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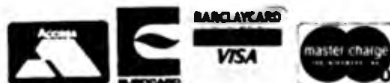
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OCTOBER 1983

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Cover

June at Old Warden, with hundreds of fascinating scale models to entertain an appreciative crowd and among them this most novel 57in Gnospeilus Gull of 1923 by Arthur Evans. Made for the light aircraft trials at Lympe, it looks more like an aeroplane than many of the 60 years younger so called microlights! Two 22swg flexible shafts in PTFE types drive the contra rotating propellers from a central rubber motor to Tamiya can gears in the nose. Inset is Jorgen Korsgaard, one of the keenest competitors in the European scene whose prize winning A-1 glider is featured as full-size plans this month

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Left: not D-IUGE, but nonetheless another scheme to choose for this 'Stösser'. Photo by Jess M. McLaughlin, California, U.S.A.

Safe flying is no accident

Aviation is one of the most safety conscious activities on earth. If the kind of safety rules and restrictions applied to aviation were applied to other activities, the world would be a far safer place!

'Airmiss' is the full-size aviation term for an encounter between two airborne aircraft which pass within less than safe operating distance — with incident reporting mandatory.

Even model aircraft are subject to the requirements of the Air Navigation Act, legislation which, effectively, is the code of safe operating practice for aviation in this country. Even so, model aircraft are the subject of minimal restrictions, we go our own way, do our own thing except at locations within 5 kilometres of an airfield where operation is legal only with the express permission of the air traffic controller and then limited to a maximum altitude of 500ft. All very reasonable, eh?

Imagine the reaction, therefore, of the U.K. Civil Aviation Authority's Joint Airmiss Working Group when reviewing details of an airmiss report near Halfpenny Green last year in which a radio controlled model aircraft was reported operating at 1,000ft within a mile of the airport. Worse still, this particular incident is only the latest in a series of reports which involve R/C gliders on the south coast and a half dozen other incidents over the last seven years.

It is this kind of track record of blind stupidity by a minuscule minority, which tempts legislative overreaction in a general attempt to be fireproof and runs the risk of jeopardising the model flying pleasure of many tens of thousands of model aircraft flyers throughout this country.

And it might just happen. So be warned — obey these simplest of airspace restrictions and remember always that you are a part of one of the most safety conscious activities which mankind has devised.

Meanwhile S.M.A.E. at Kimberley House, Vaughan Way, Leicester are compiling a list of current model operating sites within 5km of an airfield and would like to hear from all concerned as soon as possible.

Aircraft Described: the Fw56 "Stösser"

In the August 1983 issue, our "Aircraft Described" series featured the aerobatic single-seat *Focke-Wulf* Fw56 "Stösser". Author, Charles W. Cain, says he overlooked a well-illustrated feature — complete with very large photo of the Fw56/DFS 230 pickaback combination — which appeared in Alan W. Hall's excellent 'Aviation News' for 2-15 February, 1973 (Vol. 1, No.

19). One photo proves that the fifth prototype, the Fw56 V5, the second preproduction Fw56 A-02, was registered D-IUGE and not D-IGEU as stated in Cain's text. The meaning of "Stösser" is more correctly "Bird of Prey" than the usually accepted 'Hawk'.

SMAE/SAM Derby Vintage and Scale Day

Doug Sheppard has sent us full details of the SMAE/SAM indoor vintage and scale day to be held at Derby Sports Centre on Sunday, October 23rd. Various events are to be run, the usual Peanut scale, CO₂ Scale, Open rubber plus an event for 1/2-size Wakefields and CO₂ 'Gas Models', the latter two events providing the Vintage flavour.

Potentially the most interesting is the challenge issued by the organisers to produce a 4oz. indoor R/C model capable of completing a figure 8 course and spot

landing with either rubber or CO₂ power. The proposed timetable for the events is as follows:

9.00 - 10.00 a.m. General flying
10.30 - 12.00 CO₂ 'Gas' Scale, Open Rubber
12.00 - 1.00 General Flying
1.00 - 3.00 CO₂ 'Gas' Scale, Open Rubber
3.00 - 5.00 General Flying and R/C Assist

Admission fee of £2 entitles modellers to take part in the three general flying sessions, while competition event entry fees are £1 for each of the seven judged events. Juniors half-price. Further details of this low-key fun day can be obtained from Doug Sheppard, 13 Luckington Road, Monks Park, Bristol. Tel 0272 697595.

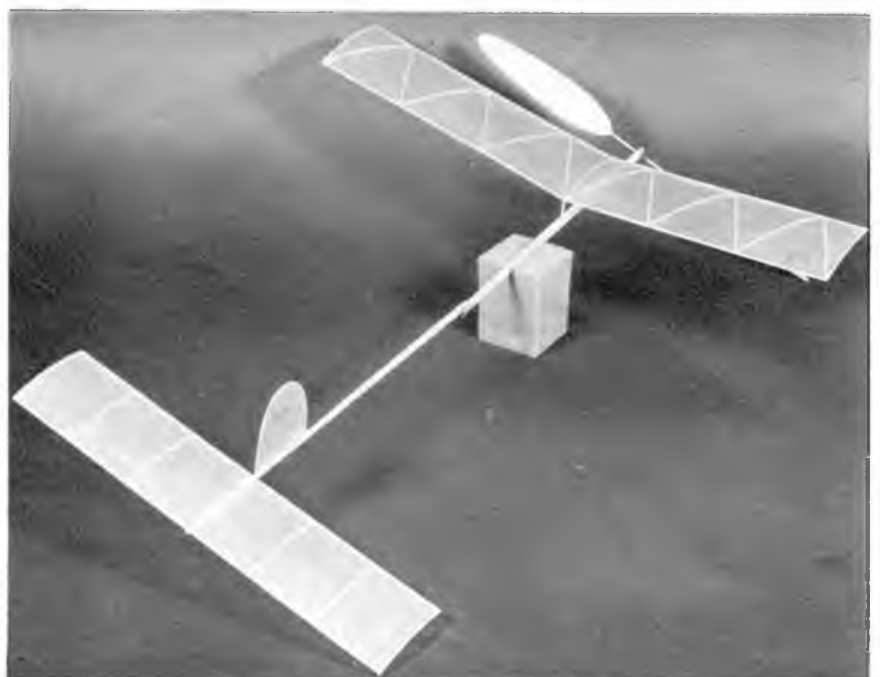
'Fly Rod' Flyers Cash Prizes

Don't miss your chance to have a go for the £140 in prizes offered for the Great 'Fly Rod' Flying Contest to be held at Cardington Airship Hangars on October 9th.

Top flyer, and it is restricted to beginners, will receive £100 prize for this contest which is a one-design event for the Laurie Barr designed 'Fly Rod' EZB indoor flyer, published in the July issue of *Aeromodeller*.

This simple beginners model is a good flyer and within the capabilities of most modellers. Why not search out your copy of June *Aeromodeller* and start cutting balsa? If you have lost your copy and still want to build a 'Fly Rod' and have a go for £100, send us a cheque or

Right: Laurie Barr's 'Fly Rod', see text for details of 'Fly Rod' competition to be held at Cardington on October 9th.





Left: Supergloy 'Chuckie' event competitors with their models before the Hemsby heat of the championship Finals on Oct 16th at Milton Keynes.

Postal Order for £1.50 and we will send you a copy of *Aeromodeller* with the plans included. Entry fees are £2 for flyers, £1 for spectators. So build a 'Fly Rod' and enjoy the EZB experience.

'Fly Rod' Clarifications

'Fly Rod' designer Laurie Barr has asked us to clarify three items that have caused builders confusion. They are:

- (1) Propeller assembly jig triangle is drawn incorrectly. Rotate the triangle through 180° so that an anti-clockwise rotating propeller results.
- (2) The wing jig should be 2 1/8 in. wide.
- (3) The 2 gramme minimum weight does not include the rubber motor.

IMAX film show

Of all the aero-films we've seen, ranging from "Hell's Angels" to "Those Magnificent Men In Their Flying Machines" and spectacular documentaries, dramatic newsreels, etc. there was one which really had us on the edge of our seats, and totally spellbound. We saw it in the Smithsonian Institution cinema at the National Air & Space Museum, Washington. The title is simply *To Fly*. Later a 16mm copy of the same film was loaned to us by AMA and though still spectacular, it was completely flat. No illusion of the third dimension. No feeling of becoming airborne in a balloon basket or flying number 7 with the Blue Angels, ducking for a cropduster or looking down on Manhattan. Reason for the immense illusionary difference is that the Smithsonian projection was on an IMAX system with 6-track sound, triple images and on a

vast screen. Now we have just such a system in the U.K.! The new National Museum of Photography, Film and Television at Bradford has a 340 seat IMAX theatre with a 62 x 45ft. screen, and, wait for it... regular performances of *To Fly*! If within reach — go to it — we'll guarantee it's the only film that ever made you feel gravity, go weightless or bank with the cockpit. The Museum tell us they plan showings no less than three times daily, Tuesdays to Sundays for a modest charge of £1.50 (75p for O.A.P.'s, under-18's and unemployed). Believe us — it's worth travelling far to see. Go — *To Fly*!

Model Photography Competition

Well known T.V. personality Bob Symes is to run a second model photograph competition which is to be promoted by Bob Symes on the air and through M.A.P. modelling magazine. Bob Symes ran a similar competition last year on British Forces Broadcasting networks and the winning entries were displayed at the 1983 Model Engineer Exhibition.

This year's contest will be run to the same format, the object is to find photographs of models which look so much like the real thing that it is impossible to distinguish them from the full-size subject.

Rules

The competition is open to all readers whether U.K. or Overseas. Entries should take the form of black and white, or colour prints (no transparencies) and should be no smaller than 6 x 4in. size.

Entries will be judged in two categories: senior and junior, junior being 16 years or younger, by 1st December, 1983. Entries must be accompanied by technical details describing both how the photograph was taken, and how the model was built, what it represents, etc.

Judging will take place during December and the judging panel will consist of M.A.P. editors with Bob Symes as chief judge.

Prizes will be to 1st, 2nd and 3rd place entries in both junior and senior classes and the winner of the senior class will be presented with the Bob Symes' Trophy at prize-giving at the 1984 Model Engineer Exhibition. Additional prizes will take the form of cameras, film and free magazine subscription.

The Aim of the Competition

The judges will be looking for photographs of models which are difficult to distinguish from the real thing. Entrants are encouraged to supply with their official entries, additional photographs depicting the model as a model, so that the judges can gauge the degree of ingenuity shown by the entrant, in staging the competition shot. A stamped, self-addressed envelope should be included for the return of photographs after the competition.

Closing Date for Entries

Entries must be received by November 25th 1983. Address your entry to Bob Symes Photography Competition, M.A.P. Ltd, P.O. Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, HP2 4SS.

What's On

- September 18 **15TH TOWNER TROPHY FOR THERMAL SOARING** Venue: Golden Cross, Sussex. Contact: N. F. Couling, 7 The Green, Walk, Willingdon, Eastbourne, East Sussex.
- September 18 **2ND ELLIOT CONTROL LINE RALLY** FAI Teamrace, Goodyear (incl. Class 2). B Teamrace Carrier, Aerobatics Venue, Marconi Avionics, Rochester, Kent. Contact: Peter O'Neill, Tel: Sevenoaks 457899.
- September 18 **PETERBOROUGH MFC 4TH ROUND OF CLASS A BRITISH COMBAT CHAMPIONSHIPS** Venue: River Embankment, Contact: Brian Waterland, Tel: Market Deeping 343722.
- September 25 **SMAE C L TEAM TRIALS, F2A, F2B, F2C, F2D** Venue: Three Sisters, Contact: R. Horwood, Tel: Bristol 48769.
- September 25 **ROLLS ROYCE VINTAGE FLY-IN** (R.C. assist only) Venue: RR Airfield, Hucknall, Nottingham. Optional Texaco Event Details, SAE to A. Walker, 5 Farm Close, Belper, Derby DE5 1RY, Tel: Belper 2990.
- September 25 **6TH AREA CENTRALISED FARROW SHIELD TEAM OPEN RUBBER POWER SMAE CUP - F1A GLIDER** Contact: Area Competition Secretary.
- October 2 **HESWALL MAC OPEN STUNT & COMBAT COMPETITION** Stunt prizes for F2B, Novice and Junior. Combat is for slow diesel A and A (Peterboro rules) Venue: Neston Recreation Centre, Contact: Jim Major, Tel: 051 355 4075.
- October 2 **PETERBOROUGH MFC 4 COMBAT COMPETITION** Venue: River Embankment, Contact: Brian Waterland, Tel: Market Deeping 343722.
- October 2 **SOUTH MIDLAND AREA SMAE OPEN THERMAL SOARING EVENT BARCS LEAGUE EVENT** Entry fee £2.00 + SAE - frequency Venue: RAD Weston on the Green, Contact: J. Shaw, Alverne, Winney Road, Freeland, Oxon OX7 2HO. SMAE Members only.
- October 2 **SOUTHERN GALA FLIGHT CUP - O.R. PILCHER - O.G. SHORT CUP - O.P. QUICKSTART TROPHY - A POWER, RIP, MAX CUP - A 1 GLIDER, COUPE D'HIVER, HAND LAUNCHED GLIDER** Venue: Odham, Hanis, Contact: Norman Couling, Tel: 0323 53116.
- October 9 **FLY ROD CONTEST**, Cardington, Berks. Details from Laurie Barr, (0628 258951).
- October 9 **THREE KINGS SCALE DAY C L STAND OFF, PROFILE SCALE** Valuable prizes and trophies. Silencers & insurance needed. Fly all day, any number of models may be entered. Plan & photo of model required. Venue: Croydon Old Aerodrome, Purley Way, Croydon, Contact: Wal Cordwell, Tel: 01 764 1661.
- October 16 **SUPERGLOY CHUCKIE CHAMPS FINALS** Middleton Hall, Milton Keynes Central. Details from DPR Models Unit 9, The Vanguards, Vanguard Way, Shoeburyness, Essex, 03708 5110.
- October 16 **FIREBIRDS M.C. AUTUMN R.C. FLY-IN** Fairthorns Manor, Botley, Hanis. Entry £1.00 per flyer on day. Proof of insurance is required. Refreshments available. For details contact: Lou Fisher, Southampton (0703) 692784.
- October 23 **THIRD WITCHFORD MEETING** FAI and Mini start 0930 and including the Croydon Wakefield Cup. Contact: Newham Beaumont, Tel: 01 393 4398.
- October 28/30 **SOUTH MANCHESTER MODELS GROUP EXHIBITION** Aircraft, boats, railways, ships, trams and engineering, free car parking. Venue: Blessed Thomas, Halford School, Urban Road, Altrincham, Cheshire. Details: Mr. B. Billington, 18 Cholmondeley Ave, West Timperley, Altrincham, Cheshire, WA14 5BB.
- October 30 **CENTRALISED MINI CONTEST A 1 GLIDER, COUPE D'HIVER, A POWER, HLG, CO** Contact: Dave Hipperson, Tel: 01 207 0179.

European Control line Champs

Jim Woodside reports on the premier C/L event of 1983 held at Utrecht on 13-17 July

ONE HAS THE IMPRESSION that the Utrecht organisation is a well oiled machine able to swing easily into action to provide all the required contest services. Of course the site has such advantages as permanent buildings, offices and staff but we should not underestimate the achievement. Special thanks are due to Ron van Vugt for undertaking the exacting job of event secretary with such skill and competence. The availability of a word processor and photo-copying services courtesy of the Canon organisation meant that competitors had results literally within an hour of flying ceasing for the day. An impressive 'novelty' was the video room where the F2C jury could warm up by watching races from the bank held at the club. It is sometimes easy to get the impression of living on the edge of the action! Certainly Utrecht is one of the forcing grounds of present day control line activity. The commercial side of the site continues to forge ahead with the Mk. II version of the USE 15 glass plug in production as well as a powerful 21 size car engine. The installation of a temperature-stable computer lathe has now bought the investment in machinery alone to one million Guilders.

However, a warning note regarding finance was introduced during the opening speech. It is now becoming an undertaking of large scale finance to run championships of this magnitude. The chief problem area is that of accommodation and catering which must be booked months in advance. The venture capital needed for future bookings is reaching the status of a major financial nightmare for organisers — who remain essentially keen, even gifted, amateurs. It may well be prudent for competitors to consider accepting lower levels of provision, such as camping and self-catering. It is also my opinion that too much of a team manager's time is taken up with sorting out 'domestic arrangements' after all he is there to see that the flyers do their best with their models (flying that is!). I am sure a reduction in costs would be welcomed by many national aero clubs and might well encourage a more eager response from potential organising nations.

For this meeting the organisers had rented two adjacent fields property of a football club. These provided the combat contest and practice site as well as training circles for aerobatics. Speed and team-race competitors had to make use of the limited time available in the cage or drive 50km to Arnhem where another site is available. While one sympathises with those who suffered poor settings I see little alternative. Few places are as favoured as Genk (site of the 1981 Champs) which has acres of space.

Class F2A — Speed

Defending Champion — L. Parramon (270kph)
Defending Nation — Hungary
Contest Director — Ron Brands
Entry — 33 No British team entered

At the 1972 Helsinki World Champs, Dusi of Italy recorded a winning 252kph using, I think, lines of 0.3mm diameter. Two years later the line diameter was up to 0.4mm but the revolutionary introduction of line groupers allowed both Ricci and Dusi to achieve 279kph. Line groupers were quickly outlawed by the FAI as a danger to safety. However, steady development over the last nine years has seen the establishment of a new world record at a higher speed than the 1974 figure. Mult's 282.1kph represents a phenomenal increase in horsepower needed to tow those 'chains' through the air. Some figures published in a recent 'Model Aviation' by Jerry Rowtio suggest that to reach 274kph (170mph) 1.23 thrust horsepower is needed.

Below: D. Mults winning 'sidewinder' style F2A speed model. Rossi powered. Mult gained a new world record of 282.1 Kph with a 275.8 Kph back-up. Note the slightly off-set helmet style air inlet trunk on the motor and single-blade propeller counterweight just proud of the spinner.



A major change to be seen was the wide scale use of suction systems. In recent years the C.F. (centrifugal switch) pioneered by flyers like Emil Rumpel of Germany had held sway. The C.F. system allows an increased supply of fuel to the engine as speed builds up to the resonant frequency of the tuned length pipe. However, the simplicity of having only one needle valve to set seems to have brought about the demise of the dual needle C.F. system.

On the official practice days interest centred on the Hungarian and Soviet teams. However, the most obvious feature was the problem experienced by all competitors in finding the right pipe, plug and compression ratio combination in the rather hot conditions (32°C).

Round 1

This started at 8.00 a.m. Only seven competitors recorded a time at the first attempt. Most preferred to wait for warmer and less humid afternoon conditions. In the first re-flight Pisarchuk (USSR) recorded 272.7. This gave him a temporary lead and an eventual third place overall. It was, however, his only official flight. Ten minutes later Szegedi (Hungary) put in 273.7 to lead the first round. All other entrants at this stage were at least 8kph slower.

Round 2

Most of the seeds had established a setting. Temperatures had dropped a couple of degrees but changes in humidity were still marked. One of the biggest problems was that of the pilots of quick models — they had to scamper round the pylon ten times in 14 seconds in all that heat. Kostin of the USSR seemed to have acute problems in coping. He had the fastest speeds in training but failed to get in an 'official'. His eventual 10th place with 260.8kph was way below potential.

The reigning world champion Mult nailed the top place with a 275.8kph flight only to see teammate Szegedi take it away with a 276.9 effort one

hour later. It is most impressive to watch the Hungarians in operation. They obviously fly together often and this shows in the excellent use they make of the three minute period. I saw Mult take off, stop his motor via a shut-off, re-fuel and try again with a new setting no less than three times within one period. Molnar (5th place) is an old team race hand so knows about pit-stops!

Round 3

Starting at 9.00 a.m. on Sunday this was to prove decisive as far as first place was concerned. At the end of Round 2 the positions were: 1. Szegedi 276.9; 2. Mult 275.8; 3. Pisarchuk 272.7. By the end of Round 3 only positions 1 and 2 and 15 and 16 changed place. Humidity was again high at 84% but Mult made no mistake this time. That distinctive note of the winner's exhaust note at 36,000rpm spread over the circuit — 282.1kph — a new world record. In this round no other competitor could come within 16kph of this superb flight.

Only one flyer in the first ten used a C.F. switch model. All the fastest flights were made on small single bladed props and the leading Hungarians favoured maple wood propellers with wide blades. They thought epoxy bonded carbon tended to age and disintegrate at the revs they are using.

Long time enthusiast Jurgen Lenzen had some nice items on display including pans and propellers.

Mult's winning model used the new style Rossi with the liner raised 0.1mm to give an exhaust period of 196°. Internals were said to be standard but obviously this kind of performance must entail considerable selection and fitting of parts. The pipe was a basic standard Rossi but with smoother contours, extended 1.5cm and with an outlet diameter of between 4.1-4.4 mm. A homely touch is that the wing is constructed of venetian blind slats. To make the one metre-plus wing more transportable it is made in two plug together sections.



Above: Ole Anderson with 'Shark', placed 4th, aerobatics. Above right: winner Stan Cech's sleek well-silenced model prior to release for winning flight. Left and far left: engine installation and fuel filler details on Cech's 'Uno', ST46 power.



Class F2B — Aerobatics

Defending Champion L. Compostella, Italy
 Defending Nation Italy
 Contest Director Robert Villem
 Entry 44 (39 flew)
 Judges Mick Harvey, G.B. Chief
 Karl Kosmalla, Germany
 Mr. Rosenberg, Israel
 J. Bensch, Belgium
 B. van Hoek, Holland
 British Team Bill Draper
 Barry Robinson
 Peter Coates

The aerobatics circle at Utrecht is part of the radio control car track and has some changes in level. It is barely big enough for models flown on maximum length lines and, surrounded by trees, is a recipe for turbulent conditions as models clear tree height. In the calm conditions of this event no competitors seemed to be disadvantaged by gusty conditions, nor did anyone hit the jury tower although there were near misses. However, those height changes did cause some bounced landings amongst the flyers, Bill Draper included.

