeuvres. Supplied with each standard 15 engine, however, is an extra venturi insert of 6.5mm i.d. which enlarges the effective choke area by approximately 30% to 13.7sq.mm. to release more power where maximum fuel draw is of less importance. For optimum top-end performance, the venturi inserts can be dispensed with entirely, opening up the intake to 9mm i.d. and effective area to 36sq.mm. This, of course, requires a pressurised fuel system and O.S. list a crankcase pressure nipple (OS P/N

22019008), for fitting in place of the transfer side upper backplate screw, and from which the fuel tank can be pressurised.

The R/C version of the Max 15 is equipped with an O.S. Type 21 carburettor. This is a conventional barrel-throttle unit with adjustable airbleed for setting the idling mixture. It has a 4.6mm i.d. choke and a 2.5mm dia. jet tube which projects into the choke, leaving an effective area of approximately 12sq.mm. However, after loosening a locknut, the jet assembly can be screwed in or out, if the owner so wishes, to vary the effective choke area between about 11sq.mm. (for maximum suction) and 14sq.mm (for maximum power).

The main difference between the Max-III 15 and the new Max 15 that replaces it, is that the new model has a full-length main casting with drop-in cylinder-liner, instead of the short case and integral-finned cylinder of the earlier model. This brings the 15 into line with all other current O.S. engines. Most other parts of the engine have less obvious changes. The crankshaft, for example, has the same main journal o.d. and crankpin o.d. but is increased from 6.4mm to 7.1mm dia. ahead of the main bearing for the new prop driver which is of machined aluminium instead of die cast. The lapped Meehanite cast-iron piston is practically unchanged and continues to feature skirt transfer ports although the corresponding ports in the liner are increased from 4.5mm to 5.0mm dia. The cylinder head has a new combustion chamber shape, with the addition of a 2.5mm wide squishband and the glowplug is now placed centrally in the head instead of offset to the transfer side.

Port timing is not significantly different. The rotary-valve, its long rectangular shaft port uncovering a parallel sided intake aperture, opens at 35 deg. ABDC and closes at 45 deg. ATDC. Cylinder port timing was checked at 65 deg. BBDC to 65 deg. ABDC for the exhaust and 52 deg. BBDC to 52 deg. ABDC for the transfer.

Like all O.S. engines (with the exception of the 40-SR racing engine and FS-60 four-stroke) the Max 15 and 15 R/C are supplied complete with an appropriate OS silencer - in this case the OS-702 expansion chamber type that also fits the Max 20 and 25 engines.

**Performance**

The handling qualities of the Max 15 in both standard and R/C versions were generally excellent. Starting was easy at all times with instantaneous hand-starting from cold and only slightly less rapid response with the engine hot. If over-propped (i.e. loaded for speeds below 10,000 rpm) there was a noticeable loss of power as the engine



warmed up from cold but this disappeared when the engine was allowed its head - specifically at speeds above 12,000rpm. At speeds in the 14,000-18,000rpm range, wherein the O.S. achieves its maximum power, the engine ran very steadily and with reasonably low vibration levels.

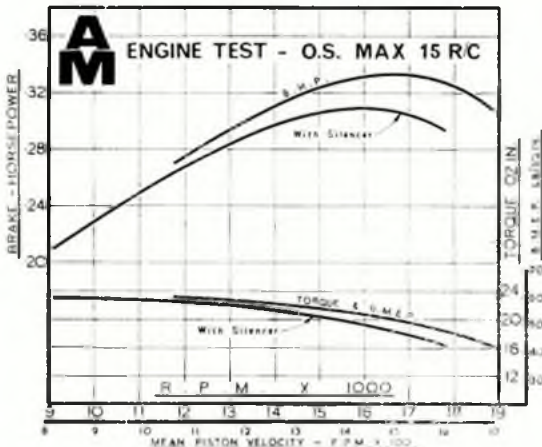
Our performance tests were carried out on the R/C version. Using the OS-702 silencer supplied, a maximum torque of 23oz in (equivalent to a brake mean effective pressure of 60lb/sq.in.) was recorded at 10,000rpm and a peak power output of just on 0.31 bhp at 16,000rpm was determined. This compares with slightly below 0.26bhp at a little under 15,000 rpm for the Max-III 15 R/C and the earlier and more restrictive OS Jetstream type silencer, as tested in 1966.

Removing the silencer raised the Max 15 R/C's output to over 0.33bhp at approximately 16,600rpm. (The earlier engine, less silencer, developed about 11% less at a peak of 16,000rpm.)

The best prop size to use if one wishes to obtain the maximum available power from the 15 R/C would appear to be an 8x4 of reasonably low torque-absorption such as a Taipan glassfibre-nylon 8x4. On one of these (less silencer) we obtained 14,900rpm. 14,600rpm were recorded on an 8x4 Power-Prop wood and 13,300 on an 8x5 Power-Prop wood. On 7 inch props, 14,300 were obtained on a 7x4 Taipan, 17,200 on a 7x4 Power-Prop and 17,500 on a 7x4 Taipan. The largest practical size - e.g. for a large slow flying lightweight model - would, we feel, be a "fast" 9x4. On a 9x4 Taipan, our engine reached 11,800rpm. Adding the silencer reduced all these figures by between 100 and 400rpm according to prop size.

As already mentioned, our performance figures relate to the R/C version. However, they are also a reasonable

*continued overleaf*



# READERS' LETTERS

Dear Sir,

I was interested to read the letter from D. V. Long in the October issue. Like him I am not sure of the relevance of the sound attenuation graph produced with his letter. Perhaps this represents a situation where sound reflection is present as the attenuation with distance appears to be less than one would expect in a free space environment.

However it is *Figure 11* that has me worried. Surely the drop in noise level with distance is roughly 6dB for each doubling of the distance away from the source? If it is indeed only 3dB then we are in trouble! Certainly my elementary theory indicates that anything that is propagated uniformly drops in intensity by a factor of *four* for each doubling of the distance. A factor of four converts conveniently into about 6dB. This will make all the difference in the world to *Figure 11*.

For line one of the table this would give distances as follows:

|         | No. of models |     |     |     |     |     |
|---------|---------------|-----|-----|-----|-----|-----|
|         | 1             | 2   | 3   | 4   | 5   | 6   |
| 60dB(A) | 290           | 410 | 502 | 580 | 648 | 710 |

Perhaps someone else would like to have a go at this important subject?  
*Winterbourne, Bristol D. C. L. Francis*

Dear Sir,

I had reservations about the basic data used in my letter (published Oct 1976), I said so at the time. Now Mr. Francis has put his finger on the problem (6dB sound reduction per doubling of distance, not 3dB as shown in *Figure 1* as published). I have done a lot more reading on the subject.

First of all, as I said, the graph was produced to predict traffic noise, which is considered as a linear source and is attenuated at the rate of 3dB per doubling of distance. We are dealing with a point source but I have been unable to determine, whether we are concerned with spherical or hemispherical sound propagation. Maybe it's something in between. I also had my doubts concerning the degree of extra sound attenuation to be expected over soft ground.

Last weekend I borrowed the firm's noise meter and did some measurements. Horror of horrors! I discovered that the background noise level at my site was only 40 dB (A), not the 50dB(A) I had expected

to find from my reading of B.S. 4142. Since this BS considered that an increase of 10dB could lead to complaints, I am now faced with a maximum noise level of 50dB(A), compared with my assumed 60dB (A).

