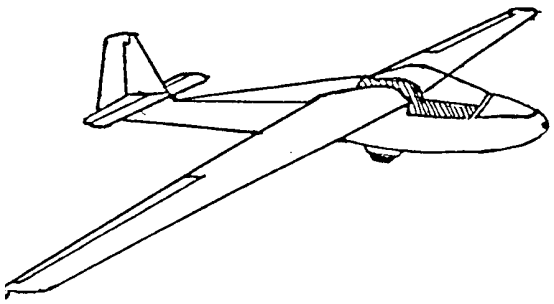


The HOMEBUILT SAILPLANE
ASSOCIATION

P.O.Box 503
LOXTON,5333
Sth Australia
AUSTRALIA.

No 7,FEB 1996

## EDITORS CORNER

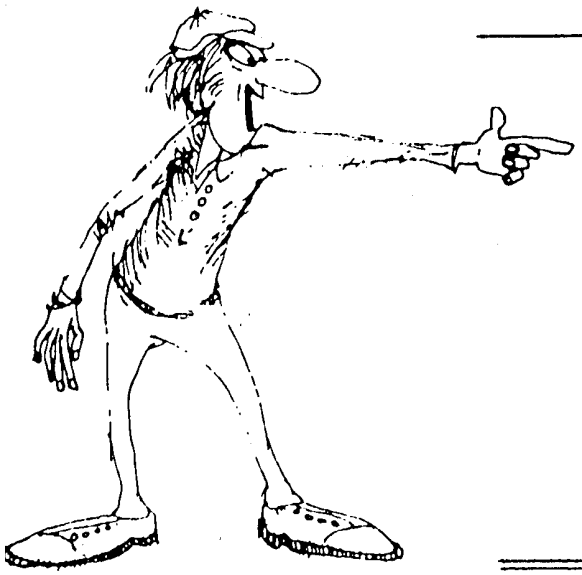
OK,Welcome to 1996,I hope everybody had a happy and safe new year,I also hope your new years resilouition is to do more glider building!

Well,the very first Homebuilt Sailplane Assoc regatta has now been and gone,I have made a report which is enclosed inside this issue,so I won't say to much here except, HOO HAA,what a buzz,a great time was had by all and we are already making plans for the second regatta,so I'll keep you posted as things progress,but plan to attend if you like relaxing and fun mixed together.
This months technical sermon is once again from Gary Sunderland,all about Statics and Aerials and Static calibration systems,we have a few gliders around the place nearing completion,so I think this sermon could come in handy.

My Woodstock is very slowly but surely coming along,I have rebuilt the rear fuslarge to incorpirate the origional fixed tailplane system,the stabilizer and fin are both mounted on the fuslarge although neither are skinned yet,the elevators have been started and the control coloum bearings are being made so soon I should be able to get the 'pullin ger pushin shtick verkin' and then pile in the cockpit and play around like I'm at 10,000' under Cu,after outclimbing every piece of plastic in sight,or something like that anyway!,I can't spend as much time as I like to due to work commitments,but it is still moving,if only at snails pace,still,slowly but surely.
In my normal whingeing way,I ask all you people out there to please send me a letter or phone me and let me know what you are doing out there,the newsletter is only as good as the member input,even a little report as I have just made regaurding my progress would be good,we are all intrested in what you are up to,so,lets go,pen to paper and send the guff in,OK?
Well,time to get on with the 'guff'that I have in my hot little hands,so read on.

---

We have another 'first' for this newsletter,it's genuine 'small print'just to cover the 'legal guff',it was really big in the last issue,so I suppose everybody saw it so now we have it in the 'new reduced size' to use up less of our precious space.....



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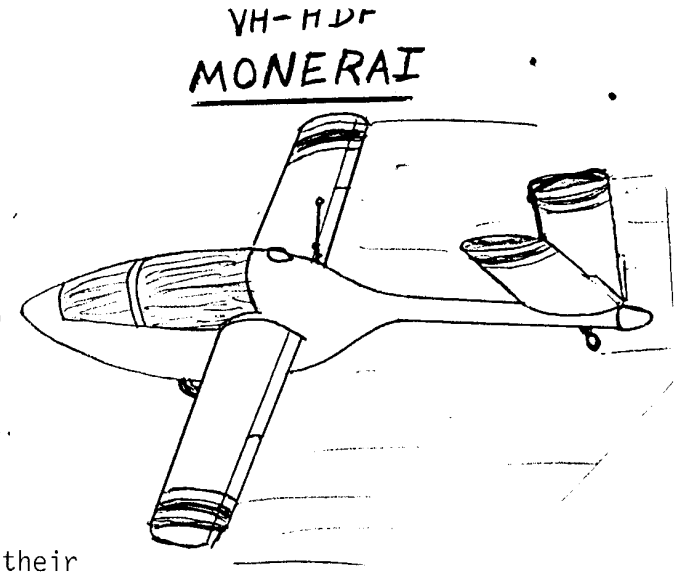
SUBMISSIONS

Manuscripts submitted for considiration should be type written or neatly hand written. Photos should be captioned and credited.All homebuilt sailplane/motor glider related material welcome.

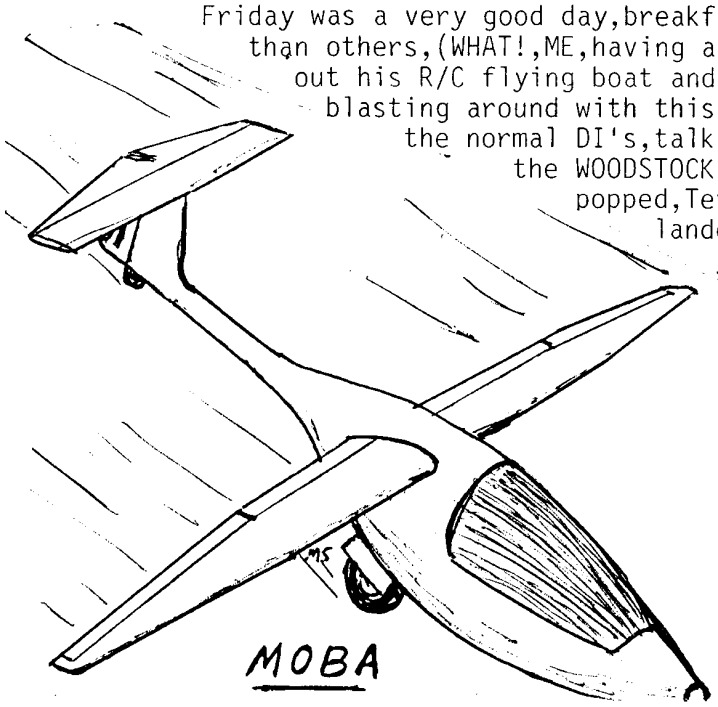
## OUR FIRST REGATTA

by Mark Stanley.



