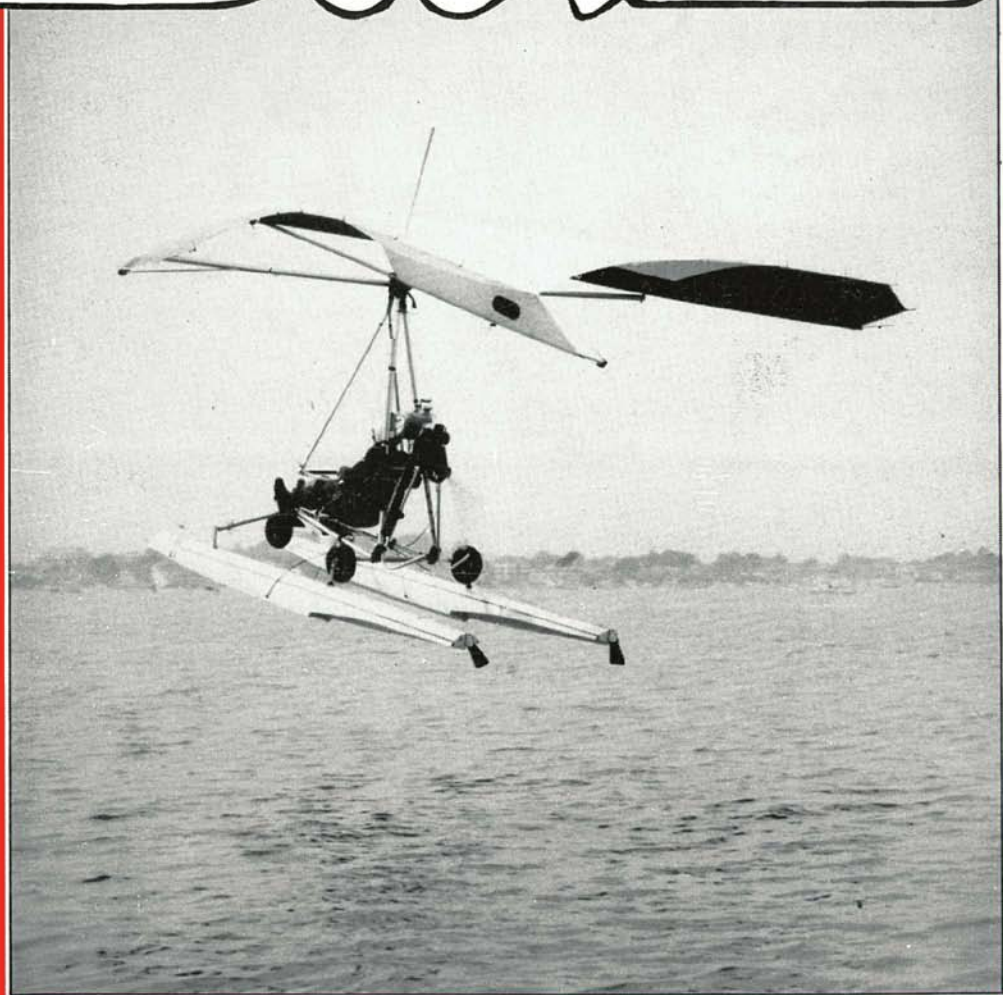


FLIGHT

line



Magazine of the BMAA

Jul-Aug 1982

BRITISH! BEST! and FIRST, again and again

SCORPION MICROLIGHTS

Our single seat was the **first** British three axis control microlight, our dual seat was and is the **first** made in Britain, the **first** full time three axis control dual seat training school in the UK uses two seat Scorpions flying three or four hours each aircraft, each day! A comprehensive course that stands or falls on aircraft reliability.

Now! New! and First again, the ultimate performer,
THE NEW SCORPION PACER, THE BEST ON THE MARKET!



The **PACER** is the result of all that we have found to be needed in our research and experience, to provide the best in performance, reliability, and portability. Features include the first time harnessing of the full power of the Robin 54 hp., engine with our new toothed belt drive, nose-wheel steering is standard, clipped wings and wing tip spoilers electrify roll response, the elevators are rod actuated, tuned exhaust and better power utilisation gives fuel economy - all in a package of high standard engineering and finish.

THIS IS IT!!! THE ULTIMATE IN MICROLIGHTS!!!

We issue a challenge to our competitors to try and match the performance of the **PACER**, and we will pay for the results to be published!!!

**SOUTHERN AERO SPORTS LTD.
124 PUNCHCROFT, NEW ASH GREEN,
KENT. DA3 8HS. TEL. 0474 873836**

**DEALER ENQUIRIES INVITED
FOR UK AND OVERSEAS MARKETS**

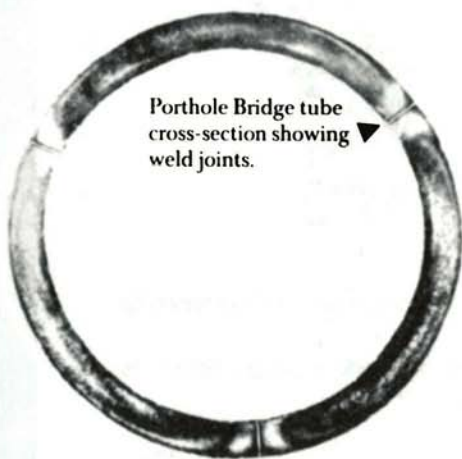
Is this seam safe?

This cross-section (below) shows the structure of aluminium tube made by the Porthole or Bridge tool method of extrusion. The resulting tube comprises a number of extrusion seams along its length (often not externally visible).

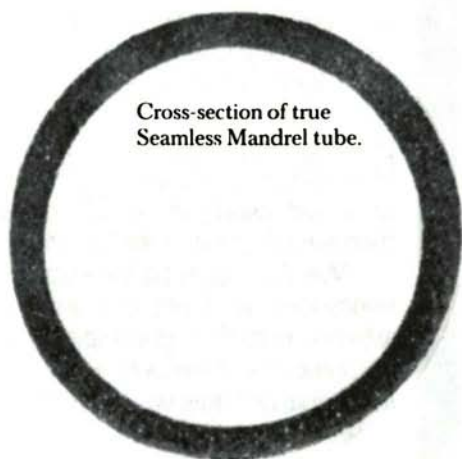
Rigorous and complex testing is necessary to establish weld soundness on this type of tube.

This is a cross-section of true Seamless Mandrel tube (below). As defined in BS 3660, it contains "no split or deliberate longitudinal bonding of two or more edges by pressure, fusion or mechanical interlocking."

True Seamless Mandrel tube is the recommended form for highly stressed applications.



Porthole Bridge tube cross-section showing weld joints. ▼



Cross-section of true Seamless Mandrel tube.

FOR MICROLIGHT AIRCRAFT, SPECIFY TRUE SEAMLESS MANDREL TUBE

For further details apply to:

BACO

® British Aluminium Extrusions Ltd.,
Tubes Division,
Studley Road, Redditch, Worcs. B98 7HN
Tel: 0527 21242. Telex: 338829.

HAZE SAILS

AREN'T JUST SAILS TALK

We will design prototype sails to cover your latest microlight, run up patterns and carry out your production runs with attractive trade discounts.

For the individual, we can supply glue-backed registration letters in black, red, blue or white, complete with instructions, for £12.65 inclusive.

We can supply replacement sails for a growing range of popular designs (Mx, Humming bird, Mirage etc.) from £300-£450 delivered, usually at least 25% cheaper than the bought in price from the States.

We also supply padded fabric seats, windsocks, sail covers and carry out repairs, renovations and commercial artwork all to the highest specifications.

Come in and see us or give us a call. One off work or production runs, individual or trade; we either stock it or make it.

See you soon.



For more details contact Brian Hayes:

Haze Sails, Yardley Works, Stourbridge Rd., Stambermill, Stourbridge, West Midlands.

Tel: Lye (0384-82) 7668 or Lye (0384-82) 3545 (evenings).



COVER: Maurice Sheppard's Skytrike is now amphibious. Full story on p28.

Comment

Norman Burr

6

Chairman's airwaves

Graham Andrews

6

Whistles in the wires

9

Letters

12

Educating Ollie

Peter Lovegrove looks at the response to Having a ball

16

Wingco Nick

Microlight Airforce launched

20

Events

PFA Cranfield Rally

20

Grenoble Show

20

Leicestershire rally

22

Davidstow fly-in

23

Cover story

(see above)

28

A Mitchell milestone

The story of one of the UK's first Mitchell wings

30

Flight report

Lincs to Cornwall by Ian Stokes

32

Technical

Adhesives advice

36

World engine survey, by

Nick Regan and Donald Gurrey

39

London-Paris Race

Background to the Great Race, plus timetable

52

Stateside view

from Glenn Brinks

54

Safety

Accident toll rises

60

Safety notes by Brian Giles

62

Rig it right, says Rick Stuart

64

In the air

Roger Black tests the Puma

69

Goldwing impressions by

Bob Calvert

70

Brian Wronski discusses the latest

Hummer

70

Training notes

Brian Powell

72

Secretary's letter

Ron Bott

75

Contact

78

Calendar

80

Small ads

80

Flight Line is published by the British Microlight Aircraft Association

Editorial and Advertisement Office Oak Cottage, The Green, Wennington, near Lancaster LA2 8NW (tel 0468 21166 any time)

Editor Norman Burr (address as above)

Technical Editor Peter Lovegrove (tel 0235 812556 home)

Opinions expressed by the authors and correspondents are not necessarily those of the Editor or the BMAA.

Advertising BMAA does not guarantee or endorse any product or service offered through advertising in this magazine. We invite constructive criticism and welcome any report of inferior merchandise.

Next deadline for advertising and editorial 18 August (all contributions should include home and work telephone numbers)

BMAA VAT No. 371 7533 45

Printing and typesetting Knight & Forster, Water Lane, Leeds LS11 9UB

British Microlight Aircraft Association 20 Church Hill, Ironbridge, Telford, Shropshire TF8 7PZ.

President Mrs Ann Welch OBE (tel 0252 715991)

Chairman Graham Andrews (tel 0272 735896)

Vice-Chairman and Safety Officer Brian Giles (tel 0625

861648 home, 0625 861757 work or 0253 45440 work)

Secretary Ron Bott (tel 065477 235 or 095245 2302)

Treasurer John Wincott (tel 0533 863310 home)

Technical Committee Chairman Bruce Giddings (tel 0983

526192 home or 0983 402208 work)

Training Committee Chairman Ian Stokes (tel 056686 514)

Training Officer Brian Powell (tel 0372 52008)

Council Members Paul Baker, Julian Doswell (tel 060872 413

work), Dave Thomas (tel 0252 26182 home, 0252 517983

work)

© BMAA 1982

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form, or by any means, electrical, mechanical, photocopying, recording, or otherwise, without the prior permission of the copyright owner.

Comment

By Norman Burr

They'll Have To Do Better Than This

The London-Paris race is a marvellous idea and ought to be the highlight of the microlight year.

I sincerely hope it works out that way, but having read a recent press release from the French organisers, one would be forgiven for doubting whether Fenwick General Medias knows enough about microlights to run the event smoothly and safely.

It was obviously written by someone who doesn't know the first thing about the sport and contains serious factual errors, such as 'Take off in 10m', 'Requiring little piloting skill', 'Never a problem to land, even if the engine is not working.'

Even allowing for the probability that these generalisations were aimed more at the popular press than at aviation magazines, this is nevertheless one release that should never have been released. As *Flightline* went to press, Fenwick's race manager Bernard Lamy, who presumably carries the ultimate responsibility for such *faux pas*, was due to meet our Chairman Graham Andrews to discuss BMAA's role in the event. The BMAA Council very much hopes to

take a positive role but I don't blame them for wanting to first satisfy themselves that the event has been properly thought through.

At the time of writing, the omens are quite good, with the race organisation steadily, if belatedly, getting into gear. It is beginning to look as if this unfortunate press release is atypical — let's hope so, if the race is run well it could become an annual event.

The Next Move is MAMTA's

Sooner or later MAMTA or something very like it was bound to be formed. Every industry has its trade association and the microlight industry, now that it is becoming established enough to think of itself that way, was bound to follow suit.

The news produced one or two long faces at the BMAA, but the gloom hasn't lasted long; there's no point in bemoaning the inevitable and anyway there's no good reason why the BMAA and MAMTA shouldn't develop a useful working relationship. Goodwill prevails.

Almost MAMTA's first act was to make it clear that it dislikes the BMAA Registration & Approval Scheme in its present form. However, its delay in coming up with any specific objections means that negotiations on the future of the scheme, which is sorely needed in some form or other, have yet to begin.

The BMAA is likely to be reasonably patient, if only because it knows better than most the sort of problems which can occur when an embryonic organisation is trying to get its act

Chairman's airwaves

By Graham Andrews

Since the last issue there has been a steady flow of telephone calls from members seeking clarification of the rules and details applicable to the new Group D. The most frequent question has concerned those who currently hold a Certificate of Competence — what do they need to send to CAA to gain a PPL Group D? I will apologise here to two members because I did not give them a full list, omitting the log book. Here is the full list:—

- Completed Application Form FCL102D,
- Certificate of Competence,
- Completed Medical Declaration Form FCL150/AB,
- A cheque to CAA for £45,
- Log Book.

The log book will be rechecked to see that the

minimum total of 25hr has been carried out (of which at least 10h must be solo). The log book should be countersigned by a BMAA flying instructor when set tasks were achieved; in particular the qualifying cross-country is important in this respect. Also the CAA will add an entry to the log book for a Certificate of Experience.

I have received a few grumbles about the Council being full of non-microlight pilots so I did a check at the last Council meeting. Of the eight members present only one had not flown a microlight in the preceding week. We have also made an attempt to balance up the Council, following the loss of the experience of Jonny Secome and Nick Regan, by co-opting Dave Thomas. Dave is steadily taking over the reins of safety from Brian Giles who has his hands full with competitions, rallies and events.

Recently the Council has been taking some

together. But in return MAMTA must treat these negotiations as a priority; every month's delay is another month's freedom for the cowboy operator — and he's the target, not the guy on the other side of the negotiating table.

Whose Brave Enough?

It's high time I got airborne. Being immersed in the microlight world day in and day out and yet never getting the time to fly the things is just too frustrating.

So if any brave school is prepared to teach a rookie pilot from scratch and is confident enough to let the experience be written up — warts and all — in *Flightline*, then give me a call.

Susan Breaks Male Monopoly

Congratulations to Susan Bell, the thousand-and-forty-fifth member of BMAA and the first woman to obtain the BMAA Certificate of Competence. So far microlight aviation is heavily male dominated but there is no good reason why this should continue. Here's hoping Susan is the first of many!

Norman Burr

important steps on behalf of the movement. Bruce Giddings organised the site and the aircraft for the microlight noise trial asked for by the Department of Trade; a meeting with the department's Under Secretary of State (Iain Sproat) has been arranged; Bath University has been approached to investigate ways of producing quieter engines and a specialist firm has also offered to do the same although both avenues will cost money; Bristol University is planning a Microlight Symposium in the Easter vacation next year, which will be sponsored by BMAA and the Royal Aeronautical Society.

Also, *The Times* did an excellent article on microlights in their *Preview* on 18 June — almost as good as the piece by Katie Thomas in *Mayfair* — and the CAA is asking us to produce criteria for displays and for display pilots. We have agreed some provisional rules.

These are examples of recognition by the authorities and the media of a responsible association. I ask every member not to forget that he or she can contribute to, or detract from, our reputation — and that this reputation largely rests on the standard of our airmanship.

Leisure Flight LTD.

MICROLIGHT AIRCRAFT

THE INCREDIBLE & VERSATILE GOLDWING



- * Flown 3000 miles across America, Feb. '82.
- * Outright Winner-Ultralight Air Race Arizona, Feb. '82.
- * 450 miles in 8 hrs., Paris to South of France, March '82.
- * Thermalled 4,000 ft., without power, Cornwall April '82.
- * Cruise Speed of 55 - 65 m.p.h.
- * Climb Rate of over 700ft./min.
- * Range of 200 miles.
- * Factory Built or D.I.Y. kit.

DEVELOPED THROUGH NINE PROTOTYPE STAGES AND SUBJECTED TO DETAILED STRESS TESTING, THE GOLDWING OFFERS PERFORMANCE WITH RELIABILITY AND SAFETY.

NEW CUYUNA POWERED EAGLES

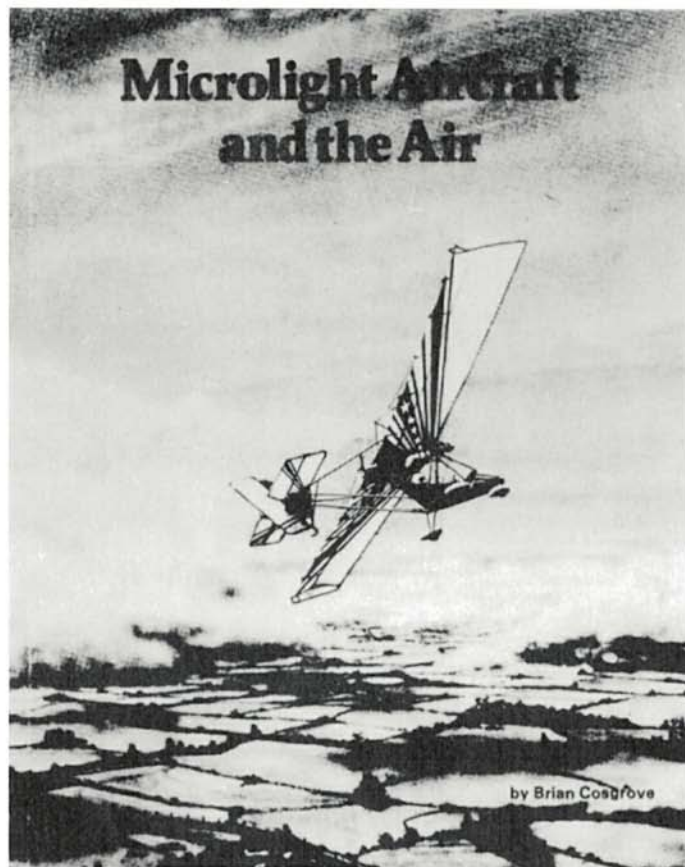
SPARES AND REPAIRS

- * Easy access 4½ miles N/East of M1 exit 20
- * FOR DETAILS JUST SEND TWO FIRST CLASS POSTAGE STAMPS.

LEISURE FLIGHT LTD.

UNIT 163
BRUNTINGTHORPE AIRFIELD
UPPER BRUNTINGTHORPE
Nr. LUTTERWORTH
LEICESTERSHIRE
Tel: 077 382 4497

...from Breen Aviation Ltd...



...contains all a Microlight Pilot needs to know, wants to know and **must** know for 'B' Certificate Pilot Examinations!

This valuable, Microlight Pilot's training manual has been authoritatively written and compiled by **Brian Cosgrove** (a member of the BMAA Training Committee) and evolved from his experience as a contributor of examination papers to the BMAA.

'Microlight Aircraft and The Air'

is as essential to pilots as the coveted 'B' Certificate: each copy is professionally printed & bound, and costs only **£5.95** plus 95p postage & packing.

Write, for your copy, to:



Breen Aviation Ltd

Microlight Aircraft Division
Enstone Airfield
Oxfordshire

Telephone: Enstone (060872) 413/4

Whistles in the wires

Trade Organisation Launched

By Norman Burr

On 2 June in a Birmingham hotel, the Microlight Aircraft Manufacturers' & Traders' Association was born. MAMTA intends to be a professional body representing all companies with an interest in manufacturing or supplying microlight goods or services. According to MAMTA founder member Julian Doswell, who is also a BMAA Council Member, the aim is to complement rather than compete with BMAA.

However MAMTA already finds itself in conflict with BMAA, over the BMAA Registration & Approval Scheme, which is intended to squeeze out the cowboys in the microlight business. While not against the scheme in principle, MAMTA spokesman Tony Faulkner told *Flightline* that MAMTA members were being advised not to co-operate with it at present. 'Everyone at the inaugural meeting was up in arms about the scheme as it stood', he said. He declined to be specific about the organisation's objections to the scheme, saying that MAMTA had not yet had time to collate members' opinions into a definitive association position.

However a number of actual or potential MAMTA members are known to be unhappy about the annual cost of BMAA registration, which has been fixed at £75 or £1 per aircraft produced (whichever is the greater), feeling that this represents poor value for money. Registered companies receive a 'Registered Organisation' stamp on their advertisements in *Flightline* (the first ones appear in this issue), free advertising in the twice yearly 'yellow pages' and a certificate which they must display at their place of business. They are also obliged to:

- 1 Permit spot checks on their premises by BMAA Technical Committee members,
- 2 Not knowingly sell unairworthy aircraft,
- 3 Submit one example of each aircraft for BMAA type approval, at their own expense,
- 4 Put right promptly any faults which develop in service,
- 5 Sell single-seaters only to Cat A licence holders or above,
- 6 Sell dual-seaters only to Cat B licence holders or above,
- 7 Operate in a fair and businesslike manner.

MAMTA hopes to be able to open negotiations with BMAA soon and the BMAA for its part has expressed a willingness to do so.

The new association's chairman is J Faulkner and the acting secretary Greg Stokes. MAMTA's mailing address is c/o the chairman at 32 Brownhills Road, Norton Canes, Cannock, Staffs.

New Weedhopper Agency

George Armitage has relinquished his Manchester-based Weedhopper agency for the UK. A new company, also in Manchester, is being set up to take over Weedhopper sales and service, headed by Stephen Reynolds. Stephen is planning various improvements to the machine, particularly the engine, and can be reached on 061-442 8455.

With Friends Like This

The agony of microlight enthusiasts in Nottinghamshire is not yet over.

As if the loss of Langar airfield were not enough (*Flightline May/June p10*), responsible pilots in the area now have to live down the blatant encroachment of an Air Traffic Zone by an

BMAA Treasurer John Wincott aloft at the recent Leicestershire rally. More on the event: p22.



unregistered machine, which recently flew over RAF Syerston, near Newark, at approximately 200ft (61m) while a training exercise was going on. Having landed nearby, it remained stationary for some 10min and then took off again, apparently oblivious of the fact that all take-offs had been halted on the airfield for fear of collision with it, and also apparently oblivious of the red aldis lamp which was being flashed at it by air-traffic-control.

The pilot, who has been identified, is not a BMAA member.

Shape of Things to Come?

A microlight with a 1200cc four-stroke and disk brakes could herald a major change of direction for the microlight aviation. Yet that is exactly what the British Air Ferries' subsidiary Dragon Light Aircraft Co has promised to unveil at the Farnborough airshow in September.

The aircraft has been designed as a side-by-side two-seater right from the start and is aimed squarely at the training market. Dragon is being very tight-lipped about the source of the engine, but director Rory Keegan scotched speculation that it could be a Citroen-derived unit, an approach which is known to be interesting other microlight manufacturers.

'The engine is British', Keegan told *Flightline*, adding only that it had connections with the motorcycle industry and that it would be more powerful, more reliable and less thirsty than the 45bhp Hunting 525 two-stroke, which will be an option. However the company is known to have had discussions with Weslake, which has already designed a very light, very powerful four-stroke for speedway bikes.

Hunting-engined planes will cost around £500 less than four-strokes, he said, but gave no indication of how much the aircraft would cost overall. Instrumentation and a semi-enclosed cockpit would be standard, with a partly enclosed cockpit optional.

Dragon expects to have the first of five prototypes flying from its Cardiff base by the end of July and aims to destruction-test at least one before starting its production run of 1000 aircraft. Production aircraft are scheduled to be available from the Farnborough show.

Keegan continued: 'To date there are no microlights that satisfy the demands of a flying club — long-term engine and airframe reliability, pilot comfort and proper training layout. With existing aircraft, noise is also a great problem, due to their very high-revving two-stroke engines'. Dragon is using much slower-revving engines and a correspondingly slower prop.

Microlight Airsport Services Ltd.

UNIT 6, FESTIVAL DRIVE, LOUGHBOROUGH, LEICS. LE11 0XJ ENGLAND.

Wire Cordage Service

made to customer's requirements

Quicksilver MX wires from stock, fast return service for others

Galvanised wire 7 × 7 × 2.5mm, 7 × 19 × 3mm, plain or black PVC covered

Stainless steel wire 7 × 7 × 2.5mm, 7 × 19 × 3mm,
plain or black PVC covered

Tangs in 12 gauge stainless steel, thimbles in stainless steel

Nicropress ferrules: aluminium for galv. wire, cadmium for stainless steel

Visa and Access cards accepted
Trade enquiries welcome



Skymaster Mods

Adventure Sports Equipment reports two detail improvements to its Skymaster parachute system. These modifications involve the fitting of a steel seating washer for the parachute release pin and the replacement of the spring clip in the release cable with a special speed link of superior strength.

All users have been informed but if anyone has begged, borrowed or stolen a Skymaster and has not received the update would he please contact Adventure Sports and the parts and instructions will be supplied by return. Adventure Sports Equipment is at 127 Wath Road, Mexborough, South Yorks (tel 0709 583235/76979).

Besam Dogged by Bad Luck

Besam Aircraft, whose tantalising advertisements promising a radically new machine have had the microlight world guessing for several months, says it will now be some time before its aircraft gets into production, thanks to a burglary and subsequent fire at the Kidderminster works.

The aircraft was to have been launched at the Isle of Wight festival in May, but John Wakefield of Besam told *Flightline* that the fire had destroyed all their drawings and damaged the

prototype to the point where it was easier and safer to start again from scratch.

There is no word yet from the company about when the new aircraft will be revealed to public view.

No More Mistrales

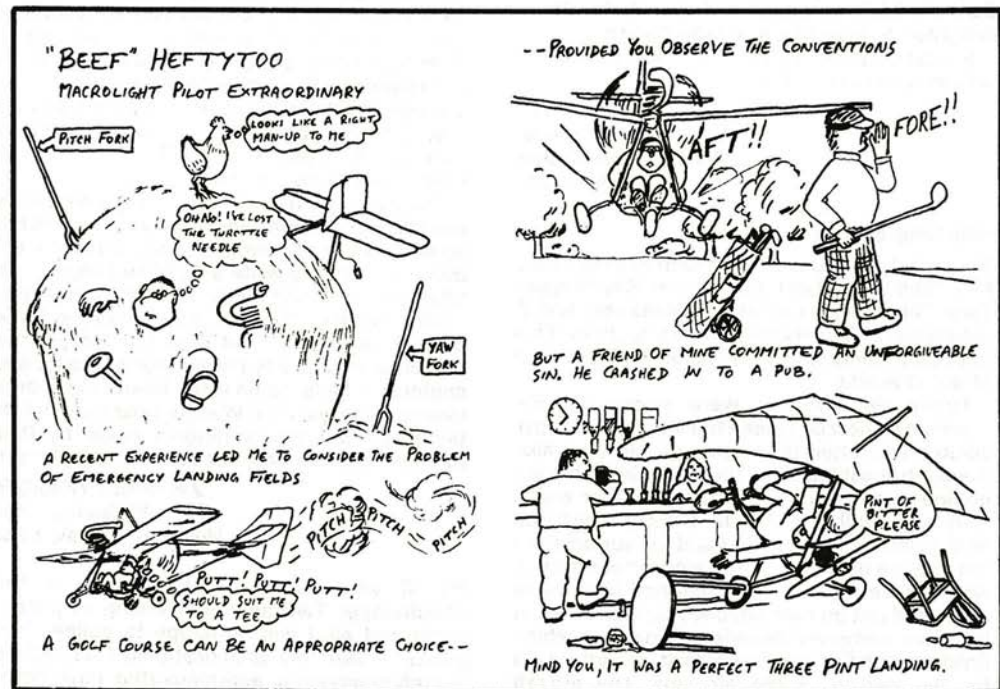
Micro Engineering Aviation, manufacturer of the Mistrale microlight, has gone into liquidation. The company was headed by BMAA Council member Paul Baker.

Crop Spraying Charges

The CAA has announced that from 1 November this year anyone wishing to crop-spray his own land by microlight will need an Aerial Application Certificate.

The application charge for the certificate will be £360 — half the cost of an equivalent certificate for conventional aircraft. In addition a charge of £60 per aircraft is payable when the certificate is granted or renewed. The equivalent figure for conventional aircraft is £175.

● A farmer member of BMAA is interested in setting up a 'farmers' section' of BMAA. Anyone interested please contact the Secretary.



Letters

Correspondence relating to Ollie Houldridge's
Having a ball article appears on p16.

Hopping Mad I

Sir, In reply to your report on the Weedhopper (*May/June p59*), may I say what an amateurish, bigoted, unresearched, presumptuous and virtually libellous load of rubbish the article was?

I am a PPL holder and have built a single-seat Weedhopper with the 460 Chotia. I am 13 stone and six feet, have extra silencer and parachute fitted, yet my machine G-MBRF has a short take-off roll, does a *spiral ascent* to 1000ft AGL in 4min, cruises on less than half throttle at 45mph and uses about 1½gal/hr. I have made many and various cross-country flights and landed in various rough fields without a hitch. I have flown to Sunderland airport in 15kt winds from Consett (17 miles) when the engine wasn't even run-in fully. It has surplus power and, should Mr Bennett wish to come and see it, I will be delighted to give him a demonstration.

Incidentally, my machine cost only £1900 and was very easy to build.

