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Hello! Happy New Year to you all. I’m your new editor, Nick Regan.

I see FLIGHT LINE as being your magazine, each and every one of you. It’s your voice to inform and interest your fellow aviators and to influence the direction taken by the B.M.A.A. It will be as good as you make it, with my help and guidance. I hope you’ll agree that there’s been an improvement in the quality of presentation — I’m hoping for a similar improvement in the content of the magazine.

I need your ideas which I can hopefully organise into fresh copy for the magazine. Technical articles on any aspect of microlight aviation are needed to help establish FLIGHT LINE as a respected journal in the world of aviation. Flight Reports can make us laugh, while helping us all in the acquiring of experience. I intend to publish independent, factual ‘Road Tests’ of various microlight aircraft as the year progresses. I need reporters for various projects I have in mind. I need photographers to cover visually what’s going on in their areas (sharp, black and white photos only, please).

FLIGHT LINE will be the way for you to communicate with everyone in the B.M.A.A. You’ll enjoy seeing your name in print and I’ll be pleased to help you put it there. Give me a call!

Your thanks should go to Dave Thomas and Joan Hunt for the incredible amount of work they undertook, in difficult circumstances, to bring about the first year of FLIGHT LINE in 1980. Thank you, Joan and Dave.

I’ll leave you with a thought that’s been bothering me recently. There’s an attitude appearing amongst certain manufacturers and retailers of microlight paraphernalia that goes something like this, “It’s part of an aircraft, so you’ll have to pay aircraft prices”. This is not what the microlight movement is about. The whole point of it is to provide inexpensive sport flying. I hope you will provide the pressure, through FLIGHT LINE, to help make the market more competitive and to stop this unnecessary ‘aircraft prices’ syndrome from leading us away from microlights, to expensive and hidebound light aviation, from which so many of you have escaped.

N.R.

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SURREY
What is a Microlight?

When I first dreamed of powering a foot-launch hang glider with a small motor which had ample power to carry me and the glider aloft, I could visualise a still summer’s evening in a flat grass field; after a few steps, the machine would lift me away effortlessly to cruise around and play with a few fluffy white clouds. A nice dream — but the reality was different. The powered gliders were somewhere between dangerous and impossible to launch from flat ground! Once launched, however, these aircraft were a joy to fly and they were clearly of little risk to other people; weights were low, typically 150 kg. all-up (even allowing 100 kg. for pilot and fuel), and wing areas high (18.1 m.² or 195 ft.²) and the resulting flying speeds were low; kinetic energy, a measure of the destructive power or potential danger to the public of these aircraft, was low.

The foot-launched powered glider was quickly superseded by a whole range of aircraft: Eagles, Pterodactyls and, in Britain more than anywhere else, trikes. When I built the first British Skytrikes I never thought they would be made in such diverse ways, by so many people. Early trike combinations were low-powered but still a manageable light 66 kg./18.1 m.² (143 lb./195 ft.²). Later 250 c.c. trikes with the latest gliders could now be 88 kg./14.9 m.² (195 lb./160 ft.²). A two-man trike combination could be about 117 kg. (258 lb.) but with a wing area of about 19 m.²; this aircraft with one pilot would have a lower typical kinetic energy and destructive power than the 250 c.c. trike.

It is clear that there is no fixed connection between aircraft empty weight and potential destructive power and hence danger to pilots and the general public in a crash. However, at the inaugural meeting of the B.M.A.A. in 1979, the scope of the Association was extended to cover all aircraft under 100 kg. empty weight for single-seaters, and the Committee subsequently proposed a minimum wing area for microlights of 10 m.². We may have written into our proposals a dangerous trap!

There is now a greater movement towards more complex aircraft, not only my own Pathfinder, but also the Pterodactyls and Hummers from the U.S.A. and Skyriders from Australia, all being built or in use in Britain. The lessons with these aircraft have already been learned in Australia where the rules led to the development of workmanlike aircraft rather than adaptions to hang gliders. Australian rules state the maximum all-up weight of the aircraft to be 400 lb. (181 kg.) with a maximum wing loading of 4 lb./ft.² (Equivalent: 9.3 m² (100 ft.²) at 400 lb. AUW.) This gives a choice of aircraft weight but a converse limit on pilot weight. One Australian manufacturer, Col. Winton, produced a lovely little aeroplane called the Grasshopper — moderate wing area (well over 100 ft.²) and enough power, but the weight was 120-125 kg. leaving little margin for pilot and fuel. To improve his position with the authorities, he redesigned the craft; now the Cricket, it is smaller and the pilot no longer sits in a comfortable enclosed seat with the engine behind him, but in an open seat with the engine right in front. The craft is lighter and may be better in some ways, but it definitely flies and stalls faster in the cause of obeying arbitrary requirements; it also has a much higher kinetic energy and destructive power.

In the light of experience, I personally would propose a different set of parameters for an operational agreement with the authorities; slightly more complex, but allowing sensible design freedoms, and not leading to overfast, structurally weak microlights in Britain. Other B.M.A.A. members have also indicated that they are unhappy with a 100 kg. maximum without regard to other factors. Clearly there must be some maximum weight and minimum wing area because of other considerations, but I believe the shaded area in the graph may represent a more workable operational definition for the construction constraints of microlight aircraft.

![Graph showing aircraft empty weight against wing area]

**S.H.**

**Legend to Graph**

- A Super Scorpion and Soarmaster-type unit
- B Small trike combination
- C Pterodactyl
- D Large trike combination
- E Two-man trike combination (one pilot only)
- F Winton Grasshopper (very approximate figures)
- G Skyrider (very app. figs.)
- H Winton Cricket (100 kg. empty weight, 10 m² wing area (very app. fig.)
- J Monnet Self-Launch Sailplane (very app. fig.)
- K Quickie Canard (very app. fig.)

Pilot and fuel assumed to be 100 kg.
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SHEFFIELD POWER

Dear Sir,

Anticipating the inevitable increase in powered hang gliding, the Sheffield Hang Gliding Club has for some time been negotiating take-off and landing areas for motorised hang gliders. Recent irresponsible buzzing of prime sites by visiting pilots has forced the club to formulate and publicise a two-part sites policy for powered hang gliding.

Firstly, the S.H.G.C. does not allow the taking-off or landing of motorised gliders at Bradwell, Stanage, or the Mam Tor area. The use of power at these sites is putting existing agreements at risk, and the club will use all means at its disposal to dissuade pilots from flying motorised hang gliders in these areas. This should not be taken as an attempt to restrict the development of powered gliding, but rather as a concession to local landowners, agents and conservationists who permit the use of their land for conventional hang gliding. (Why the hell are power pilots using a hang gliding site anyway — Ed.)

Secondly, and more constructively, the club has to date obtained permission to take-off and land motorised hang gliders on six other sites in the Sheffield area. Visiting pilots are requested to contact responsible club members before considering flying powered — for contacts see June 1980 issue of WINGS! or ring the Secretary, Richard Kulig, on Sheffield (0742) 53204.

Richard Kulig
Secretary, Sheffield Hang Gliding Club Ltd.

CONVERSION

Dear Sir,

Messrs. Laundy and Birbeck’s contribution in ‘Flight Line’ (Nov./Dec.) deserves some sort of response if only to stop other conversion thirsts being put off this very attractive sport.

Mike Laundy knows he should not have attempted to fly the machine. He also knows that had he gone to any flying or gliding club expecting to fly a new type of machine without first being properly checked out, he would have been refused. There is also a requirement to produce some evidence, i.e. a licence or certificate together with a log book showing the pilot’s competence to fly. Whatever possessed him to think he could fly one of these machines without any previous experience completely eludes me and the owner was very lucky not to have finished up with a bent Trike or worse.

As a private pilot and aeroplane owner I was thrilled to see microlights and other aircraft all operating together at Popham last year. The Skytrike impressed me as being simple, cheap and obviously a popular choice. It also appeared to be easy to transport, rig or derrig, as well as being inherently easier to fly because of the simple control system. I subsequently became a member of a group owning a Trike and undertook a course of training to learn how to fly it as a condition of purchase. I encountered some of the problems recalled by Mike Laundy but the situation was under much stricter control and no incidents occurred involving myself though some of the ‘conventionally’ trained pilots on the course appeared to be having difficulty mainly with directional control. I must add here that I did have a go on a hang glider a long time ago prior to this but never got beyond the beginner’s slope. I found the machine very pitch sensitive, but no more so than a light aircraft (Nipper or Turbulent) and despite the low speeds, it was quite easy to stabilise the climb using the ASI between 20-25 m.p.h. The lack of a rudder meant acquiring a new roll and turn co-ordination and I must admit this ability to turn was only obtained when a bit of height had been gained and the fear of losing control in the turn was diminished. With the ASI mounted on a stalk in front of the pilot, I found no problem in fixing a datum on the horizon although later on I was not even conscious of thinking about it. I also found that when accelerating beyond 30 m.p.h. the nose of the Trike tended to pitch up even with the control bar fully back in my stomach which was quite reassuring, as was the ability of the Trike to fly ‘hands-off’. The nosewheel steering operates with the same simplicity as the rest of the controls and I see no reason why it should be changed.

Whilst at the moment the Trike seems to be very weather limited, it is a joy to fly in the right weather conditions. I hope eventually to progress to soaring conventional hang gliders when I have mastered the ‘effects of controls’ on the Trike.

I do think that a B.M.A.A. pilot certificate and also a log book are desirable as evidence of competence. With the advent of two seaters and the mobility of pupils between schools, this will become necessary anyway.