Judging throughout the eliminations remained even handed. However, in the fly-offs for the top 15 it was noted that the previous lowest scoring judge had started to increase his marks and the highest marker had become stingier. The FAI jury called a meeting to instruct the F2B jury to maintain their previous parameters. Fair comment I think. In some respects judging aerobatics remains a mystery to me. A Dutch flyer had inverted flight which was at the required height and I could detect no variation in height. This should rate a score of 10. A glance over a few shoulders revealed 7s and 8s. It seems a feature that people are marked in a 'window' of 5 to 8 marks. Nines are rare and tens seem unobtainable.

I was keen to see Ole Andersson fly after his 'surprise' third place at last year's World Champs. Watching him in practice he is obviously a very good flyer, helped perhaps by the psychological boost of being on his own turf for that event. His model is a kit Jetco Shark by Lew McFarlane finished in blues and greys, ST46 powered. At the end of the first round Andersson was third behind Sbragia and eventual winner Cech. Barile, whose flying impressed me with its fluidity in 1981 was in 4th place. He flies a developed Supermaster (CL 930 in APS range) renamed Superstar and finished in red. British hopes were supported by Barry Robinson in 7th place using his Merco 61 powered 'Northwind'. At this stage Draper was 21st and Coates 22nd. Sad story of this first round was the withdrawal of Belgium's R. Liber whose car had been forcibly entered and his models vandalised or stolen.

Round 2 saw three changes in the top 15. Out went Rampoux (France), Listopad (USSR) and Maikis (Germany) to be replaced by Eskildsen (Denmark), de John (Holland) and Bill Draper climbing up to 9th slot. Peter Coates managed an increase in his score but dropped to 24th overall — perhaps a reflection of his lack of competition flying since September '82.

Skrabelek was now top of the pack (up from 9th). Cech was still second by only 13 points with previous leader Sbragia displacing Andersson to 4th.

With both Czechoslovakia and Italy with full teams into the fly-off the struggle for team prize looked set for an interesting battle. Great Britain with two in the top 15 looked to have a chance of 3rd place with the close grouped French as the main contenders.

In the two fly-off rounds Stan Cech pulled out two excellent flights — the highest of the meeting — 2813 and 2810. The pattern was excellent and pullouts a consistent height. Skrabalek's score of 2730 gave Czechoslovakia 2nd place with Sbragia in 3rd place. Meanwhile Barry Robinson with some fine square figures had taken 9th place with Draper 13th. Great Britain thus took 3rd team prize — our best for some time.

Three models in particular caught my attention: (a) Stan Cech's winner. Stan is a first rate builder. His 1983 model features a ST46 side mounted. An extension silencer makes it impressive in flight by being so quiet. The wing is removable by lifting out of the top of the fuselage. Propeller was the MVVS 11 x 6 with wide blades nearly parallel to the tip. Fine quality finish is white with blue, black and red contrasts.

(b) I. Cani 5th place model. Finished in red this model had a pylon look with side mounted engine and a pod on the inboard side. The motor was unusual in being an M.V.V.S. rear intake, rear exhaust pylon motor fitted with a new liner of modest timing. Plenty of power with a distinctive exhaust note.

(c) A. Listopad (Russia) 18th place. The ultimate in transportable models — two fit into a small case. Wing halves mount on milled spars of alloy passed through fuselage. Fine red finish — Engine was Russian made 7cc stunt special.

Class F2C — Team Race

Defending Champion Metzemeler, Florus, Holland
 Defending Nation USSR (11 00 9)
 Circle Marshall Theo Pijls

Jury P. Hasling, Denmark Chief
 D. Heaton, G.B.
 E. Meyer, Holland
 British Team Steve Smith, Colin Brown, John Grey,
 Steve Haycock, Dave Fry, Nigel Thorpe
 Entry 38 teams

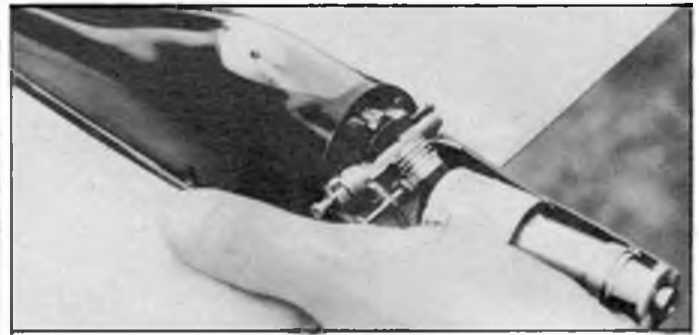
Those of you who are regular readers of the *From the Handle* column in this magazine will know that a lot of space has been taken up with the discussion of potential rule changes and their implications. The starting point of this was the '82 World Champs in Sweden when there were many disqualifications for competitors and some anxiety expressed by the jury over fair race administration. Many competitors have felt in limbo as they face an uncertain future. I am glad to be able to report that this series of races produced good clean racing and an excellent final the equal of any I have ever witnessed. In the course of the competition Kramarenko and Kuznetsov of the USSR produced two world records — one for heats, one for the final. Only four teams received disqualification from the jury for reaching three warnings. All other DQs were self-administered — foot out on landing, ejection of parts, etc.

The F2C jury spent many hours in consultation before the event, videos were watched, minutes of CIAM meetings were obtained. I would like to know why additions to the jury guide passed in December 1981 are still unpublished. The supposed definitive new rules as published by SMAE contained errors. Come on CIAM Sub-Committee — we deserve better than this. We need rapid dissemination of accurate information. Moreover we need the rules settled and in the opinion of this writer the re-introduction of the 7cc tank. This meeting showed that given a clear jury lead, the competitors will play their part. The clear jury lead came in two ways:

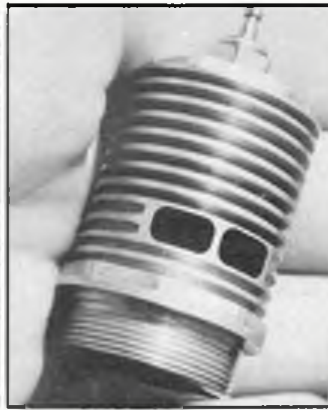
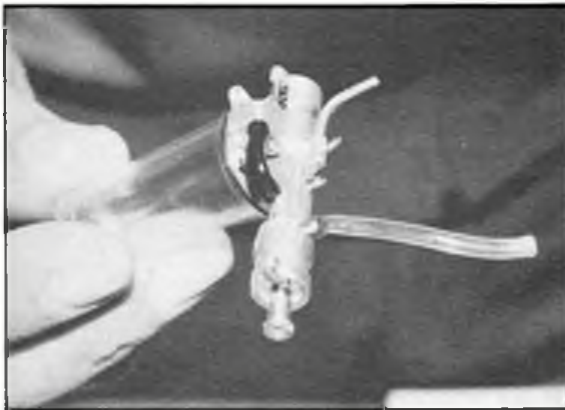
1. A list of 19 definitions of warning events.
2. The addressing of all competitors in F2C by Per Hasling, foreman of the jury.

Thus little room here for misunderstanding.

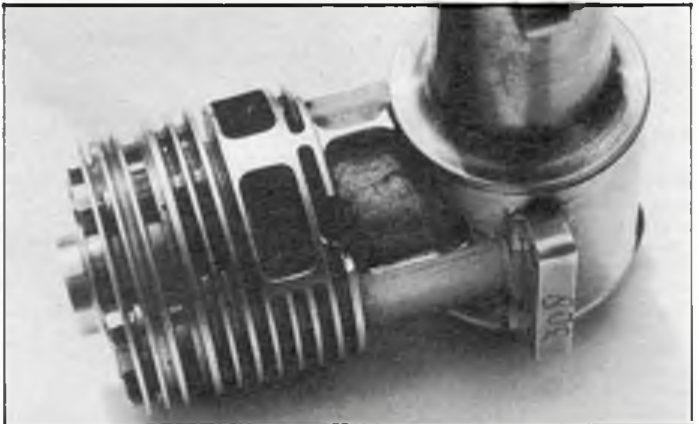
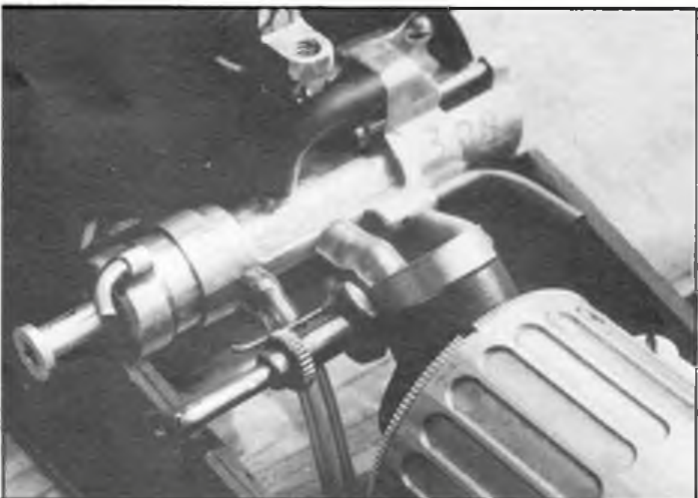
In the meantime some impressive hardware had been observed in practice. The Russian winners were sporting new models and motors. The Kuznetsov motor still features twin facing exhaust ports to aid rapid release of gases. The cylinder liner is still one piece with machined fins split vertically as an aid against distortion caused through the temperature difference between the bare wall and the outermost fin. Such practice is fairly common in racing two stroke motor bikes. The liner is said to contain no silica while the piston is around 12%. This should give generous hot running clearances. The big change is in the



Left: Kramerenko / Kutnetsov's winning T.R. Entry. Combined tank, filler priming unit can be seen in position above and in close-up below left. Below centre: a glow ignition cylinder on Russian combat winner. Beliaev's motor very similar to the T.R. motor (diesel).



Above: note the boost port prime tube on the Kramerenko motor, just below cylinder fins. Left: carb. valve in-situ in winning model. Unconnected pipes are assumed to be overflow and vent. Below: twin forward facing exhaust ports on Kramerenko engine.



bottom end of the engine. The front housing carrying the bearings is now machined from stainless steel. The conrod big end carries a ten needle caged bearing. The backplate screws in place, being made of Tufnol-like plastic and is locked by a ring. Weight just over 1oz. The airspeed is impressive. Best I saw was 17.4secs. for 10 laps (130mph) with 17.8secs. a realistic two up setting. The separate filling system not only filled a novel circular tapered clear plastic tank but also primed the carb. the exhaust tack and the engine's boost port. The engine is of the type designed to bolt direct to the fuselage. The Kramerenko model featured moulded carbon-fibre fuselage for an all up weight of 270 grams!

The new breed of Cipolla engines were also showing good pace. These also feature direct mounting to the fuselage. The successful Rossi brothers were clocked by me at 17.8-18.00 secs., although they were very marginal on range. Engine man Gino Voghera and his pitman Menozzi had equal airspeed. The new Cipolla looks likely to be the new favoured engine unless, of course, Henry Nelson introduces some changes into the highly successful Nelson 15D design. Make no mistake, there are still rapid Nelsons around. The Pazin Brothers could run at 18.0secs. but only for 26 laps. but only three Nelsons in the top nine perhaps indicates some design changes

are needed. It is good for the sport to have choices open to alternative technologies. Current World Champion Victor Chapavolov is said to be in hospital with some heart trouble. May we wish him a speedy return to full health.

Round 1

Reading my race by race notes prior to writing this I am struck by just how many teams did not perform 100%. Perhaps it was racing after lunch in the bar rather than before!

Our own Gray Haycock were in the first race but ran overcompressed for 18 laps. Several adjustments gave them 4:05 while Liber-Dessaucy recorded 3:53. Past World Champ Victor Suruev, flyig with Burtzev as Barkov has a broken leg, had a cool run to 4:08 in Race 2 but the happy Delor-Surugue put in a 3:44 using a high timed Nelson. The engine is bolted direct to the fuselage by machining the upper face of the lugs. Race 3 brought May-Geschwendther against Visser-Buys. The former were overcomped while the latter glided the last 10 laps, to achieve 3:50 and 3:46 respectively. Two races later all eyes were on K-K but they recorded a 'disappointing' 3:29 after running out of fuel on 98 laps. Race 6 saw the almost unbelievable — Colin Brown dropped both pit stops and retired, as did the Rossi Brothers owing to a combination of short range and

undercompressed motor. The popular Metkemeijer Brothers appeared in Race 7 and although they recorded 3:30. Rob was flicking the motor like mad at each stop (I know the feeling well). In Race 10 Dave Fry caught a DQ for whipping offences while in the last heat the Van Uden Bros. recorded a 3:41 despite some heavy blocking by the Bulgarian team.

So at the end of Round 1 the ninth team in Nitsche-Kunnegger with 3:50 — very much slower than expected with hardly any team nearing full potential.

Round 2

Things quickened up in this round but 3:45 remained good enough at the end to make the semis. This, I think, is more a reflection of just how tight it is at the top. Small errors cost dear with little margin for recovery. This round was memorable for two things. Firstly Colin Brown's amazing three second pit stop taken at 98 laps. The team expected to run short and Steve landed in half a lap and Colin started the engine without waiting to fill the tank — 3:38.2. The second is K-K's world record heat in a clean three-up race. Their model ran 17.8 all the way to a 3:19 and thunderous applause.

Other improvements were Visser-Buys (3:38), Rossi-Rossi (3:34), Surugue-Delor (3:40), and the new Soviet team Mazniak-Shatalov (3:41).



The UK team's discomfort continued with a 4:15 undercompressed run for Gray Haycock and a second DQ for Fry Thorpe for losing their wheel at the first pit stop.

Semi-final — 1st series. Sunday 10.30

In the back of most people's minds must have been the thought that with two attempts, the Russians were favourites for a final place so it was an eight cornered fight for two places. This is substantially the way it turned out. The two K's turned in a 3:25 in the third race while the Rossis achieved a 3:31 in the same race which meant that with a second series of semis at 13:30 seven teams would dispute what looked like the available third place, held at this time by Smith-Brown with 3:37.2.

2nd Series

In fact only five times were recorded in this group of races. The Rossis improved 0.3 sec., Smith Brown 1.1 seconds. Fisher Straniak recorded a 3:36.9 in a race which ended as a solo run but with two lights on, Fischer could not give the model any help. The Metkemeijers retired at the first stop with what turned out to be a dislodged wrist pin retaining C-clip.

The Final

With plenty of time to wait all the finalists had time to establish settings. Both the Italians and the British decided to go for a 30 lap setting at the best speed they could muster which was about 18.0 for the Italians and 19.4 for the Brits. The Russians made no concessions. And what a final of speed and drama.

The jury spoke to all teams to remind them that they still had only two warnings to last 200 laps. All teams ended on two warnings with the Russians gaining theirs close together which raised anxieties about their finishing.

The crucial factors were these, which set the pattern for the race barring accidents.

(a) K-K had speed but pit-stops with several flicks:

(b) Rossi's had one flick stops but one extra stop needed.

(c) Smith-Brown had good piloting, good stops but the lowest airspeed.

The final result was close and had it not been for a glided lap by the Rossis at a pit stop would have been a nail-bitingly closer.

Here is how it went.

1. Kramarenko-Kuznetsov	37	71
2. Rossi-Rossi	28	59
3. Smith-Brown	30	60

As I said earlier — superb. Speed is certainly exciting.

Left: Titov (2nd) fuels Doroshenko's Combat model before bout with Shiavato (Italy). Below: detail of tail on Doroshenko's model. Trailing edge from three laminations of 4.5 x 1.5mm spruce. Right: overall view of Doroshenko's model. Engine mounted on light alloy angles locked onto hardwood centre section insert.



Class F2D — Combat

Defending Champion Ray Sibbald, G B
Defending Nation Great Britain
Contest Director
Jury

Richard Evans, G B. Chief
A. Schwarz, Denmark
Ms. M Brands, Holland
37 pilots

British Team
Vernon Hunt, Neil Gill, Tim Bartram

Since 1981 Ray Sibbald's life has been dogged with back luck which has kept him from the flying field. Hence he was not present to defend his title. Sincere wishes for better future times, Ray.

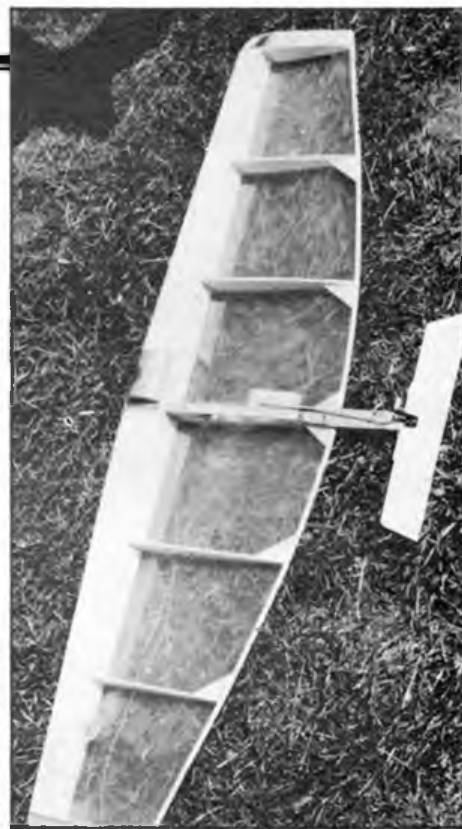
Our team was a strong one with experience in depth. Such is the state of combat that luck is just as important as preparation and skill. To express a personal opinion I now wonder why people bother with combat — the falling number of competitors seems to bear out my rather jaundiced opinion. Speeds are so high as to make adequate streamers a near impossibility and bouts are rule ridden to the extent that able pilots go out on matters unrelated to the number of cuts taken. Like many modellers, I entered competitive control line via combat and so have a sympathy with the event. It seems to me in need of being slower as it is not a race, cheaper as it is a beginner's young person's event and less rule orientated. End of sermon.

My 'egg on the face' for this meeting was to admire a young lad in beating Beliaev in the first round. Beliaev went on to win the contest via the losers refly and the young lad turned out to be a girl — Monique Wakkerman (I must not be a M.C.P.). Sorry Monique.

Overall the standard of flying seemed higher than the last contest I saw with pilots more able to control the models, although my previous remarks apply. Often one cut will completely snap a streamer. Those using the very powerful Nelson Glow often choose a prop to limit the airspeed to that of their opponent. Vernon Hunt used the Nelson but lost his first bout 2-3 to Niskanen of Finland. In the losers round Hunt ran out of fuel near the end of the bout and lost on ground time.

In the eliminations, Monique Wakkerman drew previous World Champion Doroshenko. She flew very well but in the end could not compensate for the disadvantage of lower airspeed. Meanwhile Tim Bartram using the new Cipolla combat motor eliminated Stjarnesund (Sweden) but eventually went out to Loet Wakkerman on the rule covering lines left on the ground (see what I mean?)

Pit Stop	Laps	Time
102	139	169
88	117	146
89	118	147
		175
		176
		6:55
		7:01
		7:22



While on the subject of motors it is notable that there is a healthy supply of F2D motors available to suit various purses. These include the Nelson, the U.S.E., the O.P.S. Cipolla and the C.T.M. (Combat Team Munich). This later engine is the brainchild of Johnny Dubell, although parts are also made in Switzerland. The engine will be on sale at 250DM, later in the year. In addition there were numerous Soviet specials and the old time favourites — the Rossi and ST.G20.

Meanwhile back at the flying. Last British hope Neil Gill went out to Titov, despite a protest concerning a possible unnoticed knot cut.

This left two Swiss and two Soviet flyers in the contest. As the same nationalities cannot fly each other until it is unavoidable we had two Swiss/Soviet bouts, won in each case by the Soviet pilots.

The final was enjoyable and went to the full four minutes which makes a change from the usual 30 second bash. Beliaev was the victor over Titov by 346 points to 328. The fly-off for 3rd place gave victory to Dissler by 184 to Borer's 104.

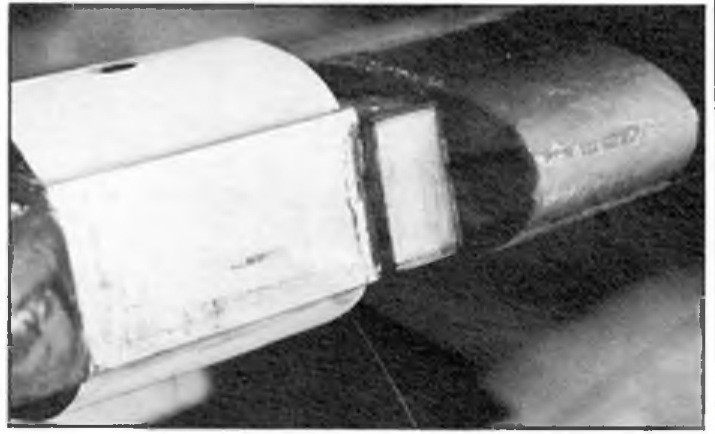
All the models strive for large area with minimum weight. Three main avenues can be seen.

Below: UK's Hunt fights it out with Niskanen of Sweden. Hunt finished 30th.





Left: typical combat engine mount system using previously mentioned aluminium alloy rails. Rossi engine shown here belongs to Leif Goransson (Sweden). Right: foil covering (also on Goranssons combat model) prevents rear exhaust from burning model.