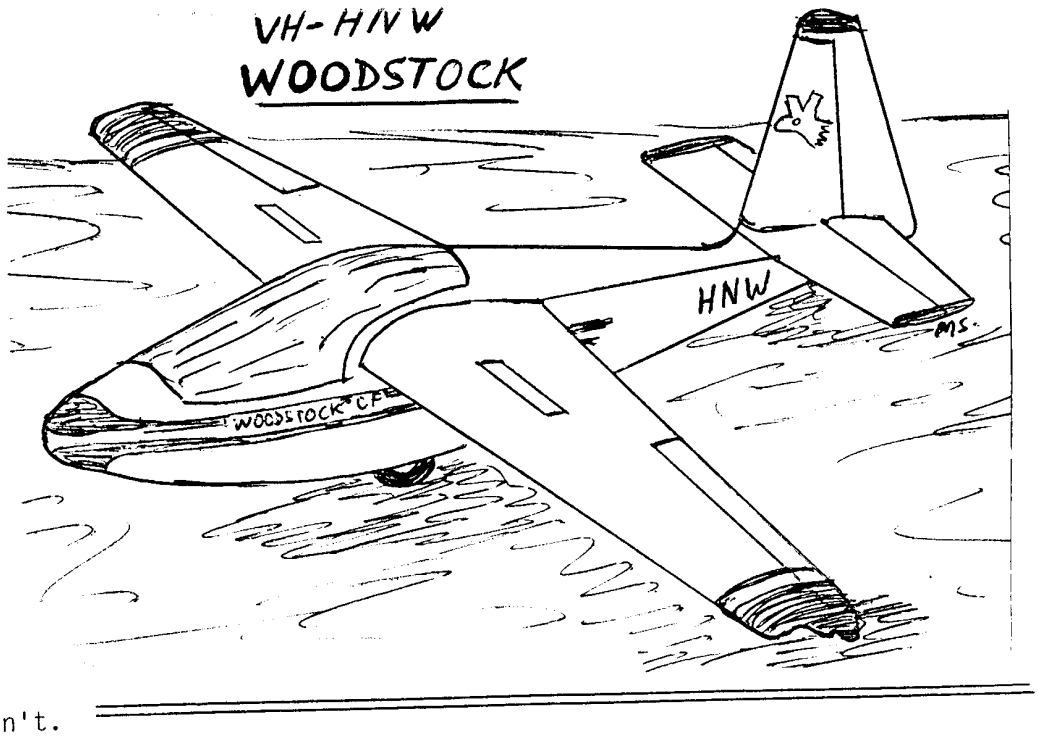

Well our first regatta has now been and gone,I think all who attended had a really good time. The main theme was on on fun,there were only basic prior arrangments made with 'doing it--as we felt like it' being the order of the day,day one was Thursday,4th January, this also happened to be the first day the the Vintage Soaring Assoc regatta were able to fly,the weather was not kind earlier in the week,the wind was still blowing as it had been all week although not as strong,plus there was still a fair bit of cloud around,but we all braved the conditions and rigged the gliders.
Peter Raphael and Terry Whitford brought along their WOODSTOCK(VH-HNW),Malcom Bennett brought along his MONERAI--'P',(VH-HDF),and I dragged along my NYMPH,which is a vintage glider as my WOODSTOCK is still being built.A new member,Kevin Parkinson from Beechworth whois co owner/buil--der in a DUSTER also attended for the 4 days.
Another new member,James Garray form Melbourne also visited for the day,James is also building a WOODSTOCK and is skinning the main wings at present,we look forward to seeing both these aircraft in the air very soon.
Lots of hanger talk went on first and we didn't fly until the afternoon,Peter flew the Woodstock for 1-1/4 hours with a max available altitude of 3600 feet.Malcom had 2 shorter flights in his Monerai,I also had two short flights in my Nymph.
After I landed,Peter and Terry offered me a flight in their Woodstock,no further prompting was required to get me in the cockpit,after a breifing we(Woody and I) head--ed for the blue yonder(well,patch's of blue,the rest was grey),this glider is a thourgh delight to fly,the controls are very light and responsive,even at 30-31kts in a thermal,it is stil very stable and responsive,the stall is very docile,it is very quiet,visibility is excellent,you look over the top of the wing in normal flight,and by leaning forward a touch,you can look under the wing,magic stuff!
My flight was only 40 mins,but to say I was VERY impressed with the Woodstock,would be an undertstatement,I am now in a bigger hurry to get my own Woody in the air,so thanks for the flight fella's!

We move on to Green lake,about one km down the road after tieing the gliders down for the night,a barby was held,and into the photo's of everybodys photo's from their pro--jects.Then it was bed time for everybody at a 'respectable' hour of the night,sleep followed for SOME of us,there were 3 tents,the one in the middle sounded like a symphony,with a bass singer with backup vocals,as I said,sleep for some!




Friday was a very good day,breakfast was had with some having had MORE SLEEP than others,(WHAT!,ME,having a shot,not likely mate!)anyway Peter dragged out his R/C flying boat and we headed for the lake front,spent a while blasting around with this model and then headed for the airfield,after the normal DI's,talking etc we got airborne. Terry was up first in the WOODSTOCK,the day was magic with CU's all over once it popped,Terry had a 1hr,36min and an ALT of 6700,then landed to let Peter have a shot at it.In the meantime,Malcom launched and had a nice time with a 3 1/2 hour flight and 6300ft.
Peters flight lasted 2hrs,19min and had a max altitude of 6500.I once again flew my NYMPH with 2 1/2 hrs and 6500 ft,my flight was finished with a round of aerobatics,top fun.There were a few occasions when the Monerai,Woody,Nymph and assorted vintage gliders were milling around in the same Thermals,all very nice to look at,magic gear

NEXT PAGE.....