David Shrimpton

RUBBISH

Dear Sir,

I would like to say that generally a lot of rubbish is often talked about microlights, with people rating them purely on speed and powered climb. I have flown a variety of machines, and enjoyed them all, and believe it all depends upon what type of flying you want to do. If you are not flying A to B, what do you want speed for? Maybe you just want power to get you in the air so you can go off grappling with thermals? Or, you might want to be capable of flying low and slow, which would require a stable machine with superior stall characteristics. One needs to assess one’s requirements before purchasing, remembering these are sport aircraft not means of transport, let’s leave that to Cessnas and Boeings. Other considerations are storage space, the size of your machine, rigging time, reliability, availability of spares and price. Let’s get things into perspective and stop trying to re-invent the aeroplane!

P. Bennett
My total light aircraft experience amounts to 20 minutes in a Cessna 150 about two years ago, and a lot of radio control model flying. After looking carefully at what was available on the microlight market, I decided to place an order for a Skycraft Scout. The aircraft is being sold locally, the price is right; it's the most conventional in layout and looks strong and simple in design.

So this morning I got a call from lan Macmillan of Skycraft U.K. Ltd. in Prestwick, to say he was demonstrating the Scout to some prospective customers just outside Prestwick and would I like to come along and watch. With my aircraft being delivered at the end of this month, I reckoned that any experience gained, even from watching, would be helpful, so off I went.

Ian was just touching down in the Scout when I arrived. He taxied over to where the cars were parked, shut down the engine and stepped out. After we had all chatted for a few minutes, lan asked if I would like to try taxi-ing about to get the feel of the aircraft. Almost before he'd stopped talking, I was strapped in the seat and getting the engine fired up! Then for the next five minutes, I trundled happily from one end of the field to the other, with the engine pulling me along at a brisk walking pace and the stick back to keep the tail down. So far, so good!

Then, lan ran over to the aircraft with the flying helmet and goggles, as I was getting blown about a bit by the propwash. He told me to open her up a bit more and hold in some down elevator; then, when the tail came up, to hold that position for a few seconds before cutting the throttle and settling back down. This went very well until the inevitable happened — yes, it lifted off! By the time I had fully realised what was happening, I was about 20 ft. in the air and clearing the boundary fence of the field. Now, I knew enough to realise that a turn too near the ground was out, as was landing in amongst the houses ahead of me! So I kept on going. When I got to about 100 ft. or so, I throttled back slightly and started a left-hand turn to get back to the field. As I had "taken-off" in zero wind, I reckoned I'd be best to attempt my "landing" as soon as possible, without having to complete a full circuit. It was at this point that I tried to recall all I'd learnt about turning too tightly, letting the nose come up, keeping the speed up, etc., etc. Throughout my first ever turn, I felt quite clearly all the little movements the aircraft was making, and found it surprisingly easy to point in the direction I thought I should be going. At last I was down to about 40 ft., heading roughly where I wanted to go, and sinking steadily. My last worry, the dreaded stall and resulting mess (mostly me), never happened! As I floated over that fence again at about 20 ft., I progressively closed the throttle and eased back on the stick, until this delightful little aircraft settled back to earth (I thing the one wheel slightly high was allowable!) and rolled to a halt.

After that, it just remained for me to offer my apologies to a much relieved and gaping-jawed lan Macmillan, and ensure him it would not happen again until (a) I had my own Scout, and (b) until I had completed lan's formal flying training course!
RELIEVED WITH THE CP16

By Paul Bennett

Brian Harrison and Andy from Eurowing arrived at my place on the Friday before the B.M.A.A. A.G.M. They had brought with them the prototype CP16, a rigid wing powered by the 250 c.c. Fuji Robin engine, using a Liebeck Aerofoil. We had hoped to fly the machine on the Saturday, but conditions were not suitable. Sunday, of course, was the A.G.M. when the minimum in B.M.A.A. became Microlight!

Monday morning arrived with very little wind, although slightly misty. With everything ready we all dashed off to the local field. Carefully we unpacked and assembled the aircraft checking that no damage had occurred during its long trip from Glasgow. Everything okay, damn and blast! no excuses for not flying it! Andy put his crash helmet and gear on, and between Brian, myself and a helpful bystander we managed to drag Andy on to the awaiting machine. As it turned out the CP16 flew as predicted: beautiful. Andy landed and climbed out, we all clapped and hailed him with "Jolly fine show and all that!". Then looking over at me Andy asked why I hadn't got my helmet and gear on because I was next!

My stomach had fallen to around where my knees used to be, but not wanting to lose face I managed to drag myself over to the hedge where I found that my bladder suddenly needed relieving. Anyway, I soon found myself kitted out with helmet, boots, flying suit and seated in the machine. Andy went through a few details, like how to fly it! and then I found myself alone with the engine running. Before I go any further let me explain the controls. On the production CP16 you have a single stick, left and right roll, back for nose up and a friction throttle lever. On the prototype though you had two twist grips. Pitch in flight is weight shift. Back to the story.

There I was at the end of the runway, I opened the throttle to just over quarter, I started to roll and pushed it up over half. I took off, not popped off, at just under 25 m.p.h. To my relief the aircraft was very stable, pitch damping seemed just right. The twist grips felt fairly light and overall I found the machine easy to fly. There I was having a great time, and this machine seemed to motor along nicely. After gaining a little bit of height I throttled back and as I hit tickover the engine cut! Quickly judging the probable glide descent I decided to lose a good bit of height before making my approach. After doing a couple of S's followed by a 360° I lined up my approach. The glide being better than expected I realised I was going to land in the last quarter of the field, not the middle as planned. At the last second I deployed both rudderons and I settled gently on the ground. Brian and Andy came over with beaming smiles saying it's all good practice, etc., etc.

Anyway, the CP16 would seem to be a good addition to the range of microlights available, and all British built. I found it to be stable, light in roll with a good speed range. The only disadvantage I can see is that it is bulky to transport and store, the wings are just car toppable but a small trailer would be needed for the undercarriage. Personally I would trailer the lot. This disadvantage is partially offset with a very quick rigging time. The kits are going to be supplied with everything cut or formed to shape, like a model aeroplane, and you just assemble.

"...but a small trailer would be needed for the undercarriage..."
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Inflated Fabric Aircraft

by

D. Perkins

Reprinted from
THE AEROPLANE

WHEN I was asked to write an article on air-inflated aircraft, with particular reference to a small 6 h.p. delta wing, I was somewhat dismayed at the task of recalling details of an aircraft designed and made in 1955. Being a poor record-keeper and an inveterate “off the cuff” designer, it has involved me in the study of lots of small grubby pieces of paper, some incomplete and often inaccurate drawings, and a great deal of memory searching.

Photographs of a developed two-seat air-inflated aircraft appeared in the Press some time ago. (See THE AEROPLANE, May 31, 1957.) The prototype, designed, made and flown at Cardington, had a delta wing of 500 sq. ft. area, mounted on a tricycle frame. A two-seat in-line cockpit was built within six vertical members supporting the wing, and attached to the two rear members was a 70 h.p. target-aircraft engine, driving a pusher propeller. Controls consisted of half-span elevons, with a single rudder mounted on the upper surface of the wing. They were operated by a normal stick and rudder bar through flexible steel wire. The gross weight was about 900 lb. As with almost every aircraft ever built, it was felt that a much more efficient machine could be designed, once the prototype had flown.

Cardington had, as most people know, always devoted its efforts primarily to the problems of making inflatable equipment and by this time I had become an even more ardent believer in the future of air-inflated aircraft and was given permission to continue development on a small scale.

It had been my belief, from the early stages, that the ultimate aim should be an aircraft that was completely inflatable, except for the engine and wheel struts. With this object in mind, and assisted mainly by Mr. Alan Lock, work was started in 1955.

The first obstacle to be overcome was the lack of a suitable power unit, but since the only engine available below 70 h.p. was a 6 h.p. twin-cylinder two-stroke, it was “Hobson’s Choice.”

We had, some time previously, built an inflated full-size orthodox model of an Auster, using the 6 h.p. engine with a direct drive to a 3-ft. propeller. Since the engine ran at 4,000 r.p.m., the propeller was very inefficient, we only managed to extract 1 h.p. from it and the machine proved capable of only short hops. Also, the cockpit and tail unit were still of rigid construction, although the fuselage was all inflated. The machine was not capable of being deflated and rolled up, and the engine, designed to run flat-out only, had given some trouble.

However, by gearing down the engine, through two Vee-belt pulleys and a lot of jiggery-pokery to the carburettor, including the incorporation of one large drawing-pin for a float needle, we managed to get 1½ h.p. from the propeller! The unit, when complete, resembled an outboard motor, incorporating petrol tanks, dry batteries for ignition, and hooks on the end of the two control wires, and weighed 40 lb. complete.

It was designed to clip on to the rear end of the fuselage and was supported by the two spark-plug heads and one peg. The control wires from the pilot could then be hooked up, and the longest job was doing up the six propeller bolts. The propeller was of laminated spruce and weighed 4 lb. For those interested in the facts of life, one 4-ft. propeller equals a lot of bad language, two sacks of shavings and considerable loss of blood!

While these engine troubles were being sorted out, construction of the wing was going ahead.

We had returned to the delta plan form, for its strength and simplicity of manufacture, but changed almost every detail of its construction.

The first major change, was to reduce the wing area to 160 sq. ft. since we did not, at that time, believe we could carry two men on 1½ h.p. Some of our well meaning but rather depressing visitors often expressed the view that we would be lucky to lift one!

To make sure that the original prototype machine was stable and easy to fly, the wing had been swept back 90° and washed out 10° at the tips. Combined with a low C.G. this had reduced the efficiency of the wing at top speed, since it required large elevon angles to make small changes in pitch.