1. the foam structure — hollowed or cored for minimum weight.
2. foam-balsa composite as seen in Hunt's models (C.L./1356 in APS).
3. built-up minimal structures in balsa/spruce as used by the Russian pilots.

The commonest way to mount the engine is to employ alloy angle bars as the crutch to which the engine is screwed. This unit can be easily switched from one model to another by loosening two bolts passed through the hard centre rib.

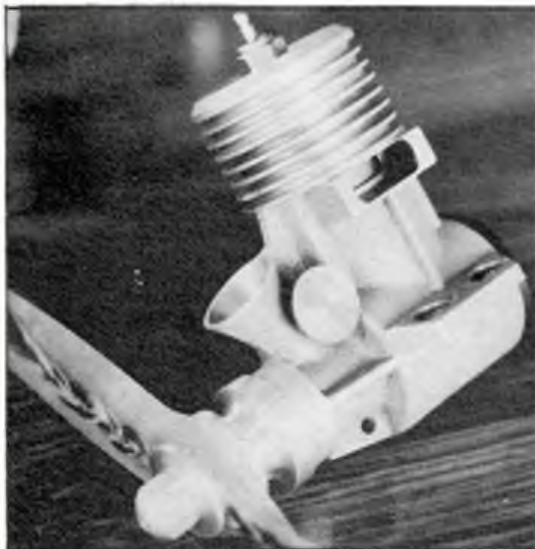
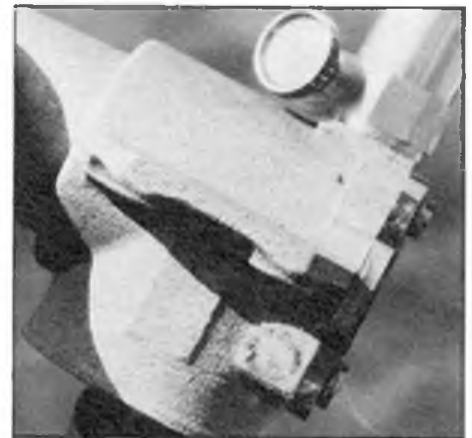
Pacifer tanks seemed favoured by nearly all competitors to provide pressured fuel supply to the engine. I believe that proposals will be laid before the FAI to make suction systems mandatory, allied to a minimum propeller diameter in an attempt to limit speed to that where pilot ability is the dominant factor.

Addresses of goods mentioned in this article:

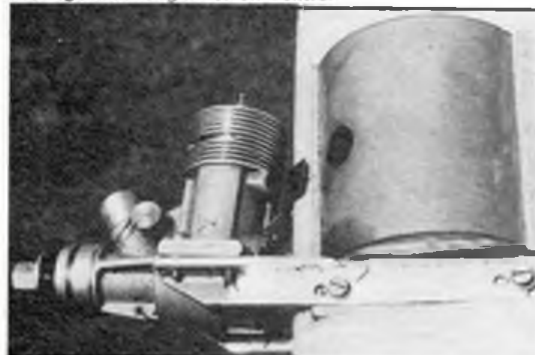
- 1 USE 15 Mk II — Combat/FF engine. Price 300dfl. from U.S.E., Stichting Werkgenoerschap, Floridadreef 17, 3565 AM Utrecht, Holland
- 2 Lenzen speed pan 50dm
Lenzen props 16dm
from Alfred Dobbert Str 57, 5600 Wuppertal 1, W Germany
- 3 Cipolla Engines — enquiries to
V.I.P. Racing, via Corridoni 35, S. Demiano-Brugherio, Milan, Italy



Below: latest combat motor from Doroshenko strongly reminiscent of 1948 Arden O.199. Drum valve, intake is in an unusual position. Note sand-cast finish to crankcase.



Above: German CTM combat motor 105gm A.A.C. piston cylinder set-up. Head screws into place. Below: note the heat deflector on the Russian model is fixed to the engine. Offset provided by washers — why not drill fuselage mounting holes off-centre?



Final Results — F2A Speed

Pl.	No.	Name	Country	RD 1	RD 2	RD 3	Best Speed
1	151	Muli, J.	H	257.6	275.8	282.1	282.1
2	150	Szegedi, S.	H	273.7	276.9	—	276.9
3	156	Pisarchuk, Y.	CCCP	272.7	—	—	272.7
4	161	Kitipov, H. I.	BUL	255.3	268.6	266.6	268.6
5	152	Molnar, J.	H	—	267.6	263.7	267.6
6	174	d'Orsi, M.	I	—	266.2	—	266.2
7	162	Kabakov, G. A.	BUL	265.8	—	—	265.8
8	153	Parramon, L.	SP	263.3	258.0	259.9	263.3
9	178	Velunsek, O.	YU	262.0	252.6	252.9	262.0
10	158	Kostin, S.	CCCP	260.8	—	259.3	260.8

Final Results — F2B Aerobatic

Pl.	No.	Name	Country	RD 1	RD 2	RD 3	RD 4	Total
1	201	Cech, S.	CSSR	2681	2785	2813	2810	5598
2	202	Skrabalek, J.	CSSR	2591	2798	2517	2730	5528
3	237	Sbragia, G.	I	2733	2694	2663	2701	5434
4	241	Andersson, O.	S	2671	2720	2680	2359	5400
5	200	Cani, I.	CSSR	2586	2648	2720	2673	5368
6	236	Rossi, S.	I	2574	2708	2573	2638	5346
7	230	Barile, S.	B	2666	2678	2655	2659	5337
8	235	Compostella, L.	I	2640	2700	2626	2609	5326
9	224	Robinson, B. P.	GB	2617	2673	2618	2580	5291
10	226	Jong, H. de	NL	2543	2655	2634	2580	5289
13	223	Draper, W.	GB	2478	2659	2536	2604	5263

Final Results — F2C Team Race

Pl.	No.	Name	Ctr.	RD 1	RD 2	Semi-1	Semi-2	Final	Engine
1	308	Kuznetsov/Kramarenko	CCCP	3 29.7	3 19.8	3 25.8	3 28.6	6 55.3	O.D.
2	354	Rossi, F./Rossi, A.	I	—	3 34.5	3 31.8	3 31.5	7 01.4	Cipolla
3	338	Smith, S./Brown, C.	GB	—	3 38.2	3 37.2	3 36.1	7 22.3	Nelson
4	346	Metkemeyer/ Metkemeyer	NL	3 30.5	3 34.5	3 56.6	—	O.D. Esci	
5	348	Visser, H./Buys, E.	NL	3 50.5	3 38.2	3 38.3	Disq.		O.D. Esci
6	360	Surugue, R./Delor, B.	F	3 44.3	3 40.3	3 45.7	3 38.3		Nelson
7	310	Mazniak/Shatalov	CCCP	3 48.0	3 41.5	3 56.4	—		O.D.
8	344	van Uden, R./van Uden, J.	NL	3 41.6	3 49.3	3 41.2	—		Nelson
9	330	Fischer, J./Straniak, H.	A	3 45.5	3 46.6	3 40.5	3 36.9		Cipolla
10	356	Voghera, G./Mezozzi, M.	I	3 49.2	3 45.9	—	—		

Final Results F2D Combat

1.	Belliaev	CCCP	6. Gill	GB
2.	Titov	CCCP	7. Ougen	F
3.	Dissler	CH	8. Figus	D
4.	Borer	CH	25. Bartram	GB
5.	Henry	F	30. Hunt	GB

AIRCRAFT DESCRIBED

NO:256



This one-of-a-kind coupe top Miles Magister in civil colours, lacks the lower wheel pants, but has the trouser fairings in place.

'The magister had a far better overall performance than any elementary trainer then in use and with its low-wing monoplane characteristics and split flaps, it reproduced in a safe manner the handling techniques associated with the new Service aircraft, deliveries of which were then starting.'

THE WRITER WAS speaking of 1937 when he penned this statement for the Putnam definitive work, *Miles Aircraft since 1925*. And as a lifelong aviation enthusiast himself, few would wish to quibble with the author, Don L. Brown, for he served as personal assistant to the chief designer, F. G. Miles.

Until Fred Miles met up with Charles Powis at Woodley, near Reading, in the early 1930s, the Miles sporting aircraft enterprise at Shoreham had been held together with, as much as anything, 'shoestring enthusiasm'. But with the availability of a bankrupt stock of suitable aero-engines, F. G. Miles created the *M.2 Hawk*, a sports, touring and club training low-wing monoplane. The prototype first flew in March 1932 and was so well received by pilots that no fewer than 22 variants were turned out in the new venture at Woodley, established by Charles Powis and his partner as Phillips & Powis Aircraft Ltd.

The *M.2 Hawk* developed into an eye-catching profile of tandem-seat streamlined neatness from the slim-cowled inverted inline and smartly trousered main undercarriage to the characteristically Milesian fin-and-rudder shape so noticeable in all the designs up to the *M.17 Monarch*. The exceptions, tail-wise, were both to be production versions of trainers for the Royal Air Force, the two-seat advanced trainer *M.9A Master I* and the military elementary trainer, the *M.14A Magister*.

For the *M.14A*, 'Magister' was, from April 1937, to be the official Service name approved by those at the Air Ministry with a grounding in Latin. The civilian name sprang from the latterday variants of the *M.2* which became the Hawk Trainer, a tailored version employed in 1936 at the Phillips & Powis-operated RAF Elementary Flying Training School, also at Woodley.

The Hawk Trainer II (the *M.14B*) was a comparatively rare bird and only a few were equipped with the alternative powerplant of the 150hp. Blackburn Cirrus Major inverted inline — the 135hp De Havilland Gipsy Major of similar configuration was fitted to

MILES M.14A MAGISTER

Charles Cain describes one of the most popular light aircraft from the famous Miles stable

nearly all of the 1,293 Hawk Trainer II's. Magisters produced between 1937-41.

A Hawk Trainer (construction no. 333) was selected for the modifications necessary to comply with the Air Ministry Specification T. 40/36 and this was followed in 1937 with an agreed production A.M. Spec. 37/37. Essentially, the changes amounted to a spatted undercarriage replacing the trousered main legs (and a tailwheel replacing the skid), cockpits sufficiently roomy to permit seat-type Service parachutes, a deepened rear fuselage and some change in the rudder shape. Only with the production Spec. 37/37 did the fin and rudder profile alter to its now familiar outline. And only in wartime did the Service demands for simplified maintenance rob the 'Maggie' of its pleasantly spatted look: an exchange that made the main legs look spindly and vulnerable.

In 1938, official spinning tests brought about the fitting of strakes forward of the tailplane — the 'rival' biplane *De Havilland DH.82A Tiger Moth* also had strakes fitted. The Magister was to be the first break with the long-standing biplane tradition reaching back to 1912. Despite the Air Ministry policy that all future Service aircraft should be of metal construction, the Magister was all-wood except for magnesium alloy castings (another 'first') for stressed parts since the *M.14* was specified as being fully aerobatic.

Needless to say, the Magister had its fair share of being a test vehicle. With the threat of invasion in the summer of 1940, some 15

'Maggiebombers' were created at Woodley by installing Light Bomb Carriers (up to eight 25lb. bombs) under the centre-section. Fortunately, this 'last-ditch' anti-personnel ploy never had to be implemented. Aerofoil devices were also tried and there were at least two devilish attempts to make young pilots old before their time. There was the Maclaren cross-wind undercarriage which Don Brown liked not at all. And then there was a fearsome Towed Wing Experiment of 1941 whereby slots were cut in the mainplanes to permit narrow booms to be anchored. Suitably wire-braced, these booms extended beyond a considerably enlarged rudder to an even larger twin-tail assembly. The idea was to use this ghastly arrangement to carry bombs or fuel to extend ferry range. In Alfred Price's *The Spitfire Story* (Jane's, 1982) there appears a line perspective of a Spitfire Mk. VIII similarly burdened, the projected nightmare being noted as 'the Malinowski Trailer-towed Fuel Tank'. By comparison the occasional post-war lapses into coupe enclosures and even smaller transparencies for racing purposes seem nothing more than delightful flights of fancy.

To end on such a note, the last word should be from Don Brown. In his excellent Putnam book he writes: "The ease of landing and safety of the Magister used to be well demonstrated (pre-war by younger brother) George Miles, who frequently landed with both hands above his head; and by Bill Skinner, the chief test pilot, who used to formate on other aircraft while flying the Magister inverted!"



After World War II a range of the more 'civilised' military types were taken onto the civil register and ex-service trainers and communications aircraft became valuable in the post-war re-emergence of British light aircraft activity. This Magister was seen at Redhill during the early 1950s.

The 1980s' survivors

The ravages of time and occasional misfortunes have reduced the roster of surviving Magisters Hawk Trainer III to five on the current UK Civil Register and around the same number in other guises. Additionally, in New Zealand, the Museum of Transport and Technology at Western Springs, Auckland, possesses ZK-AYW (construction no. 779 and RAF serial L8353) which became a civilianised Hawk Trainer III and was initially registered as G-AMMC. In Morocco, at Menara, Marrakesh, ex-RAF serial N3795 (c/n.843) survived into the 1970s as CN-TZE (previously FOAGQ and G-AIUC); and three Turkish-built examples were stored at Istanbul's Yesilkoy Airport. The oldest had been given a coupe top (c/n.35 TC-KAD); the other two, c/n.60 TC-KAY and c/n.78 TC-KAR possessed conventional open cockpits.

G-AFBS (c/n.539). Current UK Register. Part of Imperial War Museum Collection at Duxford; in RAF Trainer colours as G-AFBS prior to impressment in September 1940 as RAF serial BB661. First registered 17 September 1937 (CofA: 15.10.37) and used for training and communications by manufacturers at Woodley. For period from 21 July 1942, BB661 wore code letters FDT-A while serving, again, at Woodley, this time with No. 10 Flying Instructors' School. From No. 51 Maintenance Unit storage, 28 May 1946, BB661 was purchased by BOAC's Airways Aero Associations (Flying Clubs) and allocated in June 1948 the new registration of G-AKKU. During major overhaul at Denham Aerodrome, its true G-AFBS identity was revealed and restored on the Register. From 1952, G-AFBS was with the Denham Flying Club for a decade before being sold to a Blackbushe owner. On retirement, G-AFBS was secured via Graham H. R. Johnson for the Skyfame Museum at Staverton; and when this enterprise was disbanded, G-AFBS found its present secure public-viewing residence at IWM Duxford.

Top right: seen at the Miles Aircraft Reading plant June 1947, awaiting delivery to Denmark, this is one of the large number of re-conditioned Magisters delivered abroad after WWII. Right centre: one of several Magisters belonging to the Wolverhampton Aero Club, seen at Lympne in September 1946 for the first post-war Folkestone Aero Trophy races. Bottom right: Magister with bare undercarriage seen at White Waltham in January 1947.

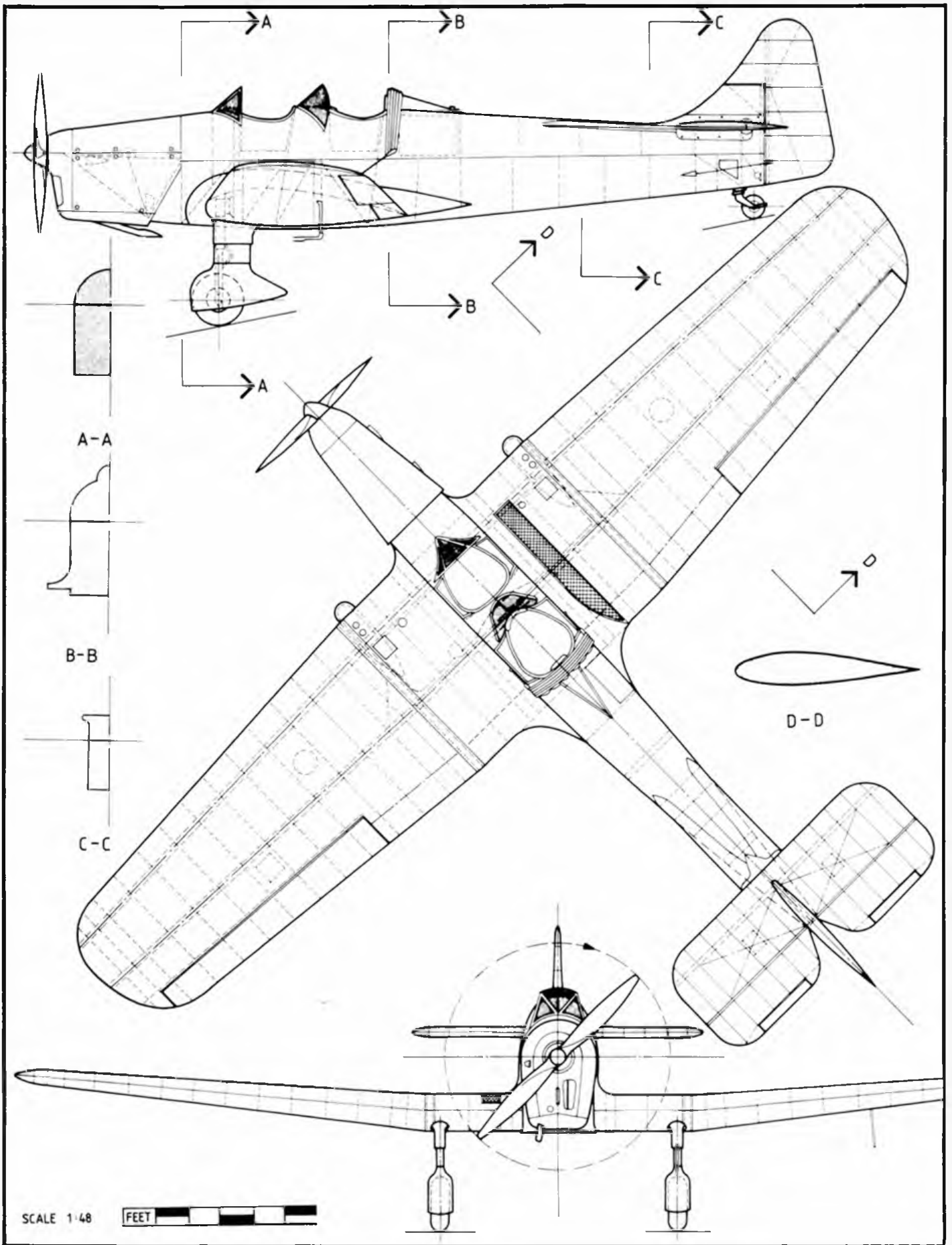
G-AHUJ (c/n.1900). Current UK Register. Built 1939, served as 'hack' with RAF squadrons, Nos. 604 and 137 with serial R1914. Registered as G-AHUJ on 6 June 1946 and used by several flying clubs to mid-1960s. Acquired in dismantled state by Strathallan Aircraft Collection in 1972 and gradually returned to full flying condition. Initial flight test, 26 June 1976.

G-AIUA (c/n. 2035). Current UK Register. Built in 1940 as T9768 and allocated in turn to training units. IN November 1946 became Hawk Trainer III registered G-AIUA. With the rear cockpit faired over, G-AIUA gained for S. M. Aarons the 1961 Norton Griffiths Trophy and the Air Racing Championship. After crashing at Roborough on 26 September 1965, G-AIUA was acquired, along with parts of G-ANWO (ex-L8262), by an owner intent on rebuilding. Since then the current owners,

The Shuttleworth Trust, Old Warden, have been proceeding with this intention. The remaining parts of G-AIUA ANWO are held by Sandy Topen. The Lincoln Field V. & H. Aircraft Collection, Bushey Hall School.

G-AJRS (c/n. 1750). Current UK Register. Built in 1940 as P6382 and allocated respectively to RAF Elementary Flying Training Schools, Nos. 16 and 3, till SOC (Struck off Charge) on 10 March 1947. After initial civilian acquisition, the airframe was married with parts of G-AJDR (ex-T9976) which in turn had already been married with the mainplane from G-AKMU (ex-L8349). The original fuselage of G-AJDR was burnt and the 'new' Hawk Trainer III was accorded its registration letters — even though the basic concept of veteran and vintage ancestry is to refer to the fuselage. Confusion continues. From 1954-57, the 'new' G-AJDR was at Renfrew with the Scottish Flying Club before joining its Denham counterpart. After an accident on 10 May 1959, the 'new' G-AJDR was given the wings of G-AIDF (ex-P6411) and a mere three months later, the port outer wing section was replaced by that of G-AJZH (ex-P2404). After spells at Speke, Christchurch and Shoreham, this pedigree-confused Hawk Trainer III came under the sympathetic ownership of The Shuttleworth Trust on 3 April 1970. After a major rebuild, it emerged in RAF Trainer colours and with the original 1940 serial, P6382, to delight successive years of flying display audiences at Old Warden then as now.





References and acknowledgements
 My old friends Don Brown and Alfred Price have already been mentioned in the main text, the name of Graham H. R. Johnson, too. He is important because not only is his support for the M 14 absolute but also he is the author of the only first-rate booklet devoted to *The Miles Magister* (Newark Air Museum publication). Sadly, this 1969 treasure trove is out-of-print. Of course, the late A. J. Jackson's *British Civil Aircraft*

since 1919 (Putnam) is a worthy source reference. Air Britain is a supreme fountain of knowledge and the Association's UK Register Historical Co-ordinator Bernard Martin, has provided the sleuthing required to untangle who owns what (parts of) Magisters. Grateful thanks also to Messrs J. A. Bagley, N. Franklin (Control Column, Newark Air Museum), J. J. Halley, D. M. Hannah and M. J. Hooks.
 C. W. C.

1/24th scale dye-line drawings of the Miles Magister are available from Aeromodeller Plans Service price 95p + 35p post & packing. Please quote plan no. 3058

G-AKPF (c/n. 2228). Current UK Register. Built in late 1940 as V1075 and served its time with the RAF's No. 16 EFTS till SOC in December 1947. On 27 January 1948 it was registered as G-AKPF. The latest owner, L. N. D. Taylor, has it in storage at Kingston, Cambs., and has plans to rebuild G-AKPF with parts from G-ANLT (ex-N3788, c/n. 836).