Anyway, I started up my Enya .15 and took readings all round it at a distance of 7 metres, and found to my joy that even at peak revolutions it produced a maximum noise level of 68.5dB(A). (Note: it has a modified silencer on it). I then took several noise measurements further away with the following results:

| Distance (Metres)   | 7    | 14 | 21 | 28 | 60 |
|---------------------|------|----|----|----|----|
| Noise level (dB(A)) | 68.5 | 63 | 59 | 56 | 50 |

Fortunately I've got an R/C model, so I chucked it into the air and flew it around glancing at the noise meter now and again. Most of the time the meter indicated 50dB(A) or less, but it did go up to about 55dB(A) when my plane passed overhead, about 30 metres up, at full throttle. As a result I conclude that the attenuation rate at ground level is not much greater than when the noise source is elevated (this is probably due to the low frequency of the source, which peaked at about 250Hz).

The formula for calculating noise attenuation due to hemispherical propagation of sound is:-

$$SPL = SWL - 20\text{Log}R - 8$$

SPL - is the Sound Pressure Level, which we are interested in.

SWL - is the strength of the source (Sound Power Level).

R - is the distance from the source to the observer.

Applying this formula to my reading above, I found that it fitted, i.e. I calculated the SWL from my first reading and found that it fitted or predicted the rest.

$$\begin{aligned} \text{viz: from } SWL &= SPL + 20\text{Log} R + 8 \\ SWL &= 68.5 + 20\text{Log} 7 + 8 \\ &= 93.4 \text{ i.e. the sound power level of my motor.} \end{aligned}$$

$$\begin{aligned} \text{then from } SPL &= SWL - 20\text{Log} R - 8 \\ SPL &= 93.4 - 20\text{Log} 60 - 8 \\ &= 49.8 \text{ dB(A)} \end{aligned}$$

I measured it as 50dB(A).

What conclusion can we draw from all this? Well the proposed DoE Code calls for 80dB(A) at 7 metres, that's an SWL (Sound Power Level) of 104.9 dB(A) and using the above formula we get 50dB(A) at 221 metres distance ( $50 = 104.9 - 20\text{Log} 221 - 8$ ).

Similarly 5 models have an SWL of 111.9 dB(A) and produce 50dB(A) at a distance of 495 metres ( $50 = 111.9 - 20\text{Log} 495 - 8$ ).

You may ask, why choose 50dB(A)? Well it is a figure that I believe is necessary at my particular site, being normally around 40dB(A) background level. I can't help wondering how realistic the rest of BS4142 really is, it's quite possible too optimistic these days because people are less and less tolerant of all forms of pollution. If, then, we take another stab at my *Figure 11* (see October 1976), using the above formula and knocking 10 dB(A) off the tolerable noise limit we get the accompanying table.

I have found no evidence to indicate that R/C flying is noisier than C/L. In fact the formula to predict noise levels from high sources (which might be expected to conform more to spherical propagation) is as follows:

$$SPL = SWL - 20\text{Log} R - 5$$

The only difference between this and the formula I've been using is in the last digit and it produces a noise level 3dB *lower* than the other formula. Thus I see no need to set different levels for the two types.

Finally the DoE separation figure of 300m, according to my table, implies 5 models in the air producing a fraction under 55dB(A) at the nearest habitation. That does not seem too bad and may well be typical of many flying sites in the U.K. But again I must add that many sites could be located near industrial sites where the degree of separation of models could be less.

I am sorry about the errors in my last letter, I completely missed the point about traffic being a linear source.

*Rochester, Kent D. V. Long*

| Site Type                                | Max. Noise dB(A) | Distance (metres) per No. of models |     |     |     |     |
|--|------------------|-------------------------------------|-----|-----|-----|-----|
|  |                  | 1                                   | 2   | 3   | 4   | 5   |
| 1. Rural                                 | 50               | 221                                 | 312 | 389 | 447 | 495 |
| 2. Suburban (little road traffic)        | 55               | 124                                 | 176 | 219 | 251 | 279 |
| 3. Urban (residential)                   | 60               | 70                                  | 99  | 123 | 141 | 157 |
| 4. Urban (light industry and main roads) | 65               | 40                                  | 56  | 69  | 79  | 88  |
| 5. General industrial and urban          | 70               | 22                                  | 31  | 39  | 45  | 50  |
| 6. Mainly industrial                     | 75               | 12                                  | 18  | 22  | 25  | 28  |

## ENGINE TEST *continued from page 45*

indication of the performance one may expect from the standard engine, as the only differences between the R/C and standard motors likely to affect power output are their effective choke areas. The R/C engine, as already noted, had an effective choke area of approximately 12sq. mm. The standard engine has an effective choke area of 10.5sq. mm when fitted with the 6mm venturi and about 13.7sq. mm when fitted with the 6.5mm venturi. In these circumstances, it would be reasonable to expect the standard engine, less silencer, to develop (on 5% nitro fuel) between 0.32bhp and 0.34bhp at 16,000-17,000rpm, depending on the venturi size used. The performance obtainable with the

venturi removed entirely is less predictable, but it is worth mentioning that our earlier engine was tested in this condition and when running on 50 percent nitromethane fuel, delivered 0.425bhp at 18,500rpm. O.S. claim a maximum of 0.48bhp for the present model which, in the circumstances, sounds quite reasonable.

Reverting to the 15 R/C, response to throttle movement was found to be very good indeed, with reliable idling at around 2,600rpm on an 8x4 and good transition between idle and full speed and back again.

**Power/Weight Ratio** (as tested): 0.84bhp/lb (with silencer)  
1.16bhp/lb (less silencer)

**Specific Output** (as tested): 1.24bhp/lb (with silencer)  
1.34bhp/lb (less silencer).

# CLUB NEWS

WHEN MAKING generalisations we often do not look much beyond the end of our noses, and if I were to venture the opinion that last year's long, hot summer had a shrivelling effect on model flying generally, I might be accused of taking too limited a view. Yet it does seem to me that the unending succession of blistering, cloudless days produced a peculiar sort of lethargy from which we have not quite stirred ourselves.

Some evidence to support my view comes in our first report, sent in by Mr. M. Dance, PRO, of the Reading & DMAC. He tells us, somewhat dejectedly, that the major problem in the club is the serious lack of flying activity. This was most marked during the past glorious summer when, paradoxically, each weekend provided near perfect flying conditions. Considering the club has a membership in the region of 150 the flying field should be under considerable pressure rather than otherwise. However, a brighter note for the club is struck when looking at the displays put on throughout the year. These have been most successful. One was a brewery fete, the brand that tells us what our right arm is for, and another for the Berkshire Fire Brigade (Happy Hose Down!) This had a superb country house setting, an enormous flying area, a first class P.A. system and good crowd control. A bonus came in a full scale rescue operation for a 'treed' model, making a change from the usual pussy.

Mr. M. L. Wood sends us another list of successes gained by the evergreen Croydon & DMAC, over the past year. The season opened with a third place for Ian Kaynes in Wakefield at the Easter two day meeting. This was followed by placings by Martin Dilly and Dave Hipperson in the first Area meeting, Dave getting first in Open Rubber and Ken Smith taking the Open Glider event. New club talent, young Richard Cedar, gained his first win in Open Glider at the East Anglian Area, and he was third in Glider at the Southern Gala. Old stagers, well at home in picking up trophies, Ray Elliott and Dave Hipperson, to name but two, cleaned up the Wakefield event at the Nationals, and generally made their presence felt at all the F/F meetings. On the indoor front, John Blount (as seen on T.V.!) took first in microfilm at the Indoor Nats., and a meritorious fourth place at the World Champs at Cardington.

Back in the days when people turned out for the model flying very much as they did for grouse shooting we used to have our 'season', opening with the famous 'Damage' cup, but in these less formal times we tend to fly all the year round, and it is an All Winter programme that the Nottingham MAC, is looking forward to. Even so, the cosy indoor pursuits have not been overlooked, and to this end the use of the Youth Club gymnasium has been obtained for a Peanut Scale Competition. Other winter diversions will be film and slide shows. Back to draughty outside world, the club has recently held an Open Glider Competition. Winner was Ken Oliver, but a special honour went to Mike Chapman for taking fourth place with a chuck glider. He went on to win the Chuck Glider event later. Jim Dobson, who sent us this report, tells us that the club is at present running a recruiting campaign, which spreads its appeal to all branches of the hobby. Secretary of the club is Reg Lowe, 49 Commons Close, Newthorpe.