Its efficiency was further reduced by its thickness chord ratio of 25%. This deep section was chosen, to give maximum rigidity, but when built it was found to require down bracing to the fuselage.

It was clear that, if we were going to improve the aerodynamic characteristics of the machine, some means of stiffening the wing must be found.

A study of a pneumatic beam in bending, through a series of

The power unit, a 6 h.p., twin-cylinder two-stroke weighs 40 lb. (dry) complete with fuel tank and ignition batteries and mounting. The laminated spruce propeller weighs 4 lb.
tests showed that its resistance to deflection was a measure of the load extension curve of the textiles used to make it. We were then able to build a beam in which we had incorporated special materials in the surfaces and succeeded in reducing the deflection to 10% of the original. Using this new information, we reduced the sweepback to 64° with a thickness chord ratio of 20% and aspect ratio increased from 3 to 3.5. The wing section was R.A.F.69. To make the machine more maneuverable, the washout was reduced to 8° at the tips.

Built as a pure cantilever, we estimated that the wing would sustain 4g up and down loads at 1 lb/sq. in. pressure; tests on the completed wing confirmed this.

To further reduce the drag, we made the wing in a lighter material by dispensing with the aluminium protecting surface and “skinned” the whole wing with a very light silvered textile, thus covering the corrugations in the surfaces, necessarily there by the method of construction.

The elevons on the early prototype had been operated by orthodox wire pulleys and levers. These had imposed local loads in the surfaces and required further local loads applied by rubber cords, to achieve static balance.

To be free of these difficulties we developed pneumatically operated full-span elevons which worked by means of inflatable tubes inserted near the root of the elevon hinges. When an elevon had to be moved, air was allowed to escape from one tube to atmosphere, while air from the wing was fed into the other. To make only one pair of wires necessary, the operating valve was situated at the inboard end of the elevon trailing edge and was spring-loaded to return the elevon to the full “up” position. This gave “feel” to the pilot, since he had to overcome the load in the spring before the elevon would move. To ensure that the elevons returned to the neutral position, a suitable spring was applied to the control wire at the pilot’s end of the system. Incidentally, the whole projecting cylinder slightly longer than a man’s leg. The whole slab was then fitted in by an outer skin, complete with carded doorway, and front and side windows of transparent flexible plastic sheet.

The pilot sat on the projecting cylinder of air with his back against the leading edge of the slab, to which a seat-belt was attached.

The outer skin was attached to the underside of the wing on an aerodynamic profile and was tight enough to put the slab into compression, so that the local load imposed by the pilot’s weight was distributed evenly along the attachment line. The pilot was virtually suspended in the outer skin.

Controls were all hand operated. A square sectioned column of the forked front wheel (plywood and tyred with a deck, quill) projected upwards between the pilot’s legs. On this was fitted a vertically sliding pair of handlebars, to the outerboard end of which, descending from the roof, were attached the elevon cords. From the lower part of the column ran the cords operating the rudder, mounted behind the propeller. To turn the aircraft left or right, one turned the handlebars, as on a bicycle; to climb or descend one slid them up or down, and to bank, tilted them port or starboard. Not having flown an aircraft I wanted something fairly simple!

The throttle control was a friction-held sliding knob on the
left-hand wall of the skin, whilst the ignition switch took a
similar form on the right, with the additional feature that it
could be pulled down like a communication cord, to hold the
chokes closed for starting.
The safety valve, which also served the purpose of inflation
and deflation, was situated above and in front of the pilot's
head, and could be manually operated if necessary.
To complete the cabin, two instruments were fitted. One
was a pressure gauge reading to 2 lb. sq. in., and an airspeed
indicator which read to a maximum of 35 m.p.h.
The undercarriage consisted of two streamlined spruce struts
and a half-axle on either side of the cabin, the top end of
the struts and the inboard end of the axle terminated on a
plywood disc attached to the pressure surfaces, which supplied
both springing and damping. All joints were quickly detachable
single rope hinges.
The 6-in. by 20-in. wheels were made of 3-ply dinghy fabric
and two plywood discs. The tread was applied in the form
of about 100 coats of rubber solution, each wheel weighing
2 lb. and operating at 6 lb. sq. in. When deflated the tyres
could be folded into the size of the discs.
The aircraft was now complete, and with \( \frac{1}{2} \) gallon of petrol
in the tank, weighed 167 lb.

For transportation by road, the aircraft was deflated and
rolled up around the propeller and wheel struts, making a
huddle 14 in. diameter and 4 ft. 3 in. long, whilst the engine
unit was packed complete into a box 16 in. by 16 in. by 16 in.

Using a large domestic vacuum cleaner, it was possible to
inflated the aircraft and be ready to fly in 25 minutes.

On Jan. 25, 1936, we took the aircraft to a disused airfield
and began towing trials with a dummy engine, to collect data
and generally test the structure.

On Mar. 7 wearing a crash helmet, and, I am assured, a
look of great apprehension, I took my seat in the cabin and
strapped myself in.

The engine was already warming up, and since it was now too
late to back out, I gave it three-quarter throttle and signalled
the checking away and immediately began to roll down the
runway.

In about 150 yds. the A.S.I. was reading 23 m.p.h. and I
very gently raised the front wheel, at least that was what I
intended to do! In fact, it came up smartly and I found myself
at an altitude of 4 ft. and rising fast. This was at least twice
as high as I considered safe, and promptly pushed down too
hard! The ground began to rush up towards me, and that
part of my anatomy nearest the concrete began to warm up
in anticipation. However, when I did touch down, it was almost
imperceptible. The struts, cushioned on the wheel, did their
job well.

In the days that followed, I made quite a number of short
flights, some of which were in side wind, but I did not
attempt any turns.

On one occasion I found myself at about 20 ft. up, with the
control wires crossed. I spun down to the concrete at 45\(^\circ\),
I drew my legs up in preparation and switched off the engine.
As I hit the deck, everything folded up about my ears—and
then, just as suddenly, straightened out again. I had felt
nothing and the aircraft had sustained only slight abrasions
on the front of the keel.

I mention this, as it is my firm belief that this type of
construction could provide the safest type of light aircraft
possible. Such aircraft are almost indestructible except by fire,
the pilot is surrounded by compressed air bags and there need
be few solids to injure the body.

The wings need only about a 4g load factor, mainly to keep
good shape, since up loads of more than this only progressively
fold up the wing tips. This does, absolutely no harm to the
wing and since one must be rising in these conditions, one
only need wait until they cease, for the wings to pop back
straight again.

In conclusion may I attempt to dispel a popular misconception.
Pneumatic aircraft are not susceptible to punctures in the air.
The materials used are woven to make them almost
untenable, and one hardly ever comes across nails and broken
glass “ up there.”

A FURTHER TEST FLIGHT

Recollections of an R.A.F. Test Pilot, Sqn. Ldr. R. A.
Harvey, who was asked to test fly the inflatable
aircraft, were that from the aerodynamic design
‘point of view’, the stability of the craft in the air
would be rather questionable. Also he was
concerned about the unconventional controls and
sluggish elevons, but he agreed to attempt to fly the
machine and relates:

“I got strapped into the cockpit, the engine was
started and we moved slowly along the runway.
We seemed to be managing, I opened the throttle a little
and we continued, slightly faster. I gave it some
more power, and we took off. I was absolutely
delighted. It was flying after all; my fears were
unjustified. The controls were much too sloppy and
would have to be improved, but it was flying. Then
the nose swung to the right and I could not correct it
and the left wing suddenly dropped and we side-
slipped into the ground, quite out of control. When
the left wing hit the ground it burst open and allowed
the air pressure to escape so by the time the
fuselage hit the ground I was not in a firm structure
as before, but in an empty flabby bag. I hit the
runway with a dull thud and was quite astonished to
find that the runway was so hard.”

Uninjured in the crash, apart from a painfully
knocked knee, Sqn. Ldr. Harvey remembers that no
further test flying was done and the aircraft
development was abandoned, much to his
disappointment as he writes:

“The tragedy was that this aircraft could have
been made to fly perfectly and I was quite willing
to do the test flights. And it was worthy of further
development as it had the ability to fold into a small
space. Moreover, it had flown with an engine of 6
h.p. which was probably producing only 2 h.p. at
the prop and that in itself was an accomplishment.”
THE SCOUT ARRIVES IN THE U.K.
By Ian McMillan

The Scout microlight aircraft was born in Australia over three years ago; its designer, Ron Wheeler, has sold over 350 units. He has a well established club to cater for his customers, The Associated Scout Owners Club of Australia, who produce a bi-monthly magazine called "Scout-About".

This microlight taildragger is of completely conventional aircraft layout, control is by rudder and elevators which are operated by a joystick between the pilot's knees. A throttle and mag. switch complete the controls. The secondary effects of the rudder are sufficient to allow balanced turns even at steep angles of bank, the control surfaces are large and this, coupled with the long moment arm of the fuselage and the position (directly in the prop-wash), provides generous and positive controlability.

This machine is made from dural tubing and heavy duty dacron sailcloth. All the control wires, bracing wires, and fittings are of stainless steel. It can be rigged by one man plus an assistant from car top to flying in approximately 20 minutes. Rigging consists of hooking on the tail surfaces and the main wings, which are tensioned against one another. The motor is supplied with the machine and is a 175 c.c. two cycle, single. Ignition is solid state and never needs touching. Drive is via two Polyflex "V" belts at a three to one reduction. This makes the machine relatively quiet to operate.