Those Magister Hawk Trainer IIIs not currently on the UK Register are as follows: **G-AKAT (c/n. 2005).** Built in 1940 as T9738 and registered 2 July 1947 as G-AKAT. Acquired in 1964 by the Newark (Nottinghamshire & Lincolnshire) Air Museum and can be seen at Winthorpe in RAF Trainer colours and with original serial T9738.

G-AKKR (c/n. 1995). Built in 1940 as T9708 and served with RAF units until SOC in June 1948 when registered G-AKKR until retirement in April 1965 and acquired by the RAF Museum. Confusingly given RAF serial 'T9707' when repainted in RAF Trainer colours for the RAF Review at Abingdon in 1968. At the RAF Museum 1972-82 until removal to the Manchester Air & Space Museum on 15 July 1982. Still 'T9707'. T9708 is said to have had parts of T9967 added to the airframe.

G-AKKY (c/n. 2078). Built 1940 as T9841 and serving with Nos. 16 and 11 EFTSs till sold in June 1948 to become G-AKKY. T9841 provides most of the currently serialised 'L6906' which was acquired by the Science Museum in 1980 through the good offices of Graham Johnson. 'L6906', now at Wroughton, was restored by the now defunct 49 Group Veteran Aircraft Association at Frenchay, Bristol, but



vandalised in 1974 and subsequently made good to static display status. The original L6906 of No. 3 Elementary & Reserve Trng. Sch. (ERFTS) was abandoned in cloud on 16 March 1938.

Miscellaneous. At Castlemoate House, near Dublin Airport, is a Magister in full Irish Air Corps colours as No. 34 (c/n. 1028, ex-N5392) delivered to IAC in February 1939. Also on display, in its original RAF

markings, in the Brussels Musee Royale de l'Armee, is T9800 (c/n. 2037 of 1940) which became SOC in October 1946 and went to the Belgian Air Force as an Instructional Airframe, serial TMR-50 and later G-1. It passed to civil use as OO-NIC from 1954-66 before being withdrawn from use. Finally, the famed Jean Salis Collection has in its Etampes storage L5999 (c/n. 431 of 1940) which after its RAF training service became SOC in September 1947 and was sold to Switzerland to become HB-EEB, the identity it retains while awaiting restoration.

Miles M.14A Magister: Design Data

Manufacturer Phillips & Powis Aircraft Ltd. (not styled as Miles Aircraft Ltd. until October 1943). Woodley Aerodrome, Reading, Berkshire, England

Category Military tandem-seat monoplane for RAF ab initio elementary training, stressed for aerobatic manoeuvres

Chief Designer Frederick G Miles

Powerplant (standard production M 14A variant), one De Havilland Gipsy Major Srs I air cooled, four-cylinder, inverted inline, delivering a direct-drive maximum 130hp for take-off at 2,350 rev./min. Propeller left hand turning (LHT); fixed pitch, two-blade wooden unit of 6ft 2in (1.90m) diameter supplied by De Havilland

Dimensions span 33ft 10in (10.30m), length 24ft 7in (7.50m), height (propeller horizontal) 6ft 8in (2.05m), wing area 176sq ft (16.30sq m)

Weights empty 1,260lb (570kg), loaded, max 1,900lb (860kg), loaded, aerobatic max 1,845lb (840kg)

Loadings max power 14.6lb/hp (6.60kg/hp), max wing 10.80lb/sq ft (52.75kg/sq m)

Military load In 1940 as an anti-invasion measure, a handful of Magisters were provided with two sets of underwing LBAs (Light Bomb Carriers). Each bomb rack could be fitted with four 25lb (11.35kg) anti-personnel bombs

Performance max speed 140mph (225km/hr) at sea-level; cruising speed 122mph (195km/hr), initial climb rate 750ft/min (230m/min) to 5,000ft (1,525km) at 70mph (113km/hr), service ceiling 18,000ft (5,485km), range 380 miles (610km) or 3 hours' duration with fuel capacity of 21 imp. gals (95lit) and 2.5 imp. gals (11lit) oil capacity, landing speed (with flaps) 43mph (70km/hr); take-off run 630ft (190m) and landing run (flaps) 420ft (128m)

Top: precursor of the Magister was the pretty Miles M2, seen here at Broxbourne in December 1946. Mr. Yveres Pougnet, seen here is preparing to take the aircraft back to France.

Above: Yet another civil registered Magister. Deletion of wheel pants and trousers was common.

Below: Magister of the Fairey Flying Club, White Waltham, Summer 1947. Aircraft crashed in September 1947 at Midhurst, Sussex en route to White Waltham from Cowes, I.o.W.

Left: Close-up of the Magister front cockpit shows uncluttered layout idea for modellers.



FREE SCENE FLIGHT

Tom Lawrie reports

1983 Scottish Nationals — 4/5 June

Newbigging is our Nationals venue. Situated in Lanarkshire, it's difficult to better because of its huge area. Entries this year were reasonable, but we always want more.

All FAI events are flown on Saturday in the usual rounds and from a line. Weather was bright and windy, the wind in an unusual direction causing odd turbulence and necessitating a reduction in the Max to 2:30 for the weekend.

A/2 Glider produced a crop of maxes but no perfect scores. Winner, Ron Sabey, dropped only 30secs, despite conditions. In second spot Brian Baines had problems with the turbulence despite having the only circle tow model there. Junior Richard Eland worked well for the third place, he had his model returned next day by a local farmer. Winning A/2 is a 'Witchita' with added ideas by Ron.

Wakefield had its own problem with lift being specially difficult to find. Russell Peers strung together maxes in the last three rounds to win the event. Brian Martin, who always does well in this event took second place using his North Korean based design. Highest placed Scot was Tom Lawrie in third place. Russell's winning model has a high aspect solid balsa wing.

FAI Power was a total flyover for Ray Moore without even token competition from the Scots, we must do better next year.

Sunday's Mini and Open Events had a complete change in wind strength and direction. Nothing daunted 'Mini' entrants pressed on till early afternoon when Richard Sheen proved to be in first place making up for bad luck in A/2. Richard Eland and Russell Peers were neck and neck till the last flight when Russell went ahead to take second place leaving Richard a well earned third.

Open rubber winner, Tom Lawrie, with his Skywalker model at the 1983 Scottish Nationals.



Russell Peers preparing his Woodpecker prior to scoring his hat-trick of Open Power.

Open events were favoured with a bright warm spell in the early afternoon. As a result half a dozen people were in a position to cause a fly-off in Glider if they maxed with their last flight. It was not to be as turbulence and assorted problems took their toll leaving John Abbey to win with the only perfect score. Ron Sabey slipped into second place leaving local lad Dave Hambly a close third. Open Glider, as usual, proved the weekend's most popular event.

Open Power was whittled down to a fly-off between Ray Moore with an 09 size model and guess who, Russell Peers with his 'Woodpecker'. The fly-off coincided with the coldest part of the day and had Russell clear five minutes with a copybook climb and glide. Ray conceded victory as obviously his much smaller model was no match in the conditions. Incidentally this is Russell's third time winning the 'Flying Dutchman' Power Trophy.

Scottish Power hopes would not rise above joint third place — next year?

In contrast Open Rubber had an all Scottish entry with most flying done in the bright period early on. Third place Jim

Results

(MAX 2:30)

F1A (11 entries)

1 R Sabey	12 00
2 B Baines	10 45
3 R Eland	9 58

F1C (1 entry)

R Moore	5 37
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Mini (10 entries)

1 R Sheen	8 55
2 R Peers	8 09
3 R Eland	7 32

Open Power (4 entries)

1 R Peers	7 30	5 10	4 0
2 R Moore	7 30		
3 G Blair	2 30		
D Hearne	2 30		

Best Junior — R Eland

Open Junior

1 D Donnelly	6 25
2 R Bhatti	5 52
3 D Arnott	2 16

F1B (6 entries)

1 R Peers	11 08
2 B Martin	10 54
3 T Lawrie	8 42

Open Glider (14 entries)

1 J Abbey	7 30
2 R Sabey	6 52
3 D Hambly	6 41

Open Rubber (5 entries)

1 T Lawrie	7 07
2 T McLaughlan	7 06
3 J Arnott	6 48

Arnott did some tactical retrieving but found a Newbigging hole on his last flight. Runner up Tom McLaughlan easily climbed highest but came down just one second too fast on his last flight to give first place to Tom Lawrie whose last flight coincided with the end of the contest. A very close finish to a good weekend of flying.

As usual the prize-giving rounds off the day with Ron Sabey orchestrating the affair, as he did all weekend, in his usual competent manner. Prizes range from the Annual awards to a modelling Lucky Dip for the lads. Something for everyone a fitting round-up to an enjoyable weekend. "Thanks to all who helped and/or competed."

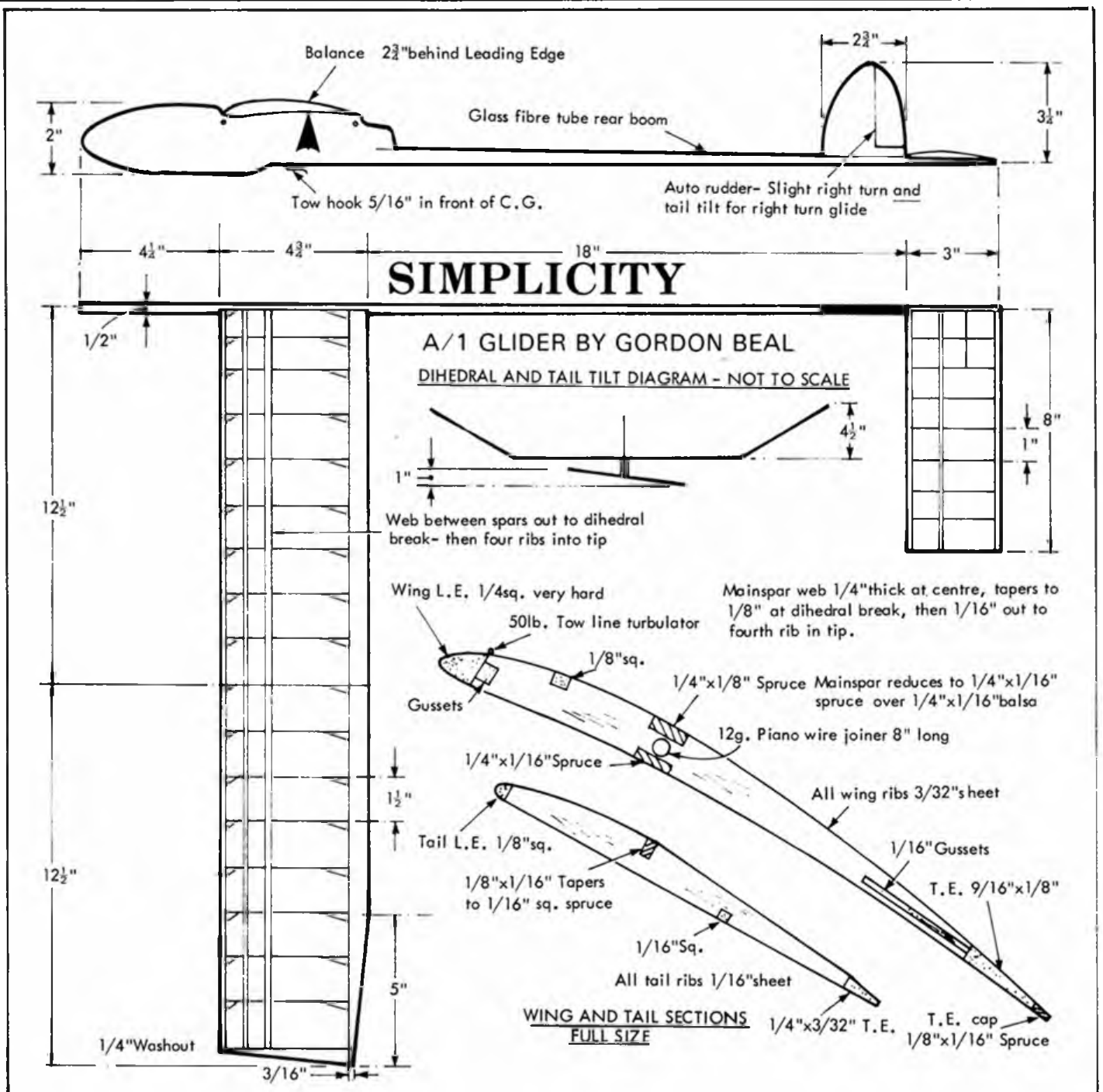
Dave Hipperson reports

Crookham Gala ... Beaulieu ... July 10, 1983

Substantially more people attended and flew in this event than had graced the proceedings a fortnight before at the same venue. The four events drew large fields the particular surprise being Open Power which always seems to find greater favour in the South. The very hot and muggy conditions with considerable heat haze all day made long retrievals very hard work even though distances were hardly vast in the 10-15mph breeze and well within the confines of the best direction of Beaulieu Heath. John Williams did well to qualify for both the Open Glider and Combined FAI flyoffs with an A2, and Carter also made six maxes look easy in Rubber and Glider. Most others called it a day at one flyoff and spent the day testing over the forgiving terrain.

It was a flyoff contest and the organisation put back the schedule to a more realistic 7pm and ran the classes in a sensible order. Combined FAI proved to be a battle between two Wakes and Williams' A2. John flying later than the rubber models and finding a very gentle patch of lift that the Wakefields missed. The five-way Power flyoff was led by Screen who climbed to an enormous height and seemed to glide off into the distance—the drift was now 5-10mph. However, his model did descend and the later flights of Hopper and Peers which climbed less high gained on the glide in the buoyant evening air that Beaulieu is famous for. Peers had quite a modest climb but glided beautifully and failed to better Screen only by one second. Hopper's model had much more height and topped them all by 30 seconds with a flight of well over seven minutes which reached the limits of the Heath and was rumoured to have actually found a corn field which were thought non-existent in this part of the world. As at the Nats, Ken Faux's super fast model, which always looks so promising came a little off the rails and recorded a flight that could have been two minutes better had the climb not flattened.

By comparison Open Glider was rather anti-climactic even if exhausting for the ten participants. It was 7.45 and the drift was dropping, only 5mph now. To tow for 15 minutes through scrub and gorse bush is a problem. Some did almost that but of the pack of A2's, only Drew found good air and following him closely the consistent and distinctive Open Model of John Carter



which flew last. No one broke three minutes and the top four times were very close.

Last class to go was Open Rubber — it had been held till 8.15pm — which was about the limit of the good daylight in the hazy conditions but popular with most contestants although some quite locally travelled were complaining that they would be home late! It was now very calm and those away early — most of the seven participants — contacted helpful and slow moving air. Times varied between 5.43 and 7.46 apart from Carter again who had a magnificent 8.29 down and nowhere near the edge of the Heath. He was in contact with upwind by CB as he retrieved and followed with glee the incidents that beset Hipperson as he blew two consecutive motors at full turns. (John Carter had had his motors in a freezer until 30 minutes before his flight). Eventually Hipperson managed to get a motor to hold to full turns and flew within seconds of

the final hooter. The very light aeroplane produced the goods to order but it was too late for the best air and drifting faster than the earlier models he had to be content with second again. The host club presented excellent trophies and plaques to round off a very well run day.

Results

Open Glider — 19 flew (10 in flyoff)		
1 E Drew	B&W	9 00 + 2 49
2 J Carter	Falcons	9 00 + 2 48
3 G Pink	B&W	9 00 + 2 42
Open Rubber — 9 flew (7 in flyoff)		
1 J Carter	Falcons	9 00 + 8 29
2 D Hipperson	Grantham	9 00 + 7 53
3 G Sharp	Croydon	9 00 + 7 46
Open Power — 12 flew (5 in flyoff)		
1 J Hopper	Freebird	9 00 + 7 18
2 S Screen	Birmingham	9 00 + 6 43
3 R Peers	Falcons	9 00 + 6 42
Combined FA1 — 14 flew (3 in flyoff)		
1 J Williams	Freebird	15 00 + 3 01 (A/2)
2 R Miller	Croydon	15 00 + 2 38 (Wake)
3 P Uden	Crookham	15 00 + 2 29 (Wake)

Simplicity — Gordon Beal's Nats 83 winning A/1

Gordon is no newcomer to aeromodelling as those who were flying in the 60's will remember. However he has had a complete layoff since then until a couple of years ago. This design is the fourth generation of a model he started to develop right back in the days when A/1s were restricted to a weight of 5 1/2 oz. He was surprised by the new rules and had to hurriedly ballast up his old model.

This did no harm to the glide but made the circle hook he had so carefully created, before he came out of hibernation, almost useless! The additional weight also gave numerous fuselage breakages as at this time the design used a balsa boom.

On MkII Gordon returned to a straight tow layout but this model was badly eaten by horses at a Northern Area Winter Rally and then its predecessor was lost at the '81

Morley Club Mini meeting. The replacement, MIII, had a glass fibre boom which solved the fuselage breaking problems but this model was never quite as positive in wind. A nylon turbulator made it steadier and certainly good enough to be lost permanently from Hemswell at the SMAE Mini Meeting of that year.

MkIV with a stronger wing replaced it immediately but incredibly this version was, to use Gordon's own words, 'worried' by a dog before it was trimmed. This was an upsetting incident and the model was put aside and replaced by MkV complete with Hatcheck circle hook. MkV was looking promising when it was lost from Driffild early this year leaving no alternative but to resurrect, repair and re-trim the dog chewed MkIV and in a hurry as the Nats were only weeks away. Since his win, Gordon is now unsure whether circle tow is really that necessary or even desirable on an A.1.

Simplicity 4 is just as its name implies but as illustrated by Gordon's development notes it has had the bugs ironed out of it over a few seasons of intense activity. The well thought out constructions allowing all weather flying mostly through the strong but flexible wing. What Gordon still has to perfect is an infallible way of avoiding his models being mistaken for animal food. Perhaps there is an animal repellent spray?

Martin Dilly reports

F1A Glider wing failure from rust

Long-term readers of Free-Flight Scene will recall that some years ago I reported on the Czech-produced kit for the Pavel Dvorak-designed *Saper* F1A glider that won the 1971 World Championships. With a rather fragile-looking structure, my own version has proved itself well able to handle the sort of towing loads that I subject it to with no effect apart from a harmless but alarming-looking bowing of the long tapered wings.

The flat centre-section panels of the *Saper* wing use spruce spars 5 × 3 and 8 × 3mm, set vertically and threaded through the centres of the ribs; these spars each have a length of .013in. (0.3mm) steel wire epoxied into a shallow groove in their lower edges, and they are then heavily varnished. I used several coats of banana oil on mine. To withstand the higher loads of present-day circle towing, which was barely known in 1971 when Dvorak first flew his *Saper*.

I added a stub spar of spruce on the upper surface of the wing at a point between the mainspars and used spruce diagonals running down and outwards from its outer end to take bending loads into it from the other spars. It also transpired that the bending of the centre section, which I had covered with model span would split the covering on the lower surface between every rib bay during a hard launch. The tip panels were covered with the long-fibre Mikelanta tissue and survived unsplit, but I recovered the lower surface of the centre panels with Klaus Salzer's Polyester-Vliess, which is a synthetic material with long strands of polyester fibre running spanwise about 3mm apart. A top layer of lightweight Modelspan smoothed the surface a little.

Another in-service modification that became necessary on the *Saper* wing was to

add 18swg dural root ribs to the ply ones the original uses. Wing fixing is by a dural tongue which slots into three 2mm ply ribs with no box. Another hard launch during a gust at Everleigh split these ply root ribs, suggesting the dural ones should be added.

In spite of its rather un-British appearance, my *Saper* survived about eight years of contest flying, including a stay of four months in a wheatfield at Bassingbourn, which left it mildewed but still flyable. The Polyester-Vliess has proved almost bullet-proof, surviving several D/Ts onto the maize stubble of Poitou that left normal covering looking decidedly flak-damaged. At last, during a gusty day at Woodbury Common, I got slowed up in the gorse and the *Saper* wing finally gave. A careful examination of the break showed that one of the spar reinforcing wires had snapped, letting the spar buckle and the rear spar then also buckled, but with its wire still intact. Adjacent to the broken wire on the surface of the spar was a distinct rust-mark and, sure enough, on the wire itself was some surface corrosion. But for that, the wing might have survived.

Using steel wire like this certainly looks like a good way to resist bending loads on a glider wing. My next *Saper*-type wing may use some of the Red Baron Models' carbon fibre strip laminated onto the lower surface of the spar, instead of the wire; meanwhile, if any importer wants to bring a good A/2 kit into the country, Igra's *Saper* looks like a good one.

The ultimate Snoopy Timer?

The somewhat unlikely combination of HLG flyer Mike Stoy of the United States and fellow countryman and CIAM noise sub-committee chairman Don Lindley have come up with another modification of the basic nylon drive used in many of the cheap plastic toys on sale in department stores and toyshops. Basically their timer consists of the lower two 'decks' or pivot plates of the drive mechanism, with the upper deck removed, along with the clockwork drive spring.

Instead of the original spring, the Stoy-Lindley timer uses the tension of the tailplane hold-down, or a light rubber loop in the hold-down line, to power it. A ply spool is fitted to the drive shaft, with a radial pin on which is slipped a small loop on the end of the hold-down line; the stretched rubber loop (the original used indoor rubber) is then wound round the core of the spool as the timer shaft is wound up. The waggler on their version is modified by adding a small solder blob on a pin which is carefully bent to clear the various other gears and internal workings of the mechanism, so that there are no moving parts, apart from the spool, on the surface of the timer.

