THE AUSTRALIAN HOMEBUILT SAILPLANE

Editors: James Garay / Peter Champness

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Editorial

G'DAY MATE!

Here we are again!. Another issue of the Australian Homebuilt Sailplane journal. It really makes a difference when somebody is helping with the production and the helping hand is Peter Champness. We are trying to be different to please you with several topics of your interest but this is only possible if you give us the input from your side in the form of articles to share your experience and knowledge with us.

I must let you know that at the moment my folders are completely empty. So I ask that you, take a pen, a piece of paper and write to me. I am already preparing the next Christmas issue due in December so will be looking forward to hearing from you.

In this issue you will find that it is jam packed with news and articles. Peter Champness did a very good review on W.W.1 Aero - The journal of the early Aeroplane Magazine and also he is telling us about THE MONERAI MISSION when we helped Michael Williams to skin the wings.

Peter Raphael the famous *Erudite* is telling how he and Malcolm Bennett were producing acrylic top hats for the completion of the Woodstock canopy. He also is giving us a full report of our visit to the RAAF aviation museum.

Our cousin from the USA, Gary Osoba, tells us all about how to fly using MICRO LIFT. A very interesting article that was on the internet.

Christopher Thorpe reviews the Symposium that we had in May-2005 at the Bacchus Marsh Club House. Stay tuned for the next one in 2006.

James Garay &Peter Champness
Editors

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Inside This Issue

MAIL BOX

Dear James,

Today I have sent my renewal fee for another year with the "Australian Homebuilt Sailplane" newsletter.

Our Volkslogger has arrived and some flights have been made. Our aim to do Silver C flights and some competition with other clubs in our national competition RST on line. Can be seen from www.segelflyget.se.

An all flying week with flying as much as possible. May be a try for 300 Km again. Motorgliders are fantastic even if the performance is back to the 70-ties. With only 3 litres of petrol/gasoline (I do not know what is used down under) *(Eds note. Petrol !)* you can fly for hours at a very low cost, compared to not powered gliders at our neighbor club.

Their "Pawnee" tug, have nearly killed then economically. Next step will be to push powerless downward in the competition in RST as well.

By the way, a new Ultralight sailplane arrived to a private owner at our hangar, from the Check republic in the middle of June. It is a 15 meters wingspan with an L/D of 29 and a power plant of 80 HP for an empty weight of only 300 Kg. It has a rescue parachute for the whole plane as well.

Our competition factor allows us to get more points for every flight tried. The inspiration mostly comes from the Australian Homebuilt Sailplane newsletter.

Thanks, for an interesting Newsletter and many happy landings to all of you.

Best regards.

Nils-Ake Sandberg. Sweden.

Eds Note.

Thank you very much for the words of encouragement. Many peoples are helping me. And you are one of them.

Dear James.

Thanks for your letter James. Finally I got to read the last issue at leisure. What a great credit is to you and your team. Lot of ready good tips for home built sailplane and "fiddlers"

We are running a wood repair "course" at the next Bordertown Vintage Regatta 2006. "A standard part" will be asked to be build by interested pilots. Any "AHS" member who wishes to participate in this course will be very welcome. My telephone number is (03) 5428-6163. Regards. Happy soaring. Keith Nolan.

Dear James,

Thanks for dropping in on me on your way to the Point Cook RAAF Museum. Hope you had an enjoyable afternoon there. They have done a marvelous job on aircraft restoration.

Many thanks al;so for the complimentary copy No 37 of your journal. I note with interest the letter from Andre Maertens regarding the little Flying Flea glider. Have not seen a picture of this aircraft. I am reminded of the diminutive 1931 Baynes Scud 1 glider, at 25ft span and 13ft long. Please see attached copy of a report in the Aeroplane magazine dated 1995. I think it is worth reproducing in your journal James, as I am sure it will be of interest to your readers.

As I lived near London Gliding Club airfield at Dunstable, Bedfordshire, I spent many happy hours on top of the horse shoe shaped ridge watching various types of gliders slope soaring along the ridge. In 1950 I actually saw the tiny Scud 1 soaring effortlessly and was able to view the glider close up on the ground along with others vintage gliders.
Wishing you happy landings James.William (Woody) Wood.

Eds note: See the article at the end of this issue.

WHAT'S NE

BOOK REVIEW
W.W.1 Aero – The Journal of the early Aeroplane

By Peter Champness

WW1 Aero is a USA magazine which is devoted to the early aeroplane before 1920. A sister publication 'Skyways' covers the period 1920-1940. The subscription is US$ 47 for overseas subscribers plus US$30 postage. For this you get 4 magazines per year. If you want to send more money, donations are gratefully accepted and are tax deductible in the USA. Australian Subscribers can pay in Australian currency direct to Colin Owers, 2 Stephensen St, Boorowra, NSW 2586.

Journals No 187 and 188 each feature a glossy cover in colour enclosing 144 pages in black and white featuring:

- Information on current projects (restorations and replicas),
- News of museums and air shows,
- Technical drawings,
- News of current publications,
- Scale modeling material,
- Photographs,
- Historical research,
- Workshop notes,
- Information on paint and colour,
- Aeroplanes, engines and parts for sale,
- Advertisements.

In addition a subscription to WW1 Aero offers access to early technical books and magazines, assistance in locating parts, engines, aircraft and information and world wide networking with many people with an extraordinary knowledge of the early aeroplane.