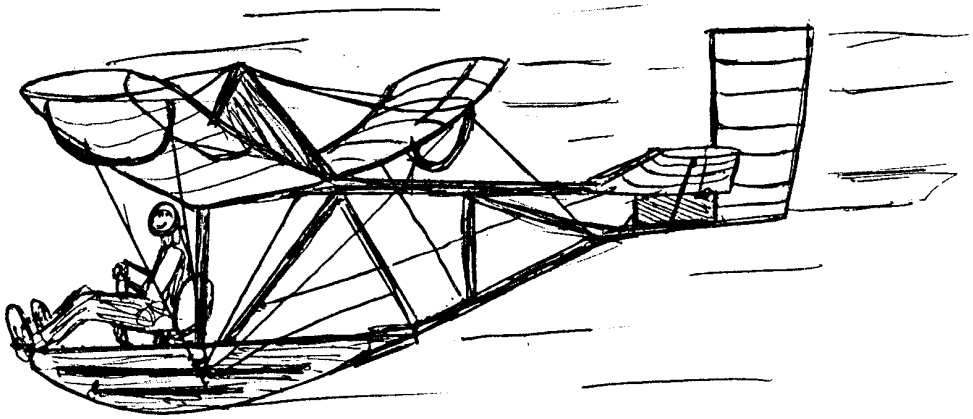



First Regatta, Con't.

Another new member joined us at the regatta on Friday, Paul Johnson of Wyndhamvale, who is building a WINDROSE, Paul said he has the fuslarge 95% complete and the tail surfaces are coming along nicely, he and his wife are using the tail surfaces as practice runs before tackling the foam cutting for the main wing panels, this seems to be common to most homebuilt projects as it is much cheaper to throw away a small part than a large, bit, the wallet likes it better.

Another intresting part of the day was having a flight in a ZOGLING PRIMARY glider, this is a replica built in the early 70's but designed in the 30's, this glider was built by Ken Davies, so it also is a homebuilt, so, it was welcomed with open arms!
For anyone that dosn't know the Zogling primary, it was the type of glider used to train many of our early pilots and start many gliding clubs in Australia, and the basic design was used worldwide as a basis for similar aircraft. They are naturally fairly basic with just a seat, rudder bar and control colum, the pre take off check is fairly -

ZOGLING PRIMARY



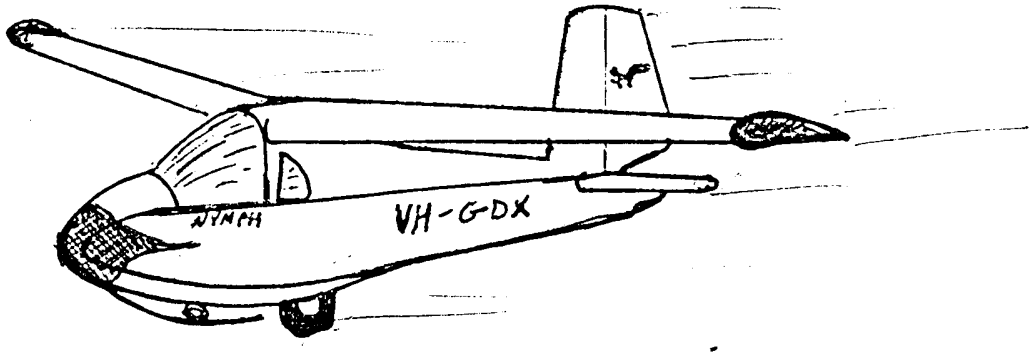
basic which match's the glider, the style is sort of varying according to who you speak to, but mine was this, Harness, controls, wings still on, wind, rope..go. yes, a fun little machine, but it is very hard for me to imagine what it must have been like to LEARN to fly in this style of glider, full marks to those who did!
Duering the day, a friend of Terry, Peter, Kevin and Malcom's arrived in his Lake buck--ineer amphibiam, these blokes went into Ararat to the pub for a counter meal, I stayed with the Vintage group to catch up on 'news', later that evening, I shot back to the Lake, had a cuppa and hit the sack, when, once again, that centre tent was haveing a 'JAM -SESSION', (honest, I'm not not haveing a go at the centre tents occupants!), so, some of us got more sleep than others, (trust me, I'm not stirring!), anyway, we survived the night, had another few flights of Peters float plane then went to the airfield.
Not allot was happining, so we got our R/C gliders out, which by the way are a very nice design of Peters, being a fibreglass pod, carbon fibre boom and built up balsa wing, so, this means that they are HOMEBUILTS!, anyway, Peter then pulled out his R/C "Citabria", and we did a bunch of 'aerotow' launch's, much to the amusement of some people, still, it

FIRST REGATTA con't

The rest of Saterday was a bit of a 'fizza',as the weather threatend to turn foul,with thunderstorms and so on around the place,we felt it was a rather good idea to put the gliders in their box's and keep them safe,as it turned out pretty well all of the rain missed the airfield,but it was a nice feeling knowing that our pride and joys were safely tucked away.
During the morning,assoc member,Tim Berkes and his mother,who is visiting Australia for a short time joined us at Ararat,Tim didn't see any-thing fly that day except some vintage gliders,but got to get an in depth look at the glider he would like to build, the Monerai,so if anyone out there has some imfo as to the where abouts of a MONERAI KIT,please give me a call on Ph-(085)413 227 or send a letter to Tim at 32 Fawkner Cres,East Keilor,3033,this would make him a very happy man.