Leslie R Smith
Bridge House
Framwellgate Bridge
Durham City

Hopping Mad II

Sir, I would like to take issue with you regarding Paul Bennett's flight test of the Weedhopper Two. This article is most unprofessional and ill conceived and furthermore casts doubt on Paul Bennett's ability to make a reasoned assessment of any machine.

Firstly the controls were sloppy on the machine he flew because a bracket on the control column was fitted the wrong way around; also the control cables were too long. Secondly the engine was not run in as stated neither was it developing full revs. Thirdly although the finish of the Dacron for the wing and tail surfaces left much to be desired, a small amount of research would have revealed that this had been hand sewn and not as now supplied by Weedhopper Inc. This company supplies all parts machine finished with fixtures, brackets etc, anodized. As for the design of the airframe, any aircraft

engineer would disagree with Mr Bennett's sweeping statements.

The engine mounting is quite ingenious and not something his grandmother could better. The idea is to allow the torque from the engine, when it is running, to take the strain off the mounting brackets. If you have ever travelled on a Viscount and watched, fearfully, as the engines bounce alarmingly around whilst the aircraft is taxiing, but are perfectly balanced once airborne — well, the principle is similar and Viscounts have been around for a while without shedding engines.

The week after Mr Bennett flew the Weedhopper I flew it. After the adjustments to the controls mentioned above, the aircraft behaved as one would expect both in pitch and roll. The aircraft is fitted with rudder and elevator only which together with a large wing area gives it a slow rate of roll. However, I carried out some 60° banked turns with the machine behaving perfectly, rolling out without hesitation. The aircraft has been thermalled, with its high lift wing giving high rates of climb. I flew the machine in quite turbulent conditions with little difficulty in maintaining full control.

There are problems with this particular engine which are gradually being sorted out. The engine requires a total of 50hr before it is properly run in; when Mr Bennett flew with it, it had less than ten. Because this is a two seater and not generally on sale to the public the contractor had some difficulty obtaining the right parts. Possibly an undersized main jet was fitted to the carburettor; this, coupled with a non-standard silencer and the incorrect fuel mixture caused a loss of more than 800rpm. As the propeller is designed to operate at 3400–3800rpm, poor performance was inevitable.

The point I am making is this: when the engine has been fully run-in and when a new aircraft has received that fine tuning required to finish it off, that's the time to write a flight test report, not after ten minutes in the air on its maiden flight.

After reading this you may be asking 'Who pulled his chain?' but my interest in this particular machine is purely that of a pilot and engineer. I have no financial interest in it or in Weedhopper Inc. The Weedhopper may not be perfection but the comments made by Paul Bennett certainly were not based on a flight test.

J R French TEng(CEI)
19 Epping Drive
Melton Mowbray, Leics

PS: If you would like an article on the Weedhopper Two after its running in period, warts and all, I will be happy to oblige. (*Yes please — ed*). My qualifications: I served an aircraft engineering apprenticeship, have flown

gliders, have a PPL IMC etc and have been associated with flying for 24 years.

Paul Bennett writes: Firstly let me reassure both Mr French and Mr Smith that neither I nor the BMAA has any inherent bias against Weedhoppers. Having said that, I do not wish to change anything said in my article. In fact this was not the first time I had come into contact with a Weedhopper — a friend of mine used to own one and his impressions run along the same lines as mine.

Let's take a few specifics as mentioned by Mr French. Firstly the control stick was fitted as per instructions and I was referring to flight sloppiness — aircraft reaction times — not the stick itself (you state the machine has a slow roll rate). Secondly — and I've just rechecked this point with the man himself — the sail was as supplied to the owner. Thirdly I still maintain that the design/construction is tatty. I would go further but I've asked Technical Editor Peter Lovegrove to give a general engineering appraisal of the machine and I don't want to prejudge his comments. Fourthly, you don't know my grandmother, and comparing the engine mounting to a Viscount — you leave me speechless! I defy you to bounce across a field without bending the mounting bolts and/or elongating the mounting holes — does this happen on Viscounts?

Finally I was told by the owner that the engine was running at the correct revs. I have seen you flying the aircraft in question and even with the new prop (not as supplied by manufacturer) I am sure you would agree that the climb rate is still distinctly marginal. I challenge you to make a dual cross-country — remember we are talking about a machine which is sold as a two-seater — and write it up for Flightline.

It is not easy to reply to Mr Smith's letter because we are not talking about the same machine. I'm glad to hear he is getting on all right but a lot of Weedhopper owners definitely are not.

Welsh Dragon

Sir, In the formative period of the BMAA, prospective clubs and members were wooed into joining with promises of knight-errant-like protection from the dragon CAA.

After a few mock jousting sessions, we not only find the knight errant flying astride the beast but breathing fire of his own with which to scorch us.

I challenge you, Sir Knight (if indeed you have tamed the dragon): obtain for us a 'stay of execution' or at least a longer period of grace

before your harsh proposals become enforced — lest in your zeal you scorch our beautiful sailwings and banish beauty and freedom from the skies of Britain for ever!

Give the pilots, manufacturers, clubs and schools a sporting chance.

David Walter
Rio Turia, Park Road
Barmouth, Gwynedd

Satisfied Customer

Sir, *Flight Line's* columns have carried several letters criticising microlight training, its cost, quality or the lack of a fair deal. As a student of both conventional (Cessna 152) and microlight (Eagle) flying, I can assure you that my experience on microlights is very pleasing, compared with the 'conventional' school.

In June I paid £175 plus VAT for a five-day course with South West Air Sports at Davidstow Airfield in Cornwall, and I am happy to confirm that this covers all they claim — as much time on the Eagle as possible, a thorough verbal test and many hours study with an instructor dedicated to producing safe and informed pilots. This included the best instruction on 'met' that I have had.

No time was wasted: when the weather said 'no flying' it was ground study — air law in detail, navigation, technical, airmanship, intelligent discussion. My wife and little boy were welcomed and made aware of the safe approach that South West has to training. In fact my wife actually enjoyed watching my first solo! Having watched most of my tow-training, she had seen simulated power failure landings and lots of my efforts, 20ft up, on the end of a rope along the 1 mile of Davidstow's main runway.

In 6hr and a bit on the Eagle I must have made nearly 30 landings, whereas in 10hr on Cessnas I have never been nearer than 12ft of touchdown (due partly to training from an airport).

My instructor made tremendous efforts to get as much airtime as possible. The weather was rather mixed — mist, wind, thunderstorms and hot thermally middays and afternoons — so for three of the days we started at 6am and waited for the mist to go. Then some flying, followed by coffee, CAP 85 or 'met', a rest period, discussion period and, with a welcome lull in the wind, some evening flying.

For an extra £75 plus VAT I was offered the option of converting my five-day course to the full A-certificate (solo standard) course, which guarantees enough airtime and ground study for this first part of the licence.

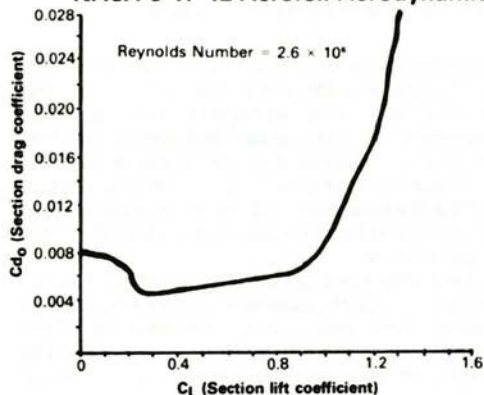
When it comes to value, most professional organisations would charge rather more for the time involved! If you only want to pay for time in

the air and do not believe in professional ground study, then frankly it might be better not to fly. I say this with some idea of what is involved since part of my job is preparing technical instructional documentation and I have been studying light aviation for years. However, there is nothing to beat a teacher who *wants* you to learn from his experience and enthusiasm.

Thank you Ian, Betty and especially Graham, for your patience, friendship, caution and encouragement. I'm looking forward to going back to South West and my advice to anyone contemplating a training course is to take a few days holiday and 'go South West'.

Paul Owen,
33 Kings Road
Fleet, Hants GU13 9AF

NACA 8-H-12 Aerofoil Aerodynamics



Does anybody know anything about these aircraft? Come to think of it is there any chance of your American contributors carrying out a flight test report on the Kasperwing and other interesting microlights?

Andrew Cranfield
The Hall Cottage, North Cheriton
Templecombe, Somerset BA8 0AE

On Kasper and Others

Sir, Readers may be interested to know a bit more about the Kasper range of aircraft. Interestingly, the BKB-1 was not entirely Kasper's own design. S Brochocki and A Bodek were also involved (hence the BKB-1 designation), and in some journals S Brochocki is credited with being the designer. The data in the table is taken from a 1970 US sailplane directory.

The Bekas-N (N for 'narrow wing') had a fuselage length of 12ft (3.7m). Both aircraft used the NACA 8-H-12 aerofoil section. This reflexed section was originally developed for helicopters as it has a zero pitching moment. Aerodynamicists may be interested in the characteristics of the aerofoil as shown on the graph.

Over the years there have been some weird and wonderful aircraft built and flown, particularly in the States. One which comes to mind as well as the Kasperwing was the Horten IV (a sort of overgrown modern flexi-wing hang-glider) designed by the Horten brothers.

Licence Manufacturers Too

Sir, We hear and read a lot about safety in the microlight world, and rightly so. The BMAA is seen to be responsibly pursuing a policy of pilot training and disciplines which must be brought in for everybody's sake.

However there is another aspect of safety which does at present not receive much mention in your columns, but which is equally as important and possibly more so. This concerns aircraft and equipment design and construction methods. No amount of pilot training can help if a pilot has an unstable or unsafe aircraft.

I would like to suggest to the BMAA a licensing system for manufacturers of aircraft and major

Kasper Aircraft Data

	BKB-1	BEKAS-N
Span	39ft (11.9m)	49.2ft (15.0m)
Chord	48 in (1.2m)	38 in (1.0m)
Sweepback	13°	15°
Wing area	160ft² (14.8m²)	158ft² (14.7m²)
Aspect ratio	9.5	15.3
Empty weight	410 lb (186kg)	350 lb (159kg)
Payload	200 lb (91kg)	200 lb (91kg)
Wing loading	3.81 lb/ft² (182N/m²)	3.48 lb/ft² (167N/m²)
L/D max	30 at 54mph (87kph)	45 at 66.5mph (107kph)
Min sink	180ft/min at 45mph (55m/min at 72kph)	120ft/min at 50mph (37m/min at 80kph)

items of equipment as well as for pilots.

Aircraft designs should be vetted by a competent authority before approval is given for production to take place and this should include stress and aerodynamic checks. Construction methods should be approved and things like highly stressed pop rivet assemblies as seen on some aircraft should be eliminated.

Reliability testing should be compulsorily carried out and no new aircraft or load-bearing part should be marketed until type tested for at least 100hr flying.

As this sport grows up it is important that the BMAA grasps this nettle. New designs come on the market practically every month. They are not all safe. Many are designed, built and marketed by amateur engineers who drift into business after knocking up an aircraft of sorts for themselves.

The BMAA must bring in a manufacturers' certification system and refuse advertising to those who do not conform. With BMAA approval we can all fly more safely.

W H Foddy
23 Chandos Close
Buckingham MK18 1AW

Chrysler Seizures

Several issues of *Flightline* have mentioned seizures with Chrysler Twinpack powerplants on Eagle microlights. As part-owner of such a machine and having spent most of my working life involved with the design of aero-engines (at Bristol Siddeley and Rolls Royce), I realised what the problem was and carried out tests to prove it.

The Chrysler Twinpack comprises two separate engines driving a common propeller. Each engine unit has a centrifugal clutch which locks up at 800rpm upwards. Should one engine unit fail (say due to fuel starvation or a fouled plug), it cannot free itself from the remaining 'good' engine and continues to be dragged

Parlez-vous francais?

If you reckon your French is good enough to volunteer for translation work for the BMAA (French to English), then the editor wants to hear from you.

round by it. This acts like a brake on the good engine and propeller thrust drops to less than 50% of the original total thrust. To the pilot, this feels like an engine seizure.

It was a design error to incorporate centrifugal clutches. Had free-wheeling couplings been used instead, the failed engine could stop rotating without affecting the good engine, and 50% of the original thrust would still be available.

As it stands the only way to free a failed engine is to throttle back until the engine speed drops below 800rpm. Then, after the centrifugal clutch of the failed engine has unlocked, the good engine can be opened up to give 50% of the original full power. This is the *only* way to remain airborne. However, this procedure is not a natural reaction because the pilot automatically opens the throttle to counteract the loss of power.

In the interests of safety I believe Twinpack owners should be aware of this problem and the procedure to obtain maximum thrust should one engine fail. If this procedure is not carried out, the symptoms are like a serious seizure. If you don't believe me, try it yourself.

K W Clark
16 Goldney Road
Clifton, Bristol



LOOKING EAST?

PUMA SALES... SERVICE... TRIAL LESSONS & TUITION TO
PPL "D" STANDARD ON II SEAT AIRCRAFT. CFI DAVID
GARRISON (EX BRITISH HANG GLIDING TEAM, 1ST LANDS END TO
JOHN O'GROATS MICROLIGHT FLIGHT)

TAURUS AVIATION LIMITED

3 THE GREEN, HADDENHAM, ELY, CAMBS. CB6 3TA.

(0353) 740534 or (0223) 60060



PETER LOVEGROVE writes: Several readers wrote or phoned to point out that Ollie Houldridge is way off track with his interpretation of the behaviour of the wool streamer on his Skytrike (May-June p44). I too deserve a smart slap on the wrist for letting this one slip through — I will hang my head and wear Dacron and ashes for a week.

The first letter received was from Mr M A R Heald of the CAA. (You see, they do read our magazine and take an active interest in us, contrary to what some folk think!) Mr Heald's letter reads as follows:-

'... the writer seems to have got his wool pulled over his eyes! If he ties a length of wool to the cable and allows it to fly free it will indicate to him — very accurately — the relative airflow past the wool. If he is flying with no slip or skid, then the wool will trail backwards nicely but if the aircraft is yawing, then it will tail at an angle. What it will not do is pay any attention to the wind and to think that it might will only induce landings where the pilot has looked at the wool, seen it trailing straight back and assumed that he is directly into wind. He might be, but that has nothing to do with the wool. He is far more likely to be out of wind or even down-wind.'

Remember that the aircraft flies straight through the air and the relative air-flow is exactly fore and aft of the aircraft axis if there is no yaw. The wool will provide him with information on the amount of rudder needed to achieve balanced flight. (Due to airframe inaccuracies, torque, and the effect of slipstream from the engine you may find you need some port or starboard rudder to achieve balanced flight.)

The tests he did with a car are not relevant to aircraft operation as the car does not 'fly' nor does it get drift from a cross wind!

Steve Evans waded in thus:

'I was surprised that you allowed the 'advice' in the latter part of the article Having a Ball to reach publication! As Ollie Houldridge says, the idea of using a tuft of wool to indicate the direction of airflow is as old as the hills; and so is his failure to understand what the wool really tells the pilot.'

A tuft of wool located on the canopy of a glider or the nose cable of a trike will show the direction of airflow relative to the aircraft, not to the ground. In other words it is a simple device to show the pilot if he is flying 'true' or if he is flying with yaw on. Flying yawed is inefficient and therefore bad practice in gliders or microlights —

Educating

or jumbo jets — unless you wish to lose height quickly without gaining airspeed. Then it's known as sideslipping!

A simple experiment would show that the way the wool points has no real connection with the direction of the wind over the ground. Find a good smoke trail and fly across it. By manipulating the controls you can make the wool point left or right or straight at you, whilst flying at right angles to the direction of the wind over the earth below.

Simpler still, imagine flying at 30mph in the same direction as a 40mph wind. Would the wool then point ahead of you?

The important point is that a windsock on the ground will show the direction of the wind over the ground, whereas a tuft of wool on an aircraft will show the direction of airflow over the aircraft. There is no connection between the two.

The way to establish the wind direction over the ground would be to get the wool tuft pointing straight back at you, then look to see if you are drifting to the right or left. If no drift is apparent you have a choice of three alternatives:- 1. You are flying directly into the wind, 2. You are flying directly downwind, 3. you are flying in still air. The decision rests on your judgement of your speed over the ground.

Ollie's experiments with cars and wool tufts misled him because cars do not drift with the wind very often! If people follow his 'advice' they might find themselves landing across wind or even downwind, (but without yaw!) resulting in some expensive repairs. They would do better to read some of the books reviewed in the same issue of Flight Line. Since Ollie clearly has an enquiring attitude he may have discovered this for himself already!

Finally, Tim Williams got his two pennorth in:

'In the article Ollie states that one can determine the direction of the wind in flight by means of a piece of wool tied to a convenient part of the aircraft. This is completely wrong. The tuft or piece of wool will always point straight backwards towards the pilot unless the aircraft is put into a slip or skid. This type of indicator will only show the wind direction whilst the aircraft is at rest on the ground.'

When an aircraft is in flight it can be considered to be flying in a 'moving ocean of air'. To stay in the air the aircraft must have forward

Ollie . . .

motion with respect to the air around it, not the ground. While the aircraft is flying it matters not one iota which way the wind is blowing.

A good analogy is one in which a boat has to cross a fast-flowing river to a point on the opposite bank. If one aims the bow of the boat at the intended destination, one can expect to hit the bank some way downstream. The boat is, at all times, travelling straight forwards with respect to the water around it, but the boat will appear to be crabbing along sideways towards the opposite bank.

To detect which way the wind is blowing while the aircraft is in flight is rather difficult; one either needs a ground reference or sophisticated radar or radio navigational aids. Apart from observing indicators on the ground such as wind-socks, smoke, etc, the only way I know of determining wind direction is by making accurate orbits or 360° turns and watching the way the turn pattern drifts over the ground.

I am slightly concerned that this article should be published because it is supplying false information which could lead to a novice pilot getting the wrong end of the stick. This could conceivably be a contributory factor in an accident.

I wonder how many people have attached Ollie's wind indicator to their aircraft expecting it to work in the way described. My advice to them would be to read a book such as Flight Without Formulae by A C Kermode before they take to the air again.

The ball idea is not so bad but it's far easier to place a piece of adhesive tape around the wire. Before gluing anything to an aircraft, make sure the glue does not attack the structure. Many glues may destroy the plastic coating on flying wires and might just attack the steel wire as well. The best way to determine whether one is in level flight or not is to use a variometer (climb and descent indicator). There are several good ones on the market and we would be happy to advise on their suitability.'

Tim has also written an article going into the subject in more depth, which we will publish in the next issue.

However, having loosed that set of missiles at the unfortunate Mr Houldridge, let us be fair to him by putting his point a little more clearly, because he is by no means as wrong as the

above letters suggest. He is, however, wrong in the words he chose and the way he put his ideas forward. Consider the following:

(a) The idea of streamer, be it a wool tuft, a small flag or a piece of ribbon is a first-class idea for *low-speed* (maximum less than, say, 60mph, 52kt, 97kph) microlights. The higher the maximum speed within this stipulated range, the heavier the streamer should be. That is, a small flag or thick ribbon is better for the 'top-end' machines and a wool tuft is fine for Sky-trikes and the like, operating closer to 20 than 60mph. The idea has been used on ultralight gyroplanes for three decades and is extremely useful and helpful.

(b) Ollie is forever trying to squeeze that extra bit of performance and economy out of his beloved Skytrike. So when he says use the streamer to 'fly directly into wind', he means exactly what the three writers are saying, but expressed it poorly (which is why your Technical Editor merits a boot in the posterior!).

If he meant fly directly into the wind in the true sense then, by definition, he would never get back to his landing strip, but disappear into the infinite!

What he was trying to say — and I have chatted with him to prove it — was, *having chosen the ground path you want, make sure that, while you are following it, the streamer points straight at you.* That way, you go fastest for least fuel consumption and most comfortable flight. With a craft as slow as his Valmet Skytrike, the ground-speed difference can be significant!

Some of the above writers have misunderstood Ollie's remarks about the car testing. He did not say he was trying to prove anything about showing wind direction. He was testing to find out at what velocity the tuft became useless as an indicator of yaw, because of its ragged turbulent oscillation.

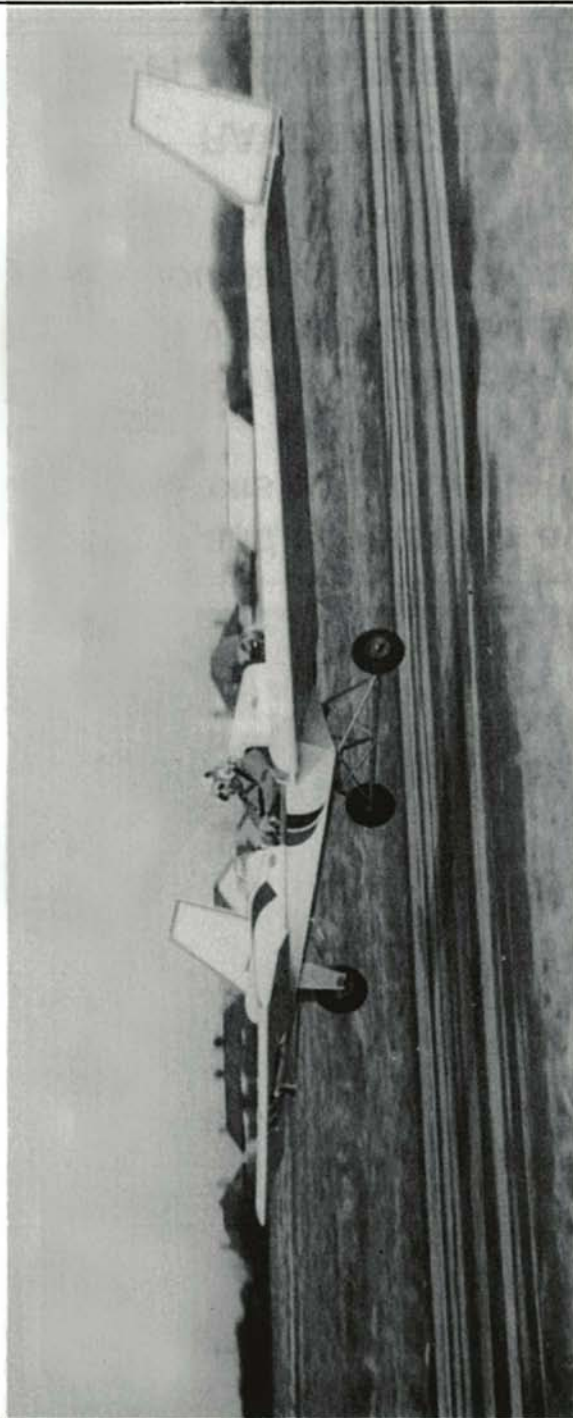
Postscript

Just as I was finishing off this article I received a letter from Michael Codd of the Bournemouth Flying Club, reiterating virtually all of the above points. My thanks to Michael, and all the other respondents.

It seems extraordinary to me that this item managed to stir people to write and phone at such length, whereas normally it's like asking for blood, trying to get readers to put pen to paper! I have to exclude Tim Williams from such gentle chiding, because he had promised some articles before this matter cropped up and has been as good as his word. But what about you chaps who promised articles, for which I seem to be waiting in vain. I understand that Norman has similarly been led up the peritrack!

Goldwing

Proven Beyond Doubt!



Prices from £1800 + VAT

- 3000 miles Trans-America flight, Feb '82
- Winner of Arizona Ultralight Race, Feb '82
- 450 miles in 8 hours — France, Apr '82
- Thermalled 4000 ft without power — Cornwall, Apr '82

euro wing

Unit 20, Dixon Place
College Milton North
East Kilbride G74 5JF
Tel: (035 52) 46498

BESAM

AIRCRAFT

ANNOUNCEMENT

FIRE AND BURGLARY HAVE MADE A
HASH OF ALL OUR SCHEDULES.

WE APOLOGISE TO THOSE WHO
SOUGHT US AT SHANKLIN AND TO
THOSE WHO AWAIT REPLIES TO
ENQUIRIES.

WE ARE DOING ALL IN OUR POWER
TO GET INTO PRODUCTION QUICKLY.

THANK YOU ALL FOR YOUR
PATIENCE.

MICRO-PROPS

Propellers
for all microlights

Trade supplied

Various sizes from 50-62 in
diameter, both left-hand and
right-hand

COME AND SELECT FROM OUR
LARGE STOCK

CALLERS WELCOME
OPEN SAT. MORNING

LEN DAVIES . MICRO PROPS
UNIT 5 BREARLEY LOWER MILLS,
LUDDENDEN FOOT, NR. HALIFAX.

Tel: Halifax 240227

Now available in the UK

THE TWIN ENGINE MICROLIGHT

Winner of many awards

Noted for pleasant handling & viceless character

One of the few with full conventional layout

Over 400 sold in North America

Very advanced design backed by
solid after sales service

Stressed +4g -2g

Two 9.5 H.P. 185cc engines

28" props for quietness

50' - 100' take off run

3 - 5 hours duration

ULTRA
FLIGHT

LazairTM

Contact us for leaflet
or

for full information package
including test flight reports, technical
information, colour brochure and other
useful information send cheque/PO for
£5.00 to address below.



WE ALSO SUPPLY TRIALERS, HANGERS AND A FULL RANGE OF ACCESSORIES

AMF
MICROFLIGHT LTD.

(SALES)

MEMBURY AIRFIELD, LAMBOURN,
BERKSHIRE RG16 7TL
TELEPHONE: LAMBOURN (0488) 72224
TELEX: 848507 (MIFLI)

Microlights

By Graham Andrews

An aviation enthusiast's dream! Though not on the scale of Oshkosh, the 2-4 July PFA rally at Cranfield had something for everyone — aircraft to see, people to meet, competition and even some flying.

Most of the common three-axis types of microlight were represented, plus a couple of trikes. Nick Jerromes recent idea of an 'airforce' along the lines of a confederate airforce (see *opposite—ed*) was on display and drew plenty of interest and comment. Also on static display was a replica of a 1913 Sopwith Tabloid, which just about fits the definition of a microlight, and Mike Whittaker's MW4 — a very interesting new single seater which had made its first flight the week before the show.

Saturday, the main day, was blessed with



Wingco Nick!

'Because of the ever changing designs and the large range of microlights currently available, many people who want to become involved with the sport are reluctant to commit themselves to a £3000-odd financial outlay'.

With these words Long Marston Aviation Co's director Nick Jerromes launched what he hopes will be the answer to the problem — the Microlite Airforce.

The idea is that those who join the airforce will be entitled to fly various aircraft owned by their local squadron, the first and so far the only squadron being, not surprisingly, at Long Marston itself.

Three grades of membership are offered. Non-Commissioned Flying Officer grade costs £250 plus VAT and includes a ground-school course and 5hr two-seater familiarisation, plus a training pack which can be used as a correspondence course, an exam at the end of the course and use of club social facilities etc.

Those who have completed the training course or who have a PPL Group D can opt for Qualified Flying Officer grade, which for £550 plus VAT gives access to the squadron's Pathfinder, Scorpion, Eagle Robin, two- and three-axis Hummers, and dual Quicksilver. Nick says these are shortly to be augmented by a Puma, Flexiform Striker, Mirage, solo Quicksilver, Goldwing, Microbiplane and Swallow.

All aircraft will be registered and will carry third-party insurance, strobe, parachute, field service kit, air-to-ground communication and an aircraft log.

Teenagers between 13 and 17 can become Cadet members, who for £35 plus VAT will receive various goodies including ground-school lectures and, provided their parent or guardian approves, two-seater instruction at 'discount rates'.

...and at

Not content with his Lincolnshire-Cornwall flight, the irrepressible BARRY GORDON was in action again at the recent Grenoble show. Here's how he saw it.

To quote *Flight International*, 'the lighter side of general aviation took the limelight' at this Ninth International Business & Light Aviation Show. Jointly hosted by that magazine and *Aviation Magazine International*, Grenoble is now firmly established as an annual event and this year was enhanced by the convention of France's 35,000-strong Federation Nationale Aeronautique, along with a national conference of the country's chambers of commerce and industry.

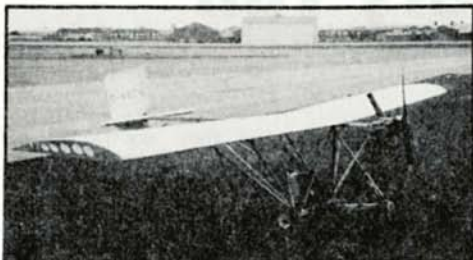
My role was to represent The Aerolite Aviation Co, which joined forces with French Quicksilver agent Fimor and American manufacturer Eipper-formance to give a continuous display of solo and dual MXs.

However, we found that the show directors had arranged to have the microlights operate from a grass strip adjacent to the main runways

in action at Cranfield . . .

good weather and generally light winds. The microlights were given a 15min slot in the general flying display and allowed a free-flying hour between 6.30 and 7.30pm. For the main slot, organised by Julian Doswell, a dozen microlights launched into a follow-my-leader circuit and completed several passes, each eliciting much interest and comment from the crowd. 'Like wasps buzzing round a jam jar' was how one enthralled spectator put it. It was a creditable display and went off without incident despite the wind picking up to around 15mph for the only time during the whole day.

What was also impressive was the standard of organisation of the whole event, with the hundreds of aircraft movements being splendidly marshalled by ATC cadets who had apparently spent the previous weekend practising, using cars as dummy aircraft. My



Flashback: the MW4 on test at Filton in preparation for Cranfield.

only criticism of this otherwise excellent organisation was that it did not prove flexible enough to accommodate a last-minute request to find a spot for the BMAA caravan on the many acres of spare airfield.