Flying the Scout
On first seeing this little aircraft I instantly felt at home with it, perhaps this is due to the striking conventionality and simplicity of the layout, it looked and felt like a mini version of the light aircraft I had been used to flying. After a very thorough read of the handling notes provided with the Scout, I felt ready to fly!

I handswung the wooden prop and the motor fired up. Sitting in the seat I fastened the lap strap and "chocks away". The Scout handled well on the ground as I taxied to the end of the field. The tailwheel is steerable and a quick blip of the throttle with the stick hard left spun the tail round until the aeroplane sat facing the wind. After a few hours of careering up and down the paddock (the first runs were like a "drunken duck") I soon got the hang of keeping straight using sideways movement of the stick as opposed to rudder pedals. Lift off and
landing again in a straight line was a normal progression from ground runs. The undercarriage is of spring steel and can take an incredible hammering as it absorbs the roughness of the ground.

The take-off method of the Scout is simplicity itself. Open the throttle fully and apply full forward stick to lift the tail off the ground, when the aircraft is in the horizontal attitude the stick is returned to the central position. As flying speed is reached a gentle back pressure on the controls rotates the machine and it settles into a steady climb. I held the climb until I was a few hundred feet above the ground and then allowed the stick to return to its central position and the airspeed to increase, adjusting the throttle to cruise setting.

In the air the Scout is very stable, permitting "hands off" cruise. The large dihedral ensures good lateral stability in turbulent air. Turns are performed by moving the stick to one side or the other. In fact, with the Scout, you just push the stick in the direction you wish to go. It is as simple as that. Its stall characteristics are extremely easy on the nerves; it is not a proper stall, rather it mushes down with a steady rate of sink. The wings stay level at all times due to the washout built into them (this washout varies in flight depending on load). The makers claim it is possible to land from this semi-stalled condition. Landing the aircraft is a case of closing the throttle to quarter and allowing the machine to take up its own attitude, the thing actually descends in the correct position! At about three feet from the ground a slow back-pressure on the stick will flare the areoplane and a greaser of a "three-pointer" is soon perfected.

This, then, is the Scout Microlight Aeroplane, with an endurance of about 40 minutes on the standard tank and a payload of 195 lb. It represents real flying without the headaches of conventional aircraft ownership. Similar in performance to the powered hang-glider variants but at the same time radically different in handling and looks. Myself, I feel it is bound to generate a loyal following in the microlight world.
At Wellesbourne and Popham, one would have had to be blind not to notice the predominance of Sky-Trikes and obvious derivatives amongst the many machines present. I would suggest that the probable reasons for this — not necessarily in order of importance — are the logical progression of pilots from hang-gliding to powered flight, the relatively modest cost of the Trike variants as compared with the machines bought in from the States, the simplicity of the packages to be transported on one’s car and, last but not least, the visibly forgiving nature of this form of microlight to clumsy pilots.

As a professional engineer, I would like to praise Mr. Hunt, or whoever designed the Sky-Trike, for the elegantly simple and sound package he devised. It has all the hallmarks of good engineering, particularly those relating to “If it doesn’t do anything, it shouldn’t be there, and then it won’t go wrong”. That is not to say it cannot be improved; it can, and that is what this article is about. But then, it is always easy to see how to improve on someone else’s ideas. So let us examine the Sky-Trikes (in this, I again include the derivatives) and see in what direction the “second generation” may take us.

Observing the Trikes in operation, I noted certain problem areas, viz:

(i) The fairly large and inertialful wing takes quite a bit of handling at times. During gust conditions or when slightly mishandled, it can cause the pivotal joint at the top of the Trike to be subjected to loads which are greater than it will ever encounter during normal flight. The same overload condition can arise either with universal or ball-joints.

(ii) During the take-off run, one occasionally saw pilots getting a little screwed-up, with the Trike pointing one way and the wing oriented in another. The outcome of this was usually a little dance until the wing and Trike came into phase.

(iii) With the machine air-borne but only just, it was apparent that the directional control left something to be desired. This trait showed up with pilots of a wide range of skills.

O.K. So those are my observations. Now what do I propose one might do about them? I intend to make certain suggestions and should any reader say to himself, “I tried that and it doesn’t work”, will he please write down exactly what he did try and what the precise results were, so that the whole movement can benefit? No vague opinions please; let’s have solid facts if you’ve got them.

The first idea which occurred to me was that it would be possible to install a rudder on the Sky-Trike (Fig. 1). One method is shown, using a pair of tubes anchored to the main axle and supporting a tube via a universal joint, to allow the wing and Trike to move a bit, relative to one another, in plan view. Another tube is mounted at the back of the keel on a universal joint. This tube telescopes into or over the lower one, allowing the wing to tilt freely. The rudder is pivoted on the outer of the two vertical tubes and is operated either by being cable-linked to the nose-wheel, or by cables from levers mounted on the control-bar. I would favours the latter, since it allows a landing approach with the nose-wheel held straight but the rudder offset to counter drift.

An alternative method of attaching the rudder tube would be to use a see-saw tube, mounted on the rear of the keel through a pivoting and rocking joint (pivoting in line with the axis of the keel, and rocking at horizontal right-angles to it). This tube would
extend about a foot above the keel and be sprung forward by a bungee between its top and a point forward on the keel (Fig. 2). A pair of cables would run from the lower extremity of the tube, forward to the outer ends of the main axle. The rudder surface would be pivoted on the vertical tube and be operated by cables passing from its control-horn forward to hand-levers on the control-bar. (With the sail limited to pitch-only control, as discussed later, the top pivot of the tube may be a simple rocking joint, not a universal.)

Yet another possibility would be to install a rudder-post rigidly downwards from the rear end of the keel and brace its lower extremity forward to the outer ends of the spar with cables. The latter need only be sized for light duty, say, around 500 lb. (Fig. 2).

I don’t know if it has registered with the reader yet, but that makes the Sky-Trike type of machine into a three-axis-control machine!

Another modification would be to add tip controls to the wing (Fig. 3). I would suggest that they should be set over at a fairly generous angle, say, 40 to 50 degrees to the vertical, to cause them to act as much like ailerons as tip-rudders. Let’s call them “Rudderons”. These controls would be installed almost exactly as those on the Pterodactyl and operated by means of hand-levers as shown (Fig. 4). These hand-levers would be mounted on a reduced-size control-bar having one cable up to the nose of the sail, one to each spar extremity, and two to a point on the rear section of the keel.

I am not familiar with the methods used to conduct control-cables from the hand-levers to the surfaces to be operated, so I may be suggesting the obvious here, but it seems to me that nylon tubing, say, a quarter-inch outside diameter, as used for pneumatic and hydraulic installations, would be very useful for such cable runs, and offer low friction.

The rudderons would be sprung-loaded against stops to place them in parallel with the airflow. When operated, the control surface would move upwards and inwards, giving the effect of up-aileron and tip-drag at that wing extremity.

Now, with either the rudder fitted, or the pair of rudderons at the tips, it may be possible to limit the tilt of the wing to the pitch direction only. It would be very simple to achieve this on the Sky-Trike design by adding cables from the outer ends of the rear frame of the Trike, and from the top of the nose-wheel attachment, out to the spar extremities where the control-bar is presently attached. The beauty of this particular modification is that, if you have added the rudder or rudderons, you can try the effect of bracing the Trike and flying the wing with pitch-only control. If you don’t like it, and want to go back to a universally-jointed wing, you just take off the cables which brace the wing to the Trike (Fig. 5).

One feature of the Sky-Trike (which is even more exaggerated on some of the derivatives) which I do not like, is the great height of the Trike. I can understand why it has come about and, with the sail converted to pitch-only control, I can see a way to do something about it.
In order to get enough control force from displacement of the pilot-engine mass, the large Trike height is required. (It also has the effect of keeping cables and keel away from the propeller, but that can also be taken care of by my proposition.) However, if the point of attachment of the Trike to the wing is raised, that is, the pivot is placed above the keel, the total movement of the controlling gravitational force is increased, for a given displacement of the Trike relative to the control-bar. With the wing moving only in the pitch-control direction, the rear tubes of the Trike frame can be brought up around the sides of the keel and attached above it, either to a modified bracket or to a beefed-up king-post (Fig. 6). Some experimentation may be needed, in order to establish the best amount of increase in control force, that is, just how far the Trike can be lowered and how far the pivot should be above the keel. Four to six inches, keel centre-line to pivot, would probably be a reasonable starting point. If the Trike frame protrudes through the sail, a small dome of Dacron could be sewn in, to restore the completeness of the cover. Alternatively, I think it likely that the only requirement might be the removal of a little Dacron from the forward end of the "keel fabric" of the sail.

With the increase in control force made available, the Trike becomes shorter and more manageable on the ground. The control-bar becomes slightly smaller and lighter. The sail stills a great deal less (because the same degree of control force results from less angular change between the Trike frame and sail), so the propeller and cable clearance from the keel will remain fully satisfactory.

So there you have it; a series of suggestions which, I believe, could lead to a second generation of low-slung, ground and air-stable Sky-Trikes. I would be most interested to hear from anyone who tries any of these ideas and the results they achieve.

(What about a composite construction, streamlined Trike: Ed.)
IMPRESSIONS OF A VJ-24 IN CALIFORNIA

By David Cook

During the last three years I have been displaying my flying routine with my Volmer 23E at most of the major air displays throughout England and Europe. In fact the 56 big shows culminated with the VJ-23 opening the Public Days at the Farnborough Air Show.

As you can imagine a great number of people have witnessed what this hang glider can do. I think the greatest asset it has is that there is three-axis control and the many varying conditions and places it has flown has shown the beauty of this controllability.