The presentation dinner was held in conjunction with the Vintage Soaring Assoc dinner, (as was the Homebuilt regatta itself),a nice,relaxed evening was had by all,with the lady's from the Grampians Soaring club putting on an exellent meal,the catering during the week by these dedicated few was excellent during the week of the Vintage regatta, plus our regatta from Thursday to Sunday,so,thanks lady's,for a job well done.
The first batch of trophys for our Assoc were handed out as follows:Best Timber Sail--plane'went to Terry Whitford/Peter Raphael with the WOODSTOCK,Best Metal Sailplane', went to Malcom Bennett with the MONERAI,Best Compisite Sailplane,went to Gary Sund--erland,with his MOBA-(My Own Bloody Aircraft). I neglected to mention Gary had delivered his MOBA to Ararat earlier in the week but only arrived at the regatta on Saterday,due to competing in the Australian Nationals for Model Aircraft.
Gary and his wife riggeed and flew the MOBA despite the threatining weather.
This is also the first time I have personally seen the MOBA,it is an impresive air--craft,and I think the Compisite award was well fitting for this glider,as it is fibre -glass,metal and timber!
The only other trophy awarded was for 'the longest distance travelled to attend", for this one you don't need a glider,just be an association member(current of course). This one went,much to my plearsure,to ME,can't say I mind!
Some may say that there was no compitition amongst the winners of the trophys for the various aircraft types/structures,I say that this is just the beginning,and the quality of workmanship in these aircraft is very impressive and this in itself desereves to be awarded,and so it was,as our group gets larger there will be true compitition amongst the owners and their gliders,this will of course be good as it helps to keep the standards at a very high level,and encourages others to get in and have a go.
The Sunday arived looking rather overcast so I jumped in my car and towed my bird home for a well deserved rest,I dont know what everybody did,but I had to get back to the real world and work on Monday some there was no choice,still,I feel that I can saftly say that our first Regatta was a complete success and we all look forward to next time which at this stage is still to be decided,but will probally be held in conjunction with the Vintage assoc again,as this theme worked very well indeed,with intrest from both groups to each others machines,and genral 'fly for fun'attitude toward the dual events. I will keep you informed in this newsletter as to updates Re next regatta.

VH-GDX
ES-56 NYMPH

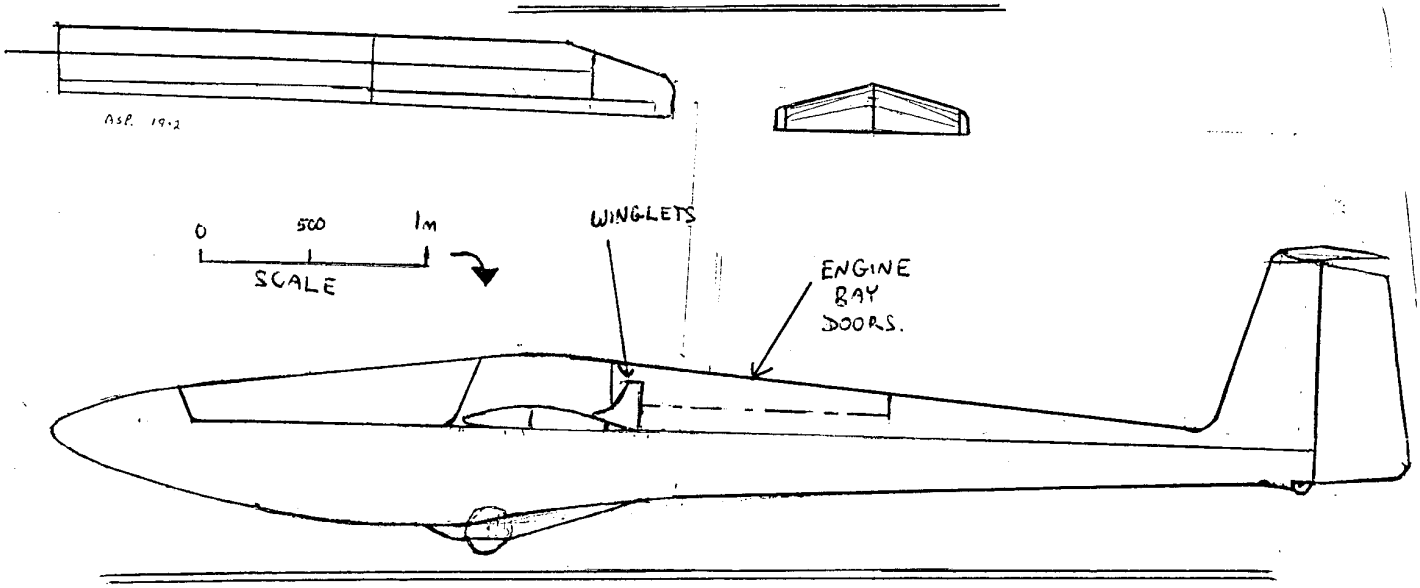



In closing, I would like to thank our hosts,the Grampians Soaring Club for their exellent running of things duering the regatta,they are a very friendly crowd,so drop in if you are going past,also,once again,thanks to the ladie's with the catering, thanks also to the Vintage Assoc for allowing us to join in with them duering their regatta and finally thanks to all who helped make this first regatta a succesess,I look forward to many more in the future,see you there.

Mark Stanley.

## MOTOR GLIDER UPDATE

A while back Garry Morgan reported that he was designing a 15m motor glider,he has just sent me a letter with some new imfo plus a side/top view for the proposed aircraft.Gary also reports that he was heading for the HSA regatta flying one of his ultralights but bad wheather forced him to turn back.(I can relate to this with an--open trailer for my NYMPH-ED),upon arriveing home he had more bad luck finding that his garage had been broken into and all his tools stolen.
Despite this setback,Garry plans to begin construction of his glider early this year, begining with the fuslarge plug and then takeing moulds from the plug,mainly the lower section of the fuslarge.
Also,the centre fuslarge truss which will be made from steel to carry the U/C,wing and motor mount will be constructed.
Thanks for the update Garry,this is the type of thing I ask people send in so we can all keep up to date on other members projects.
Anyway,below is the genral arrangement of Garrys aircraft.




## CLASSIFIEDS

**Cherokee,VH-GLV,**Fully Restored,with ground handling gear,enclosed trailer,new fabric + paint,$4500,ONO,
Ph Garry Morgan,018 253 466 or(02)525 4352(AH).