On my version, the timer is held stationary by a length of 18swg tubing which slips over the radial pin and through a couple of suitable loops adjacent to the timer; a flag is attached to the tubing to prevent launching the model with the tube *in situ*. I have also moulded a celluloid dust-cover for the timer workings. Total weight is just over two grams! Running time is in theory limited only by the length of the rubber loop, which should be kept as light as possible to avoid distorting the drive spindle and jamming it in its bearing.

After the various modifications are finished and the mechanism runs freely, the

plates are welded together with a soldering iron to prevent further unwanted movement. With timers available at this weight there is now no reason for even Coupe d'Hiver models to use a fuse. Price of a suitable toy from which to start converting is sometimes as low as 60p.

In order to keep down the loads on the timer shaft you may prefer to use a secondary trigger which actually retains the tailplane in the glide position. Thanks to the miracle of moment arms, a system like that shown in the diagram will let you use a strongish pop-up band while keeping the actual pull on the timer low.

World Championships News

When the Australian venue for the 1983 World F.F. Championships was announced, it looked as if there would be no participation by the Eastern bloc nations, because of problems with convertible currency and the lack of their own airlines flying into Australia. Latest news is that there will be an entry more representative of the world's best, with the USSR, Yugoslavia and China taking part, as well as 17 other nations. Surprisingly, the only South American nation announcing its entry is Argentina.

Our own team has the kind support of Humbrol Ltd., and of Land Rover, who will be supplying a 109in. Hard Top Land Rover with a 3.9D engine for the use of the team during the Championships. Much of the rest of the sponsorship effort has been on an individual basis, with employers, trade unions and parish councils all helping to lighten the financial burden whereby each of our team members must find in excess of £650 for the privilege of representing Britain against the world. I am astonished that British industry, especially the aerospace industry, seems to have so little interest in encouraging the sort of qualities, initiative, lateral thinking and practical problem-solving skills that are the heart of competition free-flight. At the grass roots level, could I thank all those who have contributed to the SMAE free flight team travel fund or the HOTTA appeal and organised jumble sales to raise funds, as well as those members of the model trade who were kind enough to donate goods for raffles. By the time this column appears the British team will be en route for Sydney, via Malaysian Airlines.

Do it in the park

One of the reasons that free-flight is so little known by the great British public is that any sort of flying with high-performance aircraft must take place on usually fairly removed airfields or open spaces, simply to contain the likely flights. The fact that the sort of powered R/C flying that is seen by the public often disturbs them, hardly helps the general image of model flying. How about some enterprising clubs organising contests (with the support of local council recreation committees perhaps) for limited performance silent aircraft? An 18in. maximum dimension and a commercial plastic propeller has been tried by some clubs and seems a good start, but please let us have your ideas, so we avoid annoying local variations that deter wide popularity.

Running an event like this in a park where people will see that there is more to model flying than they thought, can only be a help to model flying in general and free-flight in particular.

Your full-size
plan feature

TOP PERFORMANCE
A/1 FREE-FLIGHT GLIDER
FROM DENMARK

HOT MAX & SUPER MAX

By
Jorgen
Korsgaard



THE FIRST 'SUPER-MAX' was designed, built and flown during 1979, following my club's basic ideas on a tough A-1 Glider model based on our novice model used for years. The model had constant chord wings, a simple fuselage and the Koster 66 airfoil which is superb for these small models — with and without turbulator. The new 'Super-Max' performed well and one of the juniors (16 year old Heinz Lorenzen), actually won most of the contests with it. Indeed, he insisted we called him 'Sir' after these successes!!

I then stretched 'Super-Max' to produce 'Easy-Max' (I got tired of Wakefield flying) in an effort to give 'Sir Heinz' some more serious competition. This was in 1980 and the new model did the trick.

I won 'Jyllandsslaget' — the famous international free flight contest in Germany with a full house, the Danish nationals, etc., with the same model and a new, further developed version called 'Hot-Max'. The latter employed tapered tailplane, lots of webbing and diagonal bracing.

I was, and still am, impressed with the performance of these small gliders — their ability to be catapulted off the line gaining height and very fast transition into the glide without severe stalling. We use *no* circle tow units, just a plain hook, the right amount of wash-out and a very small tendency to go to the right on tow. The only disadvantage is the lack of facility to thermal hunt with the model on the line — you can only tow straight ahead. Thermals must be detected from the ground or by 'piggy backing'.

The best version of the 'Hot-Max' was with square tailplane and slightly larger tips, built in 1981 and won me the title again! This model and the latest 'Super-Max' are shown on the plans. The latest 'Hot-Max' was lost at the nationals in 1982 (I/T'd but went OOS) where I placed third. Heinz won with his new 'Super-Max'.

Some of my fellows do not bother to put in all the diagonal bracing as I do, but the surfaces still stay true.

All in all, in Denmark and in my club I think about 20 'Maxes' have been built since 1979 and more are under construction now. The models have won the Danish nationals in 1979, 1980, 1981, and 1982 and a lot of other contests.

I think the A-1 class (FA1: F1H) has a lot of appeal to youngsters. We have seen up to 25 participants in some of the contests over in Denmark and most of them being from 15-18 years old. My club fellows (15-19) no longer build any A-2 gliders with the CTU, etc., they just find the satisfaction flying A-1 and they do it well, as you can see.

Wings

These are very strong, with lots of webbing. This goes right to the tip being thinner outboard, starting with 2mm balsa and 0.5mm ply, ending up with 1mm balsa in the tips. Full depth diagonals help against twist and flutter. A finished wing panel for Hot-Max, including all this wood, weighs 30gms. Super-Max panels weigh a little less. Main spars are spruce in the inner panels and medium to hard balsa in the tips. Leading and trailing edge are hard balsa and medium balsa and the balsa webbing is medium to soft with grain vertical (of course). The wings are covered in Mike Woodhouse's light Japanese tissue and given six or seven coats of thinned dope (zapon-lac). The right tip has 2mm washout, the left, 4mm, with the inner panels flat. The wing joiners are two pieces of 2.5mm piano wire going into 2mm ply ribs with no tubes.

Tailplanes

They weigh about 5 to 6 grams finished and are built from medium to light balsa with a small spruce piece at the leading edge to prevent the rubber bands from cutting in. They have no warps.

Turbulators

These are made out of 30lb. Dacron line and glued onto the leading edge. We don't know if they help any; we have never flown these models without. But Peter Buchwald — our aerodynamicist — says that after wind tunnel testing the Koster airfoil *with* this turbulator is superior to the same airfoil without turbulation.

Fuselages

These are nearly the same, only differing in the distance from wing trailing edge to tailplane leading edge. The fuselage is glued together with white glue. The spruce

'longerons' are tapered from 2 x 5 mm to 1 x 3 mm to make the tail end light. If you don't do this, you'll have to put a lot of lead into the nose. The fixed ballast is mounted before completing the glueing. When the glue is dry the facing ribs are put in place, and the fuselage is then carved and sanded to shape, then covered with thin tissue. The position shown should give a very straight tow. As we have no PTFE tubing, we have all the lines going outside the fuselage constrained by three small aluminium tubes. These lines are easy to repair and ensure the fuselage has a turbulent boundary layer... (Ha-ha! (Second — editorial — joke: no trees in Denmark!)).

Trim

This is done with the CG in the right place and by adjusting the tailplane trailing edge together with the auto-rudder, so that the model will fly in medium sized circles so that it 'bumps' instead of stalling when disturbed.

Now go and build some A/1 models! I hope these words and drawings may give you some food for thought.

BOORAY

REVISITED

BOORAY HAS ALWAYS had a special place in my heart as a Goodyear model for it has been the design that has provided my peaks in achievement in this event. It was the design which John Daly and I used to win our first ever Goodyear contest in 1970, to place 3rd at the 1971 Nationals and to win the 1975 Marathon. Now it is the design that Ed Needham and I have used to win at the 2nd SMAE Control-line contest at Hullavington this year and in the process, set a new SMAE heat record of 4:00. Sadly in practice at Three Sisters during the International a double-line failure ensured a lovely, long glide to its comprehensive destruction; a sad end for a fine model.

The 1971 'BooRay' which was published as an APS plan did not have a very accurate scale outline due to lack of a good 3-view drawing. Some time later, authentic drawings became available, and were used to prepare my 1975 model and for the one presented here. All three versions of the model have had one thing in common, they have been 'rock steady' in handling, an important characteristic in my early days as a pilot and now equally important because 'BooRay' 1983 lightens by about 80gm and its CG goes forward by about 5mm during a race for reasons that will be explained in this article.

If you think that the design has a long history, then the motor we now use is almost as old. It started life in 1975 as a Mk II Rossi 15 FI Normale glow motor. John Daly converted this to a diesel for F2C Team Race use and late in 1976, now with a Rossi diesel liner rejected by Henry Nelson as scrap (thanks Henry), we used it to set a SMAE F2C heat record at 4:03. Good motors get used and quite naturally the piston/liner fit eventually became too loose once more, but because glows had arrived in Goodyear and Nelsons in F2C, the Rossi was confined to the 'loved but useless' box.

Came 1983 and my return to the UK and a new team-mate, Ed Needham. Ed has a distinct love for Goodyear, so we decided to give it a go. Out of the box came the Rossi for its liner had been chromed in the meanwhile. A hone job on the liner enabled the piston to fit it once more so we had a runner, but to compete with the Nelson 15D FI motor which had become 'the' motor in Goodyear, we had to extract the maximum possible BHP from the Rossi. A 10mm ID venturi, crankcase pressurised fuel feed and a Nelson type two-part aluminium head was the approach we selected: a good decision for one of the most powerful Rossi diesels in the world today has been the result.

Such an approach gives the BHP but also gives problems at the pitstops, especially when the tank has to be refilled. The problem is that the amount of prime available for the re-start cannot be metered,

Dave Clarkson presents drawings for the 1983 version of his successful Goodyear control line racer and outlines his techniques

but is dictated by the pressure in the tank at the time. Usually this means too much prime at a non-refill pitstop and not enough prime at a refill pitstop. We have perfected non-refill pitstops by doing two things, both of which are mechanical features of the model. The first is a thick wall (5-litre oil can tinplate) tank that does not inflate under pressure thus reducing to a minimum the amount of fuel the tank 'dumps' into the motor when the tank is depressurised by opening the shut-off. The second is the use of a two-tube crusher shut-off with button reset through the model side check that seals equally and tightly both the pressure and fuel lines when 'fired' and which can be reset immediately before the prop is hit so as to ensure instant starts. Since 'BooRay 1983' has a 100cc tank, sized to carry enough fuel for half of the warm-up and one entire heat, we spend very little time out of the air in heats and thus our heat times. The one re-fill pitstop in finals was a problem but a solution is emerging and final times near to 8:10 should come. Our philosophy is that if you don't get into finals you can't win them, thus our problem solving order.

In case anyone wants to follow our approach to the Rossi FI in Goodyear, Ed Needham is a good source for heads, venturis and tank filler and vent valves in addition to the teamrace wheels for which he is rightly acknowledged to be the 'UK' source.

The fuel we use and recommend is 50% paraffin, 35% ether and 15% castor oil, plus 2.5% IPN and 0.2% lubrizol 52 (a widely used anti-carbon additive). To turn BHP into airspeed we use a Tornado Plasticote 7-6 copy made by Graham Howard in epoxy carbon-fibre and worked up to 165mm diameter and 155mm tip pitch measured on a John Feeney pitchgauge. Obvious areas for experiment are less oil, more ether and less pitch for our airspeed is not the highest in the UK at the moment and we cannot depend upon winning races on the basis of less ground time. That big, heavy tank (take-off weight up to 150gm) certainly hurts the airspeed,

but it cannot be avoided in our approach to Goodyear.

The Model

Now, at last, to the model. As you will see from the $\frac{1}{2}$ -size plan, it has an old-fashioned 'plank' fuselage if only because there is no way that a 100cc tank can be hidden inside a 25mm wide hollow fuselage. 'Plank' fuselages are easy to build and are sufficiently strong and stiff using the construction shown. Note that the 12 x 3mm spruce reinforcer strips and the 12 x 2mm hard balsa core strips terminate before the rear end of the fuselage and are replaced by soft balsa where shown to keep the fuselage rear end light whilst retaining fuselage strength where it is needed. This is because 'BooRay' has a long fuselage and a short nose — a good recipe for a 'tail happy' model. For the same reason the fin and tail are from soft 3mm balsa sheet edged with 3 x 3mm spruce strips for reinforcement; their low aspect ratios give sufficiently stiff results despite their slender sections. A light rear end to the model is essential, both to aid a reasonable CG location and to minimise rear-end inertia and thus fuselage breaking forces in the catch.

Quite the opposite applies to the front end of the fuselage where stiffness and strength are vital. Thus the long 12 x 10mm beech bearers and 3mm thick steel engine mounting plates together with full depth 1mm ply doublers and the 12 x 3mm spruce reinforcer strips and the 12 x 12mm hard balsa core strips running right to the back of the motor.

The undercart shown is from 1.5mm Titanium sheet pivoted by a 6BA bolt through a 25 x 20 x 3mm ID tinplate box epoxied in the fuselage immediately underneath the bottom bearer and reinforced by a 1mm ply plate thickened with 3mm balsa sheet. Shock absorption is provided by filling the tinplate box with a piece of 3mm sheet rubber which has an undercart leg top shaped cut out. I like this

Continued on page 497

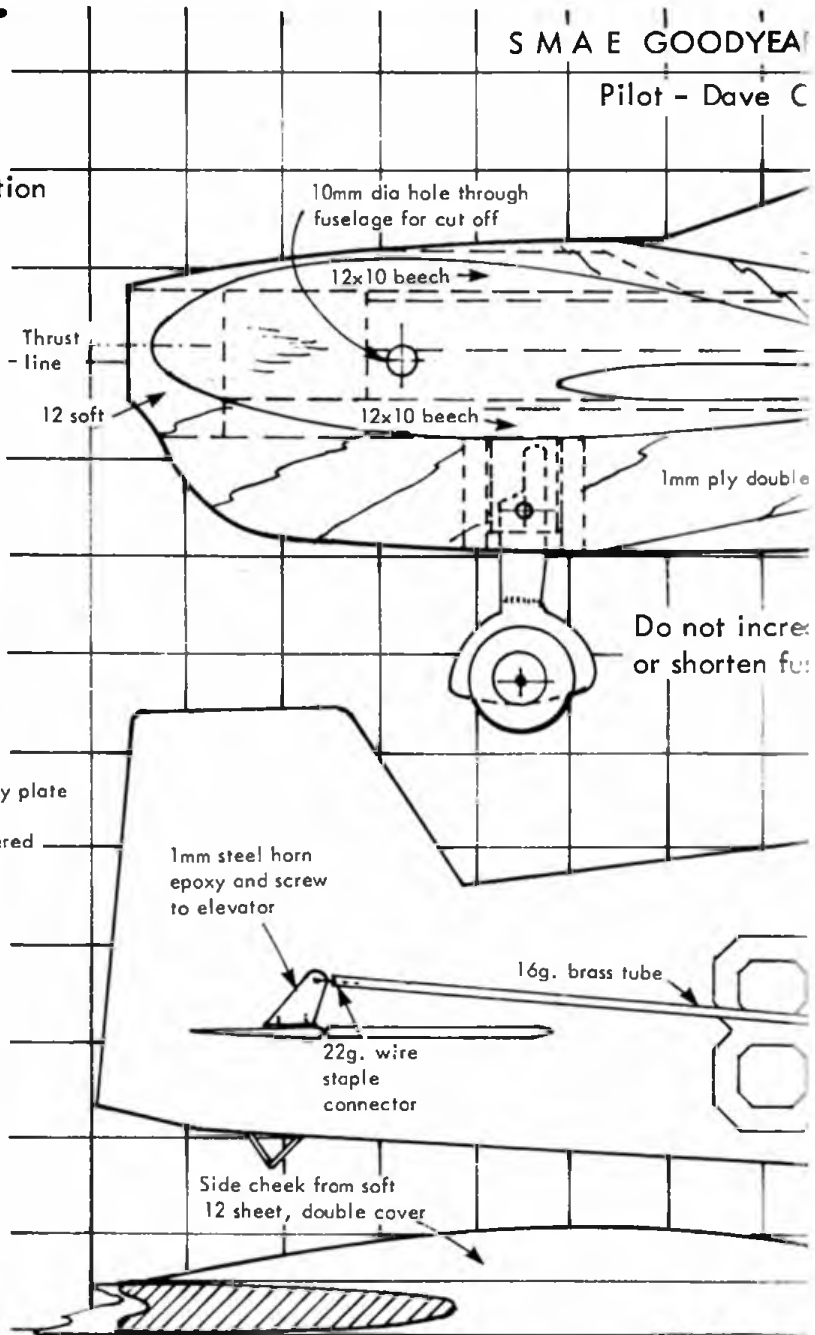
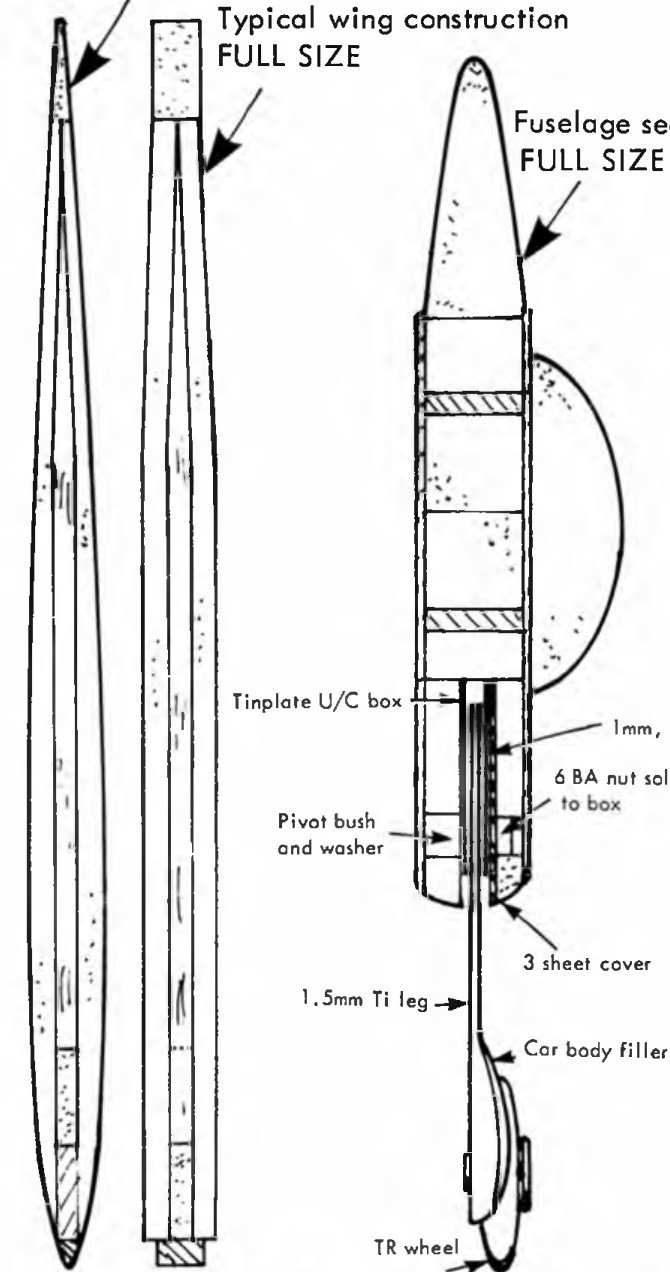
Hollow wing section FULL SIZE