Grenoble

and parallel to the display chalets. Radio communication to the tower was provided in the form of a ground control vehicle and a driver who had no idea what was in store for him. The original idea had been that we would contact this gentleman in the unlikely event that we might occasionally chance to fly one of our 'aircraft'. He would then take a minute or two from his duties as ground controller to duly record the event.

It did not take long for Grenoble to find out that given decent weather (it was perfect), a hundred feet of grass (maximum) and a pilot (we had two per aircraft), it was hard to find a microlight on the ground long enough to examine why it was possible — and doubly hard to find the ground control vehicle for normal duties.

The MXII found a place in the hearts of most of those attending, certainly those not-so-few who had a chance to experience first-hand the exhilaration of microlight flight in the co-pilot's seat. By the end of the event even the most ardent critics had been cajoled into enthusiasm.

Sarah Beck of *Flight International* led the surge of international VIPs to the microlights with her summer dress and adventurous nature. With the whirl of cameras drowning the Cuyuna's growl

she leapt into the air with Eipper's Jerry Sanderson at the controls for what she later described as a 'fantastic' experience. Next in line was David Mason, Editor of the magazine (See the 19 June issue) who reluctantly stepped forward to defend male supremacy. Ten minutes later there was another born-again convert excitedly reporting a 'supremely enjoyable' experience and thanking God 'for a two-seat model in which proper instruction is possible'.

Then came the onslaught! Charles Andriani, France's Minister of Transport, led a chain of dignitaries and VIPs eager to experience this unique realm of flight. The waiting list began to read like the who's who of French aviation as members of both conventions in attendance could no longer stifle their curiosity or, more important, their basic love of flying. It was an important breakthrough for microlights in France, with people from within the confines of conventional aviation developing a new respect — born of experience.

Throughout the show the microlights knowledgeably shared airspace with aircraft ranging from Microturbo's new Microjet 200 to commercial 747s that had been diverted from nearby Lyon due to closed runways.

A thank you is due to our hosts and to all who contributed to this triumph of microlight aviation, but particularly to Jerry Sanderson, Roy Gill, Richard Lake and Alex Zuckerman for doing what they love to do so well.

Leicester's dry run

Early in March, the then six-month old Leicestershire Microlight Aircraft Club discussed the idea of a club fly-in and decided that a small local event to test our organisational abilities would be a good idea—it seemed more prudent than going all out for a large-scale event, first time around.

With this in mind we set about organising a fly-in for our own members and for those of the neighbouring Midland Microlight Flying Club, and were almost instantly amazed at the amount of work involved, even for a small-scale event. However, five weeks of frantic effort came to fruition on 15 and 16 May at a private airstrip near Hinckley—we had roped-off areas for rigging, running-up and spectators, a control caravan, toilets, first-aid, local microlight trade displays and a Leicester ATC squadron to help run it.

Saturday dawned bright and sunny with light to moderate winds and during the day approximately 20 microlights arrived. A few spectators also arrived despite the fact that the event was not advertised at all (we didn't want too many people turning up) and we were out in the middle of nowhere.

Demonstrations from Iain Barr's Goldwing, the Micro-Bipe and the Vector 600 were accompanied by a large assortment of trikes and other microlights, all enjoying themselves until a sudden thunderstorm brought the proceedings to a halt early on Saturday evening.

The weather relented, however, and Sunday was fair with light to moderate winds, sunshine and cloud. Again, nearly 20 machines turned up and flew for most of the day. The highlight,



Hinckley Times

One for the album: Smiling faces at Leicestershire's event. Left to right David Granger, John Wincott, Graham Mayes and Barry Underwood.

however, was undoubtedly the two 62 mile (100km) flights completed by club pilots John Wincott and Tony Evans, who own a Sealander and trike in partnership. Between 12 noon and 7.30pm they managed to fly from the event to Desborough with a stop on the way back at Bruntingthorpe for fuel. Twice. Who says trikes can't do cross-countries?

Various competitions throughout the day also added to the interest, and we were pleased to find that our arrangements were able to cope with the 250 spectators who turned up on Sunday.

We look back on the weekend as a great success. The flyers flew and were happy, the spectators watched and were impressed and the local press gave us a lot of positive publicity after the event. Above all, the club as a whole learnt a terrific amount and is now planning a full rally on or about 11–12 September this year. We hope to make this a large national event with more trade stands and flyers.

See you there!

You've got your wings, now get your wings!



The price includes VAT, post and packaging.

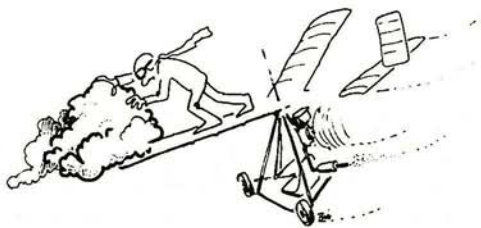
This little sketch (2/3 actual size) can't do justice to the splendid BMAA wings, hand-embroidered in gold wire with red centre cushion and gold lettering. They are available *only* to BMAA Pilot Certificate of Competence holders (the certificate will continue after 1 September) by sending £6.50 to:
BMAA Sales, Ty Dysynni, Abergynolwyn, Tywyn, Gwynedd LL36 9YR.

Wishing you were here

PETER COLE of Moorland Flying Club recently went along to the fly-in organised by MFC in conjunction with South West Air Sports. Unfortunately not many others did

The weather on Saturday chose to be a little on the grotty side but became flyable at about 5.30 in the afternoon when Roy Gill took to the air in his Quicksilver MX two-seater. The Quicksilver is a pretty aeroplane and Roy is undoubtedly a very competent pilot because the combination brought Davidstow Airfield to a standstill as Roy put the MX through its paces it was good to watch very good. The resting tourists stopped eating their jam sandwiches and even the gliding club gnomes stopped tying reef knots in their piano wire to watch as Roy used every inch of our 700 acres of airfield to best advantage. Needless to say, the passenger seat of the Quicksilver was never empty during the whole of the weekend and many a jam sandwich was left for the sheep while the owners queued to gaze upon the face of the intrepid aviator.

When George Cooke raised himself into the air with the help of his little Valmet 160 engine we chortled and knew that he was not going far. George however, knew different and quickly rocketed up to a thousand feet where he met this great, black lump of cumulus that sat on top of his wing and refused to go away. In spite of a lot



... sat on his wing and refused to go away....

of threats and hairy manoeuvres the Cu stayed put and George gave in — which is very unlike George — who finally settled for a pleasant hour of wind coursing at eight hundred feet.

Saturday evening welcomed the arrival of the bar and the barbeque. We were a small but select band of flying folk gathered around a big fire of pine logs, supping ale and eating hamburgers, sausage rolls and other delicacies that had escaped the flames of the fire and the eyes of the person who was trying to collect some money to pay for it all. A lot of ale was drunk, the man who was cooking the hamburgers was induced to eat one and the BMAA Secretary told us that he was the man that did the DI on Elijahs' chariot before it flew him to heaven. A very enjoyable evening it was.

Sunday gave us a windy but flyable day with the Quicksilver up and about early and George and his Valmet 160 thoroughly at home in the lumpy elements and winning the flour bombing competition. Ian Stokes, our poor broken CFI, could take no more of it and crawled painfully out of his wheelchair to be hoiked into the passenger seat of the MX where his plastered legs were bolted to the airframe and his twitching fingers strapped short of the control column. Ian didn't say too much after he landed but his attempts at wingovers in the wheelchair were noticeably pathetic. In fact the whole weekend was pathetic

Perhaps Davidstow airfield is too far away from everybody — perhaps the indifferent weather forecast was to blame or perhaps people are just not interested in supporting another microlight club that badly needs capital to turn old and derelict buildings into hangers, club rooms and offices — and goes to the expense of organising a fly-in to raise a little cash. Whatever the reason, only three members of the BMAA, apart from local pilots, turned up to support us....Graham Andrews our Chairman ...

Rob Bott our Secretary and Roy Gill from Aerolite Aviation. We are told that our Treasurer John Wincott made a valiant attempt to get here but his car decided to misbehave and he had to abandon the effort. You were sorely missed John and we are sorry about your car. We sincerely thank those few who braved the motorways to support us as for the rest — Enstone, Long Marston, Popham and the others we have supported in the past, we cordially invite you to attempt the impossible on yourself.

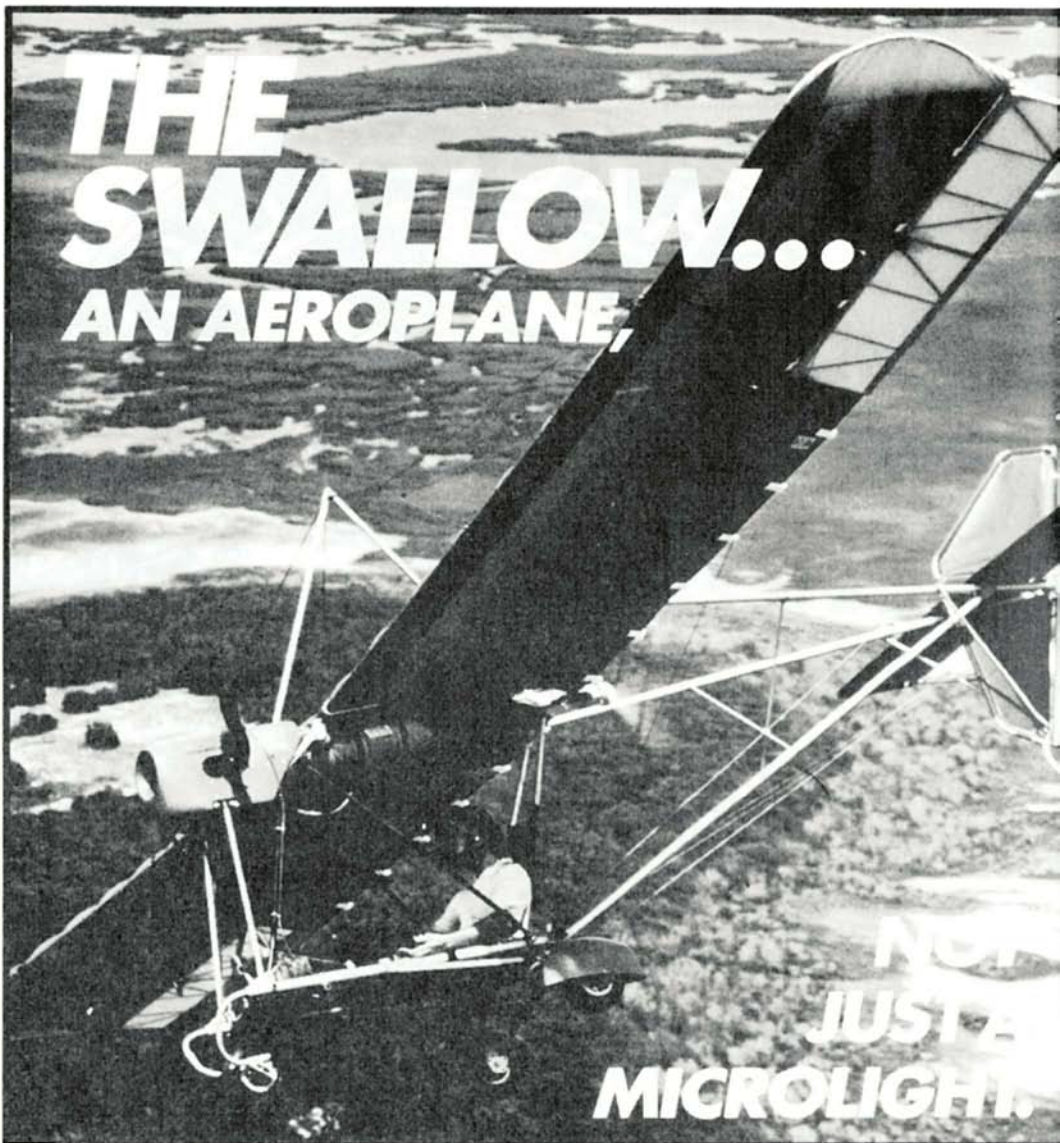
**BRITISH AIR FERRIES LIMITED
ARE PROUD TO ANNOUNCE
THE FORMATION OF
THE DRAGON
LIGHT AIRCRAFT COMPANY**

**OUR UNIQUE
TWO SEAT
MICROLIGHT AIRCRAFT
WILL BE UNVEILED AT THE
FARNBOROUGH AIR SHOW
ON 6TH SEPTEMBER 1982**

**The DRAGON LIGHT
CARDIFF (WALES) AIRPORT · RHOOSE ·
Telephone (0446) 710331**



AIRCRAFT Co. Ltd.
SOUTH GLAMORGAN · WALES CF6 9BD
· Telex 498126 BAWYS G



Two seat Trike and 3 Axis Trainer.
Approved syllabus.
Qualified professional instructors.
Licenced airfield.
Licenced engineers.
Restaurant and Club facilities.

Also available:

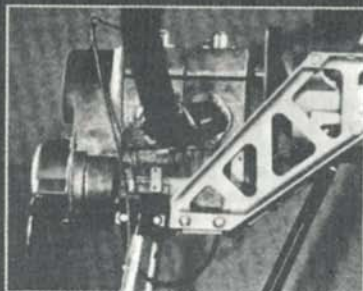
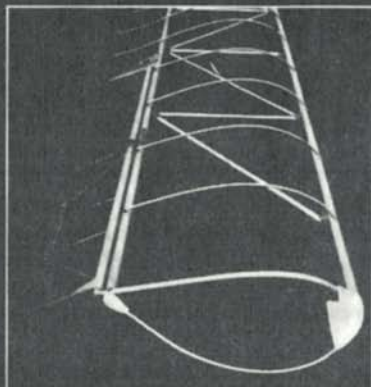
Hummingbird Prospector Single and Two Seat Trainers with superb new Limbach engines (50 hp).
The new American Hawk available shortly, and also the very successful Highway Trikes.

The SWALLOW combines the SWALLOW AEROPLANE airframe with the well-known and time-tested Cuyuna 430R engine and comes up with a whole new breed of flying machine. The two cylinder, 30-hp Cuyuna gives performance which allows the SWALLOW to bridge the gap between ultralights and "real" airplanes. The SWALLOW has the performance and control of a standard airplane but the portability and low expense of an ultralight.

IT FLIES LIKE AN AIRPLANE BECAUSE IT'S BUILT LIKE ONE!

Rigid, Double Surface Wing. The wings feature uncommon rigidity because of a drag/anti-drag tubing truss between the spars. The wing fabric is attached in such a way that the surfaces are nearly as taut as doped fabric.

Ailerons, Rudder & Elevator Controls. Everything about the controls is pure "airplane." The stick and rudder arrangement is standard and huge six foot ailerons give as much roll control as a Cub or other "normal" airplane.



Aerospace Quality Throughout. The SWALLOW AEROPLANE was designed and built by the same team Grumman and McDonnell Douglas employed to build the F-14 and F-15 mock-ups. Their primary business is building prototypes for government and aerospace companies. Everything in the SWALLOW reflects that same attention to detail.

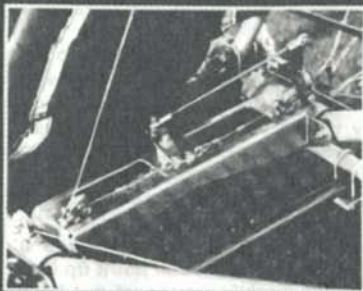
Aircraft Ground Handling. Optional nosewheel steering gives the SWALLOW excellent ground handling characteristics. It turns towards the rudder pedal which is depressed, like an airplane.

Performance specifications with a 165-pound pilot, full fuel and no wind:

Rate of Climb to 4,000 feet	780 fpm
Top Speed	70 mph
Cruise at 3,000 rpm	55-60 mph
Take-off Roll	75 ft
Landing Roll (grass, no brakes)	125 ft
Stall	28 mph
Empty Weight	290 pounds, w/cowling, pants
Fuel Capacity	3.8 gallons
Max. Pilot Weight	275 pounds plus

Kits Ready To Assemble. All holes are drilled and all components finished, so it takes two people three days, on the average, to assemble the SWALLOW.

10-Minute Field Assembly. The wings and rigging are attached in approximately ten minutes and the airplane is easily moved on a motorcycle-type trailer.



For full details please send S.A.E. to:

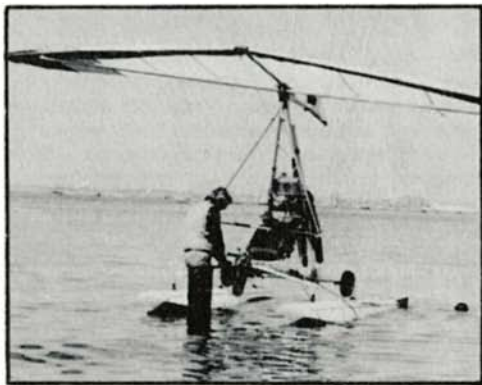
Micro Aviation Limited

HALFPENNY GREEN AIRPORT, BOBBINGTON, Nr. STOURBRIDGE,
WEST MIDLANDS DY7 5DY. Tel: BOBBINGTON (038 488) 418



Maurice's water baby

MAURICE SHEPPARD who has been dubbed 'the Bird Man of Brownsea' by his local paper, has successfully fitted floats to his Valmet-engined Skytrike. Here he tells how he did it and what the result is like to fly.



There I was minding my own business when . . .

I started building the floats in August 1981 in my garage. This was quite difficult as it was freezing cold most of the time through the winter months and, as they are built of fibreglass, the temperatures made it difficult for the resin to set. The floats are 12ft (3.65m) long and weigh 19 lb (8.6kg) each. They are constructed of 1/8in (3.2mm) ply for the framework and bulkheads, with 3/16in (4.9mm) square stringers and a thin covering of fibreglass. I built some moulds to cast the outside skins.

The old apple tree in the back garden came in very useful for deciding which position to fix the floats fore and aft for balance. I hoisted the machine up on a winch and tied the floats on to give the same attitude as without floats; this also looked about the right position for water flotation.

This proved to be the right decision as I did not have to make any alterations at all.

I have a water rudder on each float operated by cables to the foot pedals. The machine I fitted them to is a Super Scorpion with 160cc Hiway Skytrike. I have fitted the floats in such a way that I can lift them up above the wheels for landing on the ground and pivot back under the trike for water landings. This can be done quite easily while you are in the air and it takes about half a minute to deploy each float up or down. The machine handles exactly the same with or without floats — in fact you hardly know you have them on apart from the climb rate which is considerably reduced, as is only to be expected with such a small motor. However it still seems quite adequate and, as there is plenty of room out over the water, you can take your time gaining height.

Take-off length varies considerably with the surface of the water. With a flat calm and no wind it is quite a long run, about 4–500ft (122–152m), but this is very pleasant as you get up on to the

plain and skim across the surface. If there is a short chop with a light wind the take-off is 150–200ft (46–61m). On the other hand if you have a long chop with the troughs say 4–5ft (1.22–1.52m) apart, this makes it very difficult as you tend to porpoise up and down the troughs and cannot gain flying speed.

I have flown quite a lot around the Dorset coast and this does not appear to have caused any objections as regards noise, probably because it is mixed up with outboard motors on boats which are often quite a bit noisier than mine. Flying along the coast is very pleasant as you can just drop down into any nice looking bay which appeals to you. The option of putting the floats up or down in flight makes it very convenient for land or water landings.

There are a few extra safety factors to be considered when flying over water, even with floats on. If you should get an engine out over land, you stay where you come down, but on water you will drift with the wind and tides etc. So it is far safer to fly in an onshore wind, as an offshore wind could soon blow you out to sea. If you do conk out over sea and have to land, the weight-shift machine seems to make quite a good little sailing vehicle as it will point up into wind; you can lean back in your seat put both legs apart on the control frame and push right out and it will sail along quite nicely, backwards of course to the shore.

I wear a life jacket and carry a small anchor and a pack of mini flares, and also a paddle fixed to the trike, though this is only effective in no-wind-and-no-tide conditions. It is useful to have had some sort of boating experience as the seaway code will apply with taxying, take-offs and landings. Whether steam gives way to sail or not would be quite an interesting point! But I'd rather not put it to the test — I prefer to play it safe and keep out of everybody's way.



...I heard these two fellas chuckling. 'Floats with only 160cc! You'll never get airborne!' so I just...



...clambered on board, waved goodbye, turned into the wind and zoomed into the sky!





A Mitchell milestone

A year after the plans were ordered, and seven months after construction started, DAVID AND RICK BRENNER have successfully test flown one of the first Mitchell B10 wings to fly in this country. Here is their story.

Building the wing at all is no mean achievement, but to do so from plans, rather than a kit has taken a great deal of work to translate from American into English specifications, to find suppliers, and not least to iron out anomalies in the drawings — such as the fact that they do not even tell you the length of the outboard wing sections!

Once the correct materials have been ordered (from a list that is at best confusing and at worst inaccurate) and the plans deciphered, construction is fairly straightforward, if lengthy, the principle being similar to that of a conventional wooden glider. All the strength of the wing is in the D-shaped spar, made of 1mm ply, which forms the leading edge. This is held in shape by expanded polystyrene ribs. The trailing edge ribs, made of $\frac{1}{2}$ in (6mm) square spruce, are stuck on the back and covered with aircraft fabric.

We estimate it took about 500hr to build the wing alone, mostly working separately, though five weekends were spent together to complete crucial parts of the assembly.

The cage presented a few more problems, as a general arrangement drawing showed how to build it, but not how big to build it! In the end three rebuilds were necessary before a satisfactory arrangement was reached.

A 210cc Villiers kart engine was used, partly because it was cheap, but also because its modular construction lent itself to microlight use. The original chain reduction drive to the clutch was used, the chainwheel being mounted

on a new boss. The gearbox (which unbolts) was removed, and replaced by the propeller shaft and bearings. Since the propeller shaft is on top of the engine, the cylinder sticks out sideways, in the full airflow. There is no recoil start, but swinging the propeller is much more fun!

Compared to a trike, the wing is very low, and without the pilot sits back on the tailskids — if the truth be known, the first version of the cage sat on the tailskids *with* the pilot! As a result, getting in and out is an acquired art. Once in, the controls are relatively conventional; a control stick projects downwards from the wing and works the ailerons through a mixer box to give roll and pitch control. On our aircraft, a rudder bar connected to the nosewheel is fitted with pedals which work the tip draggers. This arrangement was chosen to enable the tip draggers to be used together to control the glide path on landing.

In order to get used to the throttle and rudder controls, the cage was driven round the field on its own. This proved very valuable, as the nosewheel works in the opposite sense to that expected (left foot for left turn), and is essential training for using the rudders in the air.

First flight trials were carried out at Pilling sands near Fleetwood — an immense stretch of perfectly flat sand that is a fledgling microlighter's dream.

The instruction book says that fast taxiing should be practised with the nosewheel off the ground, but this was very difficult to achieve as the wing was so keen to get airborne once the nosewheel had lifted. Indeed the first flight was only partly intentional! Straight hops were carried out next, followed, with great jubilation and throwing of hats in the air, by the first circuit.

The wing is pure joy to fly. Utterly quiet after a hang glider, it is stable in pitch and roll, but fingertip pressure on the stick gives fast, positive control. However it is not naturally stable in yaw, and the tip draggers seem surprisingly heavy



and slow; this may improve with experience.

The performance is sensational. It is estimated that the static thrust obtained was in the order of 30-40 lb (14-18kg). On this, with a very high thrust line, a nil wind take off run of 100yd was obtained, and the ventimeter strapped to the front of the cage went off the top of the scale at 55mph (48kt, 25 m/s). Even under power, the stall is utterly well behaved, and the only problem on landing is remembering that even with an engine, the glide ratio is better than most hang gliders.

So how does the Mitchell wing compare with other microlights? In the air, it is second to none. A tried and trusted design with all the bugs ironed out by extensive use in the States, none of the newer designs improve on its glide ratio and handling. Contrary to popular opinion, it is car-toppable, though a cover is recommended for long journeys. Ground handling does require some care, but the wing is surprisingly tough. Building it is a mammoth task that is probably best carried out by two people rather than one. However, if you are determined to succeed, and avoid the temptation to take short cuts in construction, succeed you will, and the feeling of flying a machine you yourself have built from the ground up will remain a glow in the back of your mind for a very long time. After this, anything else is just a microlight!

IF YOU WANT THE BEST IT'S IN THE WEST



SouthWest
AirSports Ltd

Main Dealers for:

**GOLDWING
QUICKSILVER
ZENOAH EAGLE**

We offer these attractions:

- Miles of runways
- Beautiful rugged countryside
- Accommodation arrangements to suit your pocket
- BMAA registered instructors
- Weight shift or three-axis training
- Full courses to "A" Certificate or hourly instruction
- Thorough coverage of ground associated subjects

For Sales or Tuition

Phone IAN STOKES (056686) 514



'No, I think we'd be better off turning right at London' — planning the route of the second leg.

Now which way's west?

In what must be the longest-ever British delivery flight for a microlight, IAN STOKES and BARRY GORDON recently piloted a two-seater Quicksilver MX from Lincolnshire to Cornwall. Ian takes up the story.

Manby Airfield, Lincs. 06.30 hours, Tuesday 11 May

A delightful warm spring morning. Suddenly the peace was shattered by the throaty twin Cuyuna roar as Barry Gordon and I taxied the new Quicksilver MX on to the perimeter track ready for take off. Final checks completed we looked at each other, opened the throttle, and after a very short ground run climbed into the hazy Lincolnshire sky. As we reached our cruise height, 700ft (212m) AMSL on a heading of 240°, I thought back over the last few days.

It had been exactly two weeks since Barry had promised to have a two-seater imported and built within a fortnight. Having had bitter experience of delivery delays on another make, I was sceptical, but by day 10 the machine was in Britain and on day 13 it was ready. Only yesterday Barry Gordon had been on the phone asking when was I going to fly it down to Cornwall! There was a great high sitting beautifully on top of them in Lincolnshire, he said, and it didn't look as though it would move for at least a couple of days. To fly it down would be the easiest way of getting it to me.

I didn't need asking twice — I looked up the train times, arranged for him to pick me up on arrival and headed east. On the journey from Lincoln station to Louth we discussed the route I had worked out on the way up, and over a final coffee before bed I showed him the various courses and fuel stops. We were to depart at the

crack of dawn and Susan and Fiona would meet us with fuel and sustenance en route.

And so it was that at 06.40 — actually about two hours after dawn had cracked — we were leaving Louth on our right and were heading for Langar. After about 40min of fairly boring countryside Metheringham came up dead ahead just as it should, and after a nervous glance at the fuel level I decided that Barry's estimate of fuel consumption was way out. Metheringham looked a marvellous site, but as far as fuel went it was about as dry as New York should have been in the '20s, so we pressed on to a village east of Digby where we found a suitable field just opposite a garage. After a quick circuit we put down, and even at 07.30am were surrounded by astonished locals.

Fortunately the proprietor was very accommodating and opened up to supply us with three gallons of fuel, two for the MX and one to go on my lap (we wouldn't get caught short again). Having arranged to clear us through Cranwell MATZ at 500ft (150m) — they weren't up when we left — we continued on a heading of 240° with the occasional trainer from Cranwell passing in the distance. Eventually the flat Lincolnshire fenland began to give way to the occasional bump of rising ground and Barry, spotting a castle on the side of a hill, said he knew where we were. I relaxed my map reading for a couple of minutes until he discovered he didn't know after all and it took me another five frantic minutes to re-locate us over that featureless countryside. However, bang on ETA Langar appeared under our nose wheel and we did a leisurely circuit and landed by the control tower to be met by the girls with smiles, petrol and glory be, hot coffee. Having filled up with both we sent the girls on to our next destination, Bruntingthorpe, called our offices to make sure

everyone had their noses to the grindstone as well as us, and left Langar heading 200°.

It was so hazy that we could not pick up any distant way points and became totally reliant on our compass. Indeed we had been all morning, but we now had drift to compensate for. Trying to lay off for a freshening breeze in a 36mph MX is not easy, which is why Leicester airport came into view to our right instead of our left, proving that we had been laying off too much for drift. However, having made a slight correction we made an exact landfall on Bruntingthorpe which looked to be in superb condition and even inhabited at one end, so we landed on the perimeter track near a hangar and a small hut. It turned out to be the security guard's hut for the test track of Talbot motors! Fortunately the guard was understanding when he saw our fuel situation and allowed the girls in to service us.

Next meeting was to be Enstone. Visibility improving and climbing steadily we crossed the M1 at Lutterworth interchange and passed northwest of Rugby radio poles where I was able to fix our QNH and noticed that the pressure was dropping. We were obviously moving out of the high that had given us fine weather for so long and the slight breeze was beginning to freshen up, still from the south-east. I had intended to slosh in our spare gallon at Chipping Warden which would have given us easily enough to reach Enstone, but as we neared Chipping Warden we were getting much lower on fuel than we should have been at that stage, obviously because of the freshening wind, so we decided on a field landing by a garage to buy some more.

I didn't realise until that morning that there are some garages in this country that do not sell two-stroke oil in any shape or form; still, we had our spare, so we resigned ourselves to another stop and set out on what should have been the last leg of this stage of the journey. Our route took us across the northeast edge of Banbury and on to Barford St John, and by the time we reached its inhospitable aërials we knew there would have to be another stop. Deddington, although slightly off course was going to be the nearest, so we changed direction, stopped at an Esso station and bought our last gallon of the day. By now we were well inside the Upper Heyford radar advisory zone and had already spotted several F111s, so we decided to clear Deddington and make a quick dash for Enstone at no more than 200ft (61m) AGL.