One of the ads is for our own Australian Homebuilt Sailplane Association and Journal 187 features a short review of one of last years newsletters. I think the editor, James Garay, has a reciprocal agreement to exchange a free copy with the editor of WW1 Aero, Leo Opdycke. This is a good deal for us considering the size of the respective magazines and the quality of the articles. Many of the articles in WW1 Aero are very well researched. If any member

wishes to examine past copies of WW1 Aero James will probably lend them to you for perusal.

I have skimmed through both copies of the journal and found nothing of direct relevance to Homebuilt Sailplane Enthusiasts. Many members however will have a general interest in the early history of flying, aircraft structures etc, and may find the Journal very interesting.

The number of items in each journal is far too great to review in detail so I will summarise only two:
Marco Fernandez-Sommerau of Belgium came across the remains of a WW1 aircraft which had been stored for many years in Belgium. The owner, an active member of the Belgium Air Museum had died and Monsieur F.-Sommerau acquired the remaining parts from the family. He then set about a prolonged search to identify the aircraft and any history. He was able to identify the aircraft provisionally as a Rumpler C.IV. The number 2693 appeared on two separate parts, a tail strut and an upper wing mount. The number was thought to be the manufacturer's serial number and from this he was able with the help of contacts to identify the Military serial number and a photograph of the same machine from 6 Sep 1917!

Working from hunches, his fairly detailed knowledge of First World War history and many hours of searches through museum, library and military archives he was able to discover that the Rumpler had been shot down by a Belgian Pilot, killing both of the crew. He established the identities of the crew and the exact site of the crash. The aircraft remains had been stored for years in the Brussels Army Museum but had been thrown out in the early 1980's. The parts had been rescued from the dumpster by the former owner who worked at the museum and had lain for over twenty years in his garage.

All this required the help of many contacts and letters to possible relatives, many of whom lived over seas. Information from the many diverse sources was able to make up for incomplete museum and military records. In addition he was able to find a few further parts from the same machine. It was quite an engaging story well illustrated by many contemporary as well as recent photographs. I note that this was part 1 so perhaps the next episode will involve some sort of reconstruction of the aircraft.

The second item by Paul Hare, UK, is a history of the spin, from the first recorded instance when Orville Wright entered an incipient spin and crashed the Wright No 3 glider in September 1902 until the report of Royal Aircraft Factory – Farnborough on 10 July 1917, entitled "The Experimental Investigation of Spinning". The author was Frederick Lindemann, later scientific advisor to Winston Churchill during the Second World War. In between many airmen died from spins resulting in crashes as the cause and the means of recovery from the spin were not understood during this period.

I had previously thought that Lindemann had invented the spin recovery but this was not the case. Just as many airmen had accidentally spun their aircraft so some had also accidentally recovered and in some instances they were able to remember the actions preceding the recovery.

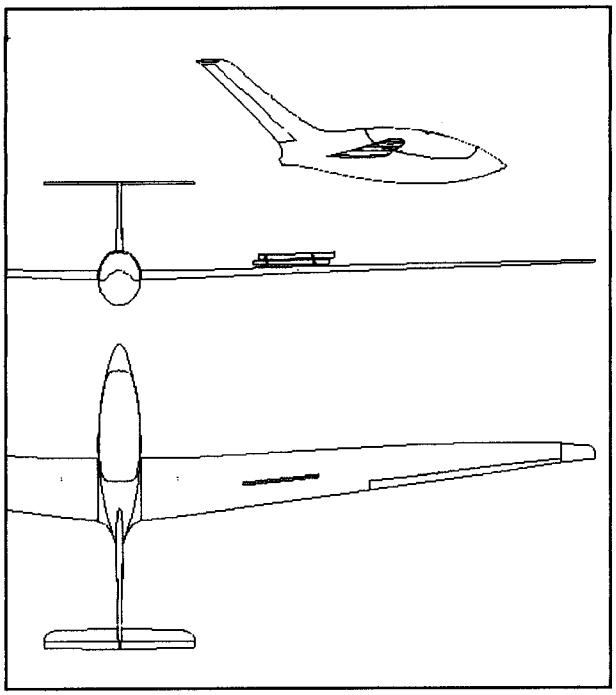
"On 25 August 1911 Lt Wilfred Parke RN was attempting to land his AVRO type F Biplane at Larkhill (near Stonehenge). At an altitude of 600 or 700 ft over the sheds he throttled back, put the nose down and began to descend in a spiral dive. Deciding that his descent was still too steep, he attempted to lift the nose while still turning and immediately fell into a spin."

"Aware that the AVRO was nose heavy with power off, he opened the throttle wide; but although he gave the engine full power it failed to have any effect on his rate of descent. Next he tried to pull up the nose with the elevators, thus making the usual mistake of trying to arrest the descent before tackling the rotation; then realizing that centrifugal force was throwing him against the cabin door he let go of the control wheel with his right hand in order to grip a strut and put the rudder hard over hoping to lessen the rate of turn. The machine immediately recovered and, since the elevator was still slightly raised, leveled out. Now at only 50 ft Parke turned into the wind and landed".

The incident was observed by other pilots including Geoffrey De Havilland and was reported in Flight magazine. The various control manouvres employed by Lt Parke were reported with the conclusion that "warping (ie wing warping ed) played no part in the recovery, the recovery resulting from the application of rudder and elevator alone". So the method of spin recovery was at least partly known and soon after this aerobatics became popular. Quite a number of pilots were able to deliberately induce a spin and then recover from it but the aerodynamic cause of the spin was not yet understood and the recovery technique was not taught in flying schools until after the Farnborough Report.