Typical wing construction FULL SIZE

Fuselage section FULL SIZE

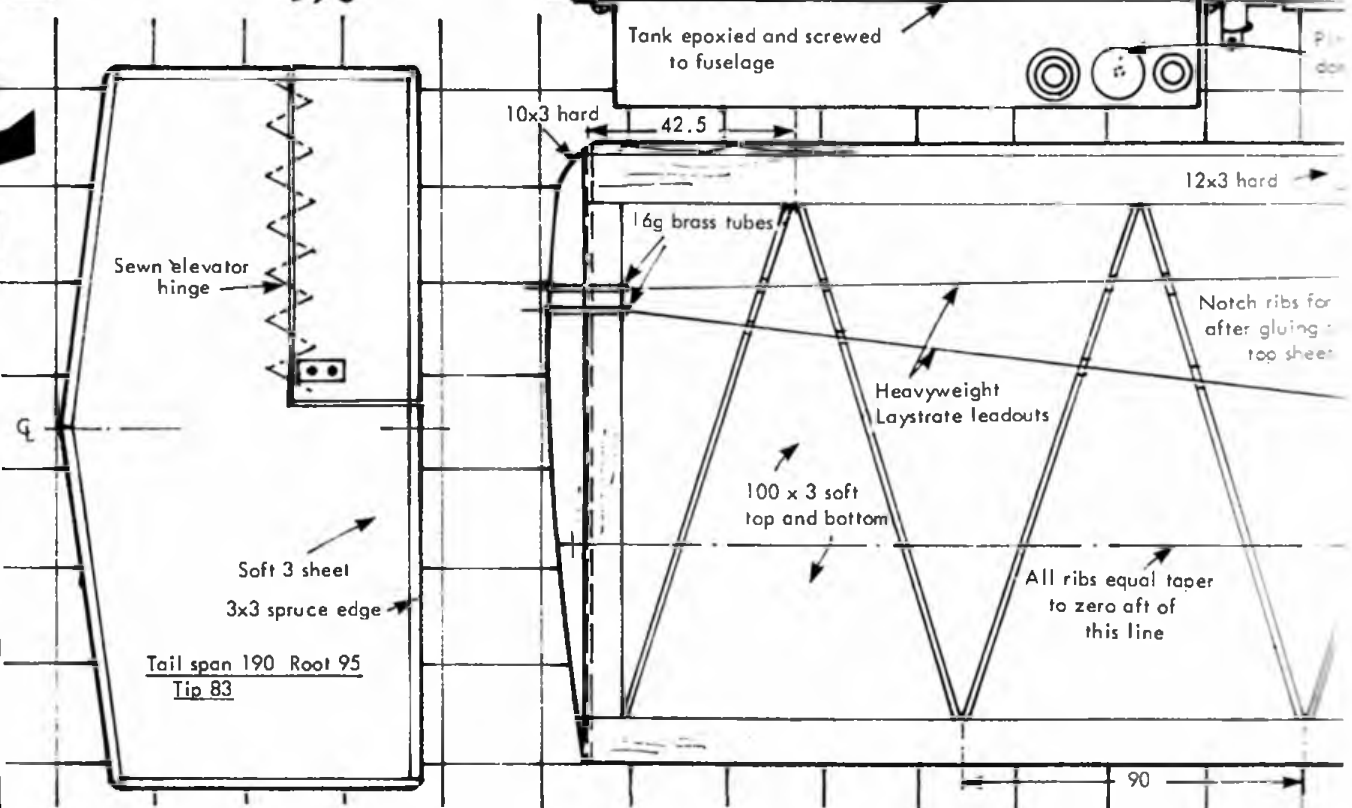
S M A E GOODYEAR

Pilot - Dave C



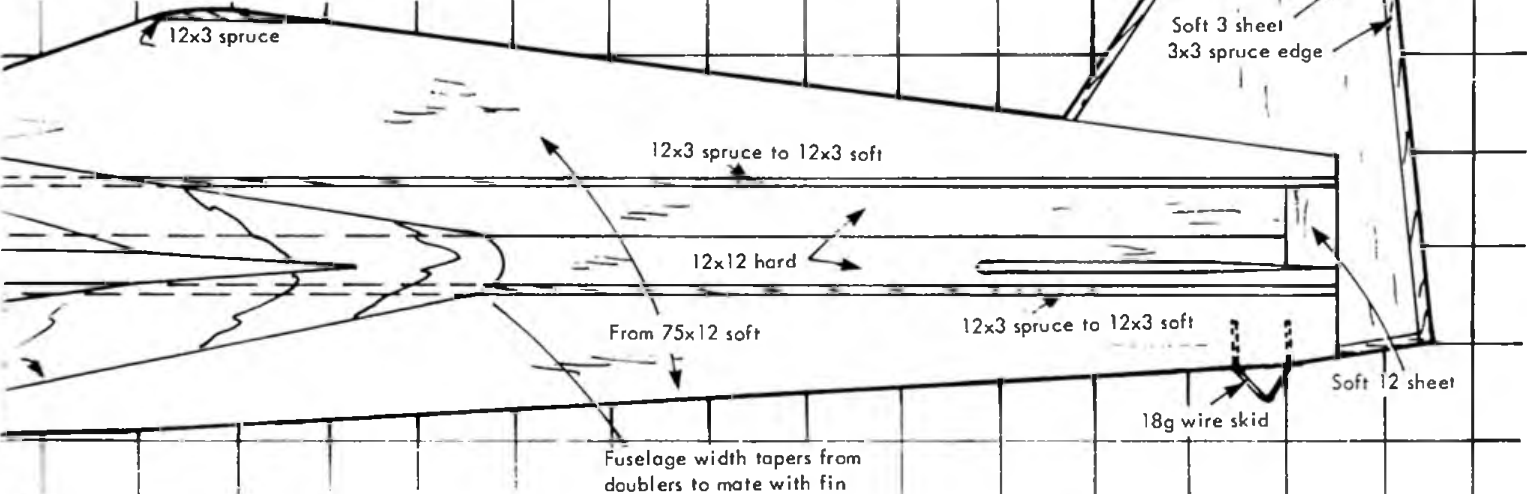
Do not increase or shorten fuselage

BOORAY



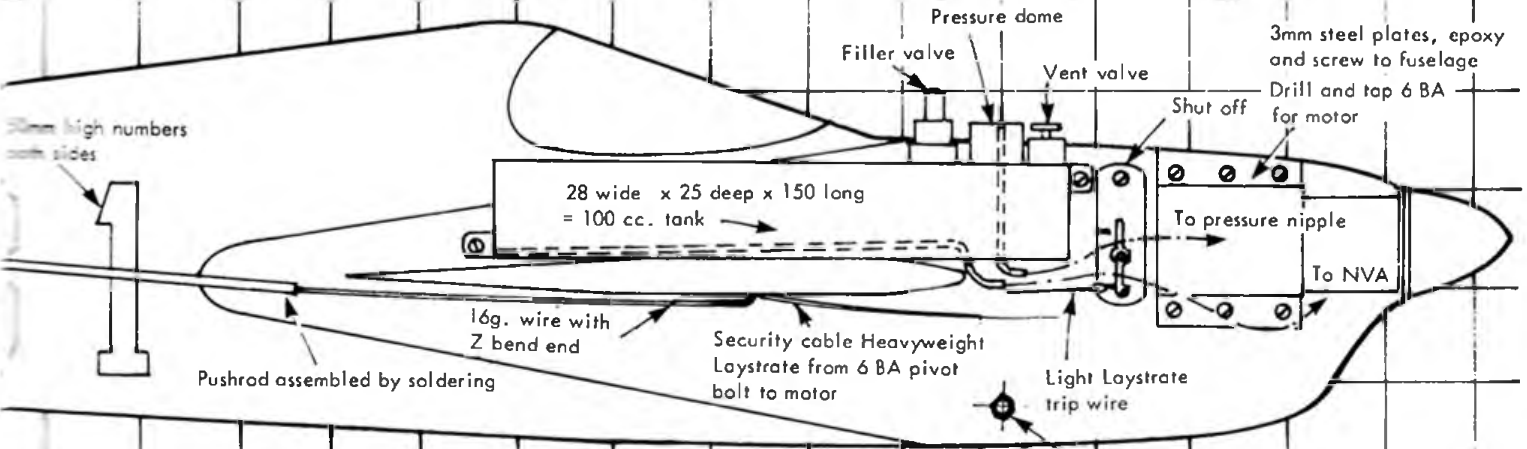
MODEL LENGTH 560mm SPAN 600mm.

arkson Mechanic- Ed Needham

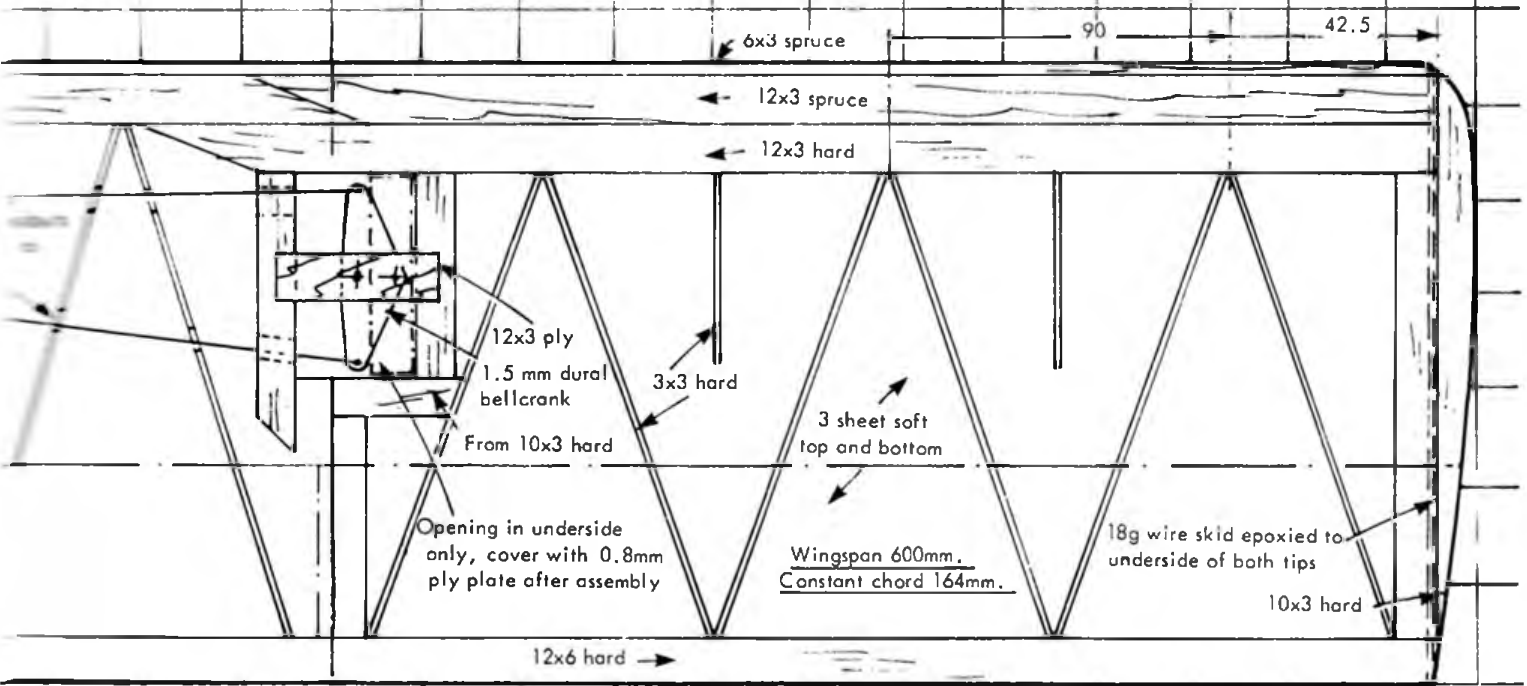


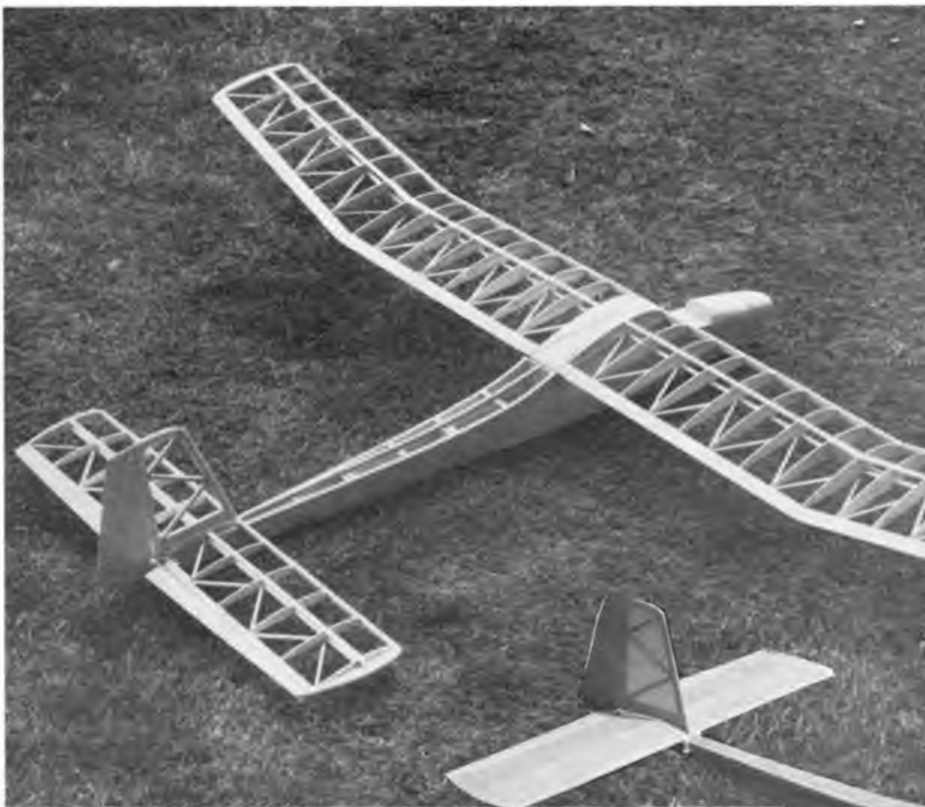
se span, reduce chord, enlarge tail, reduce fuselage depth
age, since all permitted deviations from scale are used.

ENTIRE MODEL COVERED IN 20g/m² GLASS CLOTH
MODEL SHOWN FOR ROSSI 15D F1 MOTOR USING CRANKCASE PRESSURE FUEL FEED



HALF FULL SIZE SIDE AND PLAN VIEWS
ONE INCH SQUARES





Built and flown by
VIC SMEED

KIT REVIEW



KESTREL

THE CAMBRIA KESTREL is a straight-forward, no frills kit of potentially excellent performance at a very reasonable price; the only 'extras' needed are covering material, adhesive, and, of course, R/C gear, although the model can quite safely be flown free flight. A very good full-size plan combined with a most detailed instruction booklet should leave very few snags for a beginner who has taken the trouble to read a basic book on building techniques. The design itself is excellent.

Construction begins with the fuselage and a complete beginner might have had a little bother here, since one pre-cut $\frac{1}{16}$ in. side was considerably harder than the other,

making it almost impossible to produce a symmetrical result when the tail ends were drawn together. The answer was to damp the hard side fairly thoroughly on the outside and clamp the tail ends together with a large bulldog clip. After leaving overnight to dry, the problem had disappeared and the sides could be cemented, spacers fitted, etc.

Apart from this everything went together well, though we ran out of $\frac{1}{8}$ in. \times $\frac{1}{4}$ in. when it came to the cockpit side reinforcements. It would be possible to make this up from two pieces of $\frac{1}{16}$ in. scrap from the rib sheets if no scrap box exists. Two tiny triangles were inserted at the tail end of the upper spine to

give something to which to stick the covering. Carving the very hard balsa nose-block to blend in smoothly is an area which might receive insufficient attention from some beginners, but it would be a pity to spoil the attractive shape of the fuselage nose by having a lumpy block.

The instruction booklet includes drawings which identify which ribs are which on the die-cut sheets, and it is worth lightly noting the numbers on the actual ribs before removing them from the sheet. In our kit they pressed out easily without the need for a knife; the grade of balsa was exactly right and only a very quick rub round the edges with the fine paper was needed to remove any trace of fuzz. Wing and tail construction are conventional and quick, but we ran out of $\frac{1}{8}$ in. sq. for the diagonal inter-rib braces, despite having a reputation for highly economical use of materials. When it came to the fin, the instructions and plan refer to $\frac{3}{16}$ in. sq. but there was no $\frac{3}{16}$ in. sq. in the kit. Altogether it was necessary to find about a foot of $\frac{1}{8}$ in. sq., 18in. of $\frac{1}{8}$ in. \times $\frac{1}{4}$ in. and about two feet of $\frac{1}{8}$ in. sq. in order to complete the model. On the other hand, there was plenty of $\frac{1}{8}$ in. sheet (wing centre section covering and fuselage bottom sheeting), dowel and wire, and all the pre-cut parts were accurate.

Before covering, the push-rods for rudder and elevator have to be installed and it is our suggestion that a dummy run be made with:

Aeromodeller

the radio components before bending the push-rods. There is not a lot of room in the nose and the intention is that the servos are stick-padded to the fuselage sides, side by side. As can be seen in the photograph this is perfectly feasible with average-to-small servos such as the Sanwa ones used (though it may be desirable to cut part of the drive discs away to ensure that these clear the sides) but there could be problems with some of the slightly larger servos, e.g. Futaba 17Ms, where insufficient fuselage width seems likely. If the servos are staggered there is then insufficient room ahead of them for a conventional battery pack. The answer would be to mount one servo in the underwing bay, with the receiver, even if this meant that a couple of ounces of ballast would need to be fitted in the nose.

Once the approximate positions of the servos have been found, the all-wire push-rods can be cut to length, bent and slid into place through their guides. The cabin hatch structure can be completed by placing its positioning dowel, the hole for which has to

stubs of cocktail stick, but decided the pins were easier.

Although the instructions say stick the servos in place with double-sided servo pads, adhesion to balsa, even after a couple of coats of dope, is dubious, so we smeared contact cement on that side of each pad. The suggestion is that the servo discs are removed, threaded on to the Z bends previously made in the wires, replaced on the servos and the servos moved until the control surfaces are at neutral, when they are stuck in place. However, it is worth having the batteries in and trying the radio at this stage, firstly to ensure that the servos will provide the right control sense and secondly to establish that the servos themselves are at neutral before they are glued. Only a very small amount of lengthening of the push-rods is possible although shortening them by adjusting the bends at the tail end is fairly simple. On the test model it was necessary to take the push-rods off the starboard side of each servo disc, rather than both off the inside as shown on the

plan and this meant filing a slot across part of the adjacent former to allow the rudder push-rod to be bent sideways to connect.

A movement of $\frac{3}{16}$ in. up and $\frac{1}{16}$ in. down on the elevator trailing edge and $\frac{1}{16}$ in. each way on the rudder should be available and ours came out exactly. There was plenty of room for the battery in the nose, providing not too much foam rubber packing was wrapped round and if anything, too much room for the receiver in the underwing bay. It was thought prudent to jam in a piece of expanded polystyrene to ensure that the receiver did not slide rearwards; any more positive method of location is difficult because the receiver has to be wiggled past the push-rods and this is easier in the centre of the bay where the wires can be sprung sideways without permanent distortion.

Handling the fuselage tail assembly gave the impression that the CG might be a bit far aft, particularly with the one very hard fuselage side and an even harder rudder. When assembled and balanced as recommended it was a surprise (and relief) to find that the CG was only $\frac{1}{4}$ in. or so behind where it should be, and a very small amount of ballast stowed beside the battery in the nose cured this. All up weight came out at exactly 21oz. and although an actual weight isn't stated in the instructions, from the wing loading given it is easy to work out that 20oz. is the target.

Flying can be slope, tow launch or bungee, and once again the instruction booklet covers each of these. Most people would no doubt prefer the first flight to be a hand launch from a gentle slope (as was ours) but either of the other methods can be tackled with confidence, provided the hook is where shown on the plan, the balance is as recommended and there are no major warps. Control is moderately sensitive and quick jabs of control or just a shade on the trims is all that is necessary; the model will 'free flight', so early control attempts need only be momentary twitches on the sticks.

Altogether, a straightforward model to build, a very complete kit (apart from odd bits of balsa mentioned) and a gentle and reasonable forgiving flyer, excellent as a first radio glider.

Manufacturer:

Mid Wales Model Manufacturers Ltd.,
32 St. John's Hill, Shrewsbury, Shropshire.

Price:

£16.95.



Above: Close-up of the Kestrel nose section showing the two-channel Sanwa radio installation. Note the battery box in the extreme front ahead of the two servos. Receiver is installed further back under the wing seat, just behind the main bulkhead.

be drilled in the noseblock by careful measurement. Rudder and elevator hinges (nylon film is included) are temporarily fitted and removed, which basically ensures no problems when final assembly is carried out after covering.

The choice of film or tissue covering is left to the builder, but before either is applied, the entire model needs to be sanded all over. Particular attention was paid to the rib-spar joints, especially the trailing edge, any minor discrepancy in height being smoothed away with a fingernail 'emery' board. Although the instructions seem to recommend film, details are also given for tissue; we were pleasantly surprised to find in a local shop some sheets of yellow tissue, so used that, as a tissue covered model has better overall structural strength.

Control horns and keepers are supplied and are simple to fit, provided holes are drilled through the wood parts for the screws. These are attached after finally fitting the hinges, which were slipped into their slots after applying a thin smear of contact cement. Cut-off pins are recommended as safety locks, but push a pin through the structure first, or the cut pins cannot be forced through the nylon. We tried the alternative of drilling and cementing in

Below: detail of the tailcone showing the simple rudder and elevator controls.



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MODEL NEWS

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HP2 4SS.

Photos will be returned after publication.



FLIAR PHIL, as his fans (*all* magnificent seven of them!) know, this column has to be written well in advance of publication. As F.P. writes, the election fever has mercifully died! It is a refreshing thought that most aeromodellers prefer making models to listening to politicians making speeches! An additional bonus — some delectable young ladies add their charms to this month's selection! NO rushing please!

Photo 1

This photo from Dave Dunn of Plymouth really flies back into aeromodelling's past.





It is a replica of the famous F. J. Camm's 'Advanced Compressed Air Monoplane'. Span is 66in. Built from spruce and ply. Pine prop. 16in. dia. Dave (who is a S.A.M. member) adds that the tank is 5-thou. brass foil, tested to 150 p.s.i.!

Photo 2

A wintry background adds a touch of realism to this Piper Super Cub — always a favourite with scale fans. Mr. Scutt of West Sussex says it is from a Mike Smart Designs plan. It is no peanut size job! Span is 108in.

(1/2-scale) Power YS60. Radio is Skyleader Clubman, for rudder, elevator and throttle.

Photo 3

At least no one can accuse Fliar Phil of not giving 'the unusual' a go! A twin autogyro from the Micro-Mold kit. Its 'get up and away' comes from a Super Tigre 25, aided by three-channel radio. Peter Bull from Ireland sent it and F.P. is grateful that Peter got his delightful daughter Marion to display it.

Photo 4 — Winner

Fliar Phil quotes from Bert Platt of

Sawbridgeworth's letter 'The two models in the photo are Stephanie-de-Sykes and a Korda'. Charming Stephanie has appeared as a singer in 'That's Life' and in at least two European song contest heats. Dick Korda's Wakefield needs no introduction! A legendary model, its place in model aviation's Hall of Fame is secure. Bert adds — he waited 44 years to build it — and now finds very few places to fly it! Maybe this month's camera will be some consolation Bert!