Phone Langley Mill 66786. Meeting place is Russell Youth Club, Lowdham St., Nottingham. Tuesday 8 pm.

From Tony Rogers comes a report from the Western Area. An exultant note struck here for the best ever Nationals for the Area, that of 1976, with three free flight wins. F/F aficionados will know that the top dramatic spot of any meeting is the Open Rubber fly off, when the competing models are fully extended. And conditions at the Nats was ideal for this, enabling Chris Batty of Bath to notch up a winning time of 8 mins. 7 secs. In another fly off, for A/1 gliders, Rex Woodruffe of Swindon came out top with 2 mins. 21 secs. To round off the trio of firsts, John Down of South Bristol won Vintage with his *Hell's Angel* power model. A near win was Elton Drew's effort in Open Glider. He lost it by only 8 seconds after scoring a full house. But Open Glider success for the Area came at Odiham's Southern Gala, where Dave Bailey put up a few red rims round the timekeeper's eyes with a fly off time of 11 mins. 17 secs. with his own design A/2. And so to Radio. Club 20 events in the area have been a great success, with Jan Korda of the *Swindon Model Centre* once again presenting many prizes.

That Summer languor which kept many of our flying fields so quiet was not, apparently, in evidence on the sites of the *Buckaneers Model Club*. The latest newsletter records that autumnal winds and rain have marked the end of a glorious summer of blue skies and light winds. Highly flyable, but not without problems. The heat caused plenty of radio interference, some coming from as far away as Italy (menace from Venice?), and radios fried in the hothouse fuselages. Peaceful and home loving in spite of their spikey name, the *Buckaneers* boast few contest minded people. Outstanding though, even at International level is Jim Mannall of the magic handle. He flew at the C/L World Champs at Utrecht, but his stunt model met troubles with a loosened bellcrank and an overheating engine. Things were in better shape at the Nats, however, where he came second in the Gold Stunt Trophy. He was second again at the Bochum International, and also qualified at the Team Trials for the 1977 European C/L Champs. Competitive, too, the Messerschmitt *Komet* tailless fighter of Colin Moss. He gallantly entered this flying 'bomb' in the R/C scale event at the Nats., and placed 13th in Class II. I wonder if this model features in the many Radio displays the club stages so spectacularly? There are ten pilots on the 'scramble' list, some of whom are very adept bombers, whether dropping toffees to the kids or blowing up miniature forts. Still in competitive mood, Pete Smoothy and Mike Parrott went up to Harpole, Northants. for the *Peacock Models Fly In*, and entered the Spot Landing and Limbo events. Pete won the latter event with nine passes.

There are some cheeky chappies down in Caterham, Surrey. I refer to the members of the *Caterham MFC*, who sent an offer to the Palace to put on a model flying display for the Queen and her family. No doubt it was thought this would give Phillip, I mean fillip, to the movement, but sadly a letter came back from Balmoral Castle declining the offer. Still, this gives some idea of the verve and audacity that underlines the bounding success of this club with its rather sinister Concorde like insignia. Since March club membership has increased from 45 to 65 mainly due to the publicity of club displays, according to Mr. A. V. Jarvis, the club P.R.O., who sends us this report. The displays which appear to be mainly R/C, are meticulously organised under Show manager, Deryck Carter, and have all those novel attractions that so tickle the crowds, like glider towing, parachute dropping (of sweets) and helicopter flying. The public even get treated to an occasional crash. Dave Plumb chipped his *Chipmunk* rather badly and is doing a spell in the Tower as punishment. When not flying at displays the members are to be found, or rather not to be found, on their highly secret flying field

where C/L and radio models abound, but, going through the newsletters Mr. Jarvis kindly sent along I can find no reference to free flight, other than chuck glider. We hope to hear from this club again in the future, but just now there is just not the space to cover the wealth of information we have been given.

From *Bourne Flyer*, the newsletter of the *Sittingbourne & DMAC*, we learn that members are keeping in trim with the new club lawnmower, even though it's motor powered. This smooths out landings generally, and particularly those in the Club Spot Landing Contests. In the latest one Keith Luckhurst bent the rules slightly, but not his model, by using a drag chute. It opened out a bit prematurely on his second flight, but he nevertheless won the event. There were 12 entries. Not all radio contesting, though, at *SADMAC*. There is news of a C/L mini-Goodyear event, a free flight scramble and a *Senator* contest. Dave Monk won the latter in true contest style.

I'm sure they don't mean it, but the newsheet of the *Control Line Aerobatic Pilots Association* is called *Claptrap*. Perhaps it is just a publicity stunt! What is becoming all important in the highly developed sphere of Stunt Flying is the quality of the judging. Reg Lowe writes a short piece on this, taking as his gospel the *Mannall Manual*, that is, a series of articles which appeared in this journal, about three years ago. It seems to me that the stunt judge has a task about as thankless as that of a football referee, and needs a quick and swifely eye into the bargain. Anyway, a good newsletter this, for the C/L aerobatics enthusiast.

If, however, you wish to become a stunt flyer on the cheap then the *September Leicester MAC*, newsletter is for you, for it features a plan and details of an Aerobatic kite. From one form of flap to another, John Birch recounts his painful initiation into the intricate art of indoor flying. Seems that EZB ain't so easy, and the beginner would be

## Contest Calendar . . . .

|               |  |
|---------------|--|
| December 19th | <b>WHITEFIELD/ROCHDALE INDOOR MEET.</b> EZB. Keyhole Scale, HLG, CO <sub>2</sub> . Venue Balderstone Snr. School, Rochdale, Lancs. 22ft. ceiling. 10am start.  |
| January 9th   | <b>N.E. AREA (SMAE) INDOOR MEET.</b> EZB, HLG. Scale, (N.E. Area Class II rules), Novice/Duration. Hall size 226 x 122 x 35ft. Venue - Sporting Club of Washington (by arrangement with Sunderland Assoc. Football Club). For further information contact Jeff Anderson, 16 Chevely Walk, Belmont, Durham, DH1 2AU. Tel. Durham 68493.   |
| January 16th  | <b>NORTHERN AREA (SMAE) WINTER RALLY.</b> F/F: Open R/G/P. Combined mini (K-factor), Vintage duration and HLG. C/L: FAI team race, Goodyear, Combat and Junior/Novice stunt. R/C: Novelty events. 9am to 3.30pm at RAF Church Fenton, Yorks. SMAE members only.  |
| February 13th | <b>N.E. AREA (SMAE) INDOOR MEET.</b> Details as per January 9th meeting.   |
| February 20th | <b>SMAE CENTRALISED MINI EVENT.</b> A/1. C d'H. ¼A. HLG. <i>Provisional-venue to be announced.</i>   |
| March 6th     | <b>N.E. AREA (SMAE) INDOOR MEET.</b> Details as per January 9th meeting.   |
| March 6th     | <b>S.E. AREA (SMAE) INDOOR MEET.</b> Peanut scale, EZB, HLG, CO <sub>2</sub> Scale. Venue - Crawley Sports Centre, Haslett Avenue, Crawley, W. Sussex. Hall dimension 120 x 105 x 30ft high. Pre-entry (SMAE members only) Seniors 60p, Juniors 30p, Associates 90p, Spectators 20p. Details/entry forms: D. Cash, 22 Crossways Avenue, East Grinstead, Sussex RH19 15F. Tel. E. Grinstead 23242 or A. Boyle on Horley 3664. Soft shoes only to be worn in hall. |

## YOUR CLUB?

IN THIS, and following issues, we will be publishing the addresses of model club secretaries for which we have records. Within the past twelve months all the clubs detailed have been written to and the details checked or amended. Clubs which did not reply have been deleted from our records, but newly formed clubs have been noted as the information was made available.