Fortunately I knew that area fairly well so navigation was no problem, in fact as soon as we climbed away the Enstone grain silo came into view and we made a beeline for it. Ten minutes later we arrived over Enstone and did a lefthand circuit of the field. The windsock was in its usual

horizontal position indicating 18–20kt (33–37kph) winds on number-two runway which would have meant a long taxi in very strong cross winds — not recommended. Instead we landed across the perimeter track near the main hangar, leaving quite a large safety margin owing to the strength of the wind, and taxied into the shelter of the hangar.

After 4½hr flying time and 124 miles, it was time for a break. Over lunch in the Crown at Church Enstone we discussed the remainder of our journey. Although we had enough daylight to carry on that day it had not been our intention as Barry had an appointment in London the next day and there were plenty of ways that I could make a nuisance of myself for a day.

The Tuesday evening was spent visiting various relatives I have in the area before returning to the Kings Arms at Chipping Norton for the night. I spent the next day at Enstone, but unfortunately the wind did not abate all day, so I never did get the chance to try Gordon Camp's Goldwing with the new style undercarriage.

The forecast suggested that the wind might drop on Thursday, so over dinner on Wednesday evening we decided to start at the crack of dawn once more as the wind was supposed to be fairly calm then but pick up in the west later. A very accommodating tree opposite the Kings Arms gave the wind strength to within a couple of knots, so if it was blowing too hard we needn't even bother to leave our beds. Yours truly was elected to rise at 04.00am and check the wind, which in the event was blowing at a good 15k (28kph), so being a conscientious chap I shook Barry and told him that he needn't get up as it would probably be blowing a full gale by 05.00am, and went back to bed.

When we came down for breakfast at 08.00am surprisingly the wind strength had remained the same, and it was little different when we reached the airfield just after 09.00am. However, the forecast from Brize Norton was most discouraging with all sorts of nasties en route; the only glimmer of hope was the wind direction which was 120°, a slightly quartering tail wind. I suggested a trial flight, but 'What the hell', said Barry, 'let's go anyway'. So, having topped up the tank, obtained a second spare can, got the map facing the right way up and done all the other last-minute jobs that intrepid aviators do at the last minute, we took off and did a circuit. The wind was strong but smooth, so we waved goodbye to the girls and most of the Enstone staff and headed for Cornwall.

The main obstruction between Enstone and the West is the BZN SRZ, and we had decided the previous evening to pass east of this to show my American friend Barry some of the more picturesque parts of my home county of

Oxfordshire. We headed across towards Woodstock and Blenheim Palace, the gift of a grateful nation to John Churchill first Duke of Marlborough for sorting out the French at the Battle of Blenheim, and birthplace of his descendent Winston Churchill. Proceeding, we looked across the university city of Oxford, by which time we felt we had assimilated all the culture possible in one day in a microlight. Picking up the river Thames and staying just outside the Brize Norton zone we followed it down to Lechlade where we landed in one of the flood meadows just opposite a garage. After topping up I rang Brize Norton ATC, giving them our proposed course and height and asked permission to proceed through both their and Lyneham's MATZ's which I was given with no reservations. Airborne once again on a track of 228° we followed the Thames for another couple of miles, passing to the west of Highworth and Blunsdon. I spared a couple of seconds thought for Dudley Pattison slaving away constructing Goldwings below while we passed serenely overhead in fast improving weather (the met men had got it wrong again).

The previous evening we had discussed the pros and cons of a chase car and had decided to go it alone, using Breen at Enstone as a message drop. So far this system appeared to be working well. As we passed through the northwest corner of Lyneham MATZ, the great scar of the M4 appeared under our left wing where it would stay for the next ten minutes or so, giving us a good opportunity to appreciate the improved weather and to admire the rich west Wiltshire countryside as it unrolled beneath us. Far away to our right we spotted the unmistakable shape of a Blimp tethered above Hullavington airfield, and very soon we were approaching Colerne and it was time to look for fuel.

Garages seemed few and far between in this area so we headed for a fairly densely populated area a couple of miles to the left of our track which turned out to be Corsham. Seeing no garages with accommodating fields right behind them we picked a large pasture meadow just on the northwest outskirts with a big Georgian house and a couple of friendly waving natives situated just outside one corner. As everywhere else on our trip, we were greeted with the mixture of admiration and incredulity that the pre-World War I aviators must have had to contend with. In fact this fine old house had been turned into old people's flats and this change in their daily routine ensured that we wanted for nothing, including delicious coffee and a lift to the nearest service station. After a fill-up and a check-over we taxied back on to the field, turned into what slight wind there was, took off, returned the waves of the old folk and set course

for Wells, our next scheduled stop.

One of the finest sights of the whole trip was coming up. Having crossed some high ground at about 500ft AGL we were suddenly presented, as this ground dropped away from us, with the most breathtaking view of the south-east side of Bath, its rows of Georgian houses in their pastel shades glinting in the sunlight at the bottom of the valley. This awesome scene was all too soon passed over and we headed south-west out over the beautiful Avon countryside. Radstock came and went under our left wing as we headed for the 2000ft (610m) television aerial above Wells which was conveniently right on our track.

As visibility was improving all the time, easing the strain of navigation, we passed just to the left of the mast and did an altimeter check which proved to be 300ft (91m) on the high side, so we were obviously getting nearer to the low that was supposed to be over the Channel somewhere but which I reckoned was much further south. Once more the ground dramatically fell away to reveal the ancient ecclesiastical city of Wells, while the vastness of the low-lying Sedgemoor plain stretched as far as the eye could see, criss-crossed with drainage ditches and with only the lump of Glastonbury Tor to break the monotony.

The need for petrol was making itself felt again and we spotted a garage with a convenient field opposite on the far side of Wells. Our path down passed right over the great Cathedral. I have always admired Norman architecture but viewing the geometrical precision of this vast edifice from above has increased my admiration 100-fold.

This garage was the exception that proved the rule — the attendant didn't ask where we had come from or where we were going, never mind what we were flying. But at least we got all the fuel possible on board and were now in a position to cover a fairly long leg non-stop. This, plus the fact that the wind had now veered round to about 150°, encouraged us to be more adventurous and strike out across country. So far we had stuck fairly well to airfields on or near the main roads, but the next target, Dunkerswell, seemed a very long way round so instead I suggested a new track from Wells to Davidstow direct. We were both of one mind: it was possibly the most inhospitable route as far as population or even roads were concerned, but it would certainly be different, so let's try it!

Our new track of 247° took us across the rich peaty Sedgemoor plain of central Somerset, where only a few hundred years before the sea had ebbed and flowed and Glastonbury, on slightly higher ground away on our left, had been an island, supposed by some to have been King Arthur's Avalon. It was also the place where



Home at last! I was beginning to think I was born with a helmet on

Joseph of Aramathea first set foot when he visited the heathen English in the first century AD with the Holy Grail. For all the features that were on Sedgemoor the sea might as well have still been there, and our first way point that we could fix with any accuracy was Bridgewater which turned up about four miles north of our intended track. After a slight alteration of course we headed towards the rising ground of Exmoor and west Somerset, but just south of Wiveliscombe and down to less than a pint of petrol we put down in a field and used our cans. This was the only landing where we didn't actually meet another human being.

There followed some of the wildest, most barren and yet most beautiful countryside I have ever encountered away from my home on Bodmin Moor. The next landmark of any consequence was the town of Witheridge which we thought must have a petrol station but didn't. We were once again at the "getting worried" stage, so we pressed on following a road in roughly the right direction and eventually spotted a galvanised shed and a couple of petrol pumps in the bottom of a valley. Perhaps it wasn't a five-star motorway service station but to us it seemed just as good.

We landed in a fairly flat field above the hamlet and leaving Barry to sunbathe, I stepped through the gate out of the wind and into the permanent peace and tranquility that can only be found in a Devon country lane with its eight feet high hedges covered in wild spring flowers. The only sound apart from my own footsteps was the drone of the bees as they went from flower to flower. We take too much for granted, I thought as I strolled down the hill to the main road.

I knew it was the main road because there was less grass growing in the middle. Following the

stream for a couple of hundred yards I found the garage where they were only too pleased to lend me another can to save a double journey. They didn't sell two-stroke, but having learned our lesson on Tuesday we were carrying a spare pint with us — a precaution I would advise all cross-country micronauts relying on garages to take. After alerting Davidstow and checking with Enstone, I got a lift back to the MX with a friendly local. Mixing and pouring took only a couple of minutes, and after making sure the borrowed can would be returned we waved to the crowd, taxied down wind and once more took off into the skies.

Excitement was rising. We had only one more field stop and no more garages to find, and very soon we were crossing the Taw river valley. Even over the few miles since take-off we had drifted quite a way north of our track, so we brought our heading round another few degrees to allow for the obviously increasing wind. As we crossed the high ground between the Taw and the Torridge we looked to our left and in the far distance saw the dark forbidding ramparts of Dartmoor, and as Hatherleigh passed underneath us a slight smudge appeared on the horizon ahead, which I knew would slowly enlarge into the high tors of Bodmin Moor.

This was definitely the most uncomfortable leg of our journey, with the high winds and thermal turbulence throwing us about in all directions. Had our goal not been so near or had the MX not been standing up so well to these adverse conditions we would have landed and waited for the calmer airs of later evening. In the event we pressed on and made our last field top-up just south of Holsworthy.

Very soon we were across the Tamar into Cornwall, with familiar objects starting to appear

Glue use

Readers have asked about the acceptability to the CAA of adhesive compounds such as Loctite, used typically for locking bearing tracks to propeller shafts. We have consulted the CAA on this subject and below we quote from their reply. Many thanks to the CAA's power plant department for their assistance.

The use of adhesive compounds typified by the Loctite range (Loctite being the trade name of a particular product: there are others) in aircraft power-plants has been quite successful and it is considered that, with care in the matching of purpose and adhesive, equal success should be attainable by the members of your Association.

The most common use has been as an anti-fret or anti-spinning feature in the fitment of ball- or roller-bearing tracks to shafts or housings but, in all cases, a mechanical feature provides both the bearing location and primary load path; eg the bearing tracks on the propeller shaft and in the housing should be retained by mechanical means which also transmit the axial load on the shaft (caused by propeller thrust), through the bearing and into the casing. The adhesive is used simply to prevent spinning of the bearing tracks in their locations. We would have great reservations about using such adhesive to resist

primary loads without extensive testing and precise control of the adhesion process.

The other use to which such adhesives have been applied has been the locking of nuts, bolts, studs etc and Civil Aircraft Inspection Procedure Leaflet BL/6-13 — *Locking and Retaining Devices*, is a useful publication in this respect. However, again we would have significant reservations about using adhesives to lock critical fasteners, failure of which would be hazardous.

Your point regarding batch problems of certain epoxy resins (*which sometimes fail to work, though apparently new stock — ed*) is appreciated but we are informed that the subject compounds behave in a dissimilar manner and the simple advice that we have been given is that, provided that they are still liquid, then they are OK. Cleanliness, use of correct primers and fit of the parts to be assembled are of the greatest importance.

Additionally, any of the high-temperature applications with which we have been associated require very carefully controlled curing cycles in order to ensure a satisfactory bond.

It is difficult to give advice on the use of a process which may be adversely affected by a large number of variables but it is believed that these adhesive compounds can be used successfully in the applications outlined above, provided that the guidance of the manufacturers of the adhesive is sought regarding the particular applications.

The manufacturer of the Loctite range of products is — Douglas Kane Group Ltd, Swallowfields, Welwyn Garden City, Herts.

Now which way's west?

continued from previous page

in the distance. Away to our left was the great television mast on top of Caradon Hill. Only 150 years ago it had been the site of one of the world's largest and wealthiest copper mines, now totally abandoned and overgrown with gorse and bracken, with only the occasional spoil heap to show that man had ever interfered. Some way to the right of Caradon Hill Brown Willy reached skyward, at nearly 1400ft (430m) the highest point in Cornwall and the silent sentinel of Bodmin Moor. Just to the right of Brown Willy stood Roughtor, now managed by the National Trust as a permanent war memorial to the 43rd Wessex regiment, and just to the right of Roughtor a radio mast. That was the best sight I had seen all day, for it is situated in the corner of Davidstow airfield. Home!

As with all distant landmarks, after they appear they seem to take forever to get any nearer. Eventually though we could see the forestry plantation that covers part of the south-west side of the airfield and the waters of Crowdy Marsh reservoir glinting in the evening sunlight. As we approached the airfield over Wilsey Down woods I could see a little knot of vehicles and people around our hangar area, and from our control vehicle flashed a long steady green light from the aldis lamp. 'Well', I thought, 'that's a relief, they're going to let us land after coming all this way!' We crossed the airfield boundary, did a leisurely circuit and, as the wind was still quite brisk and from the south, I elected to land on the perimeter track just in front of the hangar.

Wearily as we both felt after 10hr, 20gal (91 litre) and 300 miles (480km), when we looked at each other after switching off for the last time we knew it had been worth it.

1982 A.D.

THIS NUMBER COULD BEAR MORE SIGNIFICANCE TO YOUR FUTURE FLYING THAN MAY FIRST APPEAR!!!

The Windsports Centre's 1982 offer is to supply a 250cc Skytrike, complete with wing and ready to fly for less than **£2,000.00** inclusive of V.A.T.

In fact we also include a Crash Helmet, Airspeed Indicator, Altimeter, Thermal Suit, and full instruction up to the B.M.A.A. Pilot "A" Cert.
For £1,982.00!!!

250cc Skytrike/Glider Specifications

ENGINE

250cc Fuji Robin, Electronic Ignition, producing 18 bhp at 6000 rpm.
130lbs of static thrust with 52" x 27" hardwood Prop.
Max. Pilot weight 220lbs.

GLIDER

Single surface with trimmed cruise speed of 30 m.p.h.
Stall speed 22 m.p.h.
Climb rate 300 feet per minute.
Take off 60 feet in nil wind (12 stone Pilot)

TRANSPORT

Will transport complete on the roof of any standard saloon car with ladder type roof rack — no trailer required!!!

RIGGING

From car-top to flying in less than 15 minutes. Pack up in 10 minutes.

Aircraft can be supplied from stock unless specific colours are required.

There is no wonder that this configuration of Microlight is the most popular in the U.K. with its unsurpassed manoeuvrability, rigging time, ease of flying and value for money.

If you would like further information on this offer just contact us quoting

" " 1982 " "

Double surface C.F.X. Wings and 330cc Trike units also from stock.



**On yer
TRIKE**



BHGA & BMAA REGISTERED SCHOOL & INSTRUCTORS

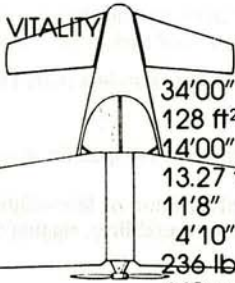
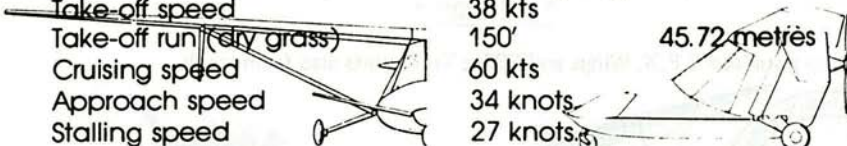
A NEW ALL BRITISH MICROLIGHT VITALITY



Single or side by side two seater • Full dual controls • Three-axis control • Robust construction • Fully transportable • Steerable nosewheel • Lively performance



LEADING DATA — VITALITY

		
Wing span	34'00"	10.36 metres
Wing area	128 ft ²	11.891 m ²
Canard span	14'00"	4.27 metres
Canard area	13.27 ft ²	1.232 m ²
Length overall	11'8"	3.56 metres
Height	4'10"	1.47 metres
Dry weight	236 lb	107 kg
Engine	440 cc develops 60 hp 2 stroke, 2 cylinder	
Take-off speed	38 kts	
Take-off run (dry grass)	150'	45.72 metres
Cruising speed	60 kts	
Approach speed	34 knots	
Stalling speed	27 knots	
		



For further details send S.A.E. to

**Luscombe Aircraft Ashford Airport Lympne
Kent CT21 4LR Phone: Hythe (0303) 67808**

Microlight engines from around the world

NICK REGAN and DONALD GURREY have been busily collecting information on microlight engines from all around the world. The survey is not as complete as they would like, simply because some manufacturers are surprisingly reluctant to supply information, but *Flight Line* will fill in the gaps as and when information becomes available.

Engines have long been a problem in the microlight world. None of the units currently used is really right for the job, but they are the only ones available off the shelf, so we have to make do.

If there is to be a massive world-wide development of this cheap aviation sport — and in the UK this is a very big 'if' due to the failure of the present BMAA structure to fight tenaciously for our freedom from the bureaucrats in the CAA — then we are going to need a proper microlight engine. Such an engine would be a four-stroke, for good or at least better fuel economy and reliability, weighing under 50 lb (23kg) complete and producing 30-40hp at an output shaft speed of 1800-2200rpm.

Impossible you say? No! It can be done in two ways, by conventional technology or advanced technology. A conventional engine would be a four-stroke flat or V-twin of 400-500cc with output taken from the camshaft to give a shaft speed low enough to drive a large-diameter efficient propeller. The advanced-technology engine is impossible to describe in even the haziest way at present, but a lot of work is going on in this area and the indications are that such an engine would be considerably lighter than the conventional.

Hopefully either or both of these engines will appear in the not too distant future, made in Britain and priced competitively enough to overcome the market inertia inevitably favouring the established engines.

Notes to Accompany the List

1. As far as possible, the information in the engine list has been arranged to allow comparison of one engine with another. However, different manufacturers present their data in different ways, so it has proved

impossible to make the data completely comparable. In particular:

(a) Power output, fuel consumption and induction and exhaust systems are all closely inter-related on two-strokes. Figures given are makers' test-bed figures and, in the case of engines sold without induction and/or exhaust components, are best treated only as a guide. Remember too that some manufacturers claim their engines capable of reliably delivering maximum power continuously, whereas others do not. Where a continuous figure is known it is quoted separately.

(b) Different methods of measuring power output give different results. Net figures, notably those measured on the DIN standard, can be up to 15% lower than gross outputs. Where known, the method of measurement is stated.

(c) Fuel consumption is dependent on revs and where a manufacturer or agent has supplied a consumption figure at a particular engine speed, this has been used. Where a graph of consumption versus engine speed was supplied, we have selected the figure pertaining to cruise speed, which we have taken as 75% of the engine speed at which maximum power is developed.

(d) In all cases we have described the standard engine, options being listed at the end. However, some standard engines are more fully equipped than others, so remember to make allowance for this when comparing prices and dimensions. Note too that some specifications for air-cooled engines include a cooling fan and ducting, whereas many microlights rely on airflow alone to provide cooling. Some manufacturers will supply their engines less these components (though seek their opinion as to the advisability of such an installation) and in such cases it should prove possible to purchase the engine for less than the price quoted.

2. Apart from the Wankel, all engines are two-strokes. Except for the Wankel and the Spitfires fitted with optional oil injection, all run on automotive two-stroke mixture.

3. Bore and stroke are listed under capacity, in that order.

4. Rotation is quoted as viewed from the output end.

5. The dimensions length, width and height are listed in that order and, in the case of in-line

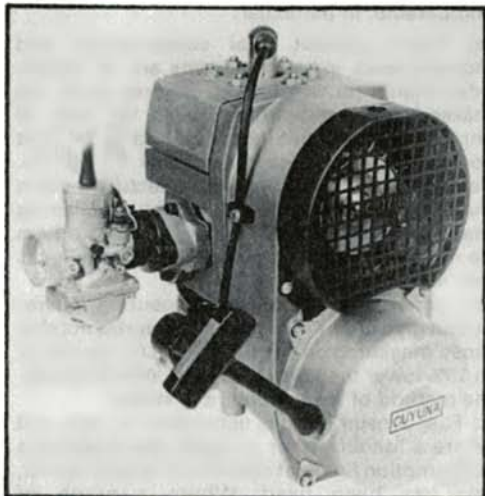
twins, are measured with the cylinders vertically above the crankshaft.

6. All information, including prices, is believed correct at the time of going to press, but imported engines may alter in price due to currency fluctuations.

7. Items marked * are not yet available.

List of Engines

Cuyuna 215R



Maker: Cuyuna Development Co, Box 116, Crosby, Mn 56441, USA.

UK agent: The Aerolite Aviation Co, The Old Control Tower, Manby Airfield, Manby, nr Louth, Lincs LN11 8UF (tel 050782 8185).

Capacity: 214cc, 67.5 × 60mm.

Number of cylinders: 1.

Power output: 20hp at 5500/6000rpm.

Compression ratio: 12.5:1.

Crankshaft bearings, number and type: 2, ball.

Weight: 39 lb (17.7kg).

Fuel consumption: Not stated.

Carburetors: Not standard.

Exhaust system: Not standard.

Electrical system: Contact breaker, Bosch magneto.

Cooling system: Air, with fan.

Starting system: Manual.

Rotation: Anti-clockwise.

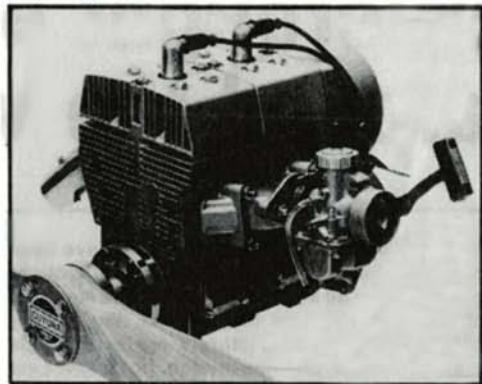
Reduction drive: None.

Dimensions as described: 324 approx × 325 × 366mm approx.

Price as described: £397.

Optional extras: Third crankshaft bearing, reduction bracket mounting, reverse-flow fan, fuel system/exhaust system package, regulator/rectifier, light regulator, cooling-air inlet screen.

Cuyuna 340R



Details as Cuyuna 215R except:

Capacity: 339cc, 60 × 60mm.

Number of cylinders: 2 in line.

Power output: 25hp at 5500/6000rpm.

Crankshaft bearings, number and type: 4, ball.

Weight: 62 lb (28.2kg).

Dimensions as described: 430 approx × 325 × 366mm approx.

Price as described: £500.

Optional extras: As Cuyuna 215R plus electronic ignition, electric start.

Cuyuna 430R

Details as Cuyuna 340R except:

Capacity: 428cc, 67.5 × 60mm.

Power output: 30hp at 5500rpm.

Price as described: £575.

Hiro-Delta Mk I



Maker: Airdelta SRL, Via Visconti di Modrone 19, 20122 Milano, Italy (tel (02) 704697 - 705181).

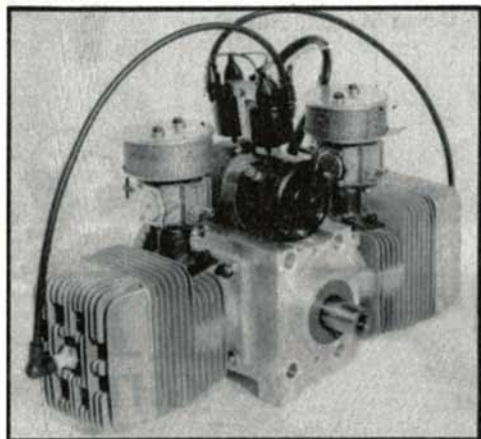
UK agent: Hiway, Sirhowy Hill, Tredegar, Gwent (tel 049525 4521).

Capacity: 125cc, 54 × 54mm.
 Number of cylinders: 1.
 Power output: 22.5hp net at 8400rpm.
 Compression ratio: 7:1 effective.
 Crankshaft bearings, number and type: Not stated.
 Weight: 44 lb (20kg) without exhaust system, radiator and propellor.
 Fuel consumption: 5 litre/hr at cruise.
 Carburettors, number and type: 1 Dellorto with anti-icing system.
 Exhaust system: Supplied as standard.
 Electrical system: Electronic ignition, magneto.
 Cooling system: Water, with pump.
 Starting system: Electric.
 Rotation: Clockwise.
 Reduction drive: Enclosed gears with oil lubrication, ratio 3.588:1.
 Dimensions as described: 400 × 450 × 600 (height figure includes radiator).
 Price as described: £527 including radiator and engine mountings.
 Optional extras: Manual start, propellor, battery, battery charger.

*Hiro-Delta Mk II**

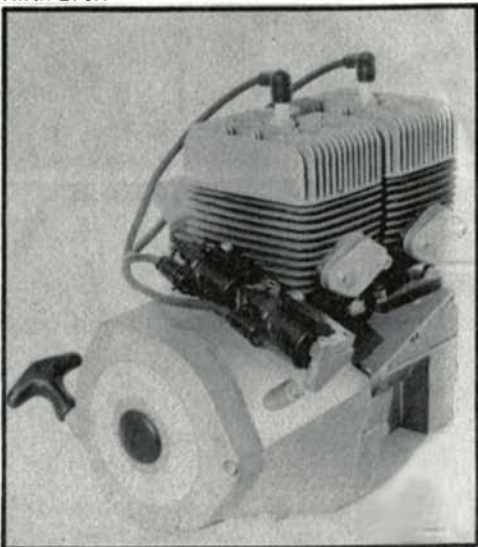
Details as Hiro-Delta Mk I except:
 Capacity: 250cc, 57 × 72mm.
 Power output: 32hp net at 7000rpm.
 Compression ratio: 6:1 effective.
 Weight: 48.5 lb (22kg) without exhaust system, radiator and propellor.
 Fuel consumption: 6 litre/hr at cruise.
 Electrical system: Electronic ignition, alternator.
 Reduction drive: Enclosed gears with oil lubrication, ratio 2.5:1.
 Dimensions: Not stated.
 Price: Not yet decided.
 Optional extras: Not yet decided.

*Hirth 261**



Maker: Göbler-Hirthmotoren GmbH & Co, 7141 Benningen, Postfach 20, West Germany (tel 07144 6074).
 UK agent: None.
 Capacity: 380cc, bore and stroke not stated.
 Number of cylinders: 2 opposed.
 Power output: 25hp at 4200rpm.
 Weight: 57 lb (26kg).
 Carburettors, number and type: two, no other details stated.
 Cooling system: Air.
 Price and other details not yet available.

Hirth 276R



Maker: As Hirth 261.
 UK agent: None.
 Capacity: 438cc, 66 × 64mm.
 Number of cylinders: 2 in line.
 Power output: 40hp DIN at 7000rpm.
 Compression ratio: 11:1.
 Crankshaft bearings, number and type: 5, no other details stated.
 Weight: 72.5 lb (32.8kg) including manual starter, carburettor and exhaust flange tubes, but excluding rest of exhaust system.
 Fuel consumption: 16 litre/hr at 5250rpm.
 Carburettors: None supplied as standard.
 Exhaust system: Not standard.
 Electrical system: Contact breaker, Bosch dynamo magneto.
 Cooling system: Air, with fan.
 Starting system: Manual.
 Rotation: Anti-clockwise.
 Reduction drive: None.
 Dimensions as described: 412 × 342 approx × 376mm.
 Price as described: DM1502.



Sole UK Distributor

The Old Control Tower
Manby Airfield
Manby, Nr Louth
Lincolnshire LN118UF
Tel: 050782 8185

'Supremely enjoyable... thank God for a two-seat model in which proper instruction is possible' – David Mason, Editor of *Flight International*

QUICKSILVER MAX II

THE WORLD'S FINEST MICROLIGHT



Tipperformance inc.

***Worlds Apart
From
All The Rest***

Dealer inquiries invited

Primary Dealers

Lincs Airports
The Old Control Tower
Manby Airfield
Manby Nr. Louth
Lincolnshire LN118UF
Tel: 050782 8184

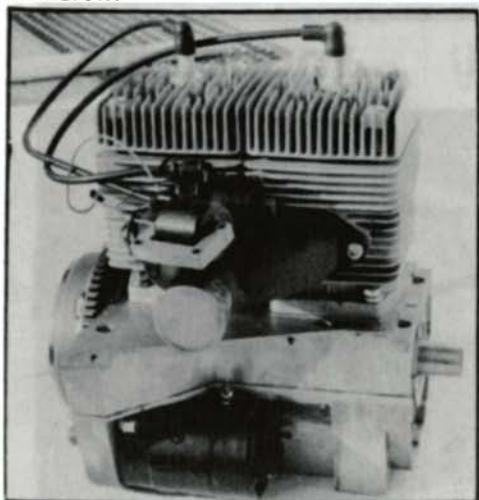
Microlight Airports Services Ltd.
Unit 6
Festival Dr.
Loughborough
Leicestershire
Tel: 0509 63330

Flight Training

Goodwood Flying School
Goodwood Airfield
Chichester
West Sussex PO180PH
Tel: 0234 774656

Optional extras: Fuel system (various parts sold separately), exhaust manifold, exhaust stubs, electric starter, ring gear (prerequisite for electric start), rectifier, relay.

Hirth 2701R



Details as for Hirth 276R except:

Capacity: 493cc, 70 × 64mm.

Power output: 43hp DIN at 6750rpm.

Weight: 70.5 lb (32kg) approx.