**Remember,**Adds in this section are free to HSA members for aviation related items.

## POST REGATTA FUN.

After the HSA regatta,Malcom Bennett and Peter Raphael continued to fly but this time from their base airfield at Nagambie(Vic),both pilots had a very nice flight of 200km, Malcom in his Monerai and Peter in his Woodstock,the first aim was to fly to Euroa, but the day was so good they kept going to Benalla and then headed for home,the max ALT was 6500 and Peter had a low spot on the way home of 3000.

Peter and Malcom are both members of the "Smithfield Soaring Group",they operate from a private airstrip at Nagambie,they are currently building clubrooms,toilets etc after having built a hanger for the gliders.
The long term aim of this Soaring group is to foster sports or fun type of flying amongst it's members,no training will available as the private pilot who's first love is low stress,fun flying is the main target for members of this group.
Vintage and Homebuilt aircraft which suit this style of flying are being actively encoraged to join in the fun,when not flying full size,Radio Control models are also flown which go's along nicely with the Fun theme.
The launchs(full size) are Via Mike Smith in his 150 Citabria,which also suits the type of aircraft flown there.
If you would like to visit this friendly group,further information can be obtained from Mike Smith at RMB 2241,Nagambi,3608,or Telephone (057)9472 84.

## NEW MEMBERS

We have 4 new members this time,as is the norm,I would like to welcome you all to our group and hope we all benifit from each others expiriances.

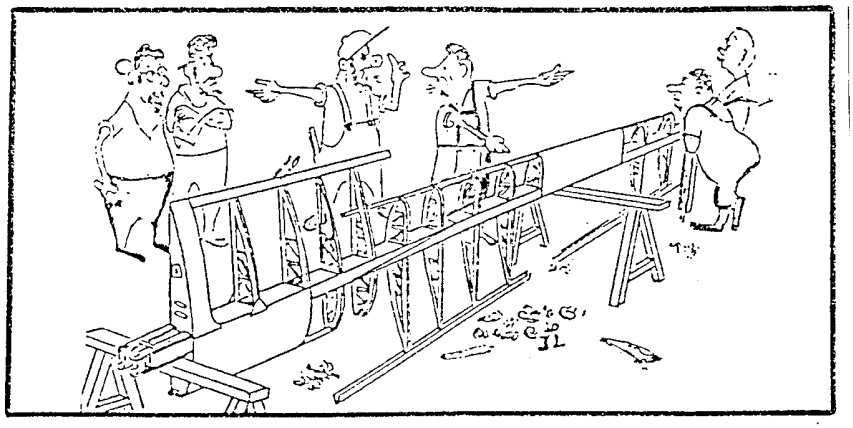
MALCOM BENNETT, from Mordialloc in Vic,owner/builder of **Monerai P**, Co owner/builder in **Duster** still under construction.

KEVIN PARKINSON,from Beechworth,Co owner/builder in **Duster**,same aircraft as above.

JAMES GARAY,from Kings Park(Vic),Building a **Woodstock**,approx 80% completed,wants to build a **Minimoa** after the Woodstock is completed.

PAUL JOHNSON,from Wyndhamvale, Is building a **Windrose(13m)**,has previously built a **Whing Ding** ultralight.

Also,one of the original members has rejoined our group,Terry Whitford from Stanley in NSW(Top name for a town that,STANLEY!) Terry is co owner/builder of **Woodstock** VH-HNW, also is co owner/builder in the Duster mentioned above,so,WELCOME BACK TERRY.



TECH TIME

# STATICS AND AERIALS

**HAMMER & SOAR**
**by Gary Sunderland**

Two equipment items worth considering at an early stage in construction are the instrument static system and the radio aerial.

Clean "zero drag" installations are to be preferred of course, which means building the systems into the airframe. This is best completed early in the project when the structure is open.

If details of the static system are not provided in the drawings, the static holes should be located to produce the minimum error in the system.

Figure 1 illustrates the problem of locating the static holes on the fuselage of a glider. This has been reproduced from "Aerodynamics for Glider Pilots" by courtesy of the author, Henry Millicer, and illustrates the relative air pressure on a wingless fuselage in an airstream. Pressures higher than normal static are shown as positive and pressure less than static are shown by a negative sign.

The figure shows that the middle point of the tail boom is a good area to locate the static ports. Actually the pressure field about the wing and tailplane have a significant effect and the optimum position is somewhere between half-way and two-thirds of the boom behind the wing.

To overcome yaw effects, at least two ports are required and it is more usual to have four holes arranged in "X" form. The lower pair of holes act to drain any water out of the system.

The ports should be robustly constructed so that failures and leaks will not be likely. It will be a difficult job getting back into this area again for maintenance!

A good robust material to run forwards as a pressure line is commercial ¼ in. nylon air line. This is available from machinery suppliers like Bearing Service Co. Clear PVC tube is used for connections. Make sure this is not the very flexible hospital variety and lash all the connections secure with lockwire.

As an alternative, you could use NYLO-SEAL tube and fittings available from aviation supply houses.

Other, less satisfactory, positions for the static ports are:

1) in the sides of the front fuselage – usually involving large pressure errors with speed:
2) incorporated in a pitot-static head in the nose – also subject to this problem and in addition the head is liable to be removed by the tow rope.
3) at the wing tip – impractical for a glider but a possibility for some motor sailplanes.

The pitot head, used to measure the dynamic head or ram pressure, is usually located in the nose, inside the profile and sometimes sharing an opening with the aero-tow hook.

A problem with this arrangement of nose pitot and tail boom statics is that we can have a dynamic response error, due to the instant response of the pitot head relative to the slow response of the tail boom static. This lag is not sufficient to affect an airspeed indicator but evidently can affect some variometers.

One idea I tried was to mount the pitot and static head together on the fin. Figure 2 shows the combined pitot-static and total energy heads on MOBA. This seems to work fine with the variometers but the static holes here are too close to the tailplane to avoid some static error. For accuracy these should have been located at least one tailplane chord ahead of the tailplane.

Having made the best choice, depending on the designer's recommendations and your own requirements, complete the plumbing of the system and seal the ends against dust. Calibration of the system will be covered during flight testing.