If your club is not listed - or if the secretary has changed recently - then please let us know and enable an accurate listing to be achieved. Amendments will be printed at the soonest opportunity.

### AVON

#### Bath Model Aircraft Club

A. M. Rudkin, 12 Kelston Road, Bath BA1 3QN, Avon.

#### Bristol & West MAC

R. J. Cummins, 14 Beachleaze, Alveston, Bristol BS12 2NE

#### South Bristol Model Aero Club

J. B. Mayes, 17 Northville Road, Northville, Bristol BS7 0RQ

#### Beaufort MFC

G. F. Redman, 31 Westcourt Drive, Oldland Common, Nr. Bristol BS15 6RU.

### BEDFORDSHIRE

#### Luton & District MAS

P. Rabiohn, 47 Hillyfields, Dunstable, Beds. LU6 3NG.

#### Ivel MAC

M. E. Harrison, Orchard End, Little Straughton Road, Colmworth, Beds. MK44 2LE

#### Royston MAC

R. Bowyer-Lowe, 10 Spring Close, Biggleswade, Beds.

### BERKSHIRE

#### Bracknell & District MAC

W. H. Longley, 21 Ambassador, Great Hollands, Bracknell, Berks.

#### Newbury & District MAS

John Savage, 111 Turnpike Road, Newbury, Berks.

#### Reading & District MAC

R. M. Tiller, 49 Albert Road, Caversham, Reading, Berks.

#### Spry Model Aero Club

B. Chilcott, Little Ringdale, Bracknell, Berks.

#### Stacey MAC

G. V. Harfield, 1 Larch Drive, Kingsclere, Newbury, Berks.

#### Windsor RMS

H. Jackson, 8 Parsonage Lane, Windsor, Berks. SL4 5EN.

better advised to try Pennyplane. These will do about two minutes and are ideal for the knockabout of small halls. Featured in the club's Gala Day's Open Glider is M. Scott's *Dad's Army*. He calls it this because it has a way of dropping to pieces at the most inopportune moments. At the C/L Rat Race, held later in September, all four entrants used muffled engines.

News from the *Watford Wayfarers* is that they have, at last found a new flying field. It is a piece of farmland only 50 yards square, but, however cramped, is better than nothing. I must say, though, that the rent, at £20 per month does appear to be a little on the high side.


A new club to the scene is the *Loughborough Model Flying Club*. This information comes in a report from the Comp Sec and PRO, Mr. J. Cooper. Membership is rapidly growing, and has already hit the 50 mark, with about 25% Junior content. Main interest is C/L, but all other types of model get a look in. Club site, outside Loughborough is of ample size for C/L and radio but a bit cramped for free flight. Several members are active contest flyers, and it is hoped others will follow suit. At least their experience will be invaluable to the Juniors. Winter activities, now well under way, include a building competition and Sunday flying session throughout the year.

A successful year is how D. Pears, Secretary of the *Melton & DMAC*, describes 1976. There have been enjoyable and profitable trips to Hendon Museum and Old Warden, and Wednesday evening comps went on throughout the summer. Two exhibitions were held in October, static and rtp flying, and the funds they produced were a welcome contribution to the purchase of heating appliances for the new club room. Membership is large - over 70. Melton, by the way, signifies Melton Mowbray, in Leicestershire.

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## SUPERSTAR I

Continued from page 39

brother, yet for the average flyer will be more than competitive – and a little better all round bet. Incidentally, a further advantage of foam-care wings for a kit model (apart from warp free wings, rapid construction etc.) is that the total weight is much more constant. With so little wood involved, the manufacturer cannot supply a 'heavy' model, and the less-than-expert modeller has little opportunity to add excess weight himself! The greatest single factor affecting the total weight is the type of covering employed – the review model built as described weighed 16 oz. – not bad at all for such a large model.

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Incidentally, those who prefer to 'do it all themselves' and want an all-out competition ship, may be more interested in the *Superstar II* already described. Kits are not available, but plans are (at a cost of £1.25) and that includes full information on foam cutting techniques.

*Superstar* kits and plans are available from most good model shops. If your local shop does not stock them, then write direct to Outlaw Model Products, The Laurels, 3 Rack End, Standlake, Oxon.

Engine used was a standard Super Tigre G15 FI, and which proved remarkably easy to handle for a high performance engine – though needle setting with the pacifier system was very touchy. Best results were achieved by opening the needle a fraction just before launch. Tornado 7 x 4in nylon prop used.



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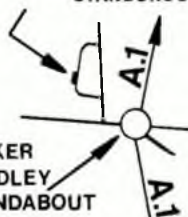
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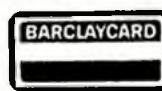
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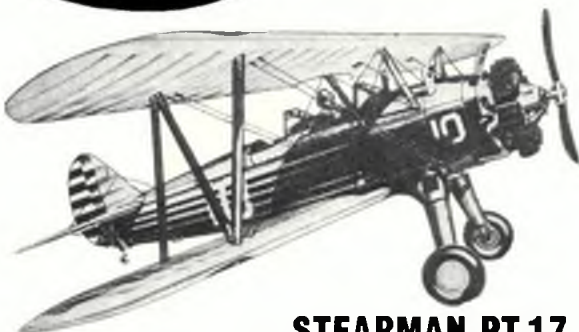


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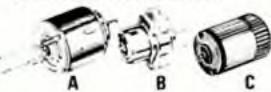
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8 Greystone Grange Crescent  
SHEFFIELD S11 7JL

KINDLY MENTION 'AEROMODELLER' WHEN REPLYING TO ADVERTISEMENTS

# SHOP GUIDE

## READERS PLEASE NOTE:

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Welcome

## DEALERS —

get your shop on the MAP guide for only £3 a month — telephone Hemel Hempstead 55499 NOW

## MODELLERS —

buy with confidence from these well-stocked shops

### AUSTRALIA

**MELBOURNE 3000** Tel. 347 8029  
RIVERSIDE HOBBY CENTRE ★  
16 LITTLE LATROBE STREET  
9am-5.30pm Mon-Fri. 9am-12 noon Sat

**LUTON** Tel. 28435  
MAPLE MODELS ★  
16 MAPLE ROAD  
9.30am-6.30pm. Lunch 1.30pm-2.30pm  
Closed Tues

### AVON

**BRISTOL 5** Tel. 557764  
AVONAIRE MODELS ★  
351 CHURCH ROAD, ST GEORGE  
9am-6pm Mon-Thurs. Late night Fri 7pm.  
Half day Wed

### BERKSHIRE

**NEWBURY** Tel: (0635) 46004  
TRENTS MODELS ★  
25-26 CHEAP STREET  
9am-5.30pm Mon-Sat

**BRISTOL** Tel. 662544  
BEV'S MODELS  
35 WEST STREET, BEDMINSTER  
10am-6pm. Late night Fri 7pm

**READING** Tel. 51558  
READING MODELS ★  
5 CHATHAM STREET  
9am-5.30pm each weekday

**BRISTOL 1** Tel. 23714  
MODELLERS DEN  
65 FAIRFAX STREET  
Open 9am-5.30pm Mon-Sat

**READING** Tel. 50074  
G. SLEEP LTD. ★  
22-24 KING'S ROAD  
Open 9am-5.30pm. 9am-4.30pm Wed

### BEDFORDSHIRE

**LUTON** Tel. 23182  
AEROMODELS (LUTON) LTD.  
20 GORDON STREET  
Open 9am-5.30pm. Closed Wed

**READING** Tel. (0734) 586899  
TRENTS MODELS ★  
51 BUTTS CENTRE  
9am-5.30pm Mon-Sat

**LUTON** Tel. 36218  
TAYLOR & McKENNA  
73 ARNDALE  
Open: 9am-5.30pm Mon to Thurs. 9am-6pm  
Fri and Sat

### BUCKINGHAMSHIRE

**AYLESBURY** Tel. 85752  
TAYLOR & McKENNA LTD  
46 FRIARS SQUARE  
Mon-Thurs 9am-5.30pm. Fri-Sat 9am-6pm

**BLETCHLEY** Tel. MILTON KEYNES 70478  
TAYLOR & McKENNA LTD  
16 THE CONCOURSE, BRUNEL CENTRE  
Mon-Thurs 9am-5.30pm. Fri-Sat 9am-6pm