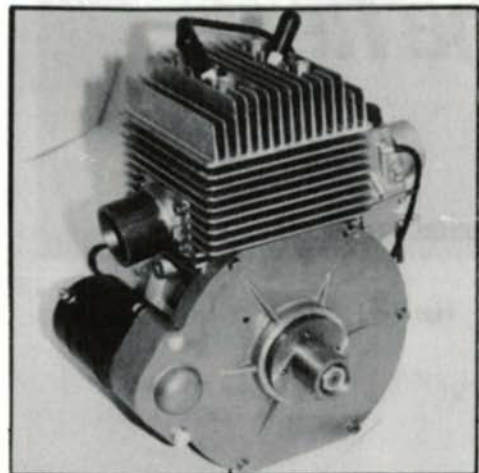
Fuel consumption: 21 litre/hr at 5200rpm.

Dimensions as described: Not stated.

Price as described: DM1577.

Optional extras: As Hirth 276R but electric start may be fitted with or without retention of manual start.

Hunting HS260A



Maker: Fieldhouse-HIP, 2-4 Latimer St, Anstey, Leics (tel 053721 2613).

UK agent: The maker, plus Skyhook Sailwings, Vale Mill, Chamber Rd, Hollinwood, Oldham, Lancs (tel 061-624 8351).

Capacity: 260cc, 72 × 64mm.

Number of cylinders: 1.

Power output: 25hp at 6000rpm.

Compression ratio: 10:1.

Crankshaft bearings, number and type: 3, ball.

Weight: 44 lb (20kg).

Fuel consumption: Not stated.

Carburettors, number and type: 1 Amal 28mm; separate pump included.

Exhaust system: Not supplied.

Electrical system: Motoplant twin-plug electronic ignition, Motoplant dynamo.

Cooling system: Air.

Starting system: Electric.

Rotation: Anti-clockwise.

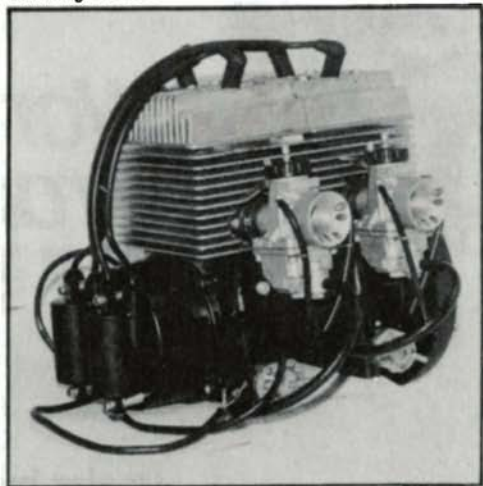
Reduction drive: None.

Dimensions as described: 290 × 330 × 380mm.

Price as described: £295.

Optional extras: Manual start, various levels of tuning.

Hunting HS525A



Maker: As Hunting HS260A.

UK agent: The maker, plus Stratos Aviation, Straight Rd, Colchester, Essex (tel 0206 67473).

Capacity: 525cc, 72 × 64mm.

Number of cylinders: 2 in line.

Power output: 45hp at 6000rpm.

Compression ratio: 10:1.

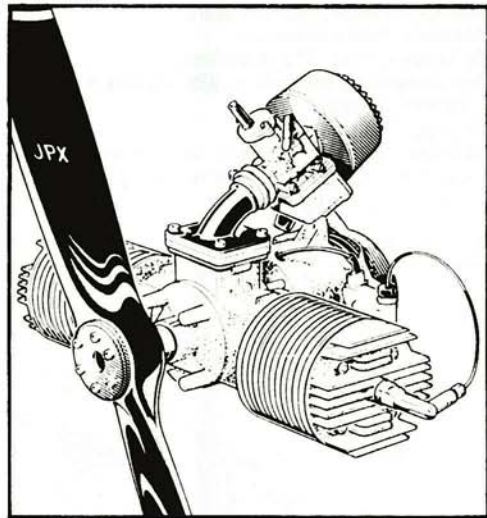
Crankshaft bearings, number and type: 5, ball.

Weight: 73 lb (33kg).

Fuel consumption: Not stated.

Carburetors, number and type: 2 Amal 28mm, each with pump.
 Exhaust system: Not supplied.
 Electrical system: Lumenition twin-plug twin-coil electronic ignition, alternator.
 Cooling system: Air.
 Starting system: Electric.
 Rotation: Anti-clockwise.
 Reduction drive: None.
 Dimensions as described: 470 x 350 x 400mm.
 Price as described: £454.
 Optional extras: Manual start, various levels of tuning.

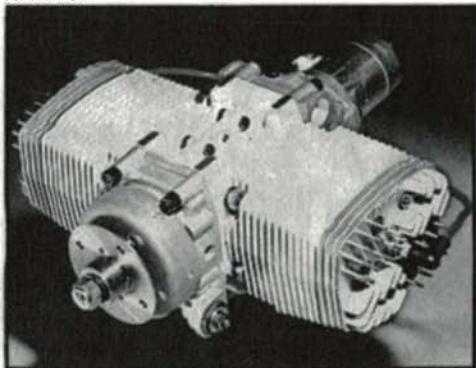
JPX PUL425



Maker: Ateliers JPX Mécanique de Précision, ZI Nord - BP 13, 72320 Vibraye, France (tel (43) 936174).

UK agent: None.
 Capacity: 425cc, 66 x 62mm.
 Number of cylinders: 2 opposed.
 Power output: 22hp DIN at 4500rpm.
 Compression ratio: 8:1.
 Crankshaft bearings, number and type: Not stated.
 Weight: 36.3 lb (16.5kg) ready to run.
 Fuel consumption: 5-8 litre/hr depending on engine speed.
 Carburetors, number and type: 1 size 32mm.
 Exhaust system: Supplied as standard.
 Electrical system: Contact breaker, magneto.
 Cooling system: Air.
 Starting system: Manual.
 Rotation: Clockwise.
 Reduction drive: None.
 Dimensions as described: 300 x 430 x 400mm.
 Price as described: 6000Fr.
 Optional extras: Not stated.

KFM 107



Maker: KFM Aircraft Motors Division, Iame SPA, 24040 Zingonia, Via Lisbona 15, Italy.

UK agent: Ferrari Racing Services, 66-69 Link House, Fruit & Vegetable Market, New Covent Garden Market, London SW8 (tel 01-720 8677).

Capacity: 294cc, 60 x 52mm.
 Number of cylinders: 2 opposed.
 Power output: 25 at 6300rpm (maximum continuous recommended is 22.5hp at 6080rpm).

Compression ratio: 10.5:1.
 Crankshaft bearings, number and type: 3, two ball and one roller.

Weight: 33.5 lb (15.2kg).
 Fuel consumption: 6.8 litre/hr at 5720rpm.
 Carburetors, number and type: 1 diaphragm type with pump.

Exhaust system: Supplied as standard.
 Electrical system: Electronic with dual coils, magneto.

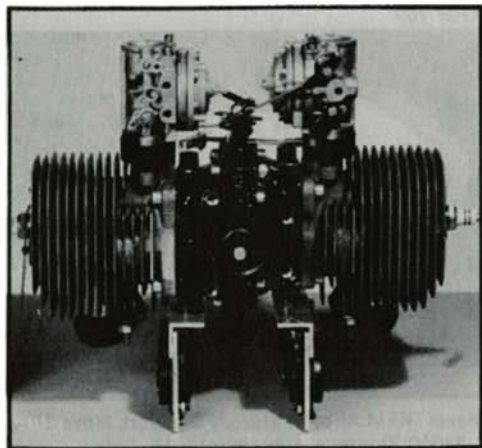
Cooling system: Air.
 Starting system: Electric.
 Rotation: Anti-clockwise.
 Reduction drive: Not standard.
 Dimensions as described: 432 x 440 x 253mm.
 Price as described: US\$1250 approx.
 Optional extras: Toothed-belt enclosed 2:1 reduction drive*, deletion of starter.

Limbach U275S

Maker: Limbach Motorenbau, Kotthausener Strasse 5, D-533 Königswinter 21, Sassenburg, West Germany.

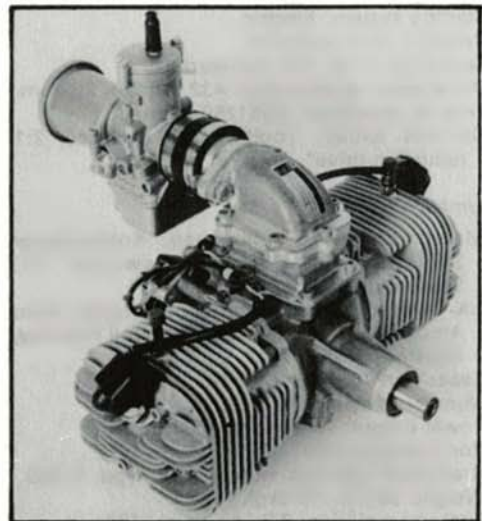
UK agent: None. Engines available from American agent: USA Inc, 7400 Gulf Freeway, Houston, Texas 77017, USA.

Capacity: 275cc, 66 x 40mm.
 Number of cylinders: 2 opposed.
 Power output: 20-25hp at 7300rpm.
 Compression ratio: 10:1.
 Crankshaft bearings, number and type: 3, ball.
 Weight: 28.1 lb (12.8kg).
 Fuel consumption: 3.8 litre/hr at 5400rpm.



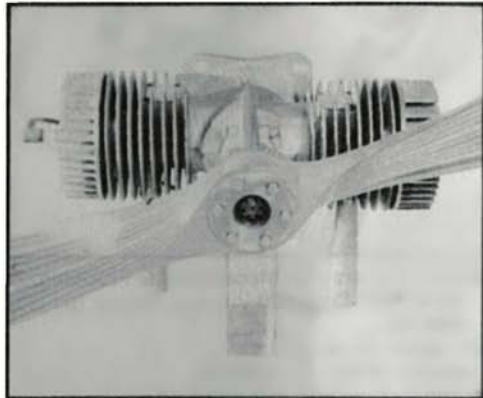
Carburetors, number and type: 2 diaphragm type each with pump.
 Exhaust system: Not standard.
 Electrical system: Electronic ignition, magneto, dynamo for lighting.
 Cooling system: Air.
 Starting system: Manual.
 Rotation: Clockwise.
 Reduction drive: Not standard.
 Dimensions as described: 188 approx \times 312 approx \times 200mm approx (width figure is minus spark plugs).
 Price as described: \$1390 ex-American agent.
 Optional extras: Dual exhaust system, exposed belt 2:1 reduction drive.

Normalair-Garrett WAM 342C



Maker: Normalair Garrett Small Engine Division, Yeovil, Somerset BA20 2YD (tel 0935 5181).
 UK agent: The maker.
 Capacity: 342cc, 66 \times 50mm.
 Number of cylinders: 2 opposed.
 Power output: 25.5hp to SAE J607a Test Code at 7000rpm.
 Compression ratio: 9.2:1.
 Crankshaft bearings, number and type: 3, ball.
 Weight: 18.0 lb (8.2kg) dry with carburettor.
 Fuel consumption: 5.6 litre/hr at 5250rpm.
 Carburetors, number and type: 1 Dellorto.
 Exhaust system: Not standard.
 Electrical system: Electronic ignition, magneto.
 Cooling system: Air.
 Starting system: Not standard.
 Rotation: Anti-clockwise.
 Reduction drive: Not standard.
 Dimensions as described: 238 approx \times 375 \times 288mm approx.
 Price as described: £425.
 Optional extras: Manual or electric start, exposed belt reduction drive, propeller, dual ignition, exhaust system.

Rebel 2-205



Maker: Rebel Experimental Engines, PO Box 805, Russellville, Ar 72801, USA (tel (501) 968-5444).
 UK agent: None — the maker would like to appoint a reliable agent in Britain and any company interested should contact Rebel at the above address.
 Capacity: 410cc, 67.5 \times 57.2mm.
 Number of cylinders: 2 opposed.
 Power output: 25hp at 3500rpm.
 Compression ratio: 8.5:1.
 Crankshaft bearings, number and type: 3, ball.
 Weight: 29.8 lb (13.5kg) including carburettor, air filter, ignition and drive plate.
 Fuel consumption: Not stated.
 Carburetors, number and type: 1 updraft Mikuni.

Exhaust system: Not standard.
 Electrical system: Electronic ignition, magneto.
 Cooling system: Air.
 Starting system: Not standard.
 Rotation : Clockwise.
 Reduction drive: None.
 Dimensions as described: 455 approx x 508 x 279mm.
 Price as described: \$995.
 Optional extras: Electric* or manual start, exhaust system, propeller for direct drive, tachometer, dual cylinder head temperature gauge, alternator*.

Robin EC25PS CDI

Maker: Fuji Heavy Industries, Shinjuku, Tokyo, Japan.
 UK agent: Nicklow Engineering, 7 Cattle End, Silverstone, Towcester, Northants (tel 0327 857418).
 Capacity: 244cc, 72 x 60mm.
 Number of cylinders: 1.
 Power output: 18.2hp SAE at 6000rpm, using maker's recommended exhaust and intake (maximum recommended continuous is 80% of this speed).
 Compression ratio: Not stated.
 Crankshaft bearings, number and type: 2, ball.
 Weight: 41 lb (18.5kg) including carburettor but not exhaust system.
 Fuel consumption: Not stated.
 Carburettors, number and type: 1 Mikuni VM30SS; pump included.
 Exhaust system: Not standard.
 Electrical system: Electronic ignition, magneto with two coils (one ignition, one lighting).
 Cooling system: Air, with fan.
 Starting system: Manual.
 Rotation: Anti-clockwise.
 Reduction drive: Not standard.
 Dimensions as described: 331 x 344 x 383 (height figure is minus spark plug).
 Price as described: £226.71 plus VAT.
 Optional extras: Electric start, dual ignition, exhaust system, exposed toothed-belt reduction drive/propeller package.

Robin EC34PM-03

Details as for Robin EC25PS CDI except:
 Capacity: 332cc, 61.78 x 55.6mm.
 Number of cylinders: 2 in line.
 Power output: 32hp SAE at 6500rpm, using maker's recommended exhaust and intake (maximum continuous recommended is 80% of this speed).
 Crankshaft bearings, number and type: 5, ball.
 Weight: 63.5 lb (28.8kg) including carburettor but not exhaust system.
 Fuel consumption: approx 5.5 litre/hr at 5500rpm.

Carburettors, number and type: 2 Mikuni VM26SS; pump included.
 Dimensions as described: 425 x 327 x 349 (height figure is minus spark plugs).
 Price as described: £346.41 plus VAT.

Robin EC44PN-01

Details as for Robin EC34PM-03 except:
 Capacity: 432cc, 67.72 x 60mm.
 Power output: 50hp SAE at 7000rpm, using maker's recommended exhaust and intake (maximum continuous recommended is 80% of this speed).
 Weight: 75 lb (34kg) including carburettor but not exhaust system.
 Fuel consumption: approx 9 litre/hr at 6000rpm.
 Carburettors, number and type: 2 Mikuni VM34SS horizontal; pump included.
 Dimensions as described: 461 x 377 x 380mm (height figure is minus spark plugs).
 Price as described: £441.30 plus VAT.

Sachs RC30E

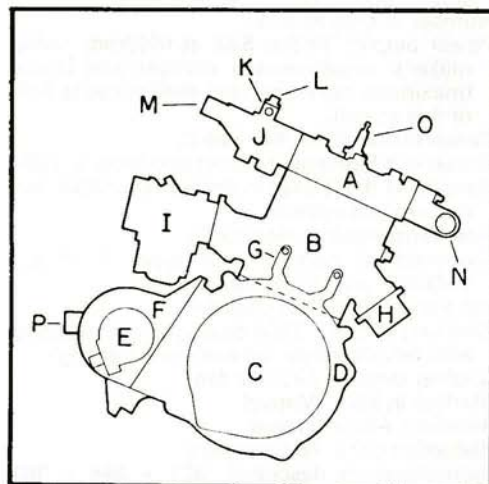


Maker: Sky-Riders, Tallweg 31, 479 Paderborn-Marienloh, West Germany (tel 05254 6129).
 UK agent: None.
 Capacity: Wankel, equivalent to 303cc; described radius 71mm, eccentricity 11.6mm, rotor width 70mm.
 Number of rotors: 1.
 Power output: 23hp at 5000rpm (maximum

continuous recommended is 21hp at 4700rpm).
 Compression ratio: 8:1.
 Crankshaft bearings, number and type: Not stated.
 Weight: 39.9 lb (18kg) including carburettor and alternator but excluding exhaust system, reduction drive, electric start and mountings.
 Fuel consumption: 4-6 litre/hr of automotive petrol mixed 25:1 with Shell-Rotella HD30 or Infox.
 Carburettors, number and type: 1 Tillotson diaphragm type HL268A, 22mm, with pump and anti-icing system.
 Exhaust system: Supplied as standard.
 Electrical system: Contact breaker, Bosch alternator magneto.
 Cooling system: Air.
 Starting system: Electric.
 Rotation: Not stated.
 Reduction drive: toothed-belt, Exposed ratio 2:1.
 Dimensions: Not stated.
 Price as described: DM4000 approx.
 Optional extras: Various propellers.

Weight: 38 lb (17.3kg) without propellor but including reduction drive and standard-equipment engine mountings.
 Fuel consumption: 3.9 litre/hr at 5200rpm.
 Carburettors, number and type: 1 Bing float type.
 Exhaust system: Supplied as standard.
 Electrical system: Not stated.
 Cooling system: Air, with fan.
 Starting system: Manual.
 Rotation: Not stated.
 Reduction drive: Exposed V-belt, ratio not stated.
 Dimensions as described: 300 approx × 487 approx × 573mm approx (height figure is to mounting plate, not to base of propellor mounting).
 Price as described: DM2300.
 Optional extras: Not stated.

Spitfire 220LC RV



A	Cylinder head	I	Carburettor
B	Cylinder	J	Thermostat cover
C	Recoil starter	K	Water bypass outlet
D	Ignition cover	L	Air bleed
E	Mechanical tachometer drive	M	Hot water outlet to radiator
F	Water pump	N	Water inlet from pump
G	Ignition coil mount	O	Spark plug
H	Exhaust outlet flange	P	Water pump inlet (cooled)

Solo 335



Maker: Solo Flightline Division, Dietrich CTA, Albstadt 105, 7000 Stuttgart 70, West Germany (tel (0711) 766313).
 UK agent: None.
 Capacity: 210cc, 70 × 55mm.
 Number of cylinders: 1.
 Power output: 19.9hp at 6900rpm.
 Compression ratio: Not stated.
 Crankshaft bearings: Not stated.

Maker: Advanced Engine Design, 4709 Highland Road, Pontiac, Mi 48054, USA (tel (313) 673-8800).

UK agent: None.
 Capacity: 219.5cc, 68.5 × 59.6mm.
 Number of cylinders: 1.
 Power output: 30hp at 9300rpm.
 Compression ratio: 7.0:1 effective.
 Crankshaft bearings, number and type: 4, ball.
 Weight: 43 lb (19.5kg).

Fuel consumption: Not stated.
 Carburettors: Not standard.
 Exhaust system: Not standard.
 Electrical system: Electronic ignition, magneto.
 Cooling system: Water, with pump and thermostat.
 Starting system: Manual.
 Rotation: Not stated.
 Reduction drive: Not standard.
 Dimensions as described: Not stated.
 Price as described: \$1455.
 Optional extras: Electric start, dual ignition, oil injection, alternator, exhaust system, radiator, carburettor, reduction-drive components, engine adaptors.

Spitfire 220LC STD

Details as for Spitfire 220LC RV except:
 Power output: 35hp at 9200rpm.
 Price as described: \$1375.

Spitfire 220LC RPO

Details as for Spitfire 220LC RV except:
 Power output: 42hp at 10,500rpm.
 Compression ratio: 10.5:1 effective.
 Price as described: \$1450.

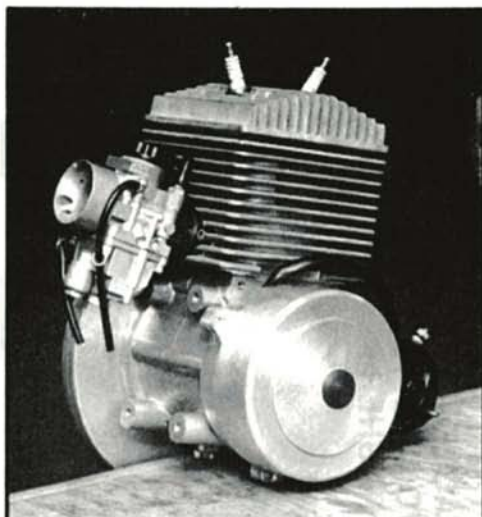
Spitfire FA250

Details as for Spitfire 220LC RV except:
 Power output: 28hp at 8100rpm.
 Weight: 38 lb (17.2kg).
 Cooling system: Air.
 Price as described: \$995.
 Optional extras: Special magnesium (lightweight) construction, electric start, dual ignition, oil injection, alternator, exhaust system, carburettor, reduction-drive components, engine adaptors.

FRENCH CORRESPONDENT

To improve its coverage of the French microlight scene, *Flightline* would like to appoint a French correspondent. If you are resident in France, are well informed on the country's microlight activity and can write reasonable (not necessarily perfect) English, then the Editor would like to hear from you.

Please note that this is an honorary post.



THE NEW ALL-BRITISH MICROLIGHT ENGINE

Purpose-built to our specification:

- 260cc single cylinder air-cooled two-stroke
- 25BHP at 6000rpm
- Electric start, dynamo, dual electronic ignition
- Weight 46 lbs plus silencer and battery
- 3 bearing crankshaft
- Price £295 + VAT



All drive components and props available from sole UK distributors:

Skyhook Sailwings Ltd, Vale Mill, Chamber Road,
 Hollinwood, Oldham, Lancs OL8 4PG
 Tel. 061-624 8351/3427
 Telex 667849 Holmes G.

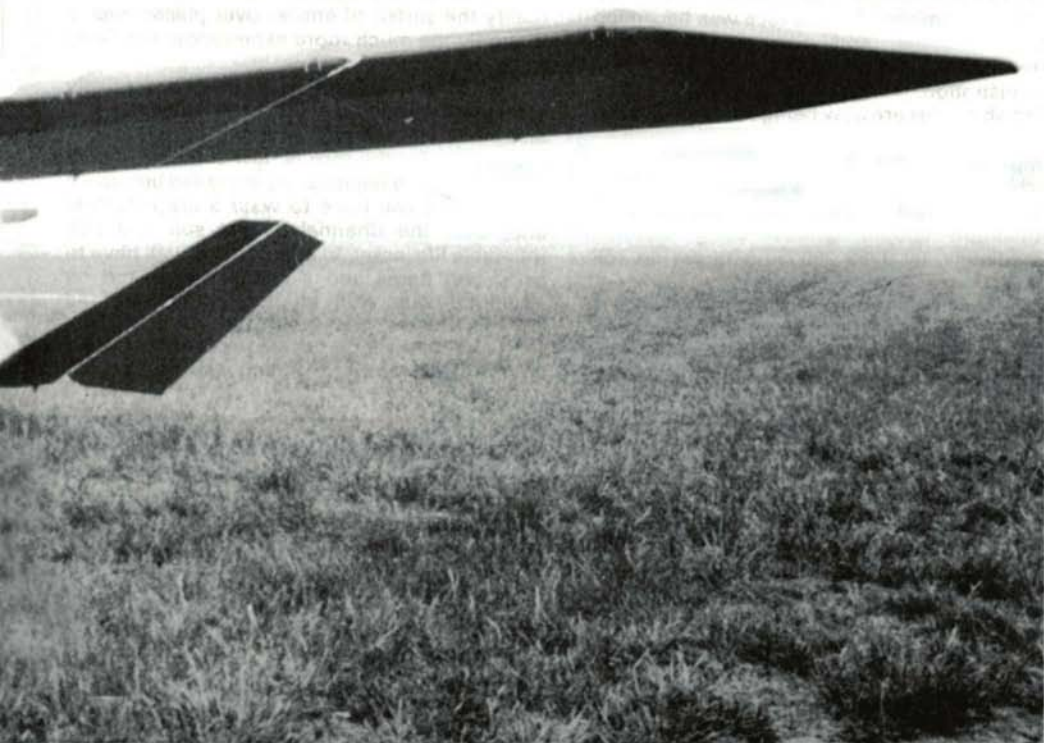
It's Here



**N.B. THERE ARE LIMITED AREA DEALERSHIPS AVAILABLE.
SERIOUS ENQUIRIES ONLY PLEASE TO HUMMER SALES.**

! THE HUMMER TX

A new, full 3 axis model, for the experienced flyer. Extensive research has now produced this new aircraft which has superb handling qualities in all 3 axis. Fully independent controls for pitch, roll and yaw, make the aircraft a pleasure to fly. See it soon at your nearest dealer and buy yourself the best microlight engineering and quality around.



FOR FULL DETAILS & YOUR NEAREST DEALER

Send large SAE to:

HUMMER SALES

UNIT 30 MALMESBURY ROAD, KINGS DITCH TRADING ESTATE, CHELTENHAM, GLOS.
TELEPHONE (0242) 34466 TELEX 43498

Great Race approaches,

By Norman Burr

Despite a last minute change of organisation at the British end, the Great Microlight Race from London to Paris was still on as *Flightline* went to press.

The originator of the idea, the Blackpool-based company Flying Machines Ltd, has pulled out of the race. Race headquarters is now in Paris, at the premises of aviator Bernard Lamy, who is running the race on behalf of Fenwick Generale Medias.

The reasons behind the pull-out by Flying Machines are complex, but it is known that the Blackpool company felt the race was becoming too commercial, and also disagreed with Fenwick about various practical matters of race administration.

British entries are now being handled through Long Marston Aviation Co and all would-be competitors who applied through Flying Machines are being sent a letter to this effect. Any applicant who has not received such notification should contact Long Marston immediately, tel 0789 295050 (address on p58 — ed).

For safety reasons the number of starters has been reduced from 100 to 60. However, to allow for non-starters, a total of 76 entries is being accepted, made up as follows: France 35, UK 15,

Belgium 11, West Germany 7, Switzerland and Luxembourg 2 each, Norway, Netherlands, Canada and USA 1 each.

According to Flying Machines, 98 British pilots had expressed an interest in participating and it is not yet clear how the 98 will be reduced to 15 for the race. One possibility is to run elimination heats which would probably take the form of a navigation and reliability trial on a triangular course starting and finishing at Long Marston on the days immediately preceding the event. Alternatively it may simply be decided on the basis of pilot experience and aircraft suitability.

Minimum pilot requirements will be BMAA Certificate of Competence standard, though in reality the surfeit of entries over places means that only the much more experienced are likely to be accepted.

The BMAA is supporting the event and is likely to provide assistance with entry selection and aircraft scrutineering.

Entry fee for the race is now 2000Fr — some £200 — and the full itinerary is printed below. All competitors will have to wear a crash helmet and, over the Channel, a wet suit and CO₂ inflatable life jacket. In addition they will have to carry two flares and a signal mirror and be equipped with ASI, altimeter, compass and watch.

The winner will be decided according to four criteria: first, accurate timing and navigation;

Race Timetable

(Local time)

Thursday 2 September

Competitors will be received at Biggin Hill from 9am until 4pm at the latest (competitors will be summoned at a given time to avoid crowding). Competitors will not fly in to Biggin Hill.

Checking of aircraft and pilots,
Checking of safety equipment,
Noise control.

From 6 to 8pm a compulsory race conference will be held for competitors and press.

8.00pm Cocktails.

Friday 3 September

6.30am current weather briefing,
8.00am first departure from Biggin Hill, for
Lydd (Approx 46 miles, 74km),
10.00am last departure from Biggin Hill.

Arrival at Lydd between 9am and 1pm.
Distribution of lunch baskets. During this
break, each machine will be checked again
before the crossing.

1.00pm to 3.00pm: departure from Lydd.

Defined sea-crossing direct to Cape Griz
Nez turning point (approx 31 miles, 50km).
Competitors will then proceed to Le
Touquet down the coast (approx 23 miles,
37km).

Time difference on arrival in France is +1
(GMT +2).

4.00pm to 7.00pm: drinks on arrival at Le
Touquet.

despite UK changes



second, speed on the Le Touquet to Abbeville run; third, landing accuracy at Bagatelle; and fourth fuel consumption. Because of the last criterion, fuel tanks will have to be sealed with lead seals or similar.

First prize will be 20,000Fr, with a team prize of the same value going to the team which achieves

the best placings. Any three pilots of the same nationality may form a team simply by declaring themselves to be such before the start of the race.

Race organiser M Lamy may be contacted at 42 Boulevard Malesherbes, 75008 Paris, France (tel (1) 265.02.82, telex 280243 F).

7.00pm to 8.00pm: competitors will be transported to their lodging (studios) by bus,

8.30pm: evening dinner during which the Touquet Trophée will be offered by the mayor.

Saturday 4 September

7.00am to 8.00am breakfast at the studios,
8.00am to 9.00am shuttle to the airport,
9.00am to 10.00am current weather briefing,
9.30am to 10.30am departure towards Abbeville, Beauvais, les Mureaux.

Optional refuelling at Abbeville and Beauvais.

Distances: Le Touquet - Abbeville 26 miles, 43km; Abbeville - Beauvais 50 miles, 80km; Beauvais - Pontoise 27 miles, 50km.

Flight schedule:

Abbeville 10.30am to 12.30am maximum downtime 15min.

Beauvais 12.00am to 16.00pm maximum downtime 15min.

Pontoise 1.30pm to 6.30pm. Dinner and lodging at Pontoise.