THE SG-1 SAILPLANE

An excerpt from the internet

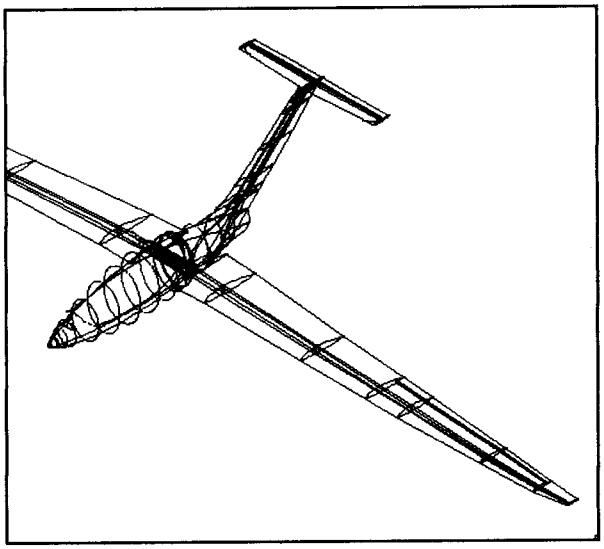


CONCEPTS

To develop a lighter sailplane with good climb in weak conditions, low momentum in an outlanding but still with good interthermal performance at speed.

To achieve this, a short pitch couple reduces the wetted area and weight, the swept fin with no boom being an inherently efficient structure. The wing is small, which affects the constraints on optimization of lift distribution and allows reduced adverse yaw.

SG-1 is similar to Genesis but is based on quite different aero'. The Genesis wing is stabilizing with a small positive foil CMc/4. In SG-1 all the static pitch stability is created by the tail and the wings foils are about CMc/4=-0.06 which enables the wide drag bucket required. On SG-1 the tailoring of the lifting surfaces and the management of the pressure recovery on the afterpart of the fuse are unique.



Basic Data.

Span (m)	13.9
Length (m)	4.52
Height (m)	1.84
Wing Areas (m2)	8.58
Aspect Ratio	22.5
Empty mass (kg)	143
Water ballast	none
All up mass with 90kg pilot (kg)	233
Max all up mass (kg)	265
Wing load at 265 kg (kg/m2)	30.65
Wing load at 233 kg (kg/m2)	27.15
Stall speed at 233 kg (knots)	35
Minimum sink speed at 42 knots	0.51
(m/s)	152
Design dive speed (knots)	+8.8, -4.0
Ultimate load factors	retractable
Undercarriage	tandem.

HINTS & TIPS

FOREVER BLOWING BUBBLES

By Peter Raphael (The Erudite)

Here are a series of pictures taken recently while Mal and I were producing top hats required for the completion of his Woodstock canopy.
While I still had the original mould a new heating box was required and this was constructed from particle board flooring with an MDF top all screwed together for easy disassembly.
A precut piece of 2mm cast acrylic is sandwiched to the top of the box the lower one support the mould while the upper one locates it. Clamping is preferred to screwing as acrylic expands and contracts considerably through heating and cooling.

Heating is provided by a two burner LPG camp stove and a meat thermometer inserted into the side of the cabinet gives an indication of temperature. The box is raised on bricks to allow airflow to the burners which are controlled from the gas bottle outside.

An old fridge compressor will provide a suitable vacuum but additional storage is required in order to remove the air from the mould quickly enough. This was effected by the use of a scuba tank and monitored with an automotive vacuum gauge. A line from this is connected to the mould and was pinched off with a pair of mole grip pliers until ready to apply.

The correct time to commence the draw is subjective but has been observed to be roughly ready when it has completed wrinkling and begins to retension itself during the heating process. It is possible to reheat a failed attempt for a second go where the draw has been insufficient.
The acrylic should be allowed to cool a little after removing the heat and before removing the vacuum.
Photos /Back pages.

MONERAI MISSION

Peter Champness

In February this year the Malcolm Bennett glider factory went to full production status. The event was the production of the wing skins for the Williams Monerai. Mike Williams has previously given us a preliminary article on his Monerai glider and the message was that" One Has To Have Contacts- Otherwise you are Nothing". Happily Mike has contacts and all his favours were called in on this day. I received a call from our esteemed editor James Garay and cleared my appointments on the day so that I could be present.
On the appointed Saturday I arrived at Malcolm Bennetts' home at about 11 am and found the new glider trailer parked outside in the street. The glider trailer was a smart item itself and I took a picture of it. The striking thing about it (for those who are used to glider trailers) was how small it was. The Monerai is of course a fairly small glider with a wing span of only 13 metres so the trailer does not have to be exceptionally long. In addition it does not have a vertical tail so the height of the trailer can be minimal. The Monerai has a V tail but both surfaces come off and go neatly into the trailer. Also the wings have quite a narrow chord. If all the bits are packed in tightly, and Mike has obviously made sure that no space is wasted, then the trailer hardly takes up any space at all.

Having inspected the trailer, I made my way down to the large backyard shed and greeted those already present which were; Malcolm Bennett, Peter Raphael and Mike Williams. James Garay appeared soon after. Later in the day we had a visit from Peter Arnold.

After checking out the contents of Malcolm's shed, which at the time included the Super Woodstock, a damaged Monerai (tree fell on its trailer) and an IS29 single seat metal glider, it was time to attend to the matters at hand. Mike had the bones of his wing laid out on trestles and the wing skin was laid carefully in a cradle to prevent dints or other damage.

The bones of the wing deserve some comment. The bones of course refer to the spar and the ribs.