**WOLVERTON** Tel. M.K. 312553  
WOLVERTON MODELS & HOBBIES ★  
26 CHURCH STREET, WOLVERTON,  
MILTON KEYNES  
Open: Mon-Sat 9.00am-6.00pm. Half day Wed

### CAMBRIDGESHIRE

**CAMBRIDGE** Tel. 59620  
MODEL MANIA ★  
17 KING STREET  
9am-5.30pm Tues-Sat. Closed Mondays

### CHANNEL ISLANDS

**JERSEY** Tel. Central 21993  
THE HOBBY CENTRE ★  
8 COLOMBERIE PARADE, ST HELIER  
Open 9am-6pm  
Closed half-day Thursday

### CHESHIRE

**ALTRINCHAM** Tel. 061-904 9949  
HOBBYWORLD ★  
323 HALE ROAD, HALE BARNES  
Open Mon-Sat 9.30am-6pm. Late night Thurs  
8pm

**STOCKPORT** Tel. 061-480 5478  
THE MODEL SHOP  
280 WELLINGTON ROAD SOUTH  
Open Mon-Sat 9am-5.30pm. Closed Tuesdays

### CLEVELAND

**MIDDLESBROUGH** Tel. 47889  
THE MODEL CENTRE ★  
17 CLEVELAND SQ., CLEVELAND CENTRE  
9.30am-5.30pm Mon-Sat  
Early closing Wed 1.30pm

**MIDDLESBROUGH** Tel. 211212  
MODEL DROME ★  
265 LINTHORPE ROAD  
9.30am-6pm. Closed Wed

### DEVON

**EXETER** Tel. 0392 58417  
EXETER MODEL CENTRE ★  
98 SOUTH STREET  
Open Monday-Saturday 9-5.30

**PLYMOUTH** Tel. 0752 21851  
PLYMOUTH MODEL CENTRE  
11 OLD TOWN STREET  
9am-5.30pm Mon-Sat

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**PLYMOUTH** Tel. (0752) 53330  
RUNWAY SOUTHWEST  
16 DEVONPORT ROAD,  
STOKE, PLYMOUTH  
Mon-Sat 9am-6pm. (Late night Friday 8pm)

**FAREHAM** Tel. 4136  
G. M. H. BUNCE & CO LTD ★  
206 WEST STREET  
Open 9am-5.30pm. Closed Wed

**ST ALBANS** Tel. 53954  
S A M S  
12 HATFIELD ROAD  
9.30am-6pm Tues to Sat. Closed all day Mon

**TORBAY** Tel. 0803 521767  
MANSEL'S MODELS ★  
PALACE AVENUE, PAIGNTON  
Open 9.15am-5.30pm Mon-Sat inclusive  
Half day Wed

**PORTSMOUTH** Tel. 25049  
RAY BROWN MODELS ★  
10 KINGSTON ROAD  
Mon 9am-6pm, Tues 10am-5.30pm,  
Thurs 10am-6pm, Fri 9am-6pm  
Sat 9am-5.30pm. Lunch 1.30pm-2.30pm

## HONG KONG

**HONG KONG** Tel. 3-680507  
RADAR CO LTD ★  
3 OBSERVATORY ROAD, TSIMSHATSUI  
KOWLOON  
Open 10am-7pm. Closed Sundays

**TORQUAY** Tel. 27764  
TORBAY MODEL SUPPLIES LTD ★  
59 VICTORIA ROAD, ELLACOMBE  
Open 9.15am-12.45pm and 2.15pm-5.45pm  
Half day Wed

**SOUTHAMPTON** Tel. 7849  
EASTLEIGH MODEL CENTRE  
2e HIGH STREET, EASTLEIGH  
Open 9am-6pm. Half day Wed

**KOWLOON** Tel. 3-800155  
SCIENTIFIC HOBBIES LTD  
185-D PRINCE EDWARD RD, MONGKOK  
10am-8pm. Sunday 2pm-8pm

## DORSET

**BOURNEMOUTH** Tel. 763480  
WESTBOURNE MODEL CENTRE  
59 SEAMOOR ROAD, WESTBOURNE  
9am-5.30pm Mon, Tues, Thurs, Sat.  
9am-7.30pm Fri. Closed Wed

**SOUTHAMPTON** Tel. 25919  
HOBBY LOBBY LTD ★  
52 COMMERCIAL ROAD  
Open 9.30am-5.30pm Mon-Fri  
Sat 9.30am-5pm

**HONG KONG** Tel. 3-684184  
WINNING MODEL & HOBBY SUPPLIES  
2a AUSTIN AVENUE  
KOWLOON, HONG KONG  
Open 10am-7pm. Closed Sun

**BOURNEMOUTH** Tel. Northbourne 4170  
J. & H. MODELS ★  
1288 WIMBORNE ROAD, NORTHBOURNE  
Mon-Thurs 9am-5.30pm, Fri 9am-6.30pm  
Sat 9am-6pm. Half day Weds

**SOUTHAMPTON** Tel. 29223  
SOLENT MODELS LTD ★  
60 OXFORD STREET SOI IDL  
Open Mon-Sat 9.30am-6pm  
Fri 9.30am-7.30pm

## KENT

**BROMLEY** Tel. 01-460 0818  
AVICRAFT LTD ★  
6 CHATTERTON ROAD  
10am-6pm (not closed for lunch) except  
Wed 10am-1pm

**POOLE** Tel. 3300  
SETCHFIELDS ★  
21-25 HIGH STREET  
Open 9am-5.30pm. 6 days

**HEREFORD** Tel. (0432) 4152  
FRED PERKINS LTD ★  
48c COMMERCIAL ROAD  
Open 9am-5.30pm. Half day Thurs

**CANTERBURY** Tel. 69888  
THE MODEL SHOP ★  
83 NORTHGATE CT1 1BA  
Open 9am-5.30pm inc. Sat  
Closed all day Thursday

## ESSEX

**ILFORD** Tel. 01-590 2390  
NEWBURY PARK MODELS ★  
958 EASTERN AVENUE, NEWBURY PARK  
Open 9am-6pm. Half day Thursday

## HERTFORDSHIRE

**HATFIELD** Tel. 63404  
DESIGN AND HOBBIES ★  
5 MANOR PARADE  
Open 9.30am-6.30pm (Thurs 7.30pm)  
Half day Wed

**MAIDSTONE** Tel. 51719  
THE MODEL SHOP ★  
19-23 UPPER STONE STREET  
Open 9.30am-1pm, 2.30pm-5.30pm  
Closed all day Wed

**WICKFORD** Tel. (037 44) 2621  
WICKFORD MODEL EXCHANGE ★  
ST PETERS TERRACE, LONDON ROAD  
Open 9am-7pm Mon, Thurs, Fri, Sat.  
10am-1pm Sun

**HEMEL HEMPSTEAD** Tel. 53691  
TAYLOR & MCKENNA LTD  
203 MARLOWES  
Mon-Thurs 9am-5.30pm, Fri-Sat 9am-6pm

**NEW ASH GREEN** Tel. 0474 872136  
THE HOBBY HOUSE  
10 UPPER STREET NORTH  
Open 9am-5.30pm. Closed Mon

**WOODFORD BRIDGE** Tel. 01-504 3602  
ARNOLD'S GIFT SHOP ★  
656 CHIGWELL ROAD  
Open 9am-6pm Mon-Sat. Closed Wed

**HITCHIN** Tel. 56132  
REDHILL MODEL SUPPLIES  
21a HERMITAGE ROAD  
10am-6pm. Thurs open till 7.30pm. Closed all  
day Wed