Sunday 5 September

9.00am to 10.00am breakfast at Pontoise,
12.00 picnic,
1.00pm to 3.00pm departure from Pontoise towards Bagatelle (the flight will not be timed). Defined route of 19 miles (30km).

Arrival at Bagatelle between 2.00pm and 4.00pm. Precision landing contest.

From 5.00pm the results will be announced and cups and the Paris Trophée distributed.

Stateside view

By Glenn Brinks

Bob Lovejoy is Back

New ultralights are turning up all the time. Often, it seems that supposedly new designs are just copies of existing designs built by people who don't have the skill or desire to design an ultralight themselves, so they just take a few measurements off a successful one and then start building copies. Bob Lovejoy calls them 'Ripsilvers' — rip-offs of the original Quicksilver, which he designed a few years ago and which is now the most copied ultralight in the world. He has a legitimate gripe.

He sold his portion of Eipper-Formance a few years ago and has been working since as a designer outside the ultralight industry. Now he's coming back with a new design. After seeing how the prices of ultralights have gotten totally out of control, he was determined to build one with simplicity (and thus low cost) as a primary goal.

His new design is a high-wing monoplane, with strut bracing and true, independent three-axis control. Unlike the Quicksilver, the new design has a rigid, double-surface wing. Ailerons are used for roll control, with a conventional rudder and elevator for yaw and pitch. The elevator is full-flying, so technically it is a stabilator. It features a tricycle landing gear with a push-right, go-right steerable nosewheel. The basic structure is aluminum tubing, but Lovejoy uses large-diameter tubes, without all the wire bracing of his earlier design. Without all the wires, there is less drag, a shorter set-up time, and a lot fewer pieces and fittings to be made, dropping the production costs.

The pilot gets to sit in an upholstered fiberglass bucket seat, with a central stick between his knees. A number of powerplants are being considered for the plane, but the prototype has a reduction-drive MAC-101. Even with the tiny amount of power from the MAC, Lovejoy says the plane will do about 45mph (72kph).

I went with Lovejoy when he took the plane out to El Mirage Dry Lake for some flight tests. Set-up time was very quick (sorry about the pun), in the order of 15–20min. Unlike some of the flimsy contraptions that are being offered these days, Lovejoy's plane is solid (but not overweight) and aircraft-quality throughout.

After we got it set up, Lovejoy took a couple of short, low level test flights in it and everything

appeared to be working fine. Ken Brock (manufacturer of Brock Gyrocopters) and Bob Hovey (designer of the Whing Ding) were watching and when Hovey took a turn at the controls he was quite impressed. There were a few details to be fixed, such as some play in the control system and so forth, but the basic design performed as expected. Unfortunately, so did the wind. El Mirage is usually windy after about 9.00–10.00 in the morning, and it started gusting just as Lovejoy was offering me a test flight. With great reluctance, I had to refuse, so it may be a while before I can give a first-hand report on it.

Plans are now being made for production and meanwhile Lovejoy is building a new set of wing panels for it, to try a smaller wing and a few other modifications. If everything goes as expected, the plane will be offered in kit form for \$1500–2000 complete with engine! If this happens, especially if it includes a good engine such as a Yamaha 100, the other ultralight manufacturers will have some serious competition on their hands. Some of the other ultralights are selling for over \$6000 without offering much more performance than this one, except perhaps in climb rate from their reduction drive monster motors. So if Lovejoy can bring out a three-axis, reasonable performance ultralight for a half to a third the price of the others, it may signal a return to truly low-cost flight. I'm looking forward to it.

Replica Eindecker

Another new design coming on the market is from Tact-Avia. That's a new company set up to do design and research work in ultralights. They are bringing out a series of designs based on a wood fuselage, tube and fabric wings, and a welded chrome-moly steel tube structure to enclose the pilot, mount the landing gear, hold the wings and cabane structure, hold the fuselage and mount the engine.

The designs will offer three-axis control, with stick and rudder pedals. The wings will be fabric covered aluminum tubes with wire bracing. The fuselage will also be fabric covered.

Initially, two prototypes are being built. They will be stand-off scale replicas of the Focker Eindecker, and the very similar Morane-Saulnier N. Construction is well under way, and the prototypes are expected to be at Oshkosh.



So far, the prototypes are coming in well below design weight (that's a switch) and they will probably weigh about 230 lb (104kg) dry. Engines will probably be the Fuji-Robin twin with a reduction drive and a 70 in (1.78m) propeller. Because of the weight, they may have to be licenced as experimental planes, but the fact doesn't bother designer Steve Mahrle. He thinks there will be enough demand for them from people who want an unusual airplane that is

solid and easy to build and offers stable, conventional aircraft handling. He expects the kits to sell for about \$3000.

Because of the type of construction, it will be easy to add similar replicas to the series. Right now Mahrle is looking at the Heath Baby Bullet and the Church Midwing, and may also add some other WWI fighters and perhaps a parasol wing.

FAA Rumors

We've been waiting for a long time for the FAA to do something concrete about ultralights. They took years to come out with their *Notice of Proposed Rulemaking*, and then, after the comments had been sent in, nothing more was heard from them. Recently I heard a new rumor about the FAA's plans. Supposedly, the regulations will specify a 250 lb (113kg) weight limit, 5USgal (4.2 imp.gal, 18.9 litre) of fuel, single seat, 3.1 lb/ft² (149N/m²) wing loading, and no cockpit enclosures of any kind. Except for the restriction against cockpit enclosures, these seem to be workable rules, but they're only rumors right now. There has been so much controversy on this issue, that there is no real way to tell what the rules will be until they actually come out.

SCORPION MAIN DEALERS



Come and see the all British Scorpion!

**80mph max in level flight, 50mph cruise at half-throttle.
1000fpm climb**

Genuine 3-axis control lets the pilot make the decisions

54hp Fuji motor

**Solo from £2600 ready to fly dual from £3300 ready to fly,
both plus VAT.**

Why not give us a ring —

**TEL. LYDD (0679) 20645 OR CROWHURST (042 483) 354
OR CODDEN (042 43) 3464**

Flexiform

Fast Wings ... f

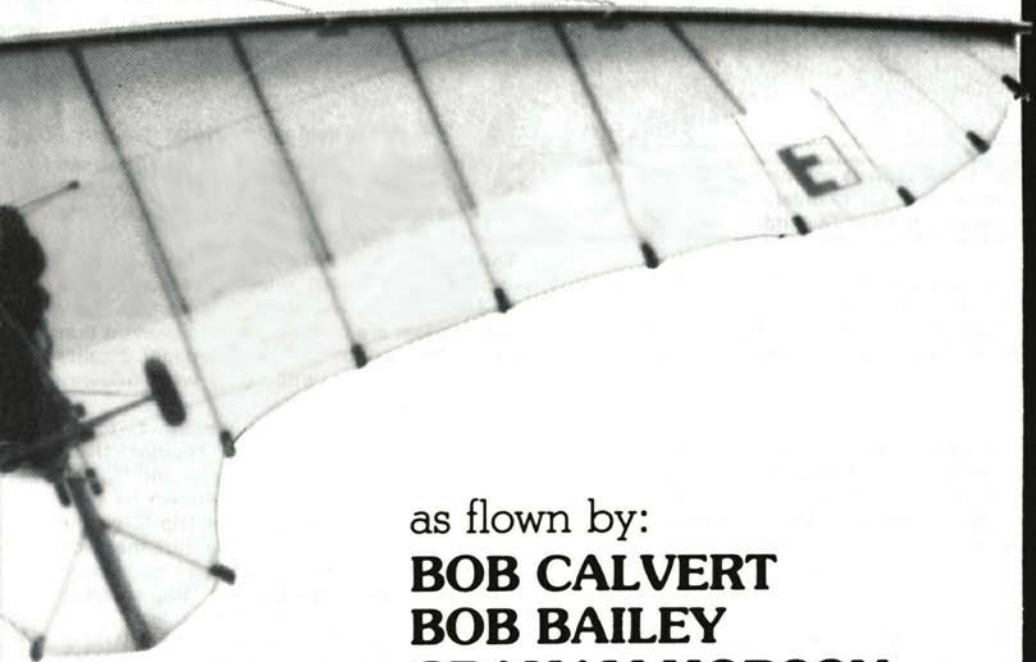


Send SAE to

Level 3, Bedingate Mill, Legh St, Patricroft,

For further details
of our Solo & Dual Seat

Sky Sails **for Fast Pilots!**



as flown by:

BOB CALVERT
BOB BAILEY
GRAHAM HOBSON
JOHN LONG

Machines · List of Agents etc.

Manchester, England. Tel: 061-707 1389

LONG MARSTON AVIATION CLUB



IMPORTANT NOTICE PLEASE READ CAREFULLY

Long Marston Aviation has now commenced its instructive training programme.

Residential weekly course or daily rates. Our instructors are qualified PPL's, CPL's and have instructor ratings.

You become honorary members of our superb aviation club during your course. Try our Bistro and lively club lounge and visit beautiful Stratford-upon-Avon at night.

Contact us now and book your course.

THE CONTROL TOWER,
LONG MARSTON AVIATION CENTRE,
STRATFORD-ON-AVON, WARCS.

TELEPHONE: 0789 295050 TELEX: 335294

**STOP
PRESS!**

We are now agents for the new British
3-axis Pathfinder — weekly demonstrations.

Letter of the law

By Peter Lovegrove

Just as it is now mandatory to register your microlight and illegal to fly it if you haven't, it is just as illegal to fly it without displaying those registration letters.

The trouble is, you don't have to look at the requirements of the Air Navigation Order for long, with regard to registration marks, to realise that most of us are in some difficulty when it comes to meeting them. If you don't have a fuselage, it becomes a mite difficult to paint letters on it!

Fortunately for us, the problems we face have already been met by amateur gyroplane enthusiasts, who have found the CAA exhibits a commonsense flexibility over such matters.

However let's clear one point up first: your aircraft *must* bear a small metal plate which is stamped with the machine registration letters and the name and address of the owner. Fix this somewhere obvious on the fuselage framework.

Gyroplanes have no wings and in most instances no fuselage bodywork, so the CAA has accepted that only displaying the registration letters on either side of the fin and rudder is adequate. The letters on these vertical tail surfaces have to be sized so as to leave the required 50mm (2 in) margin between them and the outline edge of the surface, if possible. For all that, ARB inspectors tend not to take a rule to these letters. They are satisfied if the builder has evidently done the best that is possible.

So markings on microlights will vary with the type of machine. Scorpions, Mirages or Pathfinders, for example, should have registrations displayed on wings and vertical tail surfaces. If, like the new Mirages, a nacelle is fitted, it should bear the registration letters on its sides.

Trike-Rogallo combis, however, can obviously only display the letters on their wings and this they must do. If nacelles are fitted, on go the markings.

So there are the simple ground-rules; if you have the area available where the ANO requires letters to be exhibited, you must have them. If the area is there, but too small, you must display the largest letters you can, without — in the case of the tail surface and fuselage surface — taking the letters out to the outline profile. If the area simply doesn't exist, forget that particular set of markings. No CAA inspector will ground you if you do all you can to meet the law.

The Law Paraphrased

1. The first registration letter (signifying British origin) will, in all cases, be a capital letter 'G' in Roman character. This will be followed by a hyphen and four other capital letters, also in Roman characters.
2. The letters must be affixed so as to be as permanent as possible.
3. The marks will appear on the lower surface of the left-hand (port) wing or spread across the whole span of the wing, if desired.
4. The marks must also appear on both sides of the fuselage (if feasible) and on both sides of the vertical tail surface.
5. The letters in each group must be of equal height. Those on the wing must be at least 500mm (20 in) high. Those on the fuselage sides must not extend to the vertical outline of the fuselage.
6. The marks on the vertical tail must leave a margin of at least 50mm (2 in) along the vertical edges of the surface. The marks must, if possible, be 300mm (12 in) high. If this is not possible, they should be at least 150mm (6 in) high.
7. The width of each letter (and the length of the hyphen) must be two-thirds of its height. (The letter I has a width one-sixth of its height).
8. The colour of the letter must contrast sharply with the background.
9. The lines of the letters must have a width equal to one-sixth of their height.
10. Each letter must be spaced from adjacent ones by spaces equal to half the width of a letter.
11. The letters must always be kept clean.
12. A metal plate must be attached to the airframe in a prominent position, and be inscribed with the registration marks and the name and address of the owner.

Publicity Opportunity for Manufacturers

The BMAA will shortly be mailing to the general media a package giving background information on the sport. In it we would like to include some high quality black-and-white prints of microlights — preferably one three-axis and one trike. If any manufacturer is prepared to donate to the BMAA prints of his products in action (around 200 copies will be needed), please contact the Secretary.

Accident toll mounts

Fatal Scorpion Crash

Following a fatal accident involving in-flight structural failure on a single-seat Scorpion the aircraft's manufacturer Southern Aero Sports has issued a special notice to all Scorpion owners and flyers.

This notice summarises most of the details known of the accident at the time of going to press and we reprint it here in full. The accident is being investigated by the AIB and *Flightline* will publish the AIB conclusions as soon as they are available.

'It is with great regret that we must announce a fatal accident involving Christopher Hawes of Wimbledon. Christopher died as a result of injuries sustained on farmland at Buckland near Dorking Surrey on the evening of Sunday 27 June at around 9pm.

Christopher was on his first solo flight in a Scorpion single seater following three lessons in a dual-seat Scorpion. The actual cause of the accident has still to be determined, but an eye witness reported that on the pull out under full power following the second of two high-speed near-vertical dives, the port wing was seen to partially collapse, and the aircraft fell to the ground from around 400ft (120m).

We are sure only that the aircraft was subjected to great stress during the dives and the subsequent high-G recoveries and it is not known why the pilot was engaged in these violent manoeuvres, although it has been suggested that he was over-reacting to misjudged circuit heights while flying from a small field, and in difficult country with undulating ground. Another disturbing feature is the complete absence of the engine-mounted starting battery which weighs some 7 lb (3.2kg). The battery was not at the crash site, and it and its leads have still to be found. There is a distinct possibility that it damaged some vital part of the aircraft when it came adrift.

To All Scorpion Owners

Do not fly unless you are trained and competent. Do not fly with improperly attached equipment of any kind. The Scorpion is a microlight aircraft and not a Pitts Special, and should be flown accordingly. Violent manoeuvres should be avoided particularly at high speed until we have ascertained the precise reason for this mishap.

After this notice was written, another possible

contributory factor was discovered, in the form of an undersize bolt on the stick coupling. A 3/16 in bolt was fitted in a 1/2 in hole, the effect of which would have been to reduce considerably the pilot's ability to control pitch. Nevertheless the above advice still holds good.

Southern Aero Sports is at 124 Punchcroft, New Ash Green, Kent (tel 0474 873836).

Howard Edwards Killed

Howard Edwards, proprietor of the Dunstable Hang Gliding School and a well liked personality in both hang-gliding and microlight circles, died in a microlight accident on 18 May.

Howard was flying a Chargus Cyclone fitted with a prone trike unit of his own design. Dunstable Hang Gliding School is to be sold as a result of Howard's death.

Howard leaves a widow, Sandra, and two children. His friends at Dunstable Hang Gliding club are co-ordinating a fund for them and anyone wishing to contribute should contact: Terry Prendergast, Chairman DHGC, Holbrook Cottage, 32 North End Road, Steeple Claydon, Bucks MK18 2PG (tel 0296 738033).

Puma Throttle Problem Prompts Mod

Problems with the throttle cable on the Puma have prompted Ultra Sports, manufacturer of the trike unit, to modify the design.

The trouble centres on the block which joins the separate hand and foot throttle cables to the single cable leading to the carburettor. Under a certain combination of hand and foot throttle movement, it is possible for one of the cable outers to come out of its socket and thus jam the throttle open. In one incident this resulted in a pilot taking off when he only intended to do taxiing trials.

Puma owners are advised to contact the factory, which has designed a modified component and is planning to retro-fit this to all existing Pumas. Ultra Sports is at Truleigh Sands Buildings, Truleigh Farm, Edburton, nr Henfield, Sussex (tel Poynings 526).

Skytrike Bottom-Tube Failure

Following a recent incident involving a special version of the Hiway Skytrike MkII, when the bottom tubes failed on landing, digging into the ground and extensively damaging the aircraft, owners of these machines are advised to contact

the factory. The aircraft involved was a special version with lengthened bottom tubes and the manufacturer is confident that the normal model is not affected by the problem. However if any owners are worried they should remove the seat and check that the double sleeving extends to the bolt holes.

Hiway is at Sirhowy Hill, Tredegar, Gwent (tel 049525 4521).

Vector Incident

By Norman Burr

A recent accident in Leicestershire with a Robin-engined Vector has called into question the effectiveness of the transmission system and has also raised broader issues for the sport as a whole.

The aircraft was a 330cc-engined machine supplied by Dave Turley and fitted with a Huntair power pack. It had only a few hours flying time to its credit and had under one hour on this particular engine installation, having been originally fitted with a 250cc Robin. It was owned by John Sanders and at the time of the accident was being flown by Eddie Stevens, a pilot with 2000 hours experience who has held a PPL since 1970.

Stevens had to make a forced landing in a field of oilseed rape when he experienced a worsening transmission vibration followed by the loss of drive at the flexible coupling which connects the reduction unit to the propeller driveshaft. He was not seriously injured, though the aircraft suffered undercarriage damage.

Differing explanations have been advanced as to the significance of the vibration. Steve Hunt, whose company Huntair supplied the coupling along with the engine, reduction drive and engine mounts, believes the vibration was the cause of the failure, while Turley, who fitted the components to the aircraft, maintains that the vibration was the effect of the coupling beginning to break up.

Hunt's theory is that the engine package was not properly attached to the airframe and was moving excessively under torque. Since the two halves of the coupling are only held together by the location of the engine — the rubber insert falls out automatically when the engine is removed — excessive engine movement could conceivably disconnect it in mid-flight. Both owner and pilot reported surprise at the amount of engine movement under torque, which was apparently considerably greater than on other, similar installations, though the reason for the difference has not been established.

Turley, however, lays the blame squarely at Huntair's door for supplying what he regards as an inadequate coupling, claiming that the aluminium alloy/rubber coupling, made by the

London company Picador Engineering, was being overstressed in this application.

Flightline checked with Picador to find the rated transmission capability of the disputed coupling. According to Picador sales manager Frank Barnes, the coupling was a Type 71 unit rated at 0.2hp/100rpm. In this installation it could be expected to run at a maximum of 2500rpm, allowing it to transmit up to 5hp.

Asked why he fitted this coupling to a power pack which he rates at 26hp less belt slip, Hunt replied that in common with many suppliers Picador's ratings tended to be highly pessimistic, to cover the situation where a component was 'hidden away in an industrial unit where it wouldn't get looked at for years'. So long as people accepted that the rubber part of the joint was a short-life component, the 'weakest link' of the chain, and inspected it regularly, there was no hazard, he said. He would expect the rubber to need replacing on 'one aircraft in 10 every six to eight months' and had supplied some 50 similar power packs and a number of spare rubbers to French customers without complaint. He would not be changing this coupling; it was highly reliable and some had lasted over 100hr without even a replacement rubber.

Hunt remains adamant that the coupling is adequate and that it is in any case the manufacturer's — in this case Turley's — duty to satisfy himself that the equipment supplied is up to the job. 'It is up to him and his company to ground test the installation' he asserted.

Legally the buck stops with Turley. He has an obligation under the Sale of Goods Act to refund Sanders in full, which he has done. He has now given up the Vector agency to Raven Leisure Industries, whose aircraft all use Zenoah engines.

As far as this particular case is concerned, it will probably never be established which of the two explanations is correct or whether the reality lay somewhere between the two. However the case has raised broader issues by spotlighting the dilemma faced by Hunt — and in fairness to him it should be pointed out that many others face the same dilemma — in trying to keep microlight aviation as a low-cost sport by using off-the-shelf parts. Many suppliers view the use of their products in such a sensitive area as aviation with trepidation, and some even go as far as Fuji, which marks each Robin engine package as not suitable for aeronautical use. The problem is not new: for many years light aircraft builders used Volkswagen engines without the approval of the supplier.

Often the component purchaser is faced with a choice of backing his own judgement against the advice of the supplier, or looking elsewhere for a sometimes very expensive alternative.

Safety notes

By Brian Giles, Safety Officer

We are taught and conditioned from early childhood that height is dangerous: 'don't climb on that chair or wall, you will fall off and hurt yourself'. We don't willingly stand on the edge of precipices because of the fear of falling, a fear which is so accentuated in some people that there is a medical term for it — vertigo. But in flying we turn the logic of the previous arguments on its head. *Height is safety.*

This is an exceedingly difficult concept to instil in new pilots (and some not so new). Near the ground your options and room for manoeuvre are limited, the sudden wind change or gust, engine failure or control malfunction all become much more critical and the slightest mistake or even delay in reacting can allow the aircraft to fly into the ground or worse.

Why don't we fly higher? Simply because our conditioned fear of heights together with the apparently flimsy construction of microlights does not give much reassurance when the vertical drop is thousands not tens of feet. Let me now reassure the unsure from the historical patterns of accident reports. Most accidents are due to pilot error, not aircraft structural failure. Despite their apparent flimsiness, microlights are modern technological masterpieces; the frame is cleverly designed to produce the strongest structure for the lowest weight, the materials are to an exacting specification (read John Hudson's article on aluminium tube in the May/June issue) and the overall design stressed to withstand loads far in excess of those met in normal flight.

Defects can occur, repeated heavy landings put an enormous load on the structure and in time, these, together with loads induced by turbulence and vibration can cause failures but rarely without some warning sign apparent to those who know and look. Back we come to *pre-flights*, careful, thorough and labourious; are yours? Will you fly with the odd twisted cable, the straightened tube, the old incorrect nut and bolt from the bottom of the toolbox without securing devices, the small tear in the sail (it's not getting much longer is it?) then heights are not for you. Remember mother's advice and mine — don't fly.

I get many calls from the police and other official bodies when accidents occur. Please, if involved, write up a full description of the events leading up to the accident, drawing of area and flight path, names and addresses and telephone numbers of witnesses and those involved, damage to aircraft, people and property and photographs if possible. Preferably, do not move or disturb the damaged machine until a full detailed description of the damage and disposition of parts is made.

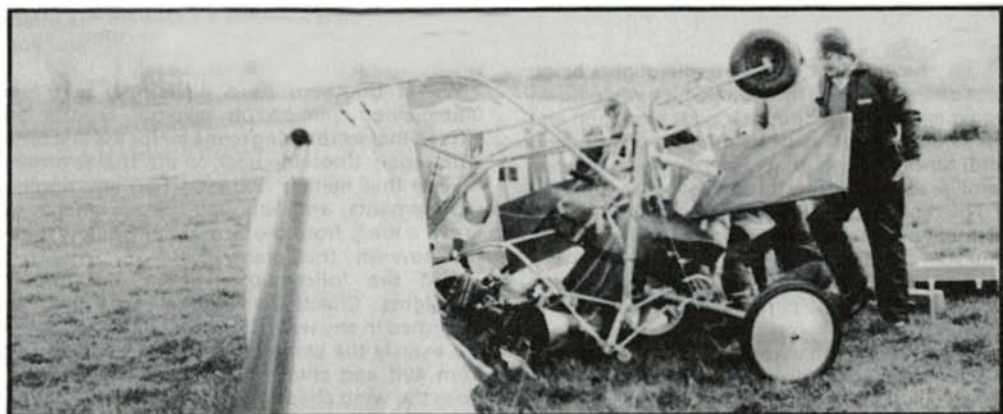
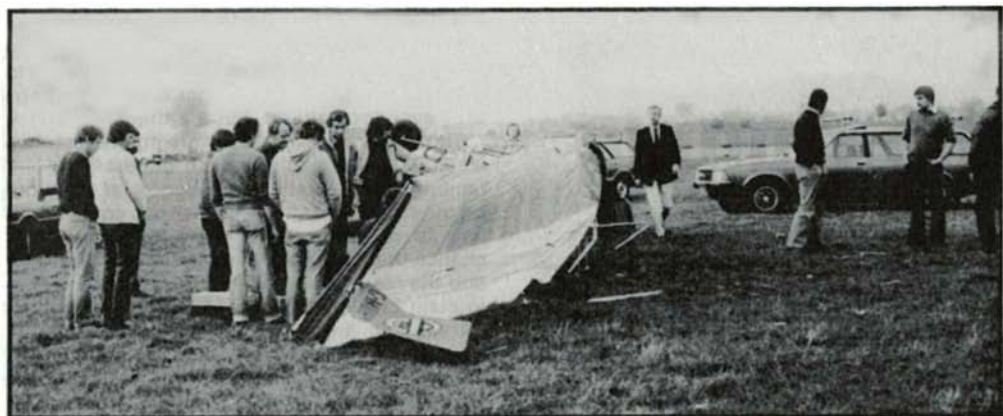
If a fatality is involved, ring BMAA for advice before wreckage is removed and inform local police promptly giving them our telephone number for reference on procedures. Send full details to me as soon as possible.

After that, it's usually too late but just a reminder:-

1. Are you insured against third party claims for at least £250,000 — if not you are *stupid*.
2. If you fly an unregistered microlight you are breaking the law and subject to a penalty of some hundreds of pounds. For £12 it is not worth the risk. *Register today.*

Below and right: Here is an example of the use of pictures to record an accident. Try to photograph the wreckage from all angles and try also to get people to move away for a few moments while you do this. Otherwise useful detail will be concealed by onlookers — as has happened in the bottom right picture. The job is important — you are trying to prevent future accidents, not lay blame for this one. Incidentally, microlights are deceptively strong — in this accident the pilot only injured his foot — the aircraft absorbed most of the impact.





Think of the rigging

After two unexplained crashes with Scorpions, RICK STUART of Southern Aerosports, which manufactures the aircraft, thinks he has discovered the cause. His conclusions apply not only to Scorpions but to almost every other microlight in the air.

I firmly believe that there are microlights being repaired at this very moment, which when flown again are going to bite their pilot hard, and end up as those bundles of bent and broken tubing and torn sailcloth that are becoming all too familiar at flying strips up and down the country.

The reason? Blind ignorance, and perhaps an element of economy which to say the least, is ill advised.

The flying surfaces are held in design-intended position on most current microlights by a cunning (and in some cases not so cunning) gaggle of tensioned wires. Make no mistake, the job that these wires do is absolutely vital — they give your aircraft its personality and its flying characteristics. Minor differences in length and tension can make a vast difference to how your aircraft handles, and to my horror this fact is not generally realised!

The designer of your pet bird has arrived at a set of features in dihedral, wash-out, angle of attack and sweep which, by calculation or trial and error, are known to give the required control and stability. Having decided on these features, how does he arrange this floppy mess of tubing and sailcloth in the right shapes? By extremely accurate and well secured wires! Great, you assemble your aircraft, tension the wires, off you go, and all behaves as it should.

However, the day comes when we flare that little too soon, or clip the corner of the barn when taxiing, or get flipped onto one wing in that unexpected gust while landing. Oh dear! Bent or perhaps even broken tubing, and that's a nasty tear in the sail! Never mind it could be worse, what have we got to buy to restore our beloved flying machine to its former glory?

Think! The forces we have just imposed have snapped that length of 1 in (25mm) 10 swg HT30TF seamless tubing like a rotten carrot (try it

in a vice!) The whiplash effect alone has snapped that trailing edge clean in half without it coming into contact with anything. So what has it done to the flying wires? They are not broken, perhaps they even look alright, but are they?

The longer the wire, the more inherent stretch it has as a general rule, and the longest flying and landing wires usually fix the degree of wash-out on most machines. If the damage to your aircraft was to one wing only, there is a very good chance that you have wire stretch on that side, and the result could be differential wash-out — in plain English, wind twist. Since it is towards the wing tip, the law of moments will magnify its effect, perhaps to the degree that it will override the control output available. You could end up with an aircraft trimmed to fly to either left or right in a tight bank you will not get out of; furthermore, if it happens on take-off the effect will be enhanced by power and speed, and you will be about to join the statistics!

We at Southern Aero have now had two unexplained 'pile-up on take-off' reports on aircraft that were taking to the air for the first time after repair. Checking back on the spares orders reveals that neither Scorpion had any rigging replacements, and although we are unable to prove a thing from the wreckage, we now think we know why they crashed.

Add the following to your post-repair pre-flights. Check that rigging eyes are not deformed in any way. Check that opposing wires are exactly the same length. Face your aircraft from 40ft and check flying surface alignment. Does the wing shape on one side exactly match that of the other? Can you see the tailplane: is it straight as it relates to the wings? Does the aircraft sit squarely and are all wires of equal tension to their opposite number?

If the answer to any of these questions is no, then put your helmet back in the cupboard and get it sorted! There are too many accidents, far too many, and I wonder how many are due to inadequate pre-flights. You can spend an hour checking the aircraft, and still never walk far enough away from it to spot the most glaring deformity! Microlights are getting faster, and the faster they go the more effect irregularities are going to have. No one would board a 707 with a kitchen table hanging beneath one wing, but I have seen people fly with bent wing tubes on a microlight! What's the difference? Whatever you fly, the ground is just as hard.

We manufacturers just can't afford to lose customers, so if you won't consider yourselves, please think of us!

(This article is not intended as an explanation of the crash described on p60. It was written before that incident occurred — ed.)

PATHFINDERS

from

BRINHAN LIMITED

officially appointed dealers for Huntair products.

Operating from a pleasant farm strip in Hampshire with easy access to the M3 (1 hour from London's West End), we are pleased to be able to offer the British built 3-axis PATHFINDER from £2,950 + VAT.