I'm often told by interested people, "Put wheels on it for T/O and landing Dave and then I'll have one please". I have very individual views upon this subject, but have to admit that foot launching is strenuous and one has to be quite fit. However, bearing these requests in mind and realising how difficult things are in Britain for the home builder, I informed Volmer Jensen what I thought people wanted and he got to work on his VJ-24 and converted it to a microlight aeroplane.

Late in October 1980 my wife and I visited Volmer in Glendale, California with the intention of flying and testing the VJ-24w.

Volmer told me of the great number of plans he had sold for the various versions of the VJ-23 and VJ-24. Many of his hang gliders are flying in the U.S.A. but only a few in Europe.

We made quite a convoy travelling to the flying site. The VJ-23e and VJ-24w on trailers and various helpers and people from the Lockheed factory.

The flying site was chosen for the wheeled T/O VJ-24 and thus a hard dirt track suited it well at this particular quarry site.

First, I was to show everyone what I could do with
the VJ-23. I appear to be treated with some respect by these people because of my record of flying in England.

Volmer designed and built his '23 with consultation from Irv Culver and I designed the whole effort to be powered. It was the powered version I was to fly.

I took off quite easily without assistance into an 8 m.p.h. wind and found it very pleasant in shirt sleeves bowling around at some height in 85°F. This machine was not as sharp as mine due to its rigging and the prop. pitch flew the machine quite fast, but with an unimpressive climb rate. A hawk had several stunts at me and it's a little nudge, I'm sure, of what there is yet to achieve in airmanship.

Upon landing a sheriff turned up in a car which looked like a lighted Christmas tree and told us to move on. I was amazed at the lack of protest from my Californian friends (maybe they had too much respect for his armory) but I told him that in England our police are much more human and after travelling 6,000 miles to fly a specific aeroplane our police would have allowed the flight and then we would have moved on. . . .

With less than one hour of daylight left a new site was located and Volmer had a gleam in his eye when he clocked the rigging of the VJ-24 in seven minutes — a trifle better than the 30-40 minutes for my '23!

I was suspicious of what the VJ-24 was capable of because it was using a McCulloch 93 which is only 100 c.c. but admittedly reduced ratio to the propeller.

Volmer sat in and strapped himself down. He set the mixture turned on the instruments, set the throttle, pushed a lever to decompress the engine and pulled the starter. The engine fired and ran immediately and I was most impressed at this, all being from the pilot's seated position. The propeller engages at 4,000 engine revs. and the T/O run was around 50 yards. Conditions were very stable with little wind and the climb looked O.K. When Volmer made his first pass I was delighted to see how very slowly this machine could fly. You old genius, I thought, at 71 years of age, to turn this machine from three years as a hang glider, three years as a foot launched powered hang glider and now to very simply transform the same machine into a microlight. It was quiet and looked like something of the Démolisse era (the French entry in the Magnificent Flying Machines film).

I flew the VJ-24 under some protest because the landing area was so restricted. There were wires, a road, a river, a bridge, tall eucalyptus trees and a 20 ft. high river bank. I had been convinced that a 100 c.c. engine was adequate but wasn't certain about slide slipping into the landing area. Volmer said I'd be O.K. and piled encouragement upon me. I almost hoped the engine wouldn't start — but it did and I gunned the throttle full. Acceleration was good and I lifted off and climbed with my eye on the ASI which I kept at 20 m.p.h. This climb rate is better than my '23, and I levelled off at 600 ft. and flew a couple of circuits.

It really was a very sweet thing to fly — very gentle on the controls and nice to have the rudder separate from my linked combination on the '23. My apprehensions were swept away when a normal landing took place and I congratulated Volmer on his very sweet handling flying machine.

Several more flights took place before sunset and now convinced of the practicality of this very fine piece of engineering I couldn't wait to get my own VJ-24w into the air in England.

I know how difficult it is to obtain the materials for building a VJ-24 in England and I spent a week running around L.A. getting all the parts and sources for producing kits and finished flying machines and hope that early in 1981 these VJ-24w's will be available for sale from myself.
BOOK REVIEW
From Tony Fuel

“ULTRA LIGHT AIRCRAFT AND THE AIR”

By Brian Cosgrove. Published by the Ultralight Aviation Centre. £6.50 inc. P&P

Ultralights as we know them today have largely been developed from hang glider models, and most pilots have come to motorised flight as a development of their hang gliding experience. And so, in true hang gliding fashion, there has been a rather casual attitude to the acquisition of expertise. Budding aviators have “sputtered” into the air with little or no prior instruction, and certainly without any of the background knowledge that after 70 years experience, the regular aviation community takes for granted.

Obviously, this situation has got to change. Ultralights are evolving, they have already sprouted wheels and silencers. Semi- or fully-enclosed cockpits will follow, just as sure as night follows day. The pressure to develop these aircraft for more practical uses will lead to an extension of the areas and weather conditions in which they are operated.

We are already seeing people entering the sport without prior experience of hang gliding. Such people are attracted by the convenience and low cost of ultralight aviation — sometimes they have an aviation background, sometimes they don’t. But either way, they have to be taught how to operate motorised aircraft based on the hang glider principle. And they have to fly safely, with consideration for other people. If the sport fails these newcomers, we will (rightly) be regulated out of existence in a very few years.

If Brian Cosgrove’s book is an example of the type of material being given to students at the Ultralight Aviation Centre, it is a very encouraging sign. I have my criticisms of some of the material, and the presentation, but this in no way detracts from my pleasure at seeing the lengths which this school is prepared to go to to ensure that its pupils get a proper start.

The book covers quite a wide scope. After a general introduction the reader is presented with a syllabus of training (presumably intended for users of the Centre). Subsequent chapters cover the basic theory of flight, meteorology, Air Law, map reading and basic navigation.

At this point, I should record a feeling of disappointment. Having praised the Ultralight Aviation Centre for producing excellent training material, I’d have to say that neither the Introduction, nor the Training Syllabus which follows it make it clear that the book is designed to be used as a classroom aid rather than as basic source material. In making it available outside the Centre, Brian is performing a considerable service to other instructors, who would otherwise have to produce their own, similar stuff. But the average ‘punter’ who buys this as an introduction to the sport is, I think, going to feel neglected. What he gets is a ring-bound set of lecture notes, insufficiently well produced to justify the rather high price. I would have liked to have seen a chapter reviewing the different types of ultralight aircraft, for example. Also, the book does not cover any of the aspects of storage or maintenance of this type of craft — or even refer to it, which I find surprising.

It could be argued that such material will be available to students on their training courses. But this book will doubtless be purchased by people who don’t have access to formal training, and they shouldn’t be left with the idea that the book is comprehensive — it isn’t.

Much the same criticisms could be levelled at the other chapters. While no doubt useful as an adjunct to classroom teaching, the book skips too quickly over too many topics to be of real use for ab-initio home study. In some places further reading is recommended, and it would be nice to see a fully comprehensive list of such recommendations given.

Notwithstanding all this, I read the book with considerable interest, and learned one or two things from it. Particularly interesting were the sections on map reading and navigation which I feel are switched at exactly the right level for the ultralight pilot. It is certainly unsafe to set off across country without first planning your flight, and the book gives you what you need to do this. I found the sequence of presentation in the navigation section slightly confusing. The section on “preparation of a navigational track” followed the section on “flying a compass bearing”, where logic would indicate that it should precede it. One of the answers given to the examples the student is recommended to work out for himself is incorrect — this should be rectified as a matter of urgency.

All in all, “Ultralight Aircraft and the Air” is a difficult book to sum up. Obviously the foundation to a well-thought-out training course it is nevertheless “bitty” and difficult to read for a person studying on his own. Taken in conjunction with “live” instruction, it would be ideal for its purpose. Whether you will be prepared to pay a high price for a typewritten set of lecture notes is debatable. But in the present state of the game, anyone who is trying to improve the general standard of knowledge within the sport of ultralight aviation deserves every encouragement. Until we get a better one — which hopefully won’t be too long — I’m therefore prepared to recommend it.
(Glenn Brinks will be bringing us a regular 
'Stateside View'. He is a freelance writer with a 
B.Sc. in Mechanical Engineering and has written 
extensively for several U.S. magazines including 
Road & Track Magazine, Plane & Pilot and his 
current monthly column 'Power Pilot' in Hang 
Gliding Magazine. He flies ultralight aircraft, too! 
Welcome to the Flight Line team, Glenn: Ed.)

In the last few months, the big news in ultralights has 
been the drive toward organization. The 
Experimental Aircraft Assn. finally agreed to form a 
division for ultralights and so the E.A.A. Ultralight 
Assn. was created. As with the other E.A.A. divisions 
(Warbirds of America, Antique/Classic Division and 
International Aerobatic Club), membership in the 
E.A.A. is required for membership in the division. 
However, in the interests of keeping costs down, 
membership in the ultralight assn. includes only the 
ultralight newsletter (appropriately titled "Ultra-
light"). A subscription to Sport Aviation costs an 
additional $15, while for E.A.A. members, adding a 
membership in the ultralight assn. costs $15 over the 
E.A.A. dues.

With the backing of the E.A.A., undoubtedly the 
group will be a real asset to the ultralight community. 
Information is available from the E.A.A. Ultralight 
Assn., Box 229, Hales Corner, Wisc. 53130, and 
from the E.A.A.'s European representative, Harold 
Best-Deveureux, 13 Stone Hills House, Welwyn 
Garden City, Herts.