**SWANLEY** Tel. 67457  
SWANLEY MODEL CENTRE ★  
(Formerly H & J Electronics)  
39 HIGH STREET  
Open 9.30am-6pm. Half day Wed

## HAMPSHIRE

**ANDOVER** Tel. 61307  
RADIO CONTROL SUPPLIES ★  
1a UNION STREET  
Open 9am-6pm. Fri 9am-8pm

**POTTERS BAR** Tel. 59355  
HENRY J. NICHOLLS & SON LTD  
8 SOUTHGATE ROAD  
9.30am-6pm. Closed all day Thurs.  
Fri 9.30am-8pm

**TUNBRIDGE WELLS** Tel. 36689  
E. M. MODELS  
42 CAMDEN ROAD  
Mon-Sat 9am-5.30pm. Closed Wed

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**LANCASHIRE**

**BLACKPOOL** Tel. 24901  
D.G. MODELS  
109 CENTRAL DRIVE  
Open 9am-6pm weekdays  
10.30am-4.30pm Sun

**BOLTON** Tel. 41808  
BOLTON MODEL SUPPLIES  
503 CHORLEY OLD ROAD  
10am-7.30pm Mon-Sat inc.

**BURNLEY** Tel. 23983  
A.D. MODEL SUPPLIES ★  
22 PLUMBE STREET  
10am-6pm Mon-Fri. Sat 9am-5.30pm

**BURY** Tel 061-764 5787  
A.L.J. ELECTRONICS ★  
(NORMAN McFARLAND)  
52/54 BOND STREET  
10am-6pm. Thursdays till 8pm Closed Tues

**FARNWORTH**  
JOYCRAFT  
3 BOLTON ROAD, MOSES GATE

**LEIGH** Tel. 77152  
LEIGH MODEL CENTRE ★  
4 QUEEN STREET  
Mon-Sat 9am-6pm. Wednesday 9am-1pm

**LIVERPOOL** Tel. 051-709 8039  
STAN CATCHPOLES MODEL WORLD ★  
85 BOLD STREET  
9.30am-5.30pm. Six days

**MANCHESTER** Tel. 061-794 4084  
LISTERS MODEL SUPPLIES  
285 EAST LANCASHIRE ROAD, SWINTON  
Closed all day Wed. Open Sun 10.30am-1pm

**WIGAN** Tel. 45683  
G. FORSHAW & SON  
58 MARKET STREET  
Open 9.15am-5.45pm. Early Closing Wed

**LEICESTERSHIRE**

**HINCKLEY** Tel 130952  
PUNCTILIO MODEL SPOT ★  
6 WATERLOO ROAD  
Open: Mon 9.15am-7pm. Tues 2pm-7pm.  
Wed & Thurs 5.30pm-7pm. Fri 9.15am-7pm.  
Sat 9.15am-5pm

**LEICESTER** Tel. 21935  
RADIO CONTROL SUPPLIES ★  
52a LONDON ROAD  
Open 9am-6pm. Fri 9am-8pm

**LINCOLNSHIRE**

**LINCOLN** Tel. 25907  
MODEL CENTRE ★  
24 NEWLAND  
10am-5.30pm Closed all day Wed

**STAMFORD** Tel. 4524  
SPORTS & HOBBIES ★  
4 ALL SAINTS STREET  
Open 9am-5.30pm. Half day Thurs

**LONDON NORTH**

**CAMDEN TOWN** Tel. 01-485 1818  
AERONAUTICAL MODELS ★  
39 PARKWAY, NW1  
9.15am-5.30pm Tues-Fri. 9.15am-5pm Sat.  
Closed all day Mon

**LONDON** Tel. 01-607 4272  
HENRY J. NICHOLLS & SON LTD ★  
308 HOLLOWAY ROAD, N7  
Monday to Friday 9am-6pm  
Saturday 9am-5.30pm

**NORTH FINCHLEY** Tel. 01-445 6531  
MICHAEL'S MODELS ★  
646-648 HIGH ROAD, N12  
Open 9am-6pm. Closed all day Mon

**LONDON SOUTH**

**ELTHAM** Tel. 01-850 4324  
ELTHAM MODELS ★  
54 WELL HALL ROAD SE9  
Mon-Sat 10am-5.30pm. Closed Thurs

**FULHAM** Tel. 01-385 9864  
PATRICK MODELS ★  
107-111 LILLE ROAD, SW6  
Mon, Sat 9am-5.30pm. Thurs 9am-1pm

**LEWISHAM** Tel. 01-852 2637  
LEWISHAM MODEL CENTRE ★  
45 LEE HIGH ROAD, SE13  
Mon-Sat Closed 6pm. Thurs Closed 1pm

**LONDON** Tel. 01-228 6319  
E. F. RUSS ★  
101 BATTERSEA RISE, SW11  
Open Fri till 7pm. Other days 9am-6pm. Early  
closing Wed 1pm

**LONDON EAST**

**LONDON** Tel. 01-520 7397  
ARNOLD'S GIFT SHOP  
132-134 HOE STREET, E17  
Open 9am-6pm Mon-Sat. Closed Wed

**PLAISTOW** Tel. 01-472 2471  
A. G. HERMITE ★  
633 BARKING ROAD, E13  
Open 9am-6pm. Closed all day Thurs

**MIDDLESEX**

**EASTCOTE** Tel. 01-866 7631  
LANCASTER MODEL CRAFT ★  
217 FIELD END ROAD  
Mon-Thurs 9am-6pm. Fri 9am-8pm  
Closed Wednesday

**HARLINGTON** Tel. 01-897 2326  
RADIO CONTROL MODEL CENTRE ★  
214 HIGH STREET  
Mon, Tues, Thurs, Sat, 9am-6.30pm  
Fri 9am-8.30pm. Wed closed all day

**HARROW** Tel. 01-427 0387  
THE MODEL SHOP ★  
31 ST ANNES ROAD  
9.30am-6pm Mon-Sat. Half day Wed 1pm

**ISLEWORTH** Tel. 01-560 0473  
RADIO CONTROL SUPPLIES ★  
581 LONDON ROAD  
Open 9am-6pm Fri 9am-8pm

**KENTON** Tel. 01-204 9867  
HOBBIES AND MODELS  
217/219 STREATFIELD ROAD  
QUEENSBURY CIRCLE  
Open 9am-6pm. Thurs 9am-8pm  
Closed all day Wed

**NORFOLK**

**AYLSHAM** Tel. 3145  
THE MODEL SHOP  
PENFOLD STREET  
9.00am-5.00pm Mon to Sat  
Half day Wed 12.30pm

**KINGS LYNN** Tel. 63164  
BARNEY'S MODEL SHOP  
SOUTH EVERARD STREET  
Open 9am-6pm

**NORWICH** Tel. 618023  
GALAXY MODELS ★  
107 WADDINGTON STREET  
Closed Mon. Tues-Thurs 10am-6.30pm  
Fri 10am-8pm. Sat 9am-6pm

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**NORTHANTS**

**NORTHAMPTON** Tel. 31223 ★  
 THE MODEL SHOP  
 230 WELLINGBOROUGH ROAD  
 Open 9am-6pm. Half day Thurs

**NORTHAMPTON** Tel. 27726  
 TAYLOR & McKENNA LTD  
 41-43 PRINCES WALK  
 GROSVENOR CENTRE  
 Mon-Thurs 9am-5.30pm. Fri-Sat 9am-6pm