The spar of the Monerai consists of an aluminium alloy 'I' beam

extrusion. The spar flanges are of a triangular section with the widest edge outboard. That is opposite to the profile normally seen in construction steel beams. The spar web had lightening holes cut out and the flanges had been gradually tapered down from full width at the spar root to almost nothing at the tip. This keeps the maximum strength where it is required at the root and saves weight at the outer end where the loads are much lower. At the very tip the main strength requirement is to resist damage from ground handling rather than the aerodynamic loads.

The ribs had all been pressed from thin alloy sheet. The flanges were bent over to 90 degrees and the flanges had wrinkles at about 10cm intervals to allow for the curvature in the upper and lower edges. Large lightening holes had been cut and each of these had a flanged edge adding enormously to the stiffness of the rib. Each rib was in two parts; a front part in front of the spar and a rear part behind the spar. Both parts were riveted to the spar web. In some wooden aircraft the ribs slide over the spar but in the Monerai the ribs are flush with the top of the spar. This has two important outcomes. Firstly the depth of the spar is the maximum which can be achieved within the thickness of the wing. This maximizes the strength and stiffness of the spar. Secondly the wing skins attach directly to the spar cap which also improves strength and transmits loads to the wing skin which is partially load bearing in the Monerai.

As well as the components of the wing all the components for the assembly had been obtained. This included the Hysol epoxy adhesive, scales, syringes for measuring the glue, mixing spatulas plastic cups, rubber gloves vast quantities of paper towel, bottles of methyl ethyl ketone and scotch-brite pads for cleaning the surface of the aluminium.

A prominent feature of the workshop was the large wooden jig which was laid out in trestles, supported by two square section steels beams about 2 inches in diameter. The jig was made by Malcolm Bennett about twenty years ago when he built his own Monerai VH-HDT. The jig consists of box sections divided up by separators, each corresponding to the position of a rib within the wing. The separators are contoured to match the profile of the ribs. Since the Monerai has a constant chord wing each rib is the same size and has the same contour. Three box sections are placed end to end to make up the full span of the wing. In addition the jig has upper and lower sections. The wing skin is laid into the lower section of the jig. The spar with its ribs is laid onto the skin and the upper half of the skin is folded over the top. Finally the top section of the jig is placed over the upper skin and clamped down compressing the skin on to the spar and ribs and ensuring that that whole wing is straight and free from warps.

Malcolm said that the jig took him about 40 hours work to build. He had forgotten how much it cost. He built it in six parts (3 upper and 3 lower sections each half the span of the wing) to assist transport and storage. He had lent it to someone and it had taken quite a bit of effort to get it back. He was not pleased because the jig seemed to have been left out in the rain while it was away. Anyway on the positive side it was getting a second use and may soon be used to repair the wing of the damaged Monerai. That would reduce the building cost to 13 hours per glider.

The wing skin had started as a flat piece of alloy sheet but was now folded in half with a straight fold across the middle forming the leading edge radius. Mike told us that that he had formed the leading edge fold with a vacuum cleaner. The sheet was folded over and the two parallel edges which will be at the trailing edge taped together. At this stage the wing skin profile resembled a large teardrop shape. Plastic sheet was then taped over each end and the tube of a vacuum cleaner was poked in to the gap at one end and sealed to the plastic sheet with adhesive tape. When the vacuum cleaner was turned on it sucked out the air inside and the outside air pressure squeezed the sheet together until the upper and lower surfaces were squeezed quite flat with a small radius bend of about ¾ inch.

The wing skin was placed into the jig and the spar and ribs were placed inside the skin to check the fit. It all went together nicely. Each rib had to sit exactly over a corresponding separator of the jig so that the pressure of the jig would squeeze the skin against each rib. Having made sure that wing skin, spar ribs and jig all lined up correctly small holes were drilled in the skin and nails placed though into the jig. The heads of the nails were cut off so that the wing skin could be removed then placed back again in precisely the same position. The position of the spar and each rib was then marked on the skin with pencil so that we would later know where to place the glue.

At this point it was just before 12 midday. Malcolm suggested that we all have lunch because the next few hours were going to be very busy and the whole job had to be completed within two hours from starting to clean the metal to clamping the job up fully glued. Otherwise the cleaned metal would start to oxidize again and the glue joints would be weakened. We drove down to the Mordialloc shopping centre and found a handy Hamburger Joint in which to fill up, sitting down to a civilized half hour lunch. Much better than I usually get at work, and paid for from Mike Williams generous pocket. The costs of home building really add up with these unplanned extras. It would be cheaper to buy your glider already made!

When we got back to the Bennett glider factory things got going in earnest. The first job was to thoughly clean all the metal parts to be glued. Many scotchbrite pads were consumed abrading the surface of the aluminium and producing lots of black oxide powder. The wing skins were quite easy and quick to do because the metal was flat and it was supported in the jig. The bones were a different matter. The spar is quite robust but the ribs are different matter, being easily bent if roughly handled. The spar was propped on two trestles and scrubbing proceeded carefully before turning the assembly over and doing the other side.

After scrubbing, the metal then had to be carefully swabbed with Methyl Ethyl Ketone (MEK) to remove all black residues. Lots of MEK and paper towels were consumed and the fumes became so powerful that we had to open all the doors to get some fresh air. Having wiped every part several times with the MEK it was important not to touch any of the cleaned parts with bare hands. Skin oils would ruin the glue joints. We used cotton and rubber gloves for all the preparation and gluing.