Installing a fin-mounted aerial in a wood or glass sailplane is no particular problem and can be carried out during building or when the sailplane is completed without too much trouble. Actually the best spot is at the back of the fin, rather than inside and consequently inaccessible.

A simple and efficient aerial can be obtained simply by stripping back the coaxial cable to the appropriate length for your frequencies, with the braided tail laid below and the whole lot fibreglassed into the corner of the fin spar. Your local friendly radio bloke will be able to advise you on the optimum aerial length and other details.

Please do not mount your aerial externally, as on a powered aircraft. The drag of a typical whip aerial is as much as half

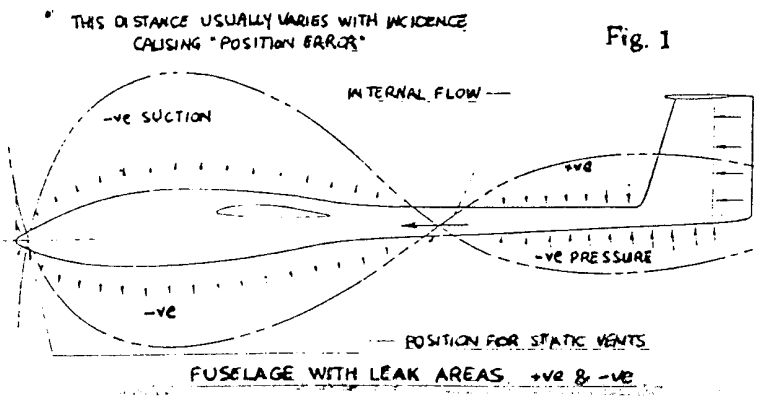



Fig. 1

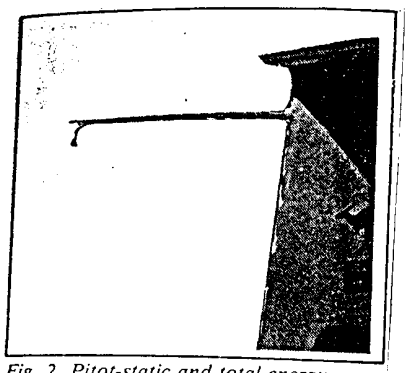


*Fig. 2. Pitot-static and total energy head installation on Moba 2.*

the tailplane. A particularly bad location is above the wing centre section. Fine for radio performance but not much good for the sailplane. The accelerated airflow in this region will increase the drag of the aerial more than ever.

If you are building a metal sailplane and wish to fit a radio, then installing an aerial can be a problem. When building the MOBA I was able to overcome this by designing the fin with a false leading edge of fibreglass, inside which the whip aerial is mounted. (Figure 3).

This aerial is somewhat directional but is very efficient in the direction of flight. This is evidently because the metal fin behind tends to radiate the signal forwards. The signal is particularly good when running towards a start gate or finish line, although I sometimes have difficulty reading when circling out on track, beyond 100 km from base.

For an all-metal sailplane we may have no real alternative to mounting the aerial externally. This can involve quite a performance penalty. If anyone has any ideas how this problem could be alleviated, please let us know.

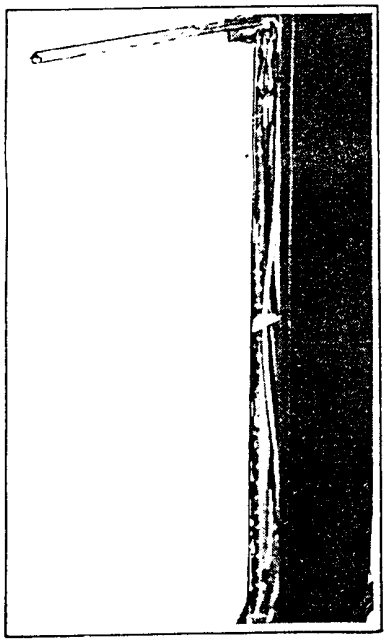


*Fig. 3. Moba fin with false leading edge removed to gain access to aerial and pitot-static plumbing.*

# STATIC CALIBRATION SYSTEMS

HAMMER & SOAR
by Gary Sunderland

After the initial flights of a new aircraft it may be necessary to conduct a static system calibration.

If the aircraft is of a series and is exactly the same as an aircraft which has previously been tested, then a calibration may already be available. This information is often not provided for home-builts and they also vary significantly from one another, even when built from the same set of plans.

In particular, a builder will sometimes re-locate the static ports or vary the local shape of the fuselage slightly near to the ports. This can alter the static pressure being sensed by the air speed indicating system and thus the indicated speeds.

One way to check this effect is to measure the static pressure actually provided by the ports over the speed range of the aircraft and compare this with static pressure in "free" air. An aircraft in flight will affect the surrounding air pressure for some distance and it is necessary to measure the air pressure at a place about one wingspan from the aircraft.

Fortunately we are only concerned here with comparing static pressure. A pitot intake is relatively free from error and can accommodate up to 15 degrees of local airflow gradient. Thus for our purpose it is only necessary to compare the static pressure at the instrument port with static pressure at some point remote from the aircraft.

We can do this if we have two airspeed indicators of known error connected to the one pitot, with the static side connected in one case to the aircraft system and in the other to a trailing static.

The usual trailing static "bomb" has been described by Johnson, in *Soaring**. As the name implies the static "bomb" consists of a faired and finned metal shape which is lowered from the aircraft and trailed behind.

The bomb is difficult to manufacture and usually is relatively heavy, to make it stable on tow when suspended by 10 to 20 metres of 5mm bore PVC tubing. Being relatively large, the bomb also affects local air pressure. It is necessary to calibrate it in a wind tunnel and apply appropriate corrections to the flight results.

In practical application, the trailing bomb system has many other disadvantages, particularly in relation to testing small light aircraft and home-builts.

The 'bombs' are not readily available and they are relatively expensive. They have to be secured to the aircraft for take-off and deployed in the air. This usually necessitates a relatively large "hatch" somewhere in the aircraft. Being so difficult to deploy and retrieve explains why they are frequently lost during the exercise!

Accommodating 10 to 20 metres of plastic tube inside the cockpit of a small home-built aircraft or sailplane is in any case often impossible.