Full PPL flying training available from our experienced staff.

*For a demonstration flight,
or for further information:*

Telephone
0256-51856

Registered Office:
12 Lancaster Road,
Basingstoke, Hants.
RG21 2UE.

LANCASHIRE MICROLIGHT CO.

250 & 330cc Mono-pole 'Micro-Trikes'
440cc twin-seaters All available ex-stock

New and used gliders supplied

Spares, accessories and repairs etc

Introductory flights and full instruction
courses on our dual Power Wing
Sealander

For further information contact:
Lancashire Microlight Co
Navigation Mill
Forrest Street
Blackburn
Lancs
tel 0254 691300

TWINFLIGHT



3-axis professional training using dual-controlled 2 seat SCORPION microlights. Instruction only by registered flying instructors. Using BMAA recommended syllabus.

5 DAY BEGINNERS COURSE

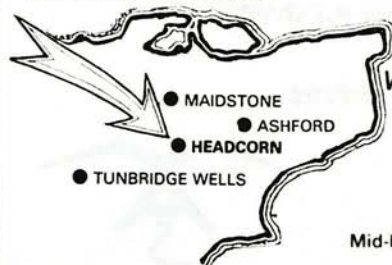
INDIVIDUAL LESSONS
CONVERSION COURSES
DEMONSTRATIONS

A comprehensive course including
flying instruction and ground
school. £230

£14.50

For PPL holders only. £40.00

£5.00



WE LOOK FORWARD TO HEARING FROM YOU
TWINFLIGHT LTD.

Headcorn Aerodrome,
Headcorn, Ashford, Kent
Maidstone (0622) 890439

Mid-Kent — easily accessible by road (A247) or rail from Charing Cross

**HAS YOUR
GET UP & GO
GOT UP &
GONE ?**

**You need our
REPLACEMENT
ENGINE KIT
for your Trike**

**HIWAY 160 Trike modifications a
speciality, but suitable for ANY
microlight**

**Phone for details
0332 512799_____**



Pine and Mahogany Propellers

Available in Fibreglass or Varnish

50"-54" From ONLY £45

Other sizes on request

**Ken Fern
311 Congleton Road, Scholar Green
Stoke on Trent ST7 3JQ
Telephone: Kidsgrove 73140**

Eagles go Cuyuna!

**American Aerolites Inc, manufacturers of the famous
Eagle, are now fitting Cuyuna engines as standard
equipment**

STANDARD

is now the 215RR single-cylinder powerplant

OPTIONAL

**is the Double Eagle specification — a powerful
430RR twin**



Both with reduction drives

**for all Cuyuna requirements contact
Microlight Airport Services Ltd.,
Unit 6, Festival Drive, Loughborough, Leics
(Tel 0509 37424/263330)**



QUEST AIR



3 axis and weightshift tuition, sales and service.

BMAA approved instructor.

Workshop facilities for:

Aluminium repairs.

Rigging service.

Engine overhauls & repairs.

Prop balancing etc.

Agents for the Huntair Pathfinder ready built or in kit form.

BLANDFORD · DORSET

DT11 9NE, U.K.
TEL 0258 - 55664 TELEK 418434 INDEX G

**LEARN TO FLY ANY 3-AXIS
MICROLIGHT IN OUR 2-SEAT
MOTOR-GLIDERS WITH
PROPERLY QUALIFIED C.A.A.
INSTRUCTORS AT ONLY £25
PER HOUR.**

*— and you can count these hours
directly towards your full Group A
light aeroplane Private Pilot's
Licence.*

OXFORDSHIRE SPORTFLYING CLUB

**Enstone Aerodrome, Church
Enstone, Oxfordshire OX7 4NP.
Tel. 060872-208**

Manager: Gordon Camp, B.Sc., MRAeS.

The Oxfordshire Sportflying Club is
sponsored by Gordonair Ltd, who are sales
agents for Goldwing & Tomcat microlight
aircraft.

HOW TO MASTER THE AIR IN A MICROLIGHT

Ultralight Airmanship *by Jack Lambie*

A technically qualified member of the Gossamer Condor design team, and pilot with 5,000 hours covering 67 types has applied his accumulated knowledge and experience to the field of microlights to produce this unique new book for anyone who wishes to extend his knowledge of this specialised branch of aviation beyond the elementary stage.

£5.60 plus 35p postage

**Robin Laidlaw - 105 Clermiston Road
Edinburgh EH12.6UR**

DEALER ENQUIRIES INVITED

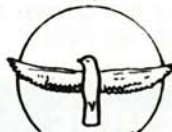
What can you do after you've learned the basics of ultralight flight? What's next? This exciting new book spells it out in clear, concise language - how you should fly to make use of, avoid, and operate in various atmospheric conditions, with specific advice and flight descriptions by experienced flyers.

A few of the topics covered by this outstanding manual include: Winds • Low Level Turbulence • Circling and Turning in the Wind at Low Altitude • Micrometeorology • "Coffin-Corner" and how to Escape • Updrafts and Downdrafts • Lapse Rates • Thermals • Spin • Seat-of-the-Pants Flying Techniques • Shearlines • Clouds and how to Get Out Safely • How to Tell if You Need Oxygen - Grunt Breathing • Simplified Navigation •

• Plus much, much more • The book is profusely illustrated with pictures and diagrams.

JUMPSUITS

SPORTSWEAR
by



Firefly

- * Cotton Drill Fabric
- * Double Full Length Brass Zips

RED	BLACK	WHITE
BLUE	YELLOW	
ORANGE	GREEN	

SMALL, MEDIUM, LARGE & XL SIZES

FLASHING: all colours - 1st Stripe Set £3, Thereafter £2.

£27 *∞* **£1.50 p&p**

WILLOW SPRINGS, CHURCH ST, DURRINGTON, SALISBURY
WILTS SP4 8AL - Tel 0980/ 52364

VISITORS WELCOME

DELIVERY 21 DAYS



THE HAPPY LANDING CO. presents . . .

For the first time in this country High Adventure Video Tapes filmed and produced by Carl Boenish the world's most accomplished aerial photographer.

PLAYGROUND IN THE SKY showing the evolution of hang gliders in particular and aerial sports in general over the last decade. Thrill at the spectacle of hang gliders skiing off the Rockies, skydivers jumping from a helicopter tracing intricate patterns across the sky with smoke. The American Red Arrows performing spectacular manoeuvres, stunt planes weaving in and out of descending parachutists - hair raising - of course. Bill Bennett and Phil Moyes compete to break the World Altitude Record firstly suspended under a balloon and secondly towed from an aircraft. The first footage of Bill Bennett's famous night hang glider demonstration. Couple all this with the first footage of the development of hang gliders and even Bill Bennett's first attempt to produce a Microlite aircraft, plus an amusing if not hilarious sequence of hang glider crashes paying homage to the Keystone Cops and you have an entertaining programme which will amuse all the family.

This action packed tape lasting 45 minutes is set to music with an amusing and informative commentary. **£40.00** + £1.50 p&p.

B.A.S.E. an acronym for buildings, aerials, spans and earth showing the first jumps performed from fixed objects by a dedicated group of parachutists determined to extend their limitations. This astonishing film set to music with an informative and dramatic commentary has taken three years to assemble. **£45.00** + £1.50 p&p.

Introductory Offer - If both tapes are purchased the cost is **£80.00** inc. p&p.

Send cheque to **THE HAPPY LANDING CO.**, 175 Croydon Road, Beckenham, Kent BR3 3QH. please state format required. Dealer enquiries welcomed. Allow 21 days delivery.

Flight test: Puma

Though it is still *Flightline's* intention to publish the BMAA Technical Committee's airworthiness assessments in place of our traditional flight test, it is taking rather longer than expected to sort out the details. However, a start has been made on the first assessment — a Quicksilver MXII — and we hope to have this ready for the next issue. In the meantime ROGER BLACK has stepped into the breach with this test of a Puma.

Introduction

This test is based on over 80hr airtime with my own Puma. I have to admit that I am in love with the aircraft, but I have tried to be objective and to mention those faults which have come to light.

General

Aircraft: Puma (two-seater), with Ultra Sports trike and Southdown Sailwings DS Lightning wing. Wing span 32ft 6 in (9.9m).

Distributors: Ultra Sports, Truleigh Sands Buildings, Truleigh Farm, Edburton, nr Henfield, Sussex (Poynings 526) and Southdown Sailwings, 82 Goldstone Villas, Hove, E Sussex (Brighton 732007).

Price: £2650 plus VAT.

Construction: HT30TF alloy, anodised; dacron fabric, stainless steel wing fittings.

Power unit: Robin 440cc twin.

Empty weight: 235 lb (107kg).

Controls: Weight shift, hand and foot throttles.

Fuel consumption: Approximately 2gal/hr (9.1 litre/hr) two-up.

Fuel capacity: 2gal (9.1 litre).

Rigging time: 20min.

Portability: Roof rack and trailer, or large estate car.

FLOATS & SKIS FOR MICROLIGHTS

contact

Dragonfly Aviation
Clear Lake
TORRANCE, ONTARIO,
POC IMO CANADA

Score Chart

(1 excellent, 2 good, 3 fair, 4 poor. Dynamic qualities are all rated when the machine is two-up)

	Puma trike unit	DS Lightning wing
Engine	2	n/a
Flight controls	n/a	2
Noise level	1	n/a
Ground handling	n/a	2
Flight handling	n/a	2
Crosswind control	n/a	3
Ground steering	3	n/a
Climb rate	2	1
Glide and sink rate	n/a	2
Speed range	n/a	2
Rigging and portability	1	1
Design and construction	3	1
Beginner suitability	4	4
Pilot (PPL) suitability	3	3

Performance

Pilot and passenger total weight for test: 392 lb (178kg).

Air temperature: 16°C.

Wind speed: 10-14mph (4.5-6.3m/s) at ground level.

Climb rate: 500ft/min (2.52m/s).

Level flight speed: 35-45mph (56-72kph).

Top speed: Over 60mph (97kph).

Take-off roll: 50-60ft (15-18m) on cut grass, wind speed as stated above.

Roll response: The roll rate is fairly heavy but has no vices.

Pitch response: Light and positive.

Stall characteristics: The stall is very gentle and there is plenty of warning. Recovery is fast with very little height loss.

Comments

The above figures were taken on the Plymouth Airport open day, when it did 7hr of circuits for the public, a task which the whole unit handled well.

As far as major failures are concerned, the aircraft has been 100% reliable. The most serious problem was the failure of an engine-to-downtube retaining bolt, which sheared. Fortunately it was wired. Also, the retaining bolt for the front forks became sloppy at 20hr and was replaced with one of larger diameter. As a matter of course we change the plugs every 20hr and have been rewarded with complete engine reliability.

The wing is well made and handles turbulence very well, the mellow if slightly heavy handling



inspiring confidence. Handling is, however, much better when flying two-up. With only one person, the lower wing loading produces a tendency to skid in the turns.

The trike unit could do with a sturdier front fork set-up and some tidying up, but it has served us well. The tandem seating is cosy and minimises drag.

For those looking for weight-shift control and company while they fly, the Puma has much to recommend it. Quite apart from anything else, that extra person is needed to help lift the 106 lb (48kg) wing off the roof rack and heave the 129 lb (59kg) trike out of the estate car!

(Safety note: Puma flyers, owners and potential owners, please see p60 — ed).

Pure gold

By Bob Calvert

I recently flew into Blackpool airport, primarily to take a look at the microlight school run by Pete Davies, which impressed me by its professional attitude.

However, while I was there I visited another company based at the airport, Modern Air Sports, who sell and assemble Goldwings. With a little persuasion I managed to get a flight in one.

After a detailed briefing I taxied out to a take-off strip which runs parallel to runway 26. The Goldwing has only limited nosewheel steering and so to turn tightly you merely put your feet down, pick up the front and put it down in the direction you require to go! It sounds ridiculous but it is simple and effective.

The on-board radio had been left switched on, so I decided to fly with a hand-held set plugged into the headset in the helmet. Eventually I got

BRIAN WRONSKI of Hummer Sales discusses the design philosophy behind the new three-axis Hummer TX.

To start making fundamental changes to any good design is a decision not to be taken lightly. You must first convince yourself that the reasons for change are the right reasons, that positive benefits will arise from the change without compromising the original concept. So, in the case of the Hummer months went by as we assessed areas in which we felt there may be room for improvement.

At the end of the day we settled on the basic control system of the aircraft. The market is moving towards conventional control, ie joystick for roll and pitch control and rudder pedals for yaw control. Now came a critical question, could we devise a conventional system for the Hummer that was not purely cosmetic but offered real increases in control?

The answer came in stages. The first stage was to compare the use of ailerons with that of spoilerons. Ailerons were the natural choice: pilots were used to ailerons, they expected them on all flying machines, it was a proven concept and totally acceptable to the flying public. However it was not acceptable to microlights in our opinion — at least, not acceptable for the Hummer for the following reasons.

Aileron effectiveness relies largely on airflow

The thinking

over its surface. Increase or decrease the angle of attack of the aileron and you either create extra lift on the wing or destroy lift on the wing. The faster you go the more effective the ailerons, the slower you go the less effective. Microlights, for all the manufacturers' claims, are pretty slow machines so it follows that ailerons will be relatively ineffective. The reason for this phenomenon is called adverse yaw which means that at a given air speed the *down-going* aileron, normally moving in that direction to give extra lift, will in fact create more drag than lift, causing the wing to drop. In this state the down-going aileron can create so much drag that, coupled with the fact that the up-going aileron on the other wing is in the low-pressure area and therefore not as effective, the aircraft can start rolling off in the *wrong* direction, an unhappy state of affairs called aileron reversal.

There are ways around this problem, but I don't want to delve too deeply into the subject of aileron effectiveness at slow speed — suffice to say that to solve the problem usually requires an aileron differential, involving many pulleys, etc, all of which makes stick forces higher.

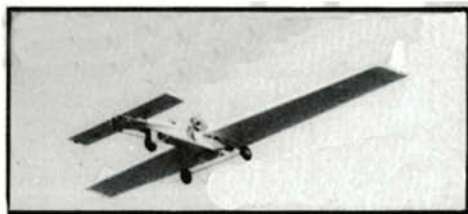
So instead we tried spoilerons. The results were quite startling — by using 6in x 28in

clearance for a right turn out into the low-level corridor.

Applying full power and using the nose-wheel and rudders to keep straight, I accelerated down the runway and at 25kt (13m/s) IAS I rotated and climbed to 200ft-40kt (61m-21m/s). Gently turning into the low-level corridor, I let the speed build to 50kt (26m/s) in order to stay at 300ft (92m).

Once clear of the airport I climbed to 1500ft (460m) to try out the handling. During the climb I noticed that the noise level is much lower than with a Skytrike because the engine is situated much further from the pilot and the speed is higher.

Progressively I tightened up the turns and I soon found that they could be easily co-ordinated by aligning the centre line of the canard with the horizon. Acceleration to 65kt (33m/s) was very quick and required only slight lowering of the nose, quite similar in fact to a sailplane! Trying to stall the Goldwing was a delight: full aft stick reduced the speed to 20kt (10m/s) without any tendency to drop the nose or a wing.



Returning to the circuit at the recommended manoeuvring speed — 40kt — and using the power to control the approach, I had no difficulty in landing exactly where I intended.

So my first impressions of the Goldwing are good. It has a sensible fuel tank for a 330cc Fuji Robin engined machine — 6 gal (27 litre) — and a very impressive performance. It reminded me more of a Cessna than a Skytrike and with a claimed glide angle of 16:1 and a sink rate of 275ft/min (1.4m/s) it is sure to be easily soarable. Handling is generally excellent, though the pitch control seemed oversensitive.

I came away thinking that if portability is to be sacrificed for performance then the Goldwing offers an excellent package.

behind TX

(152×712mm) spoilers on the outer panel of each wing we began to get good rates of roll in all speed ranges. The effect of spoilers is as their name suggests, to spoil the airflow over the top surface of the wing, thereby causing drag and a wing drop in the required direction. Because the opposite wing remains unaffected — the spoiler on that wing remains down — the tendency is for the wing to move slightly faster thereby increasing its lifting capability and assisting the roll. We have tested the spoilerons extensively and believe they are the answer as far as the Hummer is concerned.

The mixer system for the three-axis Hummer caused the greatest problem of all. We wanted to keep the V-tail because it offered good ground clearance, and gave excellent yaw/roll authority with its generous tail/ruddervator areas. After several abandoned ideas, like operating the spoilers with one's feet a-la-Quicksilver, and torque-tube systems, we finally settled on a conversion of the existing system using cable-operated rudder pedals and spoilerons, making the system completely conventional.

First flights in the new Hummer were exciting. The aircraft now handles in a totally different way with very crisp response in all three-axes and

very light stick loads thanks to the use of bronze bearings. In fact the first three-axis conversion was so light in stick movement that we felt we ought to build in a little more 'feel' to the control loads. The aircraft is easily capable of turning on spoilerons alone and you can really tighten things up by using a dab of rudder, but rudder tends to be used only for lining up on finals and handling crosswind landing. Tailwheel steering is also operated by the rudder pedals.

We feel that a higher level of pilot skill is required to fly the Hummer TX, so the aircraft will be available only to microlight pilots with at least 10 hours PI on a stick controlled microlight, current PPLs and current glider pilots who have had some current power experience. The new aircraft is a delight to fly with handling qualities not far removed from, say, a Piper Cub.

We think the design will speak for itself over the coming years in the numbers seen flying and for those of you already flying a Hummer, fear not, because the whole development can be retro-fitted by the factory to existing aircraft. Indeed we feel that pilots would benefit by purchasing the two-axis Hummer first and gaining experience on it (because it's so easy to fly) and then having the aircraft converted. This may also enable people to get in the air that bit earlier because of the lower initial purchase price.

(We hope to have some flying impressions of the new Hummer in the next issue — ed).

Training notes

By Brian Powell, Training Officer

Who Does What and With Which and To Whom?

(with apologies to two lesbians of Khartoum)

Having been a dyed in the wool three-axis man, I viewed my entry into the microlight world with some interest. I'd never tried a weight-shift aircraft and I was to experience a new approach to flying control. What would be my instinctive reaction? Would weight shift come naturally? How long would it take to master the new after being so steeped in the old? Surprisingly it was much easier than I thought.

But how naive I was to think these would be my only problems! It didn't end there — oh, no sir! Suddenly I discovered that we have on the market an aircraft (*Quicksilver MX — ed*) — purporting to be three-axis controlled but with the control functions crossed. The roll control is operated by the 'rudder' and the side-to-side stick movement operates, incredibly, the rudder. It doesn't take much imagination to see that this is a recipe for disaster.

How can we ask the CAA to allow microlight flying hours to count towards the PPL Group A if the poor student has got to unlearn all he's been taught — all he's learnt by instinct on a non-standard control system — before he can start to learn to fly a conventional light aircraft?

Let's set up the scene. Take a swing to the left on a cross-wind landing, for instance. Course opposite rudder . . . where the hell's the rudder Mavis? A boot full of 'rudder' pedal and over goes the wing. Full *left* stick to stop it scraping on the ground and whoops! . . . I've got it wrong again dad! I wonder what they'll charge me for the new undercarriage and wing tips?

How about recovery from a spin? It's no valid excuse to claim that a particular aircraft can't be spun — the student must know the recovery drills in case he flies an aircraft that *will* spin. And what is it? Full opposite rudder . . . er, now let me think . . . oh yes, it's the stick not the pedal you fool. Now what else did the man say? On no account apply opposite aileron? Dammit that means my feet. What a pity I didn't start this caper from 10,000ft, then I might have had time to think it through. Famous last words.

To add to the confusion, the manufacturer is now offering an optional modification kit to convert this aircraft to standard three-axis

control. Imagine two in a club, one modified and the other not, and both looking otherwise identical. Imagine the feelings of the poor punter — 'Oh hell, was it golf mike november they changed, I thought it was golf mike mike . . . will the insurance cover it sir?'

And what about switch labelling? The other day I came across the work of a manufacturer who should be complimented for trying. He'd labelled the fuel cock 'push' and 'pull' but which was open and which was shut? And then we have throttle switch pull to open, throttle switch push to open, twist grips clockwise to open, twist grips anti-clockwise to open. Conventional nose-wheel steering and soap-box-cart nose-wheel steering. Fuel cocks across line to open, fuel cocks in line to open. Ignition switches up for on, ignition switches down for on. The list is endless.

Have we learnt nothing from history? Must we go back to 1905 and learn it all again the hard way? We already have a long list of accidents attributable to pilot error. No one knows how many of these were caused by non-standard or unfamiliar controls. Why make it harder for the pilot? The forthcoming BMAA airworthiness requirements will cover a number of these points anyway, so think again you budding designers and make up your minds to standardise. Otherwise discerning customers will be making your minds up for you.

More Instructors' Courses

The next two instructors' courses will be on 23 August and 13 September. Venues will be Long Marston and Headcorn respectively. Details from the BMAA Secretary.

Flying Instructor Wanted

to establish microlight pilot training school at the Popham Air Centre, nr Winchester, Hants.

Only enthusiasts dedicated to the promotion of recreational flying need apply.

Conventional full-sized aircraft available for initial training.

Apply to Jim or Trevor Espin;
tel 025675 733 or 423.



CONGRATULATIONS TO Bob Calvert who flew the winning combination to this new world altitude microlight record.

It's Official!

16,168' HIGH ON A MAINAIR TRI-FLYER TRIKE and SOLAR WINGS TYPHOON

A WORLD RECORD



- Kits
- Plans
- Ready to Fly
- All Major Wings
- 250cc ● 330cc ● 440cc
- Dual & Single Seaters ●

330cc Full Cockpit Tri-Flyer connected to Flexiform Striker Wing
THE FASTEST COMBINATION IN THE SKY

TRI-FLYERS

STREETS AHEAD OF THE COMPETITION
IN DESIGN, R & D AND PURE PERFORMANCE.



MAINAIR SPORTS TRIKE CENTRE
SHAWCLOUGH, ROCHDALE, LANCs. ENGLAND OL12 6LN

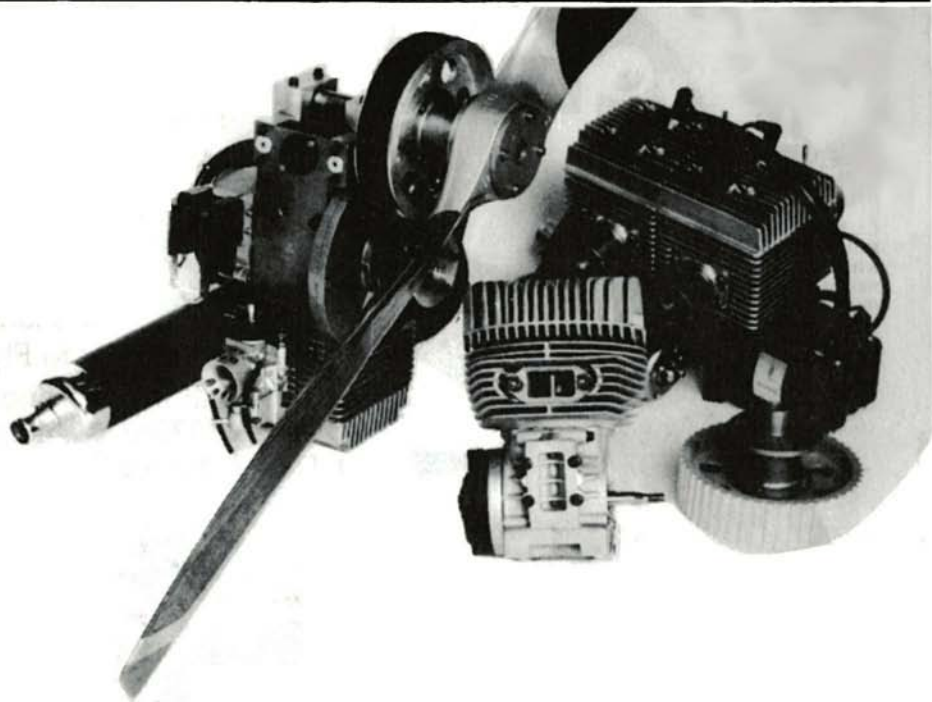
SEND LARGE SAE FOR INFORMATION



52 Crescent Road
Nether Edge, Sheffield S7 1HN
Telephone: Sheffield 585644 (STD 0742)

Sheffield Micro-Light Aircraft

Manufacturers and Suppliers of Aircraft and Accessories.



The best of British engines and reduction drives.

Manufacturers of the Trident Trike. Winner of the Norfolk Air Race (Trike class 8l) and as featured on 'Tomorrow's World'.

Sole agents for Javelin flying suits.

Glass fibre wheel spats £25 per pair.

Glass fibre trike front fairings £75.

Glass fibre Mirage and Scorpion front fairings £85.

Dual trike tuition to BMAA certificates of competence.

Hang gliding tuition to Pilot 3. BHGA registered school. HIA instructors.

North eastern agents for the fabulous Goldwing built and customised to customers own requirements.

Specialised machining facilities available.

Secretary's letter

By Ron Bott

There's none so blind as those that don't want to see and none so deaf as those that don't want to hear. Regulation we try to minimise. We need support to achieve this, the *Supplement to CAP 53* shows how much we have managed in our fight to put microlights on the same level as the rest of general aviation. Please think of the rest of the BMAA membership *before* you fly your unregistered or uninsured microlight. It *can* happen to *you* and it will. If and when it does, don't think that it's only you that looks the fool, *you* are helping to make BMAA the whipping boy of aviation that I was discussing last issue. Fly sensibly, fly safely, live longer, but most of all *think* before you fly. Sympathy has to be earned. There is a lack of it in the CAA Enforcement Branch, unless you deserve it, and this is the department that *can* stop you flying. Ignorance of the law is no excuse. Flying is magic, enjoy it, but fly within your limits and those of your

aircraft. Familiarity *can* breed contempt, don't let it.

The new regulations starting in September contain a lot of the freedom that we were seeking during negotiation; at the outset our job is to protect BMAA members in their microlight activities. We feel that a good deal has been achieved, we hope that you will think so too. If you are not clear on any aspect of the requirements please write to me with your queries not forgetting to enclose a SAE for the reply. I anticipate a lot of microlight flying will be going on during July and August in order to obtain the BMAA Pilot Certificate of Competence. This scheme will continue on after September and all holders will receive a certificate that they can have framed to display, as a symbol of achievement.

BMAA has been admitted to membership of the Central Council of Physical Recreation. This news was received on the 25 June. It is to be hoped that a lot of people will benefit from this as we feel that we have a lot to offer the sporting fraternity of these islands. A BMAA fly-in at Thruxton in May 1983, in aid of Help the Aged has been mooted as also has *The Annual BMAA Rally*. Dates, times and venue later. An award for the safest microlight of the year is under consideration as is also ideas on how to safely

SKYMASTER

Parachute recovery
system



SIMPLE, ADVANCED, FAST, EFFECTIVE

the **ONLY** viable Microlight back up system.

£345.00

⬆ Spherical Compasses. We are sole agents for this superb XC instrument. Universal mount, works in any attitude, 2" diameter, highly visible. Also good in the car. **£7.75**

Thunderbird variometers. High specification, rechargeable, British. **£198.00**

Tired rigging? 'Nicopress' swaging service. Galvanised/stainless wire.

Trike back-up loops. Made to length, 4400 lbs b/strain.

Karabiners. Renewed yours lately? We sell the best alloy Krabs: rated, stamped and screw-gated for **£2.99 each** or **5 for £12.50**.

ADVENTURE SPORTS EQUIPMENT

127 WATH ROAD, MEXBOROUGH, SOUTH YORKS.
Tel (0709) 76979 - (0709) 583235

All prices include VAT
plus P&P

train physically handicapped persons to fly microlights. If you feel you can assist — maybe you have special knowledge on this subject — please let us know.

BMAA Council was pleased to note the action taken by the manufacturers and dealers who are setting up their professional association. This has been required for a long time in order to set standards. The Council are looking forward to cooperating with the new association and wish them every success.

BMAA instructors please note that written exam answer papers are required by the Secretary as proof of students having sat the exam; these are now part of the records that we are keeping. Ensure that your students' answer papers are sent in as soon as possible in order to expedite the issue of the Certificate of Competence. Students must send their BMAA Log Book, together with the legibly completed Task Form B, in order that the PC of C can be attached to the Log Book. Instructors must ensure that the dates of completed tasks coincide both in the Log Book and on the Task Form. Any instructor that has not received a copy of the new syllabus, the written exam paper (June 82 issue) and some of the exam forms is asked to contact the Membership Secretary as quickly as possible.

A problem resolved by the BMAA Council means that all Instructors qualified to receive their rating under the 'grandfather' clause will do so on payment of the instructor course fee, namely £140. This ensures that when they attend the course their fee has already been paid. On the course at Blackpool, two students withdrew at the last moment causing a much greater financial burden to fall on the BMAA resources, already strained, because as you all know, BMAA does not receive any financial assistance at all except membership subscriptions.

Notes for your scrap book

1. If you have a two-seater remember that it is illegal to carry passengers for hire or reward unless you have a Commercial Pilot's Licence. Non-instructional flights or air-experience flights are OK if they are for club or temporary club members, and if the pilot has the club's permission. Such flights can be made on an aircraft loaned to the club.
2. Pilots: check your insurance — it may be invalid if you fly outside daylight flying hours (defined as half-hour before sunrise to half-hour after sunset). With two-seaters there is no requirement in law for passenger insurance.