Preparation was now complete and we were ready to mix glue. The glue system has been perfected by Peter Raphael and Malcolm Bennett over a number of such projects. The glue is placed into small zip lock plastic bags (which can be obtained from the supermarket these days – sandwich bags). After the bag has been closed the corner is cut off with a pair of scissors to form a small nozzle. Gently squeezing the bag produces a thin stream of glue which is easy to run along the required glue line and then spread with a wooden spatula (paddle pop stick). Glue spreading proceeded so quickly that Mike and I had trouble mixing the glue batches fast enough to keep up the supply.

Hysol is a two part epoxy adhesive produced by Ciba Geigy, which is suitable for metal to metal bonds. The glue is apparently quite expensive. Both components are quite viscous, a bit like thick honey. The mixing instructions specify the ratio of part A to part B by weight. Mike had a set of scales but it was obviously going to be quite time consuming to carefully measure each batch in that way. Mike had some plastic syringes of about 30ml capacity. We carefully cut the tip off two syringes (one for part A and one for part B). By pushing the end of the syringe into the glue and pulling back the plunger at the same time we could fill them without getting any large air bubbles. The glue could then be measured quickly and accurately by volume. We decided to standardize on 30 mls of part A. The syringe has a scale on the side and we marked the 30ml level with a pen. The syringe was slightly over filled then the excess glue expelled and scraped of square at the end. We measured the weight of the empty syringe first then filled it with glue and measured the full syringe. Subtracting the weight of the empty syringe gives the weight of 30 ml of glue (part A). The required weight of part B was calculated and then the volume of B was found by adjusting the volume until the full syringe weighed the required amount. The volume was again marked on the side of the syringe with a pen. I think it turned out to be about 20ml of part B to mix with 30 ml part A. Not surprisingly this turned out to be the same ratio as the size of the tins of part A and B.

Having established the required volumes it was then a very quick process to measure out the glue for the second and subsequent batches.

Having spread the glue along all the required glue lines on the skin, the spar and rib framework was carefully placed onto the skin within the jig and glue spread on the top surface of the ribs and spar. The top surface was folded over and aligned with the small holes on the nails which had been drilled and placed during the test run. An inspection was made from each end to ensure that the ribs all lined up with the glue lines and then the top of the jig was place over the top skin and the whole jig then clamped at about 300 mm intervals. This took quite a lot of clamps.

The final inspection was made with torches and mirrors to see that each glue line showed some squeeze out at the edge and that there were no dry joints. The final job was to remove a thin strip of wood which had been placed at the leading edge to keep all the ribs aligned. The leading edge of each rib was pushed into a thin saw cut in the wood. There was supposed to be enough room at the leading edge to wiggle the strip out after the jig had been clamped up. Unfortunately the remaining space was not quite sufficient. Various ideas for removing the wood strip were discussed including termites and fire! These techniques seemed far too drastic so the wood was left inside. I suppose Mike has thought of some way to get it out by now, maybe a small chisel on the end of a long stick, removing it a bit at a time.

The second wing was completed the next weekend by a smaller team of Mike Williams, Malcolm Bennett and Peter Raphael. Despite the few workers the job was apparently completed in even less time than the first wing, demonstrating the value of practice!

Six months has gone by since then and I have not kept up with Mike's progress on the Monerai. I am sure he has made more progress so I hope to have a further installment in the next newsletter. ***(Eds note. See photos at the end pages)***

MICRO LIFT

By Gary Osoba.

Eds note this is (An excerpt from the Internet)
Toward a 20 Hour Work-Week
(It's a tough job, but someone has to do it.)
Flying basically every other afternoon, it looks like I'll wind up logging about 20 hours in the prototype Carbon Dragon this week. The work conditions have been deplorable.... almost more than one can bear! Pristine autumn air... crisp, cool,....clear. Dodging 2-3 foot corn leaves sucked into the atmosphere by big, smooth thermals. Dust devils and migrating gulls below mark columns of lift many miles into the distance with nearly unlimited visibility over the flatlands. A mile or more beneath me the earth is carpeted with a deciduous delight. Light winds aloft make it possible to move around quickly at will in any direction. Although not engaging cross-country tasks aggressively, 400-500 miles will be covered before the week's end. The lift band at 4000-6000' AGL has been consistent and efficient. Typically, in blue conditions, I've been able to travel in any direction, rarely circling, by utilizing something I call micro flight techniques. This goes beyond simple dolphin strategy and fully captures the vertical energy in our atmosphere which is free for the taking.

Macro-lift (thermals, orographic, wave, streeting, etc.) is the easy stuff. Micro-lift is comprised of disorganized burbles, disintegrated thermal fragments, and thin, string-like animals that meander through the sky and often flow into thermals like a winding stream would a lake. Microlift is fleeting, elusive, and rapidly changing. Fully exploiting it is one of the most challenging and rewarding tasks a soaring pilot will ever address. How may it best be utilized?

Two elements form the underpinning of micro flight technique. Variation in velocity and variation in heading. The basics of dolphining through variation of speed have often been addressed in soaring literature. It is important that Ultralight Soaring pilots make a distinction between conventional speed-to-fly theory (essentially speeding through interthermal space as if it were always a homogeneous unit of sink) and flying a narrower, somewhat slower speed range (which through variation of velocity takes advantage of the minor vertical discontinuities which exist). The latter technique is obviously better suited to negotiate microlift. The truth of the matter is that although sailplanes possess glide ratios and speed capabilities much superior to hang gliders (or ultralight sailplanes), they simply can't fly slowly enough to fully utilize microlift. It may all come together for them in strong streeting conditions, but even then pure dolphining occurs far less frequently than you might think. Actually, hang gliders are much better suited to take advantage of microlift through dolphining because of their slow speed capabilities. This does not necessarily mean that their glide ratios have reached a point which provide for frequent level flight while doing so. It simply means that they are capable of extracting the lift while a sailplane may be roaring through what feels like very light turbulence and miss the benefit of the lift it contains.