In 1970, the Airworthiness Performance Section of the Department of Civil Aviation began to experiment with a towed cone static system. This was based on the system in use by the Boeing Company in the USA, but scaled down to suit a light aircraft.

The DCA static, as originally employed, consisted of a length of 5mm outside diameter brass tube, drilled near the centre with static ports. Both ends were connected to PVC tube. The trailing end was sealed and about 3 metres of PVC tube connected to a swivel and attached to the cone.

The cone itself was originally a fibreglass plastic moulded cone, about 50cm in diameter with several 10cm diameter holes incorporated to promote stability in the air.

This system is not stowed in the aircraft but is at all times towed behind, including take-off.

The system was initially flight tested behind a DH Beaver and proved completely satisfactory. The cone is perfectly stable in flight and measurements with a sensitive pressure comparitor proved its accuracy.

The initial DCA design was still rather

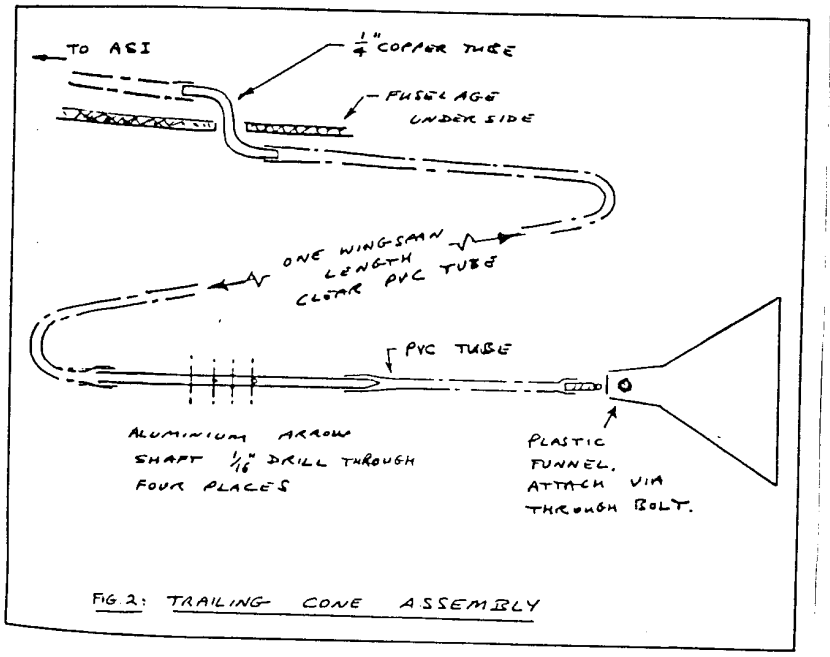



FIG 2: TRAILING CONE ASSEMBLY

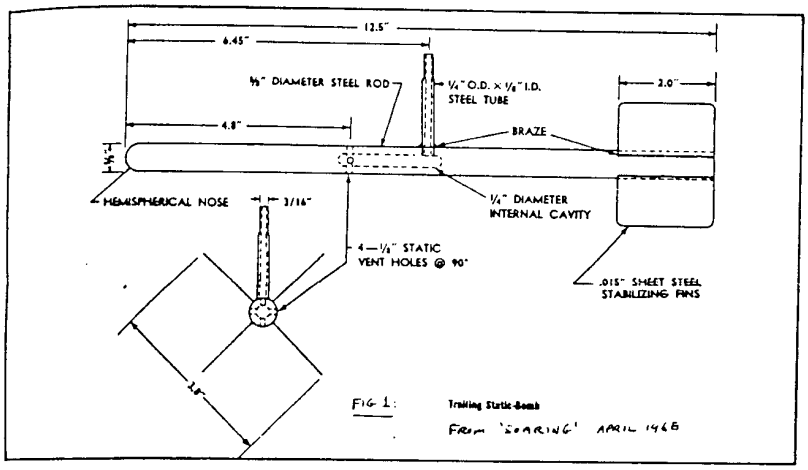
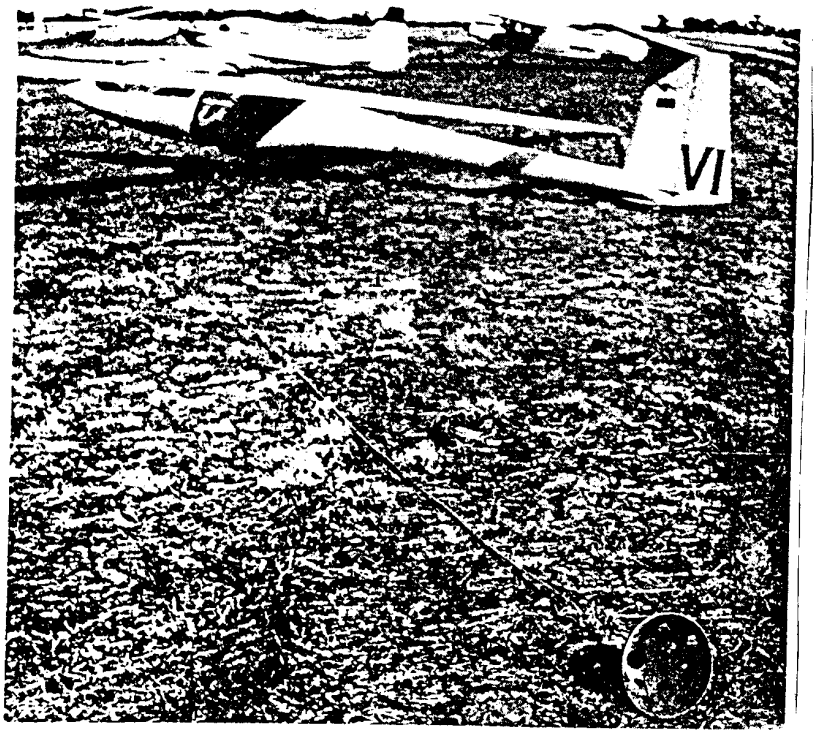



FIG 1: Trailing Static Bomb
FROM 'SOARING' APRIL 1968



large and heavy for a sailplane and a lighter version was developed by John Laycock, a performance engineer with the Department of Aviation. This was tested behind a Blanik and subsequently used to calibrate the writer's MOBA 2 sailplane and also Mike Burns' BG12.