At Davidstow Airfield in Cornwall recently we were entertained by Ian and Betty Stokes and the local club members. Although the weather was far from perfect we were able to take a trip in the new two-seater Quicksilver MX and were very impressed with its performance. On our next trip down there we expect to see the place in full swing.

The date of the Annual General Meeting at Wolverhampton this year is the 14 November. We have taken both halls within the civic hall complex. This will ensure space enough for those wishing to exhibit. Any manufacturer, dealer, school or club wishing to take space at the AGM is asked to contact the Membership Secretary (at the address in Wales), giving an approximate area required, including height (for king posts). Please enclose a SAE with your letter. Costs will be approx the same as last year. Spaces will be listed, allocated on a first-come-first-served basis, provided that payment has been made in advance. Late exhibitors will only be accepted if space is available. Closing date for applications will be 30 September.

A copy of the draft Constitution together with the minutes of the 1981 AGM will appear in the next issue of *Flightline*.

Dave Thomas, (whose wife Katey gave you all an excuse to purchase the May edition of Mayfair magazine, because it contained 6½ pages all about microlights), was co-opted onto the Council with a special interest in (no, not that!) safety. Dave is well known in the microlight world not only as a good pilot of one of the first Pterodactyls in the UK, but also as a former hardworking Secretary of this association. His phone number is 0252-26182 (home), if you are in the Aldershot area.

It was interesting to see that the magazine of the Popular Flying Association is carrying more and more information about microlights. Steve Hunt's Pathfinder has a good write-up in this latest edition. We are hopeful that we can live peacefully with our PFA neighbours whose vice-chairman Mr F I V Walker was grateful, because of our late application, to be able to exclude us from the Cranfield Rally, where they have a microlight section, on the grounds that, 'There is no space left!'. BMAA Council feels that all people interested in aviation should help each other. We shall ensure that they are invited to attend any rally or fly-in that we organise, as we feel that our members are also keen to see the aircraft that the PFA so painstakingly produce. Come on Mr Walker, truce!

The noise tests carried out on the Isle of Wight with several types of microlight came out very much in our favour. The tests, carried out for the Department of Trade by the consultancy Atkins

will be the subject of an article by the Technical Committee of BMAA. We must still strive to decrease the noise problem. Come on silencer manufacturers, butterfly syndrome please — silence is golden, (could be the colour of a good silencer).

We still require the names of some voluntary Accident Investigation Officers especially out there in the remote regions. If you feel that you can help by simply taking photos or talking to witnesses we shall be glad to hear from you. Remember, in an accident our job is *not* to place blame. It is simply to collate facts in order that the real reasons for an accident are discovered. In doing so we may discover how to *prevent* any similar accident. *Prevention* can save lives, which is why we ask you to report even the most insignificant accident, simply by writing the facts down and forwarding them to us. We have to be able to get in touch with you in case of questionable points, so just give us a telephone number as a contact. Please help to *prevent* accidents.

How would you feel about diving from the top board into an empty swimming pool? This could have the same effect as a crash from a low height without wearing a crash helmet. Think about it, you wouldn't do it would you?

There have been a number of personnel changes in the BMAA organisation recently. We now have two Accident Investigation Officers whose job it is to investigate all fatal accidents

and the more serious non-fatal accidents. Bill Anderson, who is the AIO for Scotland, can be reached on 0241 75546, while his counterpart for England and Wales is John Hunter on 07072 71027 (home).

On the training side, Ian Stokes of South West Air Sports has taken over as Training Committee Chairman. Joining him on the committee is Nick Jerromes of Long Marston Aviation Co. To all four new officials, our thanks in advance for their time and energy.

Finally, all the best dressed wives and sweethearts of microlight pilots (*you mean they're all men? Curses! — ed*) are wearing the new daringly revealing BMAA T-shirts and sweat shirts. T-shirts are £3.60 including postage and come in red, white or blue. Sizes are 34, 36, 38, 41, or 42 in. When ordering state your first, second and third colour choice, but note that the three largest sizes come in white only. Sweat shirts are £7.25 including postage (extra large £7.65) and are available in navy blue, grey or red if you want the small (34 in) size. Again when ordering please list your preference. With medium, large and extra large you can have any colour you like as long as it's red!

Happy landings.

Ron Bott

20 Church Hill, Ironbridge
Telford, Shropshire TF8 7PZ

(Membership Secretary and sales: Ty Dysynni,
Abergynolwyn, Tywyn, Gwynedd LL36 9YR).

NOTICE TO PILOTS, OWNERS AND INSTRUCTORS

Registration

By law all micro lights must be registered and must show their registration marks. It isn't difficult or expensive — the charge is only £12 — so please support BMAA by registering your aircraft *now*.

Details of how to register are available from **CAA Library, 45-49 Kingsway, London WC2B 6TE** (to whom the fee is payable) or from the BMAA Secretary.

Licensing

From 1 September you will need a licence to fly a microlight, but anyone who already has a BMAA Certificate of Competence can get one now by sending their application form, Certificate and Log Book, together with a countersigned CAA medical certificate and once-and-for-all fee of £45 to **Flight Crew Licensing, CAA, Aviation House, 129 Kingsway, London WC2B 6NN**. BMAA Certificate of Competence Holders are recommended to do this *before 1 September* — otherwise from that date you will either be flying illegally (and without the support of the BMAA) or have to take another flying test. If you don't yet hold a Certificate of Competence, you can get one by sending your completed Task Form B, together with your Log Book and completed Exam Papers, to the BMAA Secretary.

Instructors

From 1 September, it will be an offence to give instruction if you do not hold a licence and CAA/BMAA Instructor Rating. Therefore it is in your interests to get onto a BMAA instructor's course if you wish to teach. Details from Training Officer c/o the BMAA Secretary.

MICROLIGHT RALLY

at the Isle of Man's Jurby Airfield,
9-15 August, culminating in the annual
RAF Air Day on 15 August.

**Full flying programme, including
navigation, handling and flight
competitions for all classes of aircraft.**

Small entry fee

Jurby is a splendid site for a microlight rally — open skies up to 3000ft over the whole northern part of the island and subject only to normal Air Law, Notams and any special rules laid down by IoM CAA. The airfield has a war-time runway, control tower and hangar facilities and is the home of the Manx Eagle Club.

Accommodation can be arranged through the club and there are facilities for spouses and families to enjoy other activities, if required.

Transport: all participants are recommended to bring a car or hire locally (approx £13/day for a Mini).

Sailings from Heysham (Sealink) or Liverpool, Ardrossan, Belfast, Dublin (IoM Steam Packet Co.)

Note : it is illegal to fly by microlight to the IoM.

Organised by



MANX EAGLE CLUB

Rally Secretary,
Peter Lloyd-Davies,
'Gollane', Jurby Road
Ramsey, Isle of Man
phone 0624 812529 (office)
or
0624 812170 (home)

Contact

Stevenage, Hertfordshire

Brook International Aviation is organising a fly-in for microlights on 31 July/1 August at Knebworth House, which is alongside the A1 at Stevenage.

The historic house opens at 11.30am and the park half an hour earlier. Microlights are welcome from 10am onwards but fliers are asked to note the landing area, which will be clearly marked, and not to overfly the surrounding houses at low altitude. There will, the organiser promises, be a few surprises during the day!

Camping and caravans are welcome and a limited supply of accommodation is available. All enquiries to Martin Brook at Brook House, Langley, near Hitchin, Herts SG4 7PQ (tel 0438 3276/725875).

The same company is promising a weekend in the Port of London over the August Bank Holiday weekend. There are few details as yet, but it is understood to be a static rather than a flying occasion.

Swansea Microlight Club

By Tony Fletcher

Swansea Microlight Club is in the process of being formed, based on Swansea Airport. It will be one of the few clubs based at a commercial airfield and is being welcomed with open arms by the authorities there.

The airfield has full daytime ATC facilities and is situated at the Swansea end of the Gower peninsula, with the sea only two miles away north and south. Thus we have some of the most spectacular scenic flying with minimal navigational skills required!

R/T will possibly be a requirement in future and I am using it already — Swansea ATC frequency is 119.7. At present flying is only normally allowed during hours of ATC operation (ends 5.30pm) but I have a permit to operate up to 9.00pm and it is likely that we will be able to negotiate a similar arrangement for other club members.

On 11–12 September we will be hosting Gower Microlight Fly-In, when visitors will be able to take part in our competitions and/or enjoy our beautiful scenery free-flying. Arrangements have already been made with ATC to set up microlight corridors in and out of the ATZ — the one to be used on a particular day would depend

Clubs! Contact is your space. Make the most of it by:

- 1 Appointing a club public relations officer,
- 2 Telling *Flightline* who the person is and where he/she can be contacted, (home and work numbers please),
- 3 Helping him/her get your news in on time. Next deadline is always printed on the *Contents* page.

of course on which runway the other traffic was using. Flying fees will be a wallet-shattering £1 per day!

All comers are welcome. Camping is available ½ mile from the airfield and the usual run of bed-and-breakfast and hotels is within easy reach. An information pack is now available from me at Rainbow's End, 27 Portia Terrace, Mount Pleasant, Swansea SA1 6XW (tel Swansea 49825 home, 468500 work); please enclose a SAE.

Wealden Microlight Club

Wealden Microlight Club is the new name for Southern Microlight Flying Club. For about five months on every second Thursday, microlight enthusiasts from the Sevenoaks district have been meeting for a noddle and natter at the King's Head, Bessells Green, and during the last meeting the regular attenders decided to formalise a committee along the lines recommended by the BMAA.

The club held its first fly-in a few weeks ago and can now boast about 20 members, including two with PPLs and two others who are retired commercial pilots. Machinery owned by members includes three trikes, three Eagles and a Scorpion. A small flying site has been secured (for members' use only) and a quarterly news sheet is proposed. New members are very welcome; contact chairman Andrew Gardner at PO Box 55, Ide Hill, nr Sevenoaks, Kent.

North West Microlight Aircraft Club

North West Microlight Aircraft Club meets on the first Wednesday of each month at the Sale Hotel, Marsland Road, Sale, Manchester, at 8.00pm. New members are welcome at any meeting; alternatively contact Phill Wiles on 061-962 8590.

Quest Air

Quest Air is now operating for tuition, sales and service of both three-axis and weight-shift microlights. It offers full workshop facilities for airframes and engines, plus sail repairs. Club and hangar facilities will be available shortly. Quest Air is at Blandford, Dorset DT11 9NE (tel 0258 55664).

Popham Flying Centre

By Jim Espin

This year's Popham microlight flying and camping weekend will be held on 28-30 August and will include a barbeque on Saturday night. Popham air centre is on the A30 one mile west of the M3 and camping is available on the airfield from Friday to Monday. Water is now available on the field.

All owners of microlight aircraft who bring flying machines to Popham will be given complementary membership of the RFC; others may join at £1 per day. All BMAA members who produce a current BMAA membership card will be charged RFC membership fees *but that money will go to the BMAA Fighting Fund*. A draw will be organised, the proceeds of which will also go to the fund. Prizes for the draw are invited — one of them will be a free flight in an RFC aeroplane.

The RFC Popham Trophy will be presented to the best microlight to fly at Popham during the weekend, and in addition there will be a prize for the most adventurous flight into the event.

All responsible microlight pilots are welcome but please, *look up the rules*, join overhead, look at the signals square and keep a good look out for faster aircraft.

Enquiries to Recreational Flying Centre (Popham), Popham Air Centre, nr Winchester, Hants SO21 3HB (tel Dummer 733).

Manx Eagle Club

By Peter Lloyd-Davies

The Manx Eagle Club is pressing ahead with preparations for its rally, which has been fixed for the week of 9-15 August. Most of the competitions, which will include a parachute bombing, cross-countries and spot landings, will be held on the weekend of 14-15 August. In fact the 15th will be a very busy day as the RAF display, including the Red Arrows and the Blue Devils parachute team, is scheduled for the same day. Also planned is a mock dog-fight between a Spitfire and a ME109. See the advertisement opposite for more details.

Incidentally, don't be put off by the fact that

Manx law doesn't allow microlights to fly across from the mainland. This is not because the IoM is anti-microlight — in fact we probably have freer flying here than at many clubs on the mainland — but because of the Prevention of Terrorism Act, which restricts landings on the island. The legislation is not aimed specifically at microlights and applies to any aircraft.

Other club news. We are hoping to appoint Dennis Reed as our CFI soon. Dennis is ex-RAF and has over 35 years' aviation experience, starting as an engine man at Blackburn Aircraft. He is now a professional photographer specialising in aerial work and holds a PPL. To date he has logged over 30hr with Eagles.

Long Marston

Micro-Expo '82 will be the next microlight air festival at Long Marston, 28 August to 2 September. This event includes the heats for the London-Paris race, plus air shows, displays, show stands and evening entertainment for all the family. Hope to see you there! Details from Long Marston Aviation Co, The Control Tower, Long Marston & Airports Centre, Stratford-on-Avon (tel 0789 295050).

Calendar

9-15 August: Microlight Aircraft Rally at Jurby Airfield, Isle of Man. Details on 0624 812529 office or 0624 812170 home.

28-30 August: Microlight Fly-in at Popham Air Centre, near Winchester, Hants; camping available (tel 025675 733).

28 August-2 September: Micro-Expo '82 at Long Marston Airfield, including heats for London-Paris race.

3-5 September: Great Microlight Race, from London-Paris (formerly Blackpool-Paris). Details on 0789 295050.

11-12 September: Swansea Microlight Club fly-in. Details in *Contact*.

11-12 September: Leicestershire Microlight Aircraft Club rally. Details from John Wincott on 0533 863310.

14 November: BMAA Annual General Meeting at Civic Hall, Wolverhampton, West Midlands.

19 November: BMAA Annual General Meeting at Civic Hall, Wolverhampton, West Midlands.

31 July — 1 August: Microlight fly-in at Knebworth House, Stevenage, Herts. Details in *Contact*.

5-12 September: Farnborough Show at RAE Farnborough, Hants (tel SBAC 01-839 3231).

Easter 1983: Microlight Symposium at Bristol University, sponsored by RAS and BMAA. Dates and details later.

May 1983: Annual BMAA Rally. Dates and details later.

Small ads

Small ads are free to BMAA members, £3 for business organisations; maximum 30 words in either case. Please make cheques payable to BMAA and send with ad wording to: Flight Line, Oak Cottage, The Green, Wenington, near Lancaster LA2 8NW.

Aircraft: for Sale/Wanted/Exchange

CHARGUS T250 SKYTRIKE. Immaculate condition. Very low air time. CAA registered. Fitted with all extras. Winter ASI and aircraft altimeter mounted in console. Complete with professionally built sprung road trailer with all lights etc. £875 cash. No offers. First to see will buy. Owner going back to hang gliding. Tel Ian Hayes Basingstoke 51332 or evenings 62536. (7/2)

TRIPACER 250cc Robin engine with Mega 2 wing, good condition. £1600 ono. Tel Witham 517724 any time. (7/3)

RAINBOW EAGLE £2200 ono. New Robin fitted and spare Chrysler twin included. Demonstration can be arranged. Tel 0245 420721. (7/4)

STRIKER POWER WING MEDIUM Mainair 330 trike. 20hr flying time, £2000 or nearest offer. Tel Kendal 27803. (7/7)

FOR SALE Registered (G-MBFT) Reinforced. Ready to fly, 330cc Super Trike/Lightning 195 combination, climb rate 1000ft/min, top speed 55mph. Electronic ignition, twin carbs, 12ply prop, hand and foot throttle, safety cable fully debugged. £1955. Tel David Watts, Nutley 2977 after 5pm. Test flight and tuition if required. (7/8)

FOR SALE G-MBPY Ultra Sports 330cc twin trike/medium Typhoon combo 15 flying hours only, includes B-Bar: mint condition, only £1850. R. Parry, 1 Olivers Close, Cherhill, nr. Calne, Wilts. Tel Calne (0249) 814210. (7/11)

FOR SALE 160cc Tripacer trike with 175 Demon, both in excellent condition. A perfect thermalling combination. Only £1000 complete ready to fly. Many spares. Tel Poyning (079 156) 236 or evenings Brighton 774770. (7/12)

EAGLE not flown since overhaul at importers. C/W original Chrysler engines just overhauled. Also with new Huntair Panther 250cc unit 3hr only, spares and test stand. £1750 the whole or will split £1350 and £400 incl VAT. Tel Oban (0631) 62755. (7/13)

WANTED Trike preferably Hiway, anything considered around £500 or exchange Honda 400x4 R regd. Cash adj either way. Tel Dave on Ulverston 57553 after 5.30. (7/15)

FOR SALE Brand new phase II Lightning, test flown only, very fast, latest machine from Southdown Sailwings Ltd. Ideal power glider. List price £914, absolute give-away £795. Contact Tony: 061-775 4422. (7/16)

HIWAY 160 SKYTRIKE mint condition, good runner £400 ono. Typhoon B-bar, offers; 5 gallon alloy petrol tank suitable Hiway Skytrike type, offers. Tel Martin (0253) 739088 evenings. (7/17)

HAS ANYONE a 3-axis powerful reliable microlight he will sell me and teach me to fly on my farm. Second hand one OK if price is right. Ivydene Farm, Dock Road, Chatteris, Cambs. (7/18)

CHARGUS TRIKE demon wing, Konig engine, £1300. Would split. Tel. Swaffham 21385 or Tittleshall 250 evenings. (7/19)

TRIKE CHARGUS T250 and Vortex wing, 17 months old, used only 8 times, immaculate condition, £1300 Ring Malmesbury 3258 (home) Bradenstoke 890381 x589 (work). (7/20)

MANTA FLEDGE — Chargus T250. Conversion complete. Wing brown and yellow. Robin 250 motor, 5 gallon fuel tank, rev counter. Superb performance, flown 30hr. £1500. Stroud 5953. (7/22)

TRIFLYER 250 Trike by Mainair, well maintained and sorted with purpose-built trailer, £950 ono. Ring Dave Atkinson: evenings Blackburn 74638. (7/24)

TYPHOON 166 (med) and 250cc trike. 15hr airtime. Debugged and trimmed out. £1250 ono, phone Paul Kavanagh 070682 6659 after 6.30pm (Lancashire). (7/25)

ULTRASPORTS TRIPACER 250cc excellent condition, low airtime, extras, registered £650. Tel 0484 716069. (7/26)

2MAN CHARGUS TITAN for sale — low airtime, new Soleair drive gives quiet and efficient running. £2500 which includes tuition to BMAA certificate of competence by BMAA instructor. Phone 0983 78488. (7/27)

GOLDWING demonstrator for sale. Many extras and instruments including navigation lights and battery. This professionally built machine with low hours is a snip at £3995 plus VAT. Phone Southwest Airports 056686 514. (7/28)

330 TWIN CYLINDER TRIKE/LIGHTNING 32bhp through 58" dia prop. 1000fpm climb. Vmax 60mph. Electronic ignition. Kick start. Alloy wheels. S/steel welded joints. Unbeatable for safety and performance. As new. A bargain at £1950. Saving £500 on list price. Tuition available. (03745) 53227. (7/30)

CATTO CA15 rigid wing, Dacron covered, complete with cover. Needs engine. Will take Valmet, Solo, Hiro, Chrysler or Skyhook power systems. £650. Eurowing, 03552 64698. (7/31)

G-MBCB SOUTHDOWN LIGHTNING, 250cc engine, ASI and vario, full service record, excellent condition. Going 2-seat, hence £1600. Tel Compton (070131) 263 any time (Sussex). (7/32)

FOR SALE MIRAGE MKII G-MBBK Kawasaki engine. 40hr — colours orange black. Excellent condition, tuition available from BMAA instructors. Price £2650. Tel Nottingham 44194 day, 417221 evenings. (7/33)

QUICKSILVER MX — factory 2-seater — long range tanks — low hours — £650 below list — 0889 590964 (Staffs). (7/34)

GOLDWING — latest undercarriage — 15hr — 80mph microlight as new. £3650 plus VAT. 0889 590964 (Staffs). (7/35)

SCORPION SOLO Reg G-MBZZ, custom sail, basic instruments, engine run-in, under 5hr air time £2750. Also aluminium-skinned trailer, custom built for Scorpion, weather and vandal proof. Allows 15min rig/derig. £600. Phone 01-540 3215 evenings. (7/37)

250cc FUJI-ROBIN powered Hornet trike with fairing — as new, less than 2hr, plus Demon 175 wing — genuine reason for sale. Tel Barnsley (0226) 752604. (7/39)

FOR SALE TWO DEMONSTRATION SCORPIONS. One with electric start complete with trailer. Please contact Long Marston Aviation Co Ltd, The Control Tower, Long Marston & Airports Centre, Stratford on Avon. (7/41)

HUNTAIR PATHFINDER — run-in only, hangar stored, as new, elec start, ASI, alt, tach. Phone 021-550 7331 day, 0562 884858 evenings. (7/43)

EXCHANGE my Daimler Sovereign (pre-XJ6) in very good condition for anything that flies with engine. P Gannon 41 Oatlands Road, Enfield (tel 01-805 2444). (7/45)

HIWAY SKYTRIKE, engine only 8hr, Chargus wing, spare 225 Kyritsu engine, £1100ono. tel 0440 61329, John Cook (Suffolk). (7/46)

CONCOURS D'ELEGANCE winning trike for sale. Derek Tailby-Bates' Skytrike/Sealander Power Wing (see *Flightline* May/June) is registered and has only 15hr airtime. £2000 ono. Tel 0533 772286 (Leicestershire). (7/48)

ULTRASPORTS TRIPACER 250cc plus large Typhoon wing, complete with all gear. 10hr only, £1300 ono. Ring Lionel Mills on 0592 890408. (7/49)

Miscellaneous

FLIGHT LINE back issues are available at 50p per copy plus postage and large envelope. Postage rates are: 1 copy 16p, 2 copies 20p. Also **BMAA PILOTS' LOG BOOKS** at 80p each, enclose SAE please. Always quote your BMAA membership no. and send to: Secretary, Ty Dysynni, Abergynolwyn, Tywyn, Gwynedd LL36 9YR.

MICROLIGHT COURSES at Bailey's Yorkshire hang gliding school and microlight centre. Dual 440cc and 250cc trikes. Courses 7 days a week. £7 per hour, £35 per day. Tel 0532 662518 at 8.30-9.00am. (7/11)

HOME BUILD SUPPLIES: Polyurethanes Polystyrenes (extruded and expanded) structural foams in various densities. Profiling/Slitting capacity up to 2750mm x 1200mm x 60mm. Glass and Kevlar fibres. Reinforcing and covering fabrics. Thermal Profiles Ltd. 0592 774803. (7/15)

WINDSOCKS. Superbly made in orange nylon of 15ft telescopic, guyed, anodised aluminium mast. Send cheque for £30 to Southern Microlight Supplies, PO Box 55, Ide Hill, Sevenoaks, Kent. (Trade enquiries welcome). (7/19)

REGISTRATION marking sets to CAA specification. Self stick Terylene £12. Send SAE for form to select colour options for your plane, to Southern Microlight Supplies, PO Box 55, Ide Hill, Sevenoaks, Kent. (Trade enquiries welcome). (7/10)

PROPELLOR MAKING FOR THE AMATEUR — this book tells it all in simple language. Design, drawing, shaping, balancing, repairing, plus experimental. Revised; £3. Eric Clutton, 92 Newlands Street, Stoke-on-Trent ST4 2RF. (7/14)

PROPELLOR, three-bladed nylon type. Aluminium hub, never been used. Phone Scotby (022872) 502. (7/23)

SOUTHWEST AIRSPORTS have BMAA registered instructors waiting to coach you through all stages of microlight flying from ab initio to PPL schedule D. For details of tuition and aircraft sales phone Ian Stokes on 056686 514. (7/29)

HELPI Novice BMAA member, considering buying Eagle, wishes to meet other flyers. North/West London area. Ring David Glover on 01-998 2435 evenings. (7/36)

PROPELLORS — £35. Any size/pitch supplied ready for you to varnish and balance. Only £35 plus delivery — tel Ken Fern on Kidsgrove 73140. (7/38)

MICROLIGHT TRAILERS. We manufacture all types of microlight trailers including those for Hummer, Mirage and Pathfinder. Quotations within 48hr. Contact Long Marston Aviation Co Ltd, The Control Tower, Long Marston & Airports Centre, Stratford on Avon (tel 0789 295050). (7/40)

WHY NOT JOIN the microlight airforce and fly the latest microlights currently available? For further details contact Squadron HQ, Long Marston Aviation Co Ltd, The Control Tower, Long Marston & Airports Centre, Stratford on Avon. (tel 0789 295050). (7/42)

INSURANCE of all classes arranged with BIA companies and Lloyds for security. For personal service contact Daved Sanders, Daved Sanders Associates, The Old Post House, Bewdley, Worcs DY12 2AE (tel Bewdley 401345). (7/44)

INSTRUCTOR REQUIRED full- or part-time, summer season considered. Three-axis experience preferred. Apply Flying Machines Ltd, Building 7, Blackpool Airport (tel 0253 45440). (7/47)

The Cost of Going Up is Coming Down

*Whether you want to try, fly or buy be sure of
getting the best hand with the Breen
Microlight Flying Club.*

With the Ace of Clubs.

Before we deal you will want to know the stakes

We give you every opportunity with Saturday afternoon information seminars including demonstrations of the Amazing Mirage, the Extraordinary Eagle and culminating with a familiarisation flight in our Revolutionary Puma two-seat Microlight Aircraft.

And if watching and listening are not enough there are instructional courses which give the unique experience of piloting a microlight aircraft - whatever your previous experience.

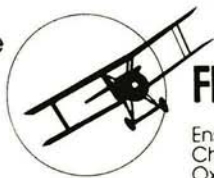
Once a member of the club, tuition is provided by Europe's most experienced Microlight Instructors up to the new PPL Group 'D' standard.

So, at last, a worthwhile club operating 7 days a week from an airfield complex offering the superb facilities of a members room, coffee bar, hangarage, lecture room and accessory shop.

All this is backed-up with Breen Aviations unsurpassed sales and service operation.

And to trump it all, aircraft are available for hire to club members.

With the cards on the table, we feel sure you will pick the Ace of Clubs.



Breen Microlight Flying Club

Enstone Airfield,
Church Enstone,
Oxfordshire.
Tel. Enstone (060872) 413 / 4.



WHERE THE CHOICE IS YOURS not the Salesmans

SKYTRIKE Simple, Cheap fun flying

EAGLE The most docile and forgiving
of all microlights

MIRAGE State of the art Microlight technology,
goes places fast

QUICKSILVER M.X. Three axis control
utilising spoilerons
for 'dive' brakes

HUMMER Easy to fly conventional
control complete with
instrumentation

WE HAVE THE POWER TO HELP YOU

- **AT THE WINDSPORTS CENTRE** We offer a 400 acre Aerodrome complex for the exclusive use of Microlight Aircraft. No conventional Aircraft to get in the way.
- **AT THE WINDSPORTS CENTRE** Our aim is to help you select the microlight best suited to your needs. Choose from the largest range of demonstrators anywhere in Europe.
- **AT THE WINDSPORTS CENTRE** We teach right through to the new Group D.P.P.L. and our instructors are B.M.A.A. qualified.
- **AT THE WINDSPORTS CENTRE** Our one day courses are part of the B.M.A.A. syllabus and are arranged to guide you through the confusing world of Microlight Aviation. And we give valuable airtime in one of our two seat aircraft just to convince you.
- **AT THE WINDSPORTS CENTRE** Some of our other facilities include a camping and caravan park, accessory shop, hangerage, repair and sailmaking facility and of course, club benefits
- **AT THE WINDSPORTS CENTRE** You can overfly the beauty of the North York Moors, one of the most uncluttered areas in the whole country.



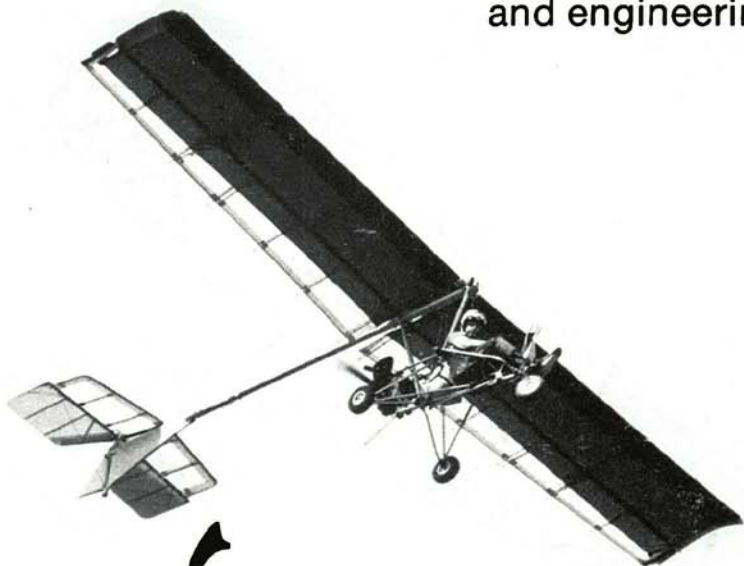
THE CENTRE OF MICROLIGHT AVIATION

Wombledon Airfield
Kirbymoorside.
Tel: 0751 32356



A NEW DIMENSION IN FLYING

The real pilot's microlight,
setting new standards
in quality of design
and engineering



HUNTAIR
PATHFINDER

Huntair Limited
Truleigh Sands, Truleigh Manor Farm,
Edburton, Henfield, West Sussex BN5 9LL
Telephone: Poynings (079 156) 599