On the other hand, when utilizing microlift I have found that the 100 fpm sink and 27:1 glide of the Carbon Dragon is sufficient to frequently provide for extended level flight because of the hang glider-like flight speeds. However, variation in heading plays a critical role in producing these results. In fact, more often than not it plays a more significant role than varying flight speed. Microlift strings (another term I have coined, if you'll bear with me) are often only a wing span or so wide. They may stretch for miles but

can meander widely and suddenly. The challenge is to stay centered squarely in them through sensitive, instantaneous changes in heading.

The pilot must divorce himself from any visual references on the ground and generally in the clouds above (I nearly always do best on blue days). He must acutely sense the lift differential across his wing span and constantly turn, first this way, then that, to stay centered. He'll often feel a pretty good surge under a wing, something reminiscent of a thermal, and turn into it instantly by reflex... if he continues the turn as in a thermal, it'll be gone! And, as he comes back around to re-enter the string he won't find it. There's often little vertical depth to a string and he may now be below it. When feeling such a surge, its best to make a rapid, firm turn into it followed by an instantaneous correction back the other way with maybe half the firmness. Then be alert to sense the lift differential across your span and make another instantaneous correction...then another...constantly reacting... always sensing. As the old adage says, "Lift is where you find it". Follow it wherever it may go. When you think you can't work it any further, try harder. The results are often limited by your level of finesse, not ambient conditions. We're talking about a delicate high-wire routine which, if performed properly, will leave you applauding your flight! As you might expect, intuition (or probably more precisely heuristic reasoning) plays a significant role in locating and continuing with microlift phenomena.

Some degree of microlift exists in every soaring environment. Some days, its minimal. Other days, its extensive. Its strength and consequent usage in relation to macrolift is something a pilot will have to judge for himself given the flight parameters and goals at any given time. Fully utilizing it does not of necessity impinge on cross-country tasks and at times can enhance them. Simple trigonometry will show that even when working macrolift systems, relatively large deivergence's from heading toward a distant goal can be justified in the pursuit of lift. Only when the angle of divergence grows to something on the order of 25 to 30 degrees does the divergence start to significantly subtract from total distance flown. The rapid, fleeting variations in heading which take place during microflight techniques have a minimal effect on distance flown when microlift is good and your overall course is not dramatically divergent.

I often make same flight/same condition comparisons of macrolift and microlift techniques. It's surprising how often you can do as well or better with microlift in the Carbon Dragon, especially when penetrating against a headwind. Recently I was making such a comparison, flying the same 7 mile beat back and forth between a couple of towns and I followed one microstring for more than 20 uninterrupted minutes with a net gain of 200' in altitude. Although my heading momentarily varied as much as 70-80 degrees to either side of the course, I never turned a circle.
I remember one day earlier this summer when we had 20-25 mph winds aloft which had to be penetrated in order to stay in the vicinity of the gliderport (I wanted to land where I took off). In spite of relatively weak conditions, microlift saved the day. Using conventional speed-to-fly, I could just stay where I wanted to, arriving back at the gliderport after each cycle with at best a modest altitude gain. After 3 cycles, I switched to microflight technique. Now, making slow headway against the wind, I returned above the gliderport at 3000' with a net 200' loss from the time I left a thermal. I Was then able to gradually progress upwind and pass up all the sailplanes (including a 19 meter open class ship many miles ahead) while gaining altitude, all before the conditions shut down. Most of the sailplanes were not able to stay up that day. Again, conventional soaring wisdom would not dictate that things like this can be done. However, with the right equipment, the right conditions and the right techniques, it is being done.

Try microflight techniques. They're more ideally suited to Ultralight Sailplanes than any other type of soaring craft. I think you'll be pleasantly surprised!

Best Regards, Gary Osoba

I have received many requests by private e-mail and otherwise to print the follow-on article regarding Microlift Techniques.
A short note prior to this new post. Keep in mind that it is an article being prepared for a publication read primarily by sailplane pilots, designers and builders. So when I start off focused on landing out, etc., it's written with their perspective in view... not that of a Hang V Flex Wing pilot who can land on the roof of any solid Port-a-Potty. Also, the references to "Figures" and their accompanying pictures won't do you any good on the Digest. Since I don't have a scanner, you probably won't see the pictures unless you subscribe to "Sailplane Builder"- which isn't too bad an idea, really. Let me know if you want to by private e-mail and I'll send you some info.

Please don't interpret any references to flex wing performance levels to be demeaning. They are certainly not intended to be. Keep in mind that I'm very proud of my flying roots in early hang gliding development. Maybe it would be more correct to say that my flying roots were born of childhood dreams, and hang gliding provided the rich humus of their genesis.