Photo 5

Fliar Phil requests you lads to drag your eyes away from lovely Jackie Smith! — and pay attention to Eliot Horwich's fine Keil-Kraft 'Falcon'. For many years a great design, this particular Falcon is fitted with radio. Highly successful in radio control Vintage. Fliar Phil is indebted to one of aeromodelling's experts, John O'Donnell, of Cheshire, for this attractive photo.

Photo 6

The country around Old Warden provides a fine backdrop for this Avro Avian sports model, built from Aeromodeller plan FSP 468 (price £2.95 + 45p p&p) by Ray Hall of Leeds. Mr. Wallace of Leeds sent the photo and comments: 'Powered by an E.D. Bee Mk.I, it flew well, but disappeared beyond those 'naughty' trees, and was never recovered.

Photo 7

If starting four motors one after another turns you on (F.P. sometimes finds one is too many!) — then follow the example of Mr. Wallis of Gwent and build a control-line Vickers Viscount (A.P.S. plan CL 701, price £3.95 + 45p p&p). A fine model powered with two 2.5cc Oliver Tigers and two 1.5cc P.A.W.s. Still flying after ten years, it looks as if it has just rolled off the production line.

Photo 8

A very nice photo of a control-line model Pitts S.1. A fine paint job gives real 'eye appeal' to this model sent by J. Allison of R.A.F. Wildenrath BFPO 42. Mr. Allison took the picture but much regrets he is not the builder of this 50in. span, black & yellow model which uses Merco 61 power, with R C throttle for third line control. Wings are removable for transport.

That's it for now. Keep the photos coming. F.P. still has some fine photos in his file. SO — WATCH THIS SPACE!

RAY MALMSTRÖM



Vintage Flying Scale Models

The flying scale model has always had an attraction all of its own. This is understandable, since from earliest times, modellers wanted their miniature aeroplane to resemble the appearance of the full-size machines as closely as possible. However, it was a sad fact that the more the model looked like the real thing, the less capable it was of actually flying and this produced two main trends.

The flying enthusiasts discarded components and shapes that were of no use in flight and so evolved the stick models of both single and twin-pusher configurations. Tractor examples were more difficult from the stability standpoint, but soon these too were flying with ever improving performances. Eventually, rudimentary fuselages replaced the simple sticks and so was born the 'normal' type of flying model.

Scale builders became more and more engrossed in reproducing models of full-size aeroplanes and the more realistic these were, the less chance there was that the models would be able to fly at all. The above relates to rubber driven models only, since even before the 1914-1918 war, some remarkable power driven flying scale models were made that were capable of carrying out good flights. Two examples being Mr. Charles Desoutter's 1/6th scale Caudron biplane powered by a four-cylinder in-line compressed air engine and his Nieuport monoplane fitted with a large CO engine that swung a 27in. dia. propeller.

Enthusiasts relying on rubber power, using the hardwood and wire constructional materials of the time waged a continuous battle against weight. Formers, stringers and dummy detail used to get the scale shapes necessary, produced heavy models that were difficult to get airborne for the short meteoric flights of which some of them were capable. However, the challenge of the flying scale model appealed to some modellers and these staunch supporters doggedly persisted, their determination and experiments producing a few outstanding models up to the beginning of the 1930s, when the arrival of balsa wood caused a revolution in this field.

Manufacturers in the USA began to produce so called 'kits' for many well known types, required shapes were now no longer a problem, their exactitude being governed by the accuracy of the working drawings or plans that were included in the kits. These

attractively boxed kits were much more appealing than the previous brown paper wrapped 'parcels of building materials' that had been available for some models. Also in most cases, there was now no need to buy anything extra to finish the models, parts were printed on sheet balsa, strips of balsa in the required sizes were supplied, wire, wheels, covering material and even dopes being provided.

The importation of such kits from manufacturers like Burd, Comet, Cleveland, Ideal and Scientific into this country was responsible for the enormous growth in the popularity of the hobby and gave special impetus to the flying scale model. Now it was possible to make accurate scale models easily, with only a razor blade and a packet of pins. However, the flying performance of the majority of these kit models, despite their low weights, still left much to be desired. Many model builders who commenced the hobby with these, either transferred their attention to duration models or were so disillusioned that they were liable to forsake the hobby altogether.

Mr. D. A. Russell, the editor of *Aeromodeller* appreciated the problem. He was keen to promote the development of the flying scale model, and although articles had already appeared on the subject, he asked Howard Boys, an active leading modeller of the time, to give this type of model the same treatment as had been given duration models in a series of beginner's articles in the magazine. Howard says that he was really 'put on the spot' with these articles which started in the November 1938 issue, he had never built a flying scale model yet here he was being put forward as a flying scale expert! He felt that in all fairness to the readership, he should become one, and wanted to start with a model of the *Forster Wickner Wicko* because of its obvious sim-

plicity and its slab-sided fuselage, but the editor insisted on a model of the *Westland Lysander*!

Ever since this machine had appeared in June 1936, modellers felt that at last their prayers had been answered. Here was a full-size service aircraft with the popular high wing layout they preferred. D. A. Russell himself had already embarked on a 10ft. span (1/5th scale) petrol engined Lysander, and by the end of 1938 it was well advanced. The Lysander had a very small tailplane, and Howard decided to overcome this failing by treating the 50in. span rubber driven version that he now started to make, almost as a tailless model, of which he had experience. He used a photograph and some detail sketches of this machine in his articles to illustrate various points of flying scale construction. The articles ran to six parts and the Lysander was eventually completed, much of the test flying being carried out in the still air of frosty moonlight nights. The model flew well but had insuf-



Below H. J. Towner with his fine Supermarine Seagull amphibian which won the Concours D'Elegance flying scale class at the 1949 Northern Heights Gala held on Langley aerodrome.



Left Doug McIard, doyen of the flying scale modellers, with 28in span Hawker Demon, designed by T. R. Kennedy was sold as a pre-war 'Keel bild' kit by Model Shop, Newcastle-upon-Tyne, while the Beautifighter (right) was one of H. J. Towner's Astral kits (see text)



ficient 'give' in the undercarriage. However, most of the model's subsequent flying was done indoors, round the pole (RTP) in the revival of interest in this type of flying that the long nights of the 'blackout' brought in that first winter of the 1939-1945 war and smooth floors gave good landings.

The leading flying scale modeller of this time was Mr. H. J. Towner. He was also an *Aeromodeller* contributor and had described his 39in. span *Miles Kestrel* in its pages. This model was kitted in de luxe form by Super Scale Kits of Rutland who could supply the plans separately that were also available from the *Aeromodeller Plans Service*. The *Lysander* by Howard Boys was also given the de luxe treatment by Super Scale Kits and both of these famous models have become classics of their time. MAP are still able to supply plans for both of them, the *Lysander* as FSR 161 at £3.60 and the *Kestrel* as FSR 165 at £2.95, postage being 45p in both cases.

D. A. Russell wanted to produce a

complete book on the flying scale model utilising Howard's articles and Howard agreed to this if it could be done in co-authorship with H. J. Towner. The book *Scale Model Aircraft That Fly* was published in January 1940 and it forever linked the name of Howard Boys with this class of model. Both of these modellers then designed a number of flying scale models for various kit manufacturers including Atlanta Aero Model Co (later Astral). They shared the task of creating models of many famous single engine types of the day and later H. J. Towner designed some multi-engine models similar to his 54in. span pre-war *Airspeed Envoy*. These included *Blenheim IV*, *Hampden*, *Hudson* and *Beaufighter* as well as a 38in. span four-engined *Short Stirling* which was 'some' flying scale rubber model. As the war progressed and balsa became scarce, hardwoods found their way into these kits and cutting out the intricate shapes required from rock hard obechi sheet with a razor blade was the order of the day!

Other vintage flying scale models that come to mind include the fine 34in. span *Leopard Moth* designed by S. R. Crow and kitted by Cloud (Model) Aircraft of Dorking and the advanced rubber driven machines like the *Short Scion* and *Tiger Moth* made by C. Rupert Moore, also the *Bristol Bullet*, *BE 2C* and *Westland Widgeon* from the drawing board of Eddie Riding. A good number of these models were built and plans are still available from MAP for all those mentioned above that were described in *Aeromodeller*. However, most modellers of the time had trouble with rubber power and some petrol driven flying scale models were beginning to emerge. Dr. J. F. P. Forster's *Spitfire II* was a development of his basic low wing petrol models using the 6cc Baby Cyclone, and the outstanding craftsmanship of Corporal A. Welsberg of the Free Polish Air Force was manifested in his excellent 1/10th scale *Lysander* fitted with an Ohlsson 23 and his 67in. span *Brown Junior* powered *RWD-8* two-seater trainer.

However, it was the coming of the small diesel engine in the immediate post-war years that gave a tremendous boost to the flying scale model. Some of the 'old stagers' modified existing rubber models, as Eddie Riding did by fitting an Ameco .87 to his

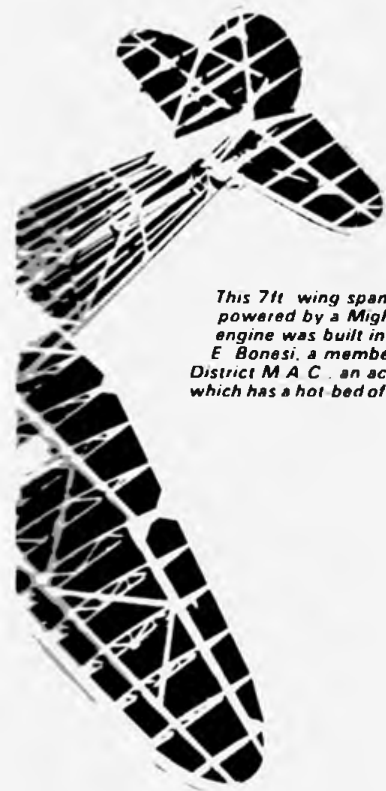
Bristol Bullet, while others made entirely new models for this type of engine that had such a good power-weight ratio, and did not suffer from the ignition problems that usually plagued the petrol engine. Also at long last, scale size propellers and undercarriages could be used and the constant thrust made flight trimming easier, features that had long been headaches for the discerning scale modeller.

The veritable spate of flying scale models that appeared up to the end of the vintage period (December 1950) relied heavily on the small diesel engine and interest in rubber flying scale waned, but over the years since then the better understanding of the subject generally, including rubber behaviour, lightweight structures and especially propeller efficiency, mainly brought about through the efforts of the Peanut experts is making vintage flying scale rubber a most popular pursuit nowadays.

SVAS Meeting

Not many models of the Shuttleworth Collection aeroplanes were to be seen at this meeting on 17 July at Old Warden, but the vintage boys were there in number and some first class models were flown under good weather conditions. There was almost a complete lack of spectators and as a result the turnout was not as large as it might otherwise have been. However, everyone present seemed to be flying and the lesser numbers made for a very pleasant meeting, where one was able to meet the same modellers time after time and thus gain a better measure of their activities. Different parts of the aerodrome were populated by the various schools and nobody seemed to encroach on the other's pitch. Many modellers were apparently using the occasion as a 'warm-up' for Vintage Day and countless *Cruiser Pups* were flying in unbelievable manner.

Various Earl Stahl flying scale rubber models were also to be seen and the most popular of these appeared to be the *Caudron Cyclone* whose long fuselage obviously means that a respectable rubber motor can be installed. Vic Dubery, Les Hoy and Phil Brooks amongst others, favoured this machine, while Don Knight was test flying



This 7ft wing span *Stinson Reliant*, powered by a *Mighty Midget Petrol* engine was built in August 1938 by E. Bonesi, a member of the Hayes & District M.A.C., an active pre-war club which has a hot-bed of power modellers

Below left: Howard Boys designed and built this 50in. span rubber driven *Westland Lysander* in 1938. Plans still available through *Aeromodeller Plans Service*, plan FSR 161, price £3.60 plus 45p p&p. Below right: Derek Camps holds his 21in. span rubber powered *Gloster Gauntlet* made 45 years ago from a *Comet* kit



VINTAGE CORNER

his Earl Stahl *Miles Magister*, finished in the early hours of the morning and yet unadorned with any decoration. Other flying scale models were to be observed, although many of these did not come into the vintage category, two models that very definitely did, having been built in 1938-39, were Derek Camps' 35in. span twin-engined *Martin B 10* made from an *Ideal* kit, which had controls moveable from the cockpit, and a 21in. span *Gloster Gauntlet* wearing the blue and white chequerboard markings of No. 19 Squadron, made from a Comet kit. Small models were very popular and many of these were CO, powered, apart from a number of Dwarfs, doubtless inspired by the recent description of this Dave Hilliard design in *Aeromodeller*, there were *Slickers*, *Scrums* and even a delightful *Hell's Angel* all under 25in. wingspan, performing just like their big brothers.

Peter Michel had brought along an original P. T. Capon Wakefield, the *Coeur de Lion Mk 20*, this being the last of the unlimited rubber weight models in its class, a beautifully build machine with a 22in. dia. two bladed folding propeller. Ray Alban was busily engaged in flying half-sized Wakefields and when I saw him he was doing some comparative flying with 'Rushy's' *Mayfly* and Pillon's Wakefield winner, both nicely made models and very attractive in the small sizes.

Amongst the radio vintage models which included the usual designs like enlarged *Scorpions*, *Junior 60s* and *Buccaners*, there was one solitary *King Bird* and it flew well, particularly attractive was Brian Downham's *Keil Kraft Falcon* with its fat French 6in. dia. doughnut wheels, which gave it good ground handling properties. In the air this model purred around on its throttled-down four-stroke engine, trimmed like a free flight model with only occasional corrections from the transmitter to ensure that it stayed within the confines of the aerodrome, the speed was right too, no violent manoeuvres were attempted and to my way of thinking this is how R. C. Vintage should be flown, good on you Brian!

Free flight power had its usual supporters, Mike Beach flying his *Baby Cyclone* powered *Bouden Mouse* and his *Flying Aces Toughie* powered at present with a *Cameron 23* ignition engine. When Mike came in from the aerodrome it did not mean that he was finished for the day, soon he was on the control-line site with his *Voetsak*, flying it just like Ron Moulton's 1940s original to the healthy crack of its *Ohlsson 60*.



Right Don Knight and his Earl Stahl *Miles Magister* for rubber power, seen at the SVAS meeting, Old Warden.

In the late afternoon activity was temporarily terminated by the arrival of a thunderstorm and the rain rapidly cleared the field, but Jack Frost had come to Old Warden to fly and he remained out there, a solitary figure in a sun hat amongst the lightning flashes, flying his yellow *Miss Farnboro* in the variable wind conditions that cumulonimbus brings. Brian Ferrett had a car load of 'gassies' which included his *Premier Lion*, *Sadler Pacemaker* and his latest model, a nice blue and white *Thor* powered by a *Keil K-6* petrol engine. The last named was the first example of this 72in. span Magnus Andersen design that the writer has seen, it was described in February 1939 *Model Airplane News* and is

a nicely proportioned model. Brian's short flights for trimming purposes went well, and we look forward to seeing the model 'flat-out' to prove the excellent spiral stability that the model is said to possess.

This was a most enjoyable meeting, it did however, help to underline the fact that we don't have enough like it, and I am sure that all of us dearly wish that there were more opportunities throughout the year to hold similar 'low-key' meetings. All that is needed is a place to fly . . . the remaining ingredients necessary for the 'Fly for Fun' atmosphere that prevailed at Old Warden being provided in abundance by the enthusiastic modellers who never pass up a chance of getting their handiwork airborne.

Howard Boys still regularly attends the model meetings. Here he is seen with radio controlled bird-wing model, which uses electric power.



Left Phil Brooks with two models built for forthcoming SAM 35 events - *Caudron Cyclone* rubber scale and a green and white *Cruiser Pup*. Above yet another *Caudron Cyclone*, this one by Les Hoy, which he was busy trimming at the recent SVAS meeting at Old Warden.

BOORAY

Continued from page 487

method of making a 'wobbly wheel' undercart, for landing and take-off shocks are well absorbed because of the hysteresis characteristic of rubber and because, simply by changing the rubber, the 'at rest' wheel position can be adjusted to its optimum position. The disadvantage of rubber mounting is that most rubber is not fuel-resistant and so the rubber sheet insert has to be replaced quite frequently.

The wing is unusual in that it is hollow, built-up construction based upon soft 3mm sheet over a hard 3mm frame. The short span and parallel chord of the 'BooRay' wing means that just two 100mm wide sheets are required for wing sheeting wood, so do take care to select two identical sheets of light but firm wood. The 'Warren glider' ribs are from 3 x 3 hard strip and are positioned in this fashion so as to give a really stiff wing — a vital requirement for a parallel chord wing. All of the ribs, before assembly, are equally tapered top and bottom to nothing from where they project from the 100mm wide front sheet skins. When planed and sanded to a nice section, such a construction leaves the skin thicknesses at 3mm at the point of maximum section depth, thus giving maximum vertical rigidity as well as maximum wood thicknesses where your fingers grip the wing in a catch. Towards the rear, the skin thicknesses reduce to

about 1mm, thus giving optimum skin distribution. Of course a hollow, built-up wing is fiddly to make and is more damage-prone than a solid one, but the stiffness for a given wing weight is greater and this most desirable feature makes the trouble worthwhile.

Finishing

One of the key subjects in obtaining a light but strong model is that of the finish and this is one area which has seen significant improvement over the years. For 'BooRay' 1983 I adopted a *Tufcote* glass cloth finish mainly because this method is simple and requires no special tooling. An epoxy glass cloth finish would have been stronger and possibly lighter, but needs a wing press for good results and pressing a hollow wing is not feasible in my opinion. I cover the wing, tail, side cheek and fuselage fin assembly separately before model assembly. 5-minute epoxy can be used for the tail and side cheek as well as for filleting but for the vital wing-fuselage joint I use and recommend *Araldite*. Once assembled, the model can be colour sprayed, the cockpit painted and number transfers positioned prior to a final coat of *Tufcote* to proof and seal everything. *Tufcote* is well known for bubbling transfers etc., and so I use cold mixed *Tufcote* out of the fridge for this final coat and find this eliminates bubbling.

When selecting the colour for the model, remember that the scheme used on the full-size original need not be followed, rather one that might have been. For me this means the entire model coloured, for no full-size Goodyear that I know of was finished

uncoloured and a highly visible colour at that. Spraying is about the lightest way of uniformly colouring a model and for me aerosol cans of car paint have proved ideal on sanded surfaces. One small can is more than enough for the three light coats of colour one Goodyear model needs. A cheap and easy solution to the colouring problem for there must be hundreds of different colours available and sales outlets everywhere.

'BooRay' 1983 came out a bit heavy at 560gm aided by my somewhat conservative wood selection policy and by a 70gm dry weight tank. This has resulted in a full tank CG no less than 25mm back from the front of the wing. Despite this very rearward location, the model was nice and stable to fly — even as it glided 200m to its destruction it flew straight and flat — the 'rock steady' 'BooRay' stability comes into play once again. I have no doubt that my next one would come out quite a bit lighter for on my next one I will adopt a recessed tank, i.e. one plugged into the fuselage from the outboard side to the inboard fuselage doubler.

Such a recessed tank would not only eliminate wood from the fuselage but would also allow the use of thinner tin-plate for the tank (e.g. food can tin-plate) whilst retaining tank stiffness because of the reinforcing effect of the fuselage. A recessed tank would also mean a solid wing for reasons of bellcrank pivot bolt support, but a really light piece of 'wing wood' at 9mm thick would mean no weight penalty here. These are the only improvements I can see for 'BooRay' and should make what was a most competitive model into a formidable one. All we need is some more BHP!



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Microlights for Modellers


by John Bridge

IN THE EARLY DAYS of Microlight aircraft, the VELMET 160cc single cylinder and the ROWENA 210cc two stroke were popular engines and while the power was sufficient with its reduction drive for the single surface hang glider wings of the time the popularity of these engines was superseded by the more powerful Fuji Robinson 250 which was better suited to the next generation of high performance double surface flex wings. Once established, this engine became very popular and was used to power all types of flexible and rigid wing aircraft.

A great deal of development work was taking place in UK to improve the performance and safety of the flex wing concept, for while most of the early trikes used normal hang-glider wings adapted for power use, these wings were designed originally to fly at much lower airspeeds and consequently due to the higher wing loading when used for power they often required heavy control force inputs and tended to be more susceptible to turbulence. Some manufacturers were busy creating flex wings especially for this purpose, in particular a range of flexiform wings such as the Sealander and Striker series, this range of wings were designed with far less washout and reflex giving them a very wide speed range. Furthermore these designs incorporated some radical thinking as far as the structure was concerned, by the introduction of a bowsprit, it was possible to completely eliminate any internal wing structure as all the drag loads and sail tension were now taken by cables from the bowsprit. Some of these cables were free to move over a pulley block to allow limited independent movement of the wings, this helped to co-ordinate turns and further helped to keep the wings stable in turbulent conditions. A further advantage of eliminating the internal structure was that the wing was now much lighter. This new breed of wing would often add about 20 per cent to the speed of a standard trike, but, the story didn't end there as trike manufacturers recognised the potential of these new wings and began to develop high performance machines to complement them.

This new breed of trikes used larger twin cylinder engines giving more power and smoother running and often came with instruments and fairings as standard equipment. Manufacturers combined forces to offer the purchaser a matched and tested combination and consequently the trend is now away from people buying a trike and matching it to a wing of their own choice.