Also being formed are the American Ultralight 
Assn. and the Professional Ultralight Assn. John 
Chotia is forming the A.U.A. as a political 
representation group to provide communications 
and to lobby with the Federal Aviation 
Administration. The Professional Ultralight Assn. is 
a manufacturers group headed by Lyle Byrum of 
Eipper. It is supposed to provide a unified voice for 
the manufacturers with various government 
agencies (especially the F.A.A.), give consumers a 
place to take complaints about products and 
practices and, in general, to do the same sort of 
things for ultralights as done by the Hang Glider 
Manufacturers Assn. for Hang Gliders. Membership 
fee is a hefty $25 per year, so it's definitely not for 
the private pilot.

F.A.A. Ultralight Rules Due Soon

The F.A.A. has been promising a set of rules 
regarding ultralights for over a year. At the Oshkosh 
fly-in they scheduled a forum to announce the new 
rules, but cancelled out at the last minute. While no 
one is saying anything officially, I checked with 
several sources and found (unofficially, of course) 
that the new definition of ultralight will be a simple 
154 lb. weight limit. There will be no requirement for 
foot-lauching. Any airplane under 154 lb., empty, 
will not require a pilot's licence. Otherwise, the rules 
will require ultralights to observe the applicable 
Federal Aviation Regulations regarding rules-of-
the-road and where to fly. Prior permission will be 
required to fly an ultralight into any airport with an 
operating control tower. That permission can come 
by radio, so an ultralight will be able to carry an 
aircraft radio and call in just like a conventional 
airplane. If the rules are released in this form, and if 
pilots show some common sense and courtesy (i.e. 
not flying a 30 m.p.h. ultralight into a traffic pattern 
filled with 100 m.p.h. airplanes, and thus 
encouraging stiffer regulations), the next decade 
could see the achievement of affordable and 
practical personal flight.

'Jury Rig' Repairs Cause Fatal Crash

John Chotia just sent out a letter to Weedhopper 
owners regarding a fatal crash of a modified 
Weedhopper. The contents of that letter apply to all 
ultralight pilots regardless of what aircraft we're 
lying.

The crash occurred when a front wing tang 
worked and failed, allowing the wing to fold up at an 
alitude of about 150 feet. Chotia says he inspected 
the plane after the crash and found "several 
improper repairs, unsafetied, coarse-threaded bolts 
and unauthorized modifications. . . . Many parts 
were bent, restraightened and reinstalled . . . the 
tang which broke wasn't of factory supplied material 
either."

There is an obvious moral here. Quoting from the 
letter, "No structural part of an aircraft should ever 
be straightened and re-used. You cannot tell what 
metallurgical damage may have occurred. Cracks 
need not be visible for fatigue life to be adversely 
affected."

"Pforce" for Pterodactyl Engines

Jim Eskildsen isn't easily satisfied. Despite the 
Pterodactyl's strong climb rate, he wanted more, so 
he designed the "Pforce", a 2:1 V-belt reduction unit 
with a monster 54 in. by 27 in. prop. He claims 50% 
more thrust, shorter takeoff roll and lower noise and 
fuel consumption. Top speed should remain 
unchanged. The penalties are 15 lb. of weight and a 
cost of $325.

Eskildsen says the increased performance 
requires more experience (minimum 20 hours on a 
stock Pterodactyl). The "Pforce" is available for 
both the Sachs 360 and the Pterodactyl (Cuyuna) 
430D engines from Arizona Air Sports, 1441 S. Rita 
Lane, Tempe, Ariz. 85281 (602) 831-0551.
WHAT’S THAT HANGING AROUND AT

By Jonny Seccombe

The habituees of the Tiger Club hangar were treated to a rare sight during a recent weekend when Jim (I’m a Company test pilot and I’m insured for millions of pounds) Bowyer arrived with the latest product of the British Aerospace Industry roped firmly to the roof rack of his well travelled Volkswagen. The long sausage revealed a Vulcan hang glider, and the tubes and wheels were unfolded to take shape as the first production version of the Hiway Mk. 2 Skyrak. Surrupitiously the aircraft was assembled inside the hangar, away from critical gaze, and the regular discussion developed, commonplace to the hang glider pilot, “WEEEE, I supposed it’s flyable, let’s go and have a feel of the wind”.

Close examination of the machine resulted in the general consensus that it was extremely well engineered. Structurally there didn’t seem to be any problems although there were some design details that broke new ground. Mike was interested to know if the sail of the wing could be put to nautical use. Tim is working on fitting the recoil pull start to the turbulents. One member was fascinated by the apparent control reversal, although I am sure Neil Williams would have explained that it was all perfectly simple if you imagined yourself sitting on top of the sail and using the King Post as a joystick, and a number of hardened Tiger pilots were delighted to find that there was no rudder on the machine, although there is a foot throttle to keep idle feet out of mischief.

Jim, having been fully briefed on the surrounding aeronautical hazards, ventured to start the inverted single cylinder two stroke engine which emitted a discreet growl on the second attempt. First problem is solved — noise level is acceptable. After a brief pause spent strapping into the comfortable cushioned seat and adjusting the venturi of the ASI, the only instrument installed, but still an optional extra, it was off to the peri-track on the way to the threshold of the westerly runway. The sight of the trike buzzing along reminded one of a demented go-cart trying to leap into the air.

After lining up into wind, a take off roll of 40 ft culminated in an abrupt rotation that launched the kite into the air. Climbing determinedly into the stiff breeze the spectators were impressed but somewhat awed by the degree of control available in the admittedly turbulent conditions. After a few tight circuits Jim cut the throttle and the kite descended almost vertically to land on the left hand side of the runway. A long taxi back to the hangar was interrupted by a sudden gust that placed a severe negative load on the sail. Two loud clunks announced the departure of a few ‘mill’ off of the prop tips against the rear flying wires and a disconsolate Jim stepped out of the seat. A further question and answer time followed, interrupted by the urgent ringing of the telephone!

The sight of the Stampe being started for an aerobatic sortie galvanised Jim back into action and without further ado the kite was back at the threshold. The Stampe offered pride of place to the Jungmeister, carrying out its first flicks and graceful slow rolls since its rebuild, while in airspace all of her own the Vulcan was thrown through a sequence of wingovers, downwind dashes and upwind hovers. An abrupt fuel starvation resulted in a premature but totally controlled vertical descent to Terra Firma and there was much talk about pre-flight checks. A slight contretemps with a gust while stationary facing downwind on the peri-track resulted in a brief interlude of semi inverted manoeuvring but no damage was done and we sat down to discuss a day’s flying.

What are the lessons? Microlights are fun, cheap and practical. It’s a totally different form of committing aviation. It is not a substitute for other aircraft but complements them by opening up new fields of aviation while using otherwise useless pieces of airspace. It’s cheap, less than £5.00 per hour, and it costs very little to train and keep current. It’s practical because it’s inherently safe. The days of high thrust lines and human undercarriages are over. The technology is well proven in the hang gliding field, nor is the noise level any longer offensive.

What of the future? Roll on the two seater! Please send one to us as soon as possible. Thanks to Jim Bowyer for putting up with all those questions, flying well and sensibly in almost marginal conditions and taking the trouble to drive all that way for the benefit of the Tiger Club. Roger Sherron, I’m going to make you eat your words — “Low, slow and almost out of control” indeed!

OBITUARY

From Gordon the Moron

Dave Jones was a good guy. He was also a man of exceptional flying ability whose skill and courage occasionally outpaced his common sense. I liked and respected him.

Suitable thoughts to his family, close friends and business associates. Ultralight aviation is a bit poorer and a bit less colourful for his passing.

But we all have a key to his locker.
BUILDING OF THE MITCHELL WING B10

An interview with John Webb of Hereford by Gordon the Moron

John has a Mitchell Wing in the later stages of construction. He is one of four people known to be building this type of ultralight in the U.K. One of the others, Theo Willford of Malvern, has his Mitchell in a slightly more advanced state than John’s, although they should both have their machines airborne sometime this year. It seemed to me an interesting and ambitious project so I thought you might like to hear what John had to say about it.

G.: What made you decide on this particular project, John?
J.: I’ve always wanted to build an aeroplane. The Mitchell seemed like the right one to start with as it fitted in nicely with my main hobby of the last five years, which is hang-gliding?
G.: When did you start building?
J.: I bought my plans direct from the ‘M’ Company about 2½ years ago and started building shortly after that. I estimate that I’ll be flying it early this year.
G.: Would you say that this is a typical length of time for construction?
J.: Probably not. A peculiarity of Mitchell Wing builders is that they seem to move house halfway through. This happened to me so it obviously had an adverse effect on construction time, especially as I had to extend the garage in my new house to make room for the project. I’m sure it would be possible to build one within 12 months. That’s just spare time work, not to the exclusion of all other activities, just steady application.

I also wanted a certain amount of time tracking down sources of various items. If I started a second Mitchell, which I may well do when this one is finished, I’d confidently expect to complete it in about six months.

G.: Why did you go for the plans rather than a kit package?
J.: Price. It’s cheaper to buy your materials from source rather than as parts of a kit.
G.: Any problems finding it all?
J.: Not really. I’m fairly patient and just keep writing to likely suppliers. The only difficult item was some really lightweight good quality nose joints with acceptably easy and light action. This problem’s solved now and they only cost £1.50 each.

G.: What previous experience did you have that might have helped you with the project?
J.: Very little that would be considered directly relevant. I’d built model aircraft in the past but nothing particularly ambitious. Just Airfix kits really and a few fairly straightforward balsa wood jobs. I’ve worked mostly on oil rigs since leaving the Army. I don’t really have any skills that directly lend themselves to aircraft construction. Obviously I can read a set of plans and I enjoy working with my hands. That’s all you need, so long as you’re a bit particular about the standard of workmanship.