More on Microlift Techniques

Nap-of-the-Earth Flying & The Save
Many questions beg the attention of a pilot about to embark on a cross country adventure. He wonders "Is it too early to launch? Can I get away easily with this wind? How high will they go today? Did I bring enough water?" The questions tug away at a pilot's mind as he readies everything for flight. However, the question which urges itself upon you so insistently, so frequently, is.... "Will I have to land out unexpectedly?"
Yes, the landing. Where will it be? How will it go? Many a cross country flight has been abandoned, even in the planning stages, by concerns over an unknown landing. Many a cross country trek, beautifully flown, has been marred in its final moments by a landing that resulted in harm to the glider or pilot. Obviously, anything which can reduce the risks of landing out will do much to enhance the frequency and enjoyment of cross country flight. Traditional soaring literature is replete with many fine suggestions in this regard. A wise pilot will not only carefully consider these, but will implement them.
However, among the advantages of a newly emerging group of soaring craft is their ability to significantly limit landing out in an unsafe manner. Their design strengths, by nature, make premature landings rare. And they make the well-timed landing an easy one. As such, the growing field of ultralight and entry-level (or light) sailplanes will do much to encourage cross country soaring.
To illustrate the point, I can't remember the last time I worried about landing out when preparing to embark on a cross country flight in the prototype Carbon Dragon. In fact, after logging the first 100 hours of cross country time, there was not a single unplanned out-landing. I was well into the second 100 hours before the first and only one finally occurred. What happened then?

I was flying a quick100 km triangle in prefrontal conditions. Frontal passage was not predicted until some 8 to 12 hours after launch. Nevertheless, things developed early. And quickly. During the second leg of the triangle, a very strong cross wind began to develop. Shortly thereafter, the sky, which had been spotted by small and infrequent cu's, began to develop a threatening darkness to the west. I aborted the triangle, and turning into a strongly building headwind, headed toward the home gliderport (Figure 1). The darkness was approaching quickly, the wind kept building, and within a minute or two, overdevelopment turned the sun off like the flick of a light switch. The entire return course now being shaded, I landed out in a wheat field some 8 miles from the airport. Helped by my friend Bob Drennon, we quickly trailered the glider, snapped a picture of the massive cumulus mammatus behind it (Figure 2), and raced back to the hanger before the storm hit.

But let's get back to all the unplanned landings which could have occurred...and never did. Why is it that pilots in gliders like the Carbon Dragon will worry very little about this common soaring predicament?

To begin with, these gliders are designed to maximize soarability. Racing around with high speed efficiency, although respected, is not the top design priority. They stay up when nothing else can. They launch way early, sometimes hours before conventional sailplanes are soaring. And they land way late, after using every little bit of lift there is to find. The result is dramatically longer average flight times. And consequently, a significantly reduced number of takeoffs, tows and landings per unit of soaring time.

When it does come time to land, the number of suitable landing sites is much greater than that for the conventional sailplane. Not only can these gliders utilize microlift, but they can perform what we may term microlandings. The contributing factors are obvious. With landing speeds approaching sometimes one half that of a conventional sailplane, many sites which would otherwise be passed up are now usable. Combined with lower gross weights, the low speeds result in dramatically short roll outs. For example, on one flight last year I flew a little over 200 miles from southern Kansas up into Nebraska, then turned and flew back another 10 or 20 miles to land closer to my chase crew. Setting up for a landing near sundown, I selected the corner of a soybean field with short crops and widely spaced rows (Figure 3). This put me right next to a paved highway with a farm road by the field. After landing (and attending to another duty or two which tend to develop on a 6 hour flight) I stepped off my landing roll at 21 feet.... in negligible wind! Although the short roll out was not needed in this field, it will come in handy in others. In an emergency situation, consider the difference in inertial mass between a glider touching down at 20-25 knots with a gross weight of 300-500 lbs. and one weighing 800 or 1000 lbs. which is landing at 40-50 knots... over unimproved terrain!

Also helpful are the shorter spans and good maneuverability possessed by these designs, allowing them to squeeze down into smaller fields surrounded by trees or other obstacles. And to use areas with somewhat undulating grades which are otherwise unlandable. Of course, the excellent soar ability of this class of gliders can sometimes work against you. Last year we took the Carbon Dragon with us on a trip to visit my wife's family in Wisconsin. I located a site with a farm road about 20 minutes away where the owner allowed local hang glider pilots to conduct tow operations. I had brought my static tow system and was able to enjoy a nice flight after taking a tow from my wife, Mary. When it came time to land, I had selected a small field several miles away which was bordered on the downwind side by a row of trees some 60 feet high. The plan was to fly 180's over the trees until descending to an altitude just above them, then turn final and drop into the field for a landing. The problem was that the wind was blowing 10-15 knots and with the excellent sink rate of the glider, I wasn't descending at all through the lift formed by the line of trees. So, I just made passes for a while, soaring the "ridge", and then resorted to my spoiler in order to effect the planned landing .
Micropatterns also affect average flight times and the frequency of landings. How so? Well, consider the rationale behind a typical, 1000' landing pattern. It's interesting to note that not only is this altitude applicable to conventional sailplanes, but many experienced hang glider pilots use it as well. The primary purpose of flying a pattern is to provide time for accurate perception... perception of current sink rate, perception of resultant glide, perception of field layout, any obstacles or other dangers, and other aircraft. A correctly flown pattern gains the pilot a grasp of perspective. Time is what's required. Even though a hang glider pilot typically flies his approach at half the speed of a sailplane and can land in some incredibly small areas, his sink rate is double that of a good sailplane. And so, the 1000' pattern is flown to provide the time necessary to size up all the variables. The sailplane has a good sink rate, but with the higher speeds, needs much more area to land in. In this case, the time provided by a 1000' pattern gives him the ability to fly a sufficiently large pattern, thoroughly scoping out his landing.