With the popularity of the sport increasing, the training requirements prompted the

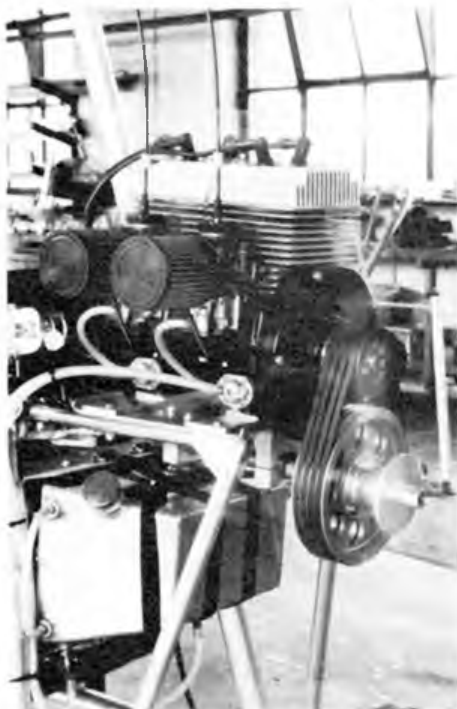


G. A. Hornets new design, the 'Invader' features independent suspension, wheel brakes, lightweight 440cc twin-cylinder engine mounted upright, seats two side by side, can be towed on its own wheels. This machine is fitted with the new Flexiform Stricken wing - see text.

rapid development of two seat machines, the lay-out favoured by most was tandem rather like a motorcycle arrangement but with the pillion passenger sat above to avoid his vision being obscured by the pilot's head. This also meant that the control bar could be reached from either position. A different approach namely side-by-side seating is favoured by Hornet Microlights and Skyhook Sailwings, the penalty of such layouts being increased drag, but this is being elegantly off-set in the latest Hornet design, the Invader, by a full cockpit style fairing and windscreen. These heavier two seat machines of course required more power and on one of the early Skyhooks they incorporated two of the well proven Rowena 210's in a neat co-axial control rotating unit, the arrangement used two standard engines, opposite rotation being achieved by the engines pointing fore and aft with reduction V belt drive to the co-axial counter shaft unit. There were many advantages to this approach, these being twin engine reliability, no torque or gyroscopic effect and centre line thrust avoiding the problems of off-set thrust with single engine operation. However, the more common method of increasing power was simply to fit a larger engine and this saw the introduction of a range of twin cylinder units, usually in-line, such as the Fuji Robin 330 and 440's and the Hunting 525, this latter engine providing twin fuel pumps, dual ignition and electric start as standard equipment.

These modern trikes have excellent flight and ground handling characteristics and will fly for extended periods with hands off the controls, the dynamics of the machine automatically compensating for any mild turbulence, an important feature when the machines are used for cross country flights which are now becoming a popular aspect of the sport with the advent of the improved range and performance.

By now many local airstrips were being established for microlight use with quite a network of regular routes between the various groups for now the conditions under which the Civil Aviation Authority would allow us to operate were well defined, briefly we could fly under visual flight rules in con-



Above: the Hunting twin-cylinder 520cc installation showing twin carburetors, twin fuel pumps and dual ignition systems.



A fine example of a radio-controlled model being used to test a new design, in this case a high performance canard lay-out by Skyhook Sailwings. The full-size prototype has recently been test-flown confirming the model's performance predictions.

Aeromodeller

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スピットファイヤー SPITFIRE



ムスタング MUSTANG

Bentom ARTF rubber powered scale

Free-flight rubber powered scale models become caught up in the foam revolution with a range of four World War Two fighters from the Bentom range distributed in the United Kingdom by **Micro-Mold**. These aircraft are the 'Spitfire', 'Mustang', 'Me 109' and 'Zero'. Each model features injection-moulded foam components for fuselage, and wing (each divided into two halves) plus one

piece tailplane and fin. The canopy is vacuum-formed from clear sheet and each of the models has pre-formed wire undercarriage legs and moulded plastic leg mounting points to suit the type. Waterslide transfers to suit the model are also supplied. A hardware pack in each contains two finely moulded plastic propellers and rubber strip motors, an ingenious 2:1 gearbox that allows the prop to freewheel, moulded plastic spinner and wheels, lead sheet noseweight material, special adhesive for the



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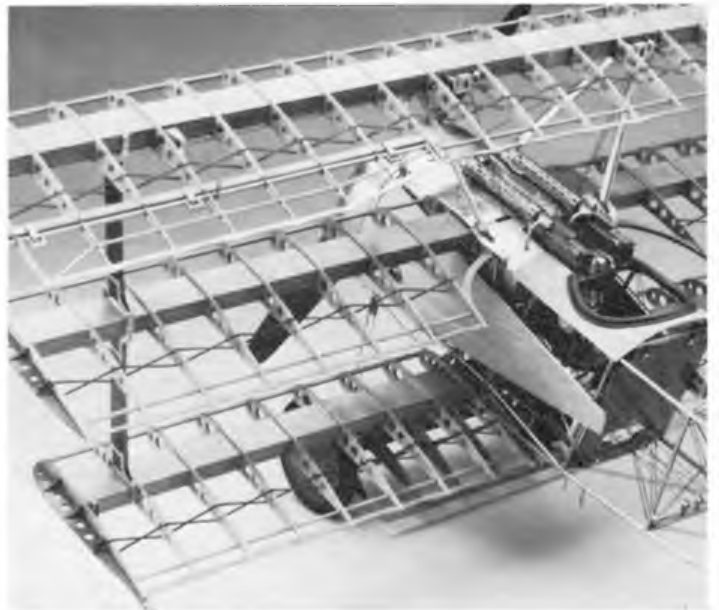
polystyrene, motor peg material and reinforcement. The 'Spitfire' and 'Mustang' 19.5 and the 'Zero' 20 inches and the price of each kit is £4.60.



Hasegawa 'Tripe'

All scale modellers will be fascinated by the latest of the Hasegawa Museum Series models, a 1/8th scale *Fokker 'Triplane'*. Although a static model, the intricacies of construction will hold the attention of the builder while the completed aircraft would take pride of place in any model display. Over 857 parts are contained in the kit, formed from

various materials including soft metal, brass, pressed aluminium, diecut plywood, Japanese Cypress, polystyrene plastic, rubber and ABS. The two photos here convey only a little of the impact of the completed model, which is to be described in detail in *Scale Models International*. The *Hasegawa Fokker 'Dr1'* is distributed by **Amerang** and has a retail price of around £145.99.



S.L.E.C. Mini Multi-meter

You don't have to be an R/C modeller to appreciate just how useful a multi-test meter can be, if the only use you make of it in the first few weeks of ownership is to discover that your low battery is nearly flat before you leave for the flying field, its purchase will be justified in saving frustration. This truly pocket-sized meter from

S.L.E.C. has A.C. & D.C. voltage ranges covering from 10-1000 volts, D.C. current measuring facility for up to 100mA and 0-200K 52 resistance range. A single pencil battery (supplied) provides the necessary power for the resistances measuring range.

The S.L.E.C. mini Multi-meter is supplied with leads and test prods and costs £9.75.

One-O-One soldering flux

Any metalworker worth his iron filings knows the importance of using the correct flux for soft soldering. Aeromodellers all too frequently don't! It is very important to use an *Active* flux when soldering piano wire, conventional resin cored solder is not really suitable, so the easy availability of a good active flux in a really handy small size container is good news. One-O-One Deluxe flux is available in a 1oz. plastic container with self-sealing flip top from many good model shops and should form an essential item on aeromodellers workbenches. Deluxe flux costs just 95p.



Aeromodeller

Big E.D. diesels

Years back, U.K. modellers seemed very prejudiced where glow motors were concerned, causing U.K. engine manufacturers to build bigger and bigger diesels. All too often, materials technology and detail design failings turned the resulting motor into a vicious even fragile beast. Experience in design and manufacture of bigger diesels has changed all that, these new motors from E.D. (Electronic Developments Ltd.) are first-rate examples of modern model engine manufacturing. Two new motors are featured here, the 'Super



Hunter' 3.46cc twin ball-race, rear exhaust, and the MkII 'Viking'. The latter is a twin-stack side exhaust

motor with once again twin ball-race supported crankshaft and throttle fitted to the disc valve intake system.

Both engines are supplied with comprehensive instructions and having been factory tested, include a little card which details needle valve and compression screw settings. Details on fuel formulation are included, but one could of course use one of E.D.'s own ready-mixed products.

The 'Super Hunter' costs £32.25 whilst the MkII 'Viking' costs £28.75. Both engines should be widely available.

Acoms 'Sirocco' for electric power

Following on from the success of their first electric power R/C Almost Ready To Fly (ARTF) model, Acoms have introduced a second model to the range, the 'Sirocco'. This all injection-moulded polystyrene foam model is a 1560mm span scale model and uses the same geared drive Mabuchi RS380 power plant and 6x600mAH cell battery pack as its predecessor, the 'Cessna'. The battery pack, charger glue and R/C system are not included in the kit, but everything else required is. Full complements

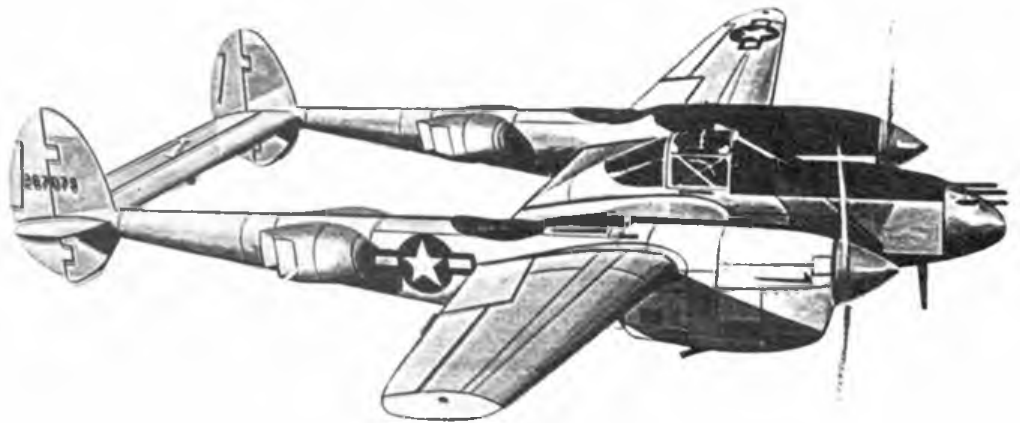
of R/C linkages and servo mounting hardware is included, plus handsome self-adhesive decals to reproduce the box top colour scheme.

A very clear instruction manual illustrated with line drawings and photographs takes the builder step by step through the assembly of the model, R/C installation and flying, the final footnote advising that spare parts are available! If 2-function R/C controlled silent flight is your ambition you could do a lot worse than find the £49.99 necessary to purchase one of these handsome kits.



Lockheed Lightning twin from Comet

A kit for a rubber powered twin motor model is a rare beast, come to think of it, we can't just at the moment even name another! This kit for the WWII Lockheed P38 'Lightning' is something really different, construction is typical Comet, plenty of stripwood, printed sheet parts galore, rubber motor, props, wire, wheels, tissue just about the whole works excepting adhesives and dope. With a little care and some trimming expertise this 34in. span model ought to be an impressive sight in the air. The 'Lightning' costs £7.50 and in common with other models in the Comet range, is imported by J. Perkins (Wholesale) Ltd





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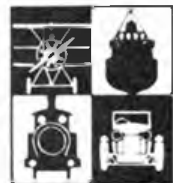
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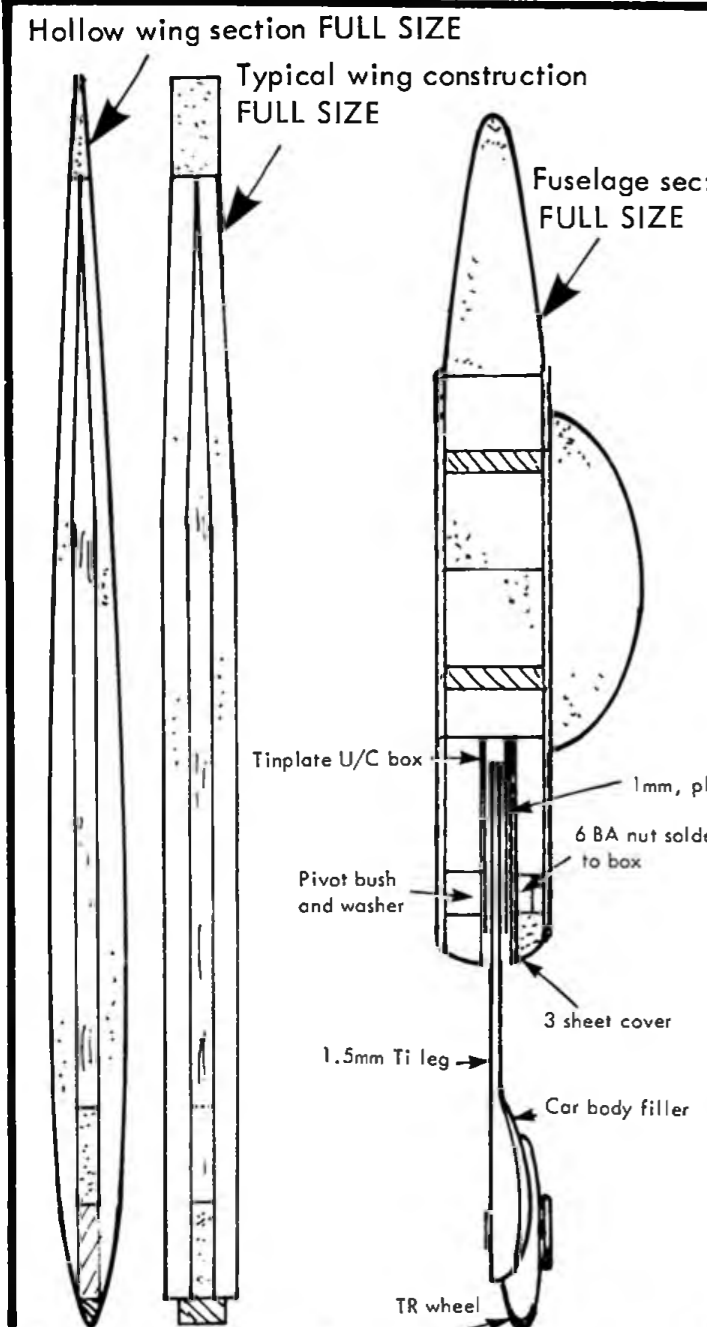
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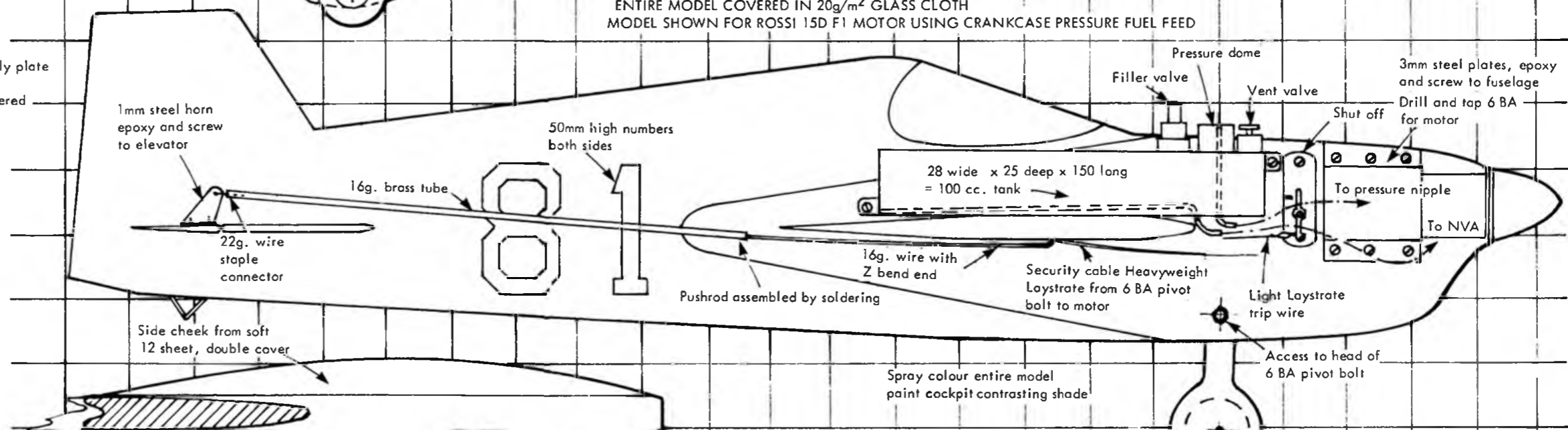
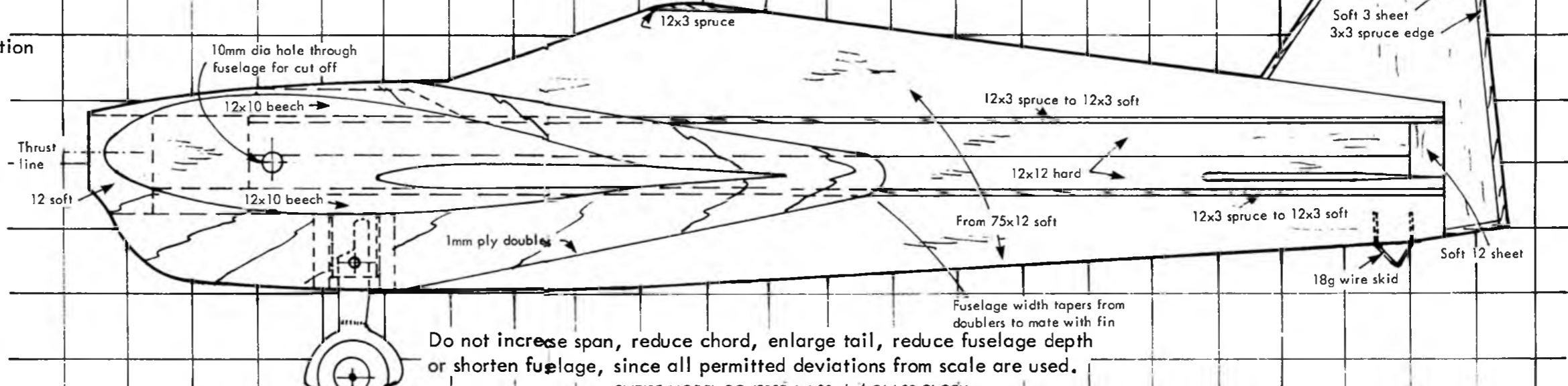
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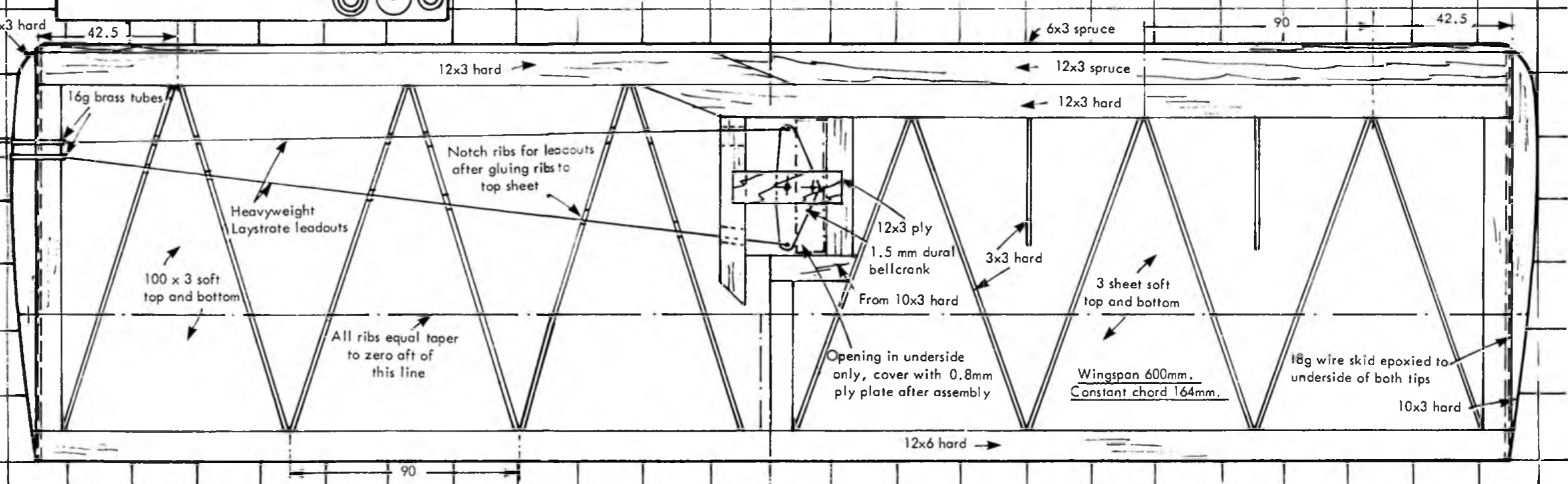
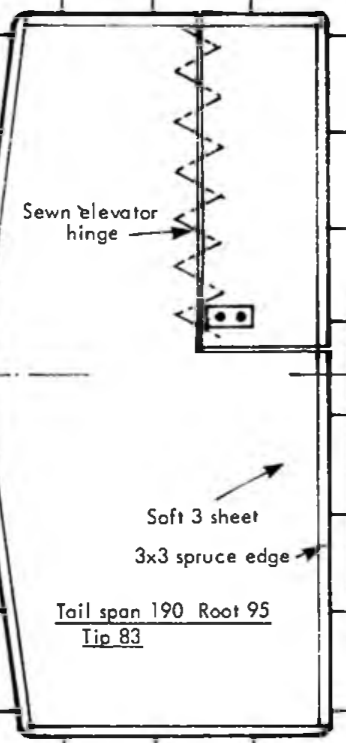


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APPENDIX - Free plans

The magazine contains one pull out folded free plan not included in this document.

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FF Pull Out**

https://outerzone.co.uk/plan_details.asp?ID=8436

**BooRay - Half size plan by Dave Clarkson
CL Centre**