Details are provided in the illustrations. Note that the whole trailing static system consists of cheap and readily available items. Thus any builder can now make an inexpensive calibrating system and accurately check the static error on his aircraft for a few dollars.

At the forward end we have a piece of copper tube which passes through a drain hole in the lower fuselage. Alternatively the plastic tube will have to be anchored to some point in the nose and lead out through a canopy vent opening.

The static sensing element is an aluminium arrow shaft purchased from a sports store which caters for archery. The arrow shaft is drilled through at various directions near its centre with a 1.5mm bit. This is not critical but any protruding metal on the outside needs to be filed smooth.

The arrow shaft is connected with the point to the rear. The PVC plastic tube should be a good fit onto the arrow. Lashing with lockwire is probably not necessary.

The cone is an ordinary 40mm plastic funnel from the local hardware shop. The original had several holes bored to lighten it and was fitted with a fishing swivel to the plastic tube. These measures were probably unnecessary as the funnel is completely stable in flight.

Two ASIs are required and one of these should have been calibrated recently. The second ASI can then be calibrated from the one with the known error by teeing the pitot and static lines to both instruments.

For the static calibration flight, one instrument has its static connected to the trailing cone. Readings can then be taken at intervals between 40 knots and 80 knots, say for one configuration, gear up and flaps zero. This is repeated for other flap settings. Usually it will be found that gear and canopy position have no effect on the readings, but this can be checked during the runs.

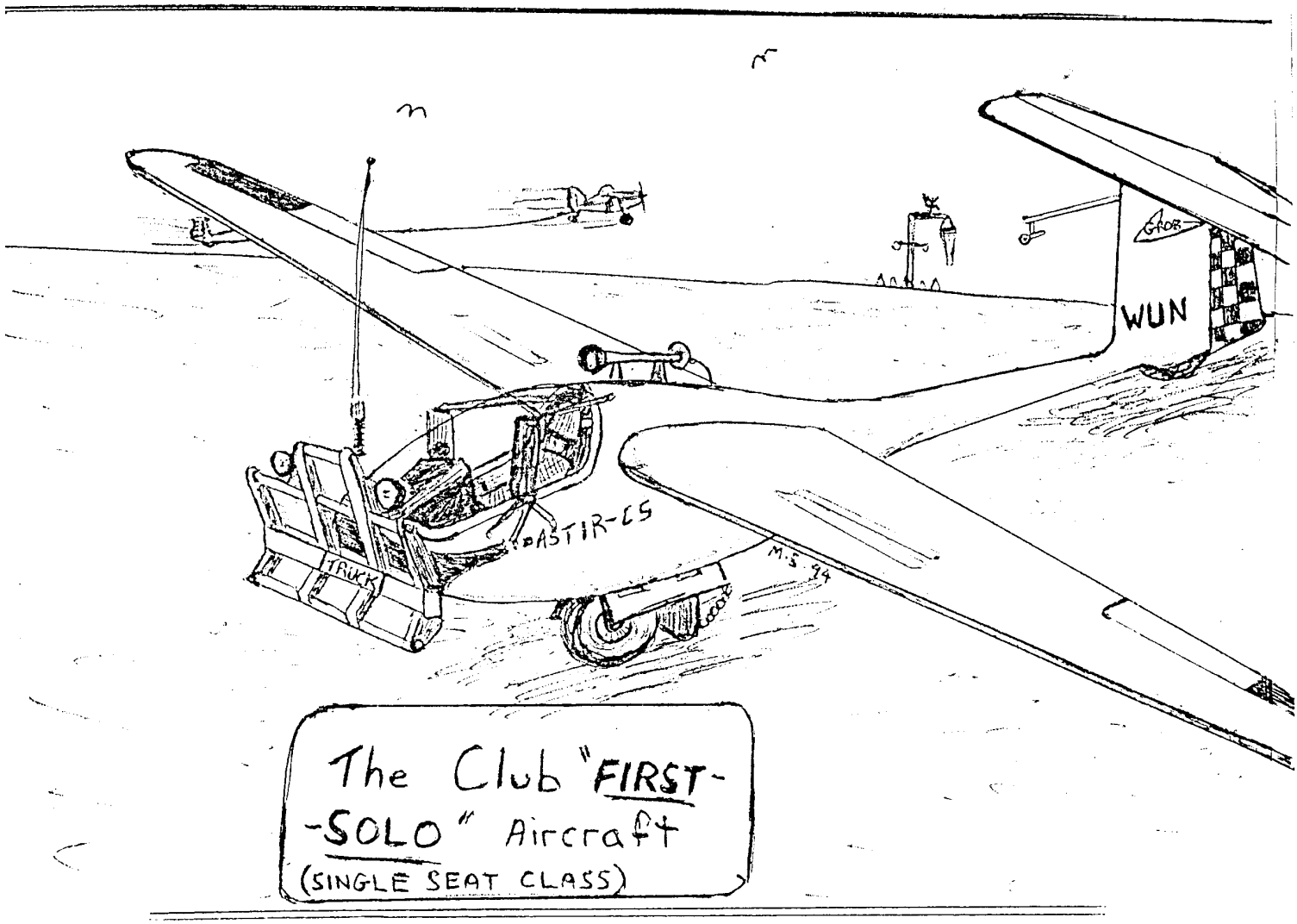
Allowing for instrument error, the corrected results are plotted on a graph of real airspeed (EAS) against indicated airspeed (IAS) for each configuration.

The lines can be extended (extrapolated) to lower and higher airspeeds. With this information and the IAS stalling speed of the glider we can calculate the structural limiting speeds of the sailplane and make up the placard for installation in the cockpit.

If our sailplane is a prototype of a new type we are also now ready to move into the serious part of the flight test program. This will be the subject of further articles in this series.

*"*"Sailplane Flight-Test Performance Measurement" by R.H. Johnson, 'Soaring', April 1968.*

I have been asked how can I be bothered building my own sailplane and just what is wrong with production sailplanes?????????????what is wrong with club aircraft,well,here is the awnser,pictures say a thousand words!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!.

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