**WELLINGBOROUGH** Tel. Wellingborough 226263 ★  
 D. B. MODELS  
 17 SILVER STREET  
 Open 10am-6pm Mon-Sat

**NORTHUMBERLAND**

**NEWCASTLE UPON TYNE** Tel. 22016 ★  
 THE MODEL SHOP  
 18 BLENHEIM STREET  
 Mon-Fri 9am-5.30pm. Sat 9am-6pm  
 Closed Wed all day

**NOTTINGHAMSHIRE**

**NOTTINGHAM** Tel. 50273 ★  
 GEE DEE MODELS LTD  
 19-21 HEATHCOTE ST, OFF GOOSEGATE  
 Open 9.30am-5.30pm. Early closing Thurs

**SUTTON-IN-ASHFIELD** Tel. Mansfield 58157 ★  
 MODELLERS CORNER  
 146 OUTRAM STREET  
 Open: Mon-Fri 9am-8pm  
 Sat 9am-6pm  
 Half day Wed (1pm)

**WORKSOP** Tel. 2855 ★  
 RUSSELL MODELS  
 MODEL CENTRE, RYTON STREET  
 Closed all day Thursday

**OXFORDSHIRE**

**ABINGDON** Tel. 21927 ★  
 F. KNIGHT & SON  
 44 BATH STREET  
 Open 8.30am-1pm/2pm-5.30pm. Late night  
 Fri 6pm. Closed all day Thurs

**OXFORD** Tel. 42407 ★  
 HOWES MODEL SHOP  
 9-10 BROAD STREET  
 Open 8.45am-5.30pm. 6 day week

**SCOTLAND**

**GLASGOW** Tel. 041-632 8326 ★  
 RIDDELL BROS  
 61 MOUNT ANNAN DRIVE  
 Open 9am-6pm. Half day Tues

**SOMERSET**

**BRIDGWATER** Tel. 3632 ★  
 R.M. TOYS AND MODELS  
 36 ST. JOHN STREET  
 Open 9am-5.30pm. Half day Thurs

**MINEHEAD** Tel. 2516 ★  
 OASIS MODELS  
 44A THE AVENUE  
 9am to 6pm, 10pm Fridays. Will open Sun by  
 request

**STAFFORDSHIRE**

**BURTON-ON-TRENT** Tel. 64240  
 J. & N. MODELS  
 22 DERBY STREET  
 Open 9am-5.30pm. Closed Wed

**STAFFORD** Tel. 3420 ★  
 JOHN W. BAGNALL LTD.  
 18 SALTER STREET  
 9am-5.30pm. Closed all day Wed

**STOKE-ON-TRENT** Tel. 263574  
 JOHN W. BAGNALL LTD.  
 30 PICCADILLY, HANLEY  
 9am-5.30pm. Closed all day Thurs

**WOLVERHAMPTON** Tel. 26709 ★  
 WOLVERHAMPTON MODELS &  
 HOBBIES  
 BELL ST, MANDERS CENTRE  
 9am-5.30pm Mon-Sat. Early Closing Thursday

**SUFFOLK**

**IPSWICH** Tel. 51195  
 BOWMANS OF IPSWICH  
 37/39 UPPER ORWELL STREET  
 Open 9am-5.30pm Mon-Sat  
 Early closing Wed

**SURREY**

**ADDLESTONE** Tel. Weybridge 45440 ★  
 ADDLESTONE MODELS LTD  
 63 STATION ROAD  
 Open 9am-6pm. Closed all day Wednesday.  
 Late night Friday 6.30pm

**FARNHAM** Tel. 26128  
 FARNHAM MODELS  
 57A DOWNING STREET  
 Tues, Thurs, Fri, Sat 10am-5pm. Sun 9.30am-  
 11.30am

**KINGSTON on THAMES** Tel. 01-546 4488 ★  
 MICK CHARLES MODELS  
 180 LONDON ROAD  
 Mon, Tues, Thurs, 9.30am-6.30pm  
 Wed 9.30am-1pm. Fri, Sat 9.30am-9pm

**WOKING** Tel. 66493 ★  
 WOKING MODELS  
 9 GOLDSWORTH ROAD  
 Open 9am-6pm Mon-Sat. Closed Wed after-  
 noon

**SUSSEX**

**BRIGHTON** Tel. 418225 ★  
 HARRY BROOKS  
 15 VICTORIA ROAD, PORTSLADE  
 Open every day except Sun 8.30am-5.45pm  
 (no half day)

**CHICHESTER** Tel. 83592  
 PLANET MODELS & HANDICRAFTS  
 108 THE HORNET  
 Open 9am-1pm and 2pm-6pm. Closed Thurs

**CRAWLEY** Tel. 21921  
 HEATHER CRAFT  
 60 HIGH STREET  
 9am-5.30pm Mon-Sat. Half day Wednesday

**HORSHAM** Tel. 61533 ★  
 MODEL CORNER  
 30 NORTH STREET  
 Open 9am-5.30pm Mon-Sat. Closed Thursday  
 afternoons

**WORTHING** Tel. 207525 ★  
 SUSSEX MODEL CENTRE  
 10 TEVILLE GATE  
 9am-5.30pm. Open six days a week. Monday to  
 Saturday

**WALES**

**CARDIFF** Tel. 29065 ★  
 BUD MORGAN  
 22 CASTLE ARCADE  
 SOUTH GLAMORGAN CFI 2BW  
 9am-5.30pm. Early Closing Wed 9am-1pm

**CARDIFF** Tel. 31367  
 RYALL & WALTERS RADIO MODELS  
 34 LLANDAFF ROAD  
 Open 9am-12.30pm/1.30pm-5.30pm Monday  
 8pm. Closed Wed

**CWMBRAN** Tel. 66727 ★  
 THE HOBBIES SHOP  
 32 THE PARADE (on the balcony), GWENT  
 9.30am-5.30pm. Half day Wed  
 Open late Fri., 7pm

**FLINT** Tel. 3123 ★  
 FLINT MODELS  
 5-9 CHURCH STREET  
 Open six days 9am-5.30pm. Half day Wed

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**NEWPORT** Tel. 65061  
 MAKE A MODEL  
 123 COMMERCIAL STREET  
 Mon to Sat 9am-5.30pm

**WILTSHIRE**

**SWINDON** Tel. 26878  
 SWINDON MODEL CENTRE ★  
 2 CIVIC CENTRE, THEATRE SQUARE  
 (Next to Wyvern Theatre)  
 Open daily 9am-5.30pm  
 Open all day Wednesday

**DONCASTER** Tel. 62524  
 B CUTTRISS & SONS  
 40 DUKE STREET  
 Open 9am-5.30pm. Closed all day Thurs

**SWANSEA** Tel. (0792) 52877  
 SWANSEA MODELS & HOBBIES ★  
 11 SHOPPERS WALK, OXFORD STREET  
 GLAMORGAN  
 Mon, Tues, Wed, 9.30am-5.30pm Thurs,  
 9.30am-1pm, Fri and Sat 9.30am-6pm

**SWINDON** Tel. 32829  
 THAMESDOWN HOBBIES ★  
 21 HIGH STREET, OLD TOWN  
 9.30am-5.30pm Mon-Sat  
 Early Closing Wed 1pm

**DONCASTER** Tel 20767  
 SOUTH YORKSHIRE MODEL SUPPLIES ★  
 313 BENTLEY RD, BENTLEY  
 Mon, Tue, Wed, Sat 10am-6pm  
 10am-8pm Friday. Closed Thurs

**WARWICKSHIRE**

**BIRMINGHAM 10** Tel. 021-772 4917  
 BOB'S MODELS ★  
 520-522 COVENTRY ROAD, SMALL HEATH  
 Open 9.45am-6.30pm. Early closing Wed  
 1.30pm