G.: What did you need as far as tools and working space are concerned?
J.: Basic carpentry tools and a few other items. Nothing expensive or out of the ordinary. Most of the sub-assemblies and ribs can be made on the kitchen table. I bought a small Myford lathe with which I’ve made a few components myself but this is something I wanted to do anyway. It’s definitely not an essential piece of equipment. Working space could be a small problem in the later stages of construction. I would say that a normal size car garage is not really big enough. Something about twice that length makes things a lot easier. That’s why I extended mine. I learnt a bit about bricklaying in the process.

G.: Has it been a difficult project?
J.: Well, it stretched me a bit at times. That’s all, nothing that a night’s sleep and a fresh headed look at the plans didn’t solve.
G.: What suggestions could you offer to anyone considering starting a Mitchell Wing project?
J.: I think primarily you should start with an interest in the construction side, rather than just the finished item. Obviously the aircraft itself is the main objective but without a good deal of enthusiasm for the construction part of it you stand a good chance of falling by the wayside. It’s happened to a lot of builders.

Apart from this first point, I think it’s an excellent idea, even if you purchase a kit of parts, to spend a few evenings studying the plans and building up a mental grasp of them. Rather than just diving in at Step One. Also, buy good quality materials (all the wood in my Wing came from Slingsby sailplanes and has a standard quality stamp on it) and resist the urge to cut corners just to bring the completion date forward. Anyone who is really serious about building a Mitchell can feel free to contact me. I’ll be happy to pass on any information I’ve acquired, including sources of materials and solutions I’ve found to
minor problems.

G.: That sounds like a generous offer. Did you get any similar help yourself?

J.: I didn’t know of any other builders in this country when I started but I’ve found the ‘M’ Company themselves very helpful. I joined the company sponsored association which puts out a newsletter periodically. It contains a lot of useful information. There’s a tremendous amount of feedback from builders and flyers, mostly in the U.S.A., which provides a continuing process of improvement in the aircraft. I’m very impressed with this as a service to future customers and fellow builder/flyers.

G.: Do you plan to fly your Wing as a pure hang-glider or as a powered ultralight?

J.: That’s a good question. Originally I only thought of it as a hang-glider. I like to spend as much time as I can flying my flexwing and I can’t see myself losing interest in this form of aviating. Yes, I would still like to fly my Mitchell as a pure hanglider.

That being said, I’m also developing a strong interest in power, especially since spending a couple of hours on a Sky Trike. The Mitchell Wing lends itself very well to power, and I’ve purchased a set of Steve Patmont’s plans for a power conversion, with wheels of course. HiWays 160 power unit is ample for a Wing as clean as the Mitchell and it fits with only minor mods. to the mountings.

I think that learning to fly the Mitchell with power and wheels from a runway may have certain advantages compared with lobbing straight over the edge at Hay Bluff. I haven’t made a final decision yet though. In any case, even if I build the power options for the Wing it can still be used for either.

G.: Thanks a lot, John, and good luck. Nice talking to you.

J.: You’re welcome.

John’s address is: 16 Vaga Street, Hereford; tel. 53203. You can also purchase an information package on the Mitchell for about £4 from Main Air Sports of Rochdale, who are the U.K. agents for ‘M’ Company. Plans are about £48.

PLAN REVIEW
From Geoff Shine

THE MITCHELL WING

Over the past two years I have seen a steady increase in the number of plans available to the potential microlight aircraft home builder, varying in price from £10 to £50 or more but it was only recently I have had the chance to glance at a few of these. In some cases I have been quite impressed by the professional approach but in others appalled at the total lack of information and presentation of the package supplied. I was prompted to mention what a rip off some of these so called plans were to our newly appointed Ed. at the A.G.M., having recently seen an even worse than average example of the art hot off the press (clutched in the eager hands of an enthusiast asking me if I could possibly explain them to him!). In the bat of an eyelid our Ed. was there like a shot and I had been conned into writing a plans review, of several packages available, over a number of issues of Flight Line.

I will not be trying in these reviews to make any comment on the type of aircraft, flying characteristics, or general design of the finished product, only on the standard of the information supplied to enable the aircraft to be constructed.

The first review is of the Mitchell Wing, marketed by the M Company. The package consists of seven sheets of component, sub-assembly and final assembly drawings, approx. 36 in. x 24 in., accompanied by a component/material list and building instructions.

The drawings are mostly well drafted, with the lettering in bold, easy to read type. Many of the parts, including the rib outlines and leading edge shapes, are drawn full scale, making it easy to take off the plans and to check the final results of construction. I found very few mistakes on the drawings although one non-dimensioned view showed one extra section to the wing which should not have been there. Only the rudder component and assembly drawings were not up to this standard, being more on the lines of sketches, with handwritten instructions beside them; even so I had no problems reading or understanding the drawings. It is probable that this section was added hastily, when the addition of tip rudders was found to be more suitable than the original spoilers, which have been deleted on the other sheets. The accompanying assembly instructions are very detailed and contain several photographs of various stages of sub-assembly giving an excellent account of the construction of the components and final assembly.

There are three points which I feel could improve the presentation of the plans. The first would be a general description of the construction of the aircraft and method of assembly, in the form of an introduction to the drawings to enable the less experienced to understand them and get a feel for what he is constructing. The instructions themselves launch into minute detail immediately. The second point is that the layout of the drawings is just a little cramped and it would aid understanding if there were more sheets, with each view slightly less crushed together. Finally the component/materials list requires the actual amount of each material to be added to it, as this at the moment has to be extracted from the drawings and any errors could cost time and money.

In general I found the plans to be easily understood and well presented with all the information to enable a not necessarily experienced builder make an adequate job of constructing the aircraft. I was also impressed by the back-up service available from the M Company, in the form of a newsletter (at a small extra cost) published several times a year, with improvements and updates devised by other Mitchell Wing builders. The company also supplied a list of other owners of plans in Europe.

I must stress that the plans I reviewed were two years old and I was unable to study a new set as I had wished. I am certain that with the responsible attitude the M Company appear to take as aircraft builders, these plans have already been improved, giving an even better package.

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SAFETY MATTERS

From Brian Harrison

(On December 21st, 1980 Dave Jones was performing radical aerobatic manoeuvres on a Mk II Hyway Sky Trike coupled to a Large Solar Storm Wing. The wing broke up and crashed. Dave was killed by the impact with the ground: Ed.)

DO YOUR SUMS!

At the recent A.G.M. it gave me considerable pleasure, as Safety Officer, to report that although we had had several incidents throughout 1980, most of these had resulted, at most, in considerable aircraft damage, but comparatively little physical damage to the pilots concerned. Now, however, with the recent death of a colleague in the industry — Dave Jones — it is apparent from some comments I have received that there are considerable misunderstandings regarding the limitations of some of our aircraft. It is a well known fact in the aircraft industry, that if you take an aircraft into the air with the sole purpose of destroying it, then this can be achieved. Every aircraft has limitations and in general aviation these limitations are known and well understood by the pilot concerned.

Most of us who fly Sky Trikes have come from a hang gliding background and have come to regard current designs to be both stable and strong aircraft, capable of withstanding any in-flight contingency which the pilot is likely to encounter in reasonable flying conditions. To assume that these criteria still apply when you have bolted on your Sky Trike is certainly one of the biggest mistakes you could make in your flying career!

As some of you may know, until recently my company was involved in the manufacture of hang gliders and in doing so we were backed by Electra-Flyer Corporation where — dare I say it — new designs were tested in much greater detail than is currently the case with many European manufacturers. Not only are designs fully tested dynamically for both negative and positive loads, together with pitch stability, and the obvious changes in handling characteristics as loads increase, but full in-flight research, complete with cameras and instrumentation, is undertaken. In particular the G stresses on the glider under radical manoeuvres are measured and recorded on film (I have such film available to anyone who is interested). In this film a pilot weighing 126 lb. can be seen flying a 55 lb. glider. In past vertical wing-overs he is pulling 3 G, a stress load of 543 lb. If we assume the glider is stressed to 6 G it should be capable of withstanding 1,086 lb. and that, of course, is all quite reasonable and realistic, provided you remember that the pilot is fairly light for the aircraft he was flying. Now let's look at a current glider to which one of the new heavier engined trikes has been attached. Let us assume a 12' stone pilot (168 lb.) flying a 60 lb. glider with 125 lb. trike, making a total of 333 lb. If the pilot flies radical manoeuvres and pulls 3 that means he is pulling 999 lb. and that is damned near the limit I am sure you will agree. Not only that, the glider which he is flying has probably not been dynamically load tested, nor has it been assumed in the above calculations that with the extra mass, the glider is going to be flying at a higher air speed and more readily pulling G forces than the pilot-only hang glider. By now if the figures haven't bored you, you are probably saying, "Hell, I don't fly radical manoeuvres on my trike, so I am safe." Wrong! If you have ever found yourself in turbulent conditions, perhaps on an otherwise smooth day, where suddenly the battens rattled off the crossbar and you fell through a hole in the air; then when the glider bit the air again and steadied up, you probably pulled over 2 G. Now is the message getting across? In other words, what I am saying is that the stresses incurred by flying radical manoeuvres or turbulent conditions can be considerably greater than you thought, especially if you haven't thought about it at all.