**WORCESTERSHIRE**  
**EVEHAM** Tel. 45828  
 P. & R. MODELS ★  
 8 VINE MEWS  
 Mon, Tues, Thurs, Fri, Sat, 9.15am-6pm  
 Closed all day Wed

**HUDDERSFIELD** Tel. 43964  
 WEST YORKS MODELS ★  
 61 WAKEFIELD ROAD  
 Mon-Sat 9.30am-6.30pm  
 Late night Fri 7.30pm

**BIRMINGHAM 11** Tel. 021-777 5964  
 KEN WHITTLE MODELS ★  
 788 STRATFORD ROAD, SPRINGFIELD  
 Mon, Tues, Thur, Fri 9am-5.30pm  
 Closed Wed Sat 9am-5pm

**QUINTON** Tel. 021-422 1000  
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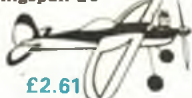
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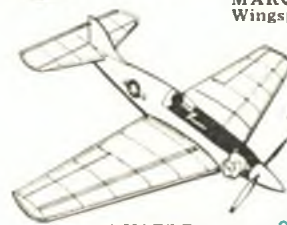


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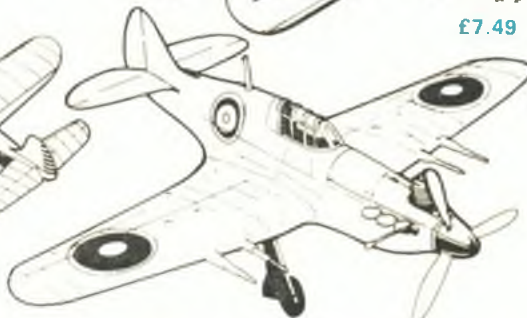
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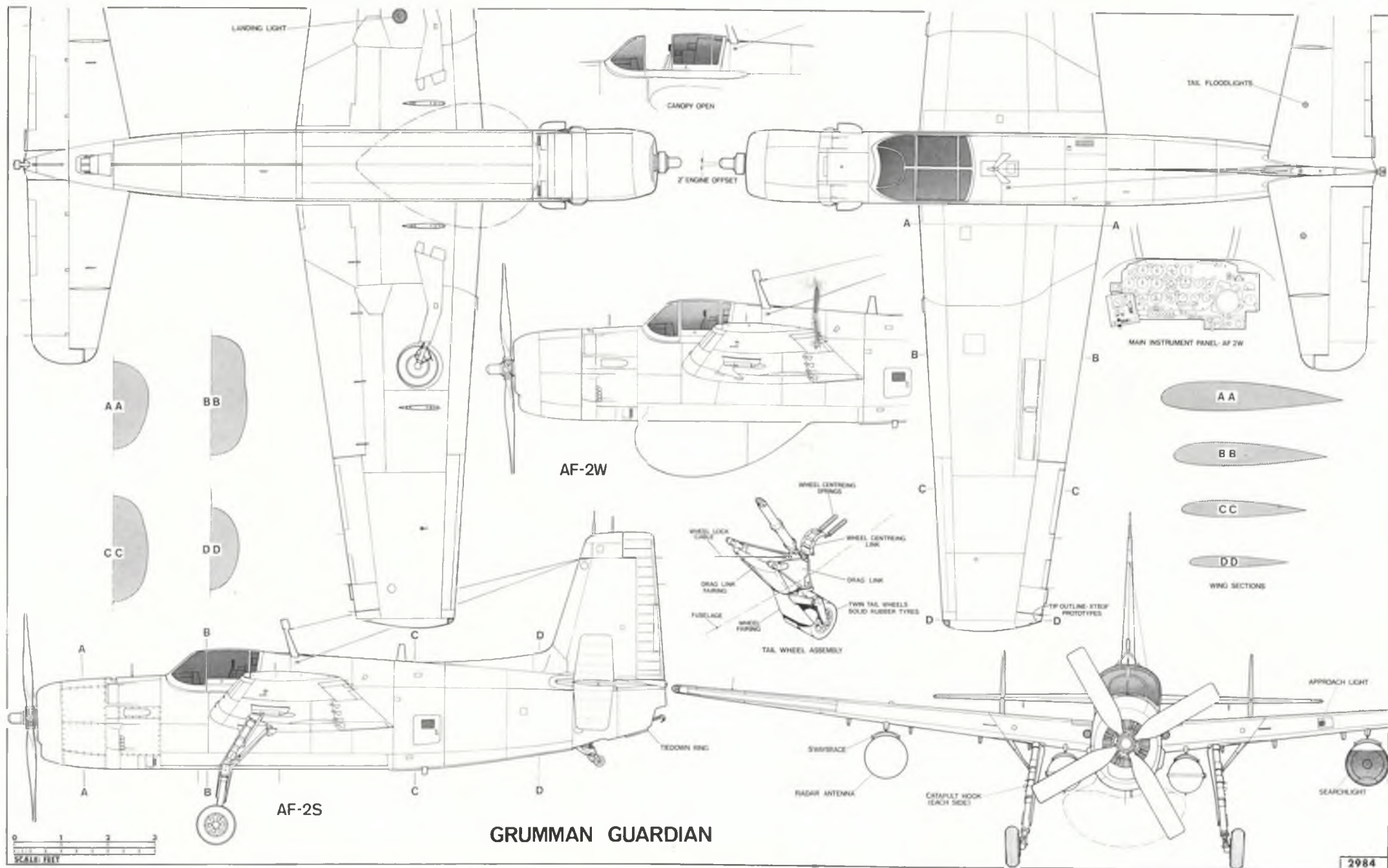


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Left, the Guardian XT83F-1S which featured instrumentation test probes on each wing tip — see drawings on preceding page. Photo: via Richard Hill.



Right, Grumman Guardian AF-3S of which only 40 examples were eventually built. This machine was a modified AF-2S carrying a Magnetic Anomaly Detector boom. Photo: via Richard Hill.

1953, — the first of these equipping VS-25 at N.A.S. North Island in 1950, although carrier operations did not commence until early 1951.

Of these aircraft, 193 were of the AF-2S type equipped with search and early warning radar in the belly radome, plus a radar relay transmitter pulse analyser, electronic counter measure receiver and homing equipment. The attack aircraft, of which 153 were made, also carried tracking equipment, consisting of a wing mounted radar and searchlight housed in identical pods, plus a receiver for maintaining sonobuoys. Internal storage catered for a single 2000lb torpedo, or two 1600lb depth charges, or two 2000lb bombs while any of these stores could be duplicated and carried externally beneath the wings.

A final line of development was the AF-3S, of which 40 were built. This was basically an AF-2S modified to accept a Magnetic Anomaly Detector boom on the starboard side of the fuselage — this MAD gear being a device which could detect changes in the earth's magnetic field, caused by submarines or other ferrous objects.

With a wingspan of 60ft. 8in., the Guardian was the largest single-engined aircraft of its period and the sight of an AF-2W particularly, with its huge belly radome and general ungainly appearance, must have caused much head shaking as it made its landing approach on one of the small escort carriers of the period.

During the Korean conflict, six Guardian squadrons were rotated to the Far East and carried out patrol duties in the Sea of Japan and the Yellow Sea, although it eventually transpired that there was no enemy submarine action carried out against the US fleet.

The only Guardian flying today is an ex forest-fire fighting aircraft, one of two previously operated out of Chino, California by the Aero Union Corp. These had been modified by increasing the size of the weapons bay by about 90% to accommodate dump tanks for the fire fighting chemicals, and removal of the sub-fins on the tailplane. Aero Union acquired a total of five Guardians but only two were operated as fire fighters.

Subsequently one of these aircraft was bought by a restoration group in California, who together with Aero Union employees restored the Guardian to its original condition, and the markings of VS-25 were applied: the aircraft is now flown mainly for airshows and fly-ins. The other four Guardians remain, engineless, at Chino, but it is hoped that of these maybe another could be brought into flying trim again.