Now I want you to think about something else which concerns me. In last month's issue of Flight Line, Mike Laundy gave an objective account of the difficulties of a non-hang glider pilot endeavouring to adapt to a Sky Trike. This problem has, of course, meant that many people have considered two man trikes for tuition purposes and several of these have already been built. It is immediately apparent that to lift two men off the ground requires not only a larger and heavier glider, but also a heavier and more powerful engine and trike. Now, if we assume that the accepted stress figures for conventional hang gliders are not to be compromised and start doing our sums, then you will see where the problems really arise. If we assume an 11 stone and 12 stone pilot are to be carried, then the figures are as follows:

- Pilot one: 154 lb.
- Pilot two: 186 lb.
- Heavier Trike: 150 lb.
- Strengthened Glider: 80 lb.
- Total: 552 lb.

In this case G would represent nearly 1½ tons! That just has to be some hang glider design! To summarise: I feel that if we ignore the figures, then those of us who are attaching larger and more powerful trikes to hang gliders are in danger of exceeding the design limitations of an aircraft which originally was never designed for this type of power application. It is therefore with that in mind that I remind you 'Trikers' to give very serious consideration before take-off to the design limitations of your aircraft and resolve to fly well within them.

CROSSWORD

Answers — for Flight Line Number 6
DOWN: 1 Mount, 2 Ate, 3 Pod, 4 N.A.T.O., 5 0tis, 6 Sleigh bells, 7 Sock, 9 Kasper Wing, 10 Miss, 13 Avid, 14 Met, 15 She, 16 M.O.D., 17 J.B.A., 18 U.N.F., 19 Ill, 23 Trim, 25 Wheel, 27 Crew, 28 Moon, 29 Nuts, 30 Sky, 31 U.F.O.

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GENTLEMEN AND FLYING ENTHUSIASTS

The Rotec Rally 28 Ultralight three-axis controlled aircraft does 45 m.p.h., twin tanks, quiet, 54" propeller available in kit form, or ready to fly, from £2,000 + V.A.T., deposit £1,000 and finance available to suitable applicants. Training School starting February 1981. For more details, telephone 0375-70096.
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SECRETARY'S LETTER

A Happy New Year to all of our members, old and new, young and mature.

1981: is it going to be a good year or not? We all here talk of how badly off we are, recession and closing down industries.

The one place that there is no time for feeling sad or having recession blues is the chair in my office or home that is next to the telephone. Having so recently become the B.M.A.A. Secretary makes me realise that there are real, enthusiastic people alive in this country. I would like to thank those people for their efforts, without which this organisation would be so very lacking.

Everybody wants to fly, and they all want to take off at the latest tomorrow morning. So where do we learn and can we get taught this afternoon?

This then is the line of conversation that I get involved in. How do we solve the problems of lack of centres to cater for our needs?

Easy! This is 1981, the year of DO IT YOURSELF! B.M.A.A. are taking the lead and we need your support in establishing clubs and centres throughout these British Isles. Think of it. Places where you can meet others of the same ilk. Where you can exchange ideas, learn new ways, discuss Safety and Laws of the Air and not be considered strange, and if you can get a social side to your club going, then there your wife and family can have an enjoyable time with other flying 'widows'.

How do we start? Is the next question. Either by an advert in your local paper or in Flight Line. Probably the local paper can be useful for free publicity if you show them a couple of pictures of microlights, but be very careful here — your local paper is in business to sell newspapers and many of them will try to sensationalise any story that get held of. So ALWAYS err on the side of SAFETY in any conversations with the press.

So where do we get together initially? Possibly a local hotel or a civic centre has a room that you can rent for the evening at a nominal fee.

Try to meet at a central location and get a list of all names and addresses of those that attend. There may be others who cannot make it on that particular evening, so try to hold at least one meeting per month. Perhaps you can attract a member who owns a microlight somewhere in your vicinity to come and give a short talk about how and where he learnt to fly.

If not, then try one of the manufacturers or their agents for brochures and information about their products, gradually building up a library of information on the various types of Trikes, Flex-Wings and Rigid Wings, etc.

Get hold of an old 1 in. map of your area. Look on it for all the old airfields that used to be in existence all over these islands.

Try to find the present owners and approach them, as cautiously as you approach the press, with a view to their allowing you to use the place as a flying centre. Obviously there has to be insurance coverage to put their mind at rest, but remember, DIPLOMACY has prevented many battles and it could get you a flying field. Later on you could even let your benefactor become an honorary member of your club. If no old airfields, then try a local farmer who may have a long flat field, away from trees and other obstructions.

Give yourself a name! Try to ensure that it reflects your club and do not let anyone bring it into disrepute. Remember that everyone remembers the bad things long after the good things have been forgotten.

Whilst all this is going on, keep in touch with B.M.A.A. — we will do our best to guide you if you have difficulties, to advise when this is necessary and to lead when there is no other way. Self help is the most rewarding virtue that we all possess.

The club can be the means that enable you to become a part owner of a microlight; many would-be aviators simply do not possess sufficient funds for outright purchase, so clubbing together with other members can be the means towards getting into the air.

Elect a Club Chairman, Secretary and Treasurer to start with. Ensure that all members belong to the B.M.A.A. as everyone is going to benefit from the hard work that your voluntary B.M.A.A. committee members are putting in.

You can then get your club affiliated to the B.M.A.A. and form part of our rapidly expanding family.

For those of you who have attended any sort of Fly-Ins, I'm sure that you all have pleasant memories to look back on. The clubhouse at Felthorpe was no exception during the Norfolk Air Race and the atmosphere was really good there. Thank you all at Felthorpe for your hospitality, Mary and I won't forget you in a hurry.

If you haven't been to a Fly-In, then you have that joy in store; but, please don't expect to be waited on hand and foot, you have to join in and help if you wish to enjoy it. If you have a fellow club member with you, then you are not alone, and that's a good start. If you do happen to turn up at some venue on your own, then try to get to know some of the people around you. Remember, microlight fliers are ENTHUSIASTS and they will be only too glad to talk to you about flying, weather, instruments, SAFETY, etc.

BUT! As and when you get into the air remember that the B.M.A.A. has no time for showoffs: we aim to get enthusiasts into the air SAFELY. If you are the type that wishes to fling an aircraft all over the sky, then go join the Barnstormers and buy one of their type aircraft. They can use you, we certainly cannot.

We aim to fly low, slow and quietly, remembering that the sky can be a place of joy as well as becoming rapidly congested at the wrong time. So we have to be alert and keep both eyes open for other air users at all times.

Remember that wherever microlight aircraft are seen, static as well as flying, we are on show to the general public. Let us make it known to all concerned that we in the B.M.A.A. are capable of self discipline and can keep our own house in order.

Best wishes to you all for the coming year. Let's make it the year that your club got off the ground.

Ron Bott,
Secretary, B.M.A.A.,
20 Church Hill, Ironbridge,
Telford, Shropshire TF8 7RZ
CONTACT!

Keith Jones is forming a local microlight club. He has a private landing strip near Oxford and can provide buildings and other facilities. Contact him at: 54 HAYFIELD ROAD, OXFORD OX2 6TU.

WESMAC Sport Flying Club was formed some months ago when I and a couple of friends, being enthusiastic about flying but not sufficiently affluent to pay out for conventional aircraft flying, decided to get ourselves a microlight. We spent many weeks investigating all that would be involved - types of microlight, the acquisition of a suitable site, etc. - and then decided to form ourselves into a club for organisational purposes. We next decided to advertise in the local press for other enthusiasts to join us, hoping both to recruit expertise and to find one or two others to share the cost. The response was better than we had anticipated, and we had to limit the membership number to suit the limitations of flying time imposed by the club's initial ownership of only one aircraft (intended ownership, that is). However, if — as we hope — we can run to a second microlight this Summer, we will extend the membership accordingly.

Our club now consists of 5 Owner Members (those buying the aircraft and making up the Committee) and three Associate Members. Among the Committee are two P.P.L. holders, a glider pilot, and an engineer, and we have been offered quite a good site by a local farmer. So we're all set to go as soon as we take delivery of a microlight and our two Flying Instructors Designate and our Air Safety Officer have completed a microlight flying training course. All being well, we expect to be in the air some time during April.

Unfortunately, a "Fly In" site in this area wouldn't be on because of our proximity to Gatwick Airport, and Shoreham not far away. But we hope at a later date to get the use of a suitable site for Fly Ins, possibly the ex-R.A.F. station at Thorney Island, as we would like eventually to be in a position to "host" other clubs.

Although it is likely we will go for a new microlight, we do not preclude the possibility of a second-hand machine, so would like to hear from anyone with a good fixed wing for sale. Contact the Club Secretary, Patrick Hassett, at: WESMAC, 1 WOODSTOCK CLOSE, HORSHAM, SUSSEX. Tel.: (0403) 51434.

SMALL ADS

Small Ads are free to members of the B.M.A.A., 40 words max. Commercial Small Ads are £2 for each insertion, 40 words max. Please make all cheques payable to B.M.A.A.

NONE?

Some of you out there must have aircraft or equipment to sell.

Small Ads are FREE to members. Send them to: SMALL ADS, FLIGHT LINE, 11 SCHOOL HILL, WRECCLESHAM, FARNHAM, SURREY.

INSURANCE: would the member who spoke to Nick Regan at the A.G.M. about an insurance company offering lower rates for microlights, please contact Nick.

FLIGHT LINE back issues Nos. 3, 4, 5 and 6 are available at 50p each. Contact: Ron Bott, Secretary B.M.A.A., 20 Church Hill, Ironbridge, Telford, Shropshire, TF8 79Z.

CALENDAR

MARCH 15th-21st: 7th Annual E.A.A. Sun 'N' Fun Fly-In, Lakeland Municipal Airport, Lakeland, Florida, U.S.A. Contact: Betty Jones, 4195 Forrest Drive, Mulberry, Florida 33860.

MAY 2nd-9th: Shanklin Show 1981. Full details for microlight participants in the next issue.

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