On the other hand, with gliders like the Carbon Dragon, 1000' patterns are just not necessary. A pilot entering the pattern at that altitude might as well set his alarm 5 minutes into the future and take a nap! With the sink rate of a high performance sailplane and the ability to land in areas nearly as small as a hang glider can, 500' is certainly adequate. I like to contrast it this way: Why enter a landing pattern at an altitude higher than I climbed away from at the beginning of the flight? Would the pilot of a 15 meter racer think of entering a landing pattern at 3000' after a soaring flight initiated from a 2000' aerotow? Hardly. Likewise, here's how it usually works for me: I take a 600' to 800' auto tow by static line. If I contact lift above 200' during the tow, I release early and fly away (Figure 5). If I take the full tow to 800' or so, it usually takes a few hundred feet to find a small thermal and then begin the afternoon's trek in that fashion. During the flying season, I get away almost every time.

Entering a landing pattern at 1000' is therefore not only unnecessary, but... well, wasteful. I don't know any other way to state it simply. On one flight last summer which was about to end, I had committed from base leg and was turning final at somewhere between 150' and 175'. I generally won't try below 200', and please don't think I'm recommending it to others, but in this instance I contacted smooth lift in light winds. So... I did it. Another unwanted landing prevented. Another flight significantly prolonged. Keep in mind that the Carbon Dragon uses about 20'-25' of vertical altitude in a coordinated 360 degree turn, enjoys a full stall recovery in about the same and a spin recovery in about 60' or 70' (if you can entice it to even enter one in the first place). It's really most genteel, without a dissonant note in it's entire repertoire.

So what kind of net effect can be expected from using 500' micropatterns instead of the standard 1000 footer? The sum, in this case, is dramatically greater than the parts. Very dramatically so. Its not as though the extra 500' on a day with 5000' thermal tops gives you 10% more time to contact another thermal. And that consequently, on the average, you'll avoid 10% of the unwanted

landings. Getting 10% more air time. No, the dynamics of micrometeorology enter the picture and the whole formula begins to change. For here, within 500' or so of the surface, the magic of microlift phenomena is truly alive. It's vibrant, and can give birth to a microwave when you absolutely need one!
For the sailplane pilot who feels that nothing useful can be negotiated at these low altitudes, think of all the times you scratched, and hunted, and struggled to stay up... only to commit to a premature landing. And sure enough, well into final, there's the lift...too low to do anything with. But high enough to play havoc with your final glide path. It's not that you missed it earlier...flew around it... it's just that you weren't low enough yet. That's right, low enough.

I've spoken with many experienced hang glider pilots who know what I'm talking about. From time to time, they've benefited from the phenomenon. They just don't yet possess the performance levels to reliably exploit this near- earth soaring environment.

Raptors certainly recognize the reality of nap of the earth microlift. In this narrow altitude band where they're most frequently found flying, their technique is truly inspiring. What soaring pilot, possessed of a rudimentary knowledge of a hawk's performance capabilities and yet observing the same in action, has not scratched his head in wonderment? And remarked that surely the laws of mathematics must have been temporarily suspended in this location.
Do the hawks know something we don't? I believe so. But maybe we can get to know it, too. My experiences in the Carbon Dragon have led me to construct an increasingly clear mental picture of what's going on down here, within 500' or so of the surface. The numbers and relationships which are presented now may vary somewhat with location, topography, etc., but the essentials should hold true. The conclusion I've drawn is that on any given day where convection is working as a result of solar heating, every likely thermal producing source can provide you with a save, whether it's "cycling" or not. Basically, every time. I say this because it's been my experience in the Carbon Dragon over dozens and dozens of instances. Now if it's too early in the day, its not going to work. If it's at the end of the day, it may not work. If the sun has shut down, as in the instance related at the beginning of this discussion, it won't be reliable. Otherwise, it's there for you. Absolutely. In fact, the referenced instance was the only time it hasn't worked for me in many hours of cross country soaring.

It amazes me that at this point in soaring history there is still a fundamental debate among some about what a thermal really looks like. There are those who will say that all thermals essentially resemble a chimney in structure, providing a constant source of lift over a thermal producing source. For any who would argue against it, its pretty hard to convince someone who has witnessed a massive dust devil towering skyward from the same field all day long that their eyes were just playing tricks on them. On the other hand, there are those who argue that all thermals are essentially big bubbles, which having reached a temperature sufficiently greater than the air surrounding them, break away as a discreet air mass, floating upward. The ring vortex model fits into this latter category. For those arguing against this approach, its pretty hard to convince pilots who have entered a thermal right below another glider, only to find the lift gone! Or those who have been spat out of a thermal who then re-enter the column to note mixed air or sink, but no more lift... no matter how long they circle.

We should be able to agree that all of these concepts of thermals, and many variations in between, exist at various times. In the case of the "chimney" thermal, it would seem that consistently strong conditions, under direct, strong sunlight, with light winds, would favor their formation. In these instances, the powerful energy of the sun just continues to pour into a ground source, such as a freshly plowed black field. Enough of a temperature differential between the source and its surrounding terrain exists so that the energy going in essentially equals the energy going out... and up. The air mass doesn't really need to pause to build up enough heat, it's more or less a constant process. The sun's radiation in... the earth's convection out. Needless to say, these kind of conditions pose no particular problem for any of the types of soaring craft mentioned in this discussion. As a matter of fact, they are truly sought after, albeit quite rare in my part of the country! The guaranteed save will be there at 500'. It will be there at 1000'. And it will probably be there at 5000'.

What about the bubble (and ring vortex) model? In this scenario cycling takes place. At times, the heated parcel of air in the near-earth environment will be hot enough to break away, or is triggered into doing so, possibly even sustaining for a while in chimney-like fashion. Then, the cycle will shut down to start the heat building process all over again. Mild and indirect solar radiation will inhibit the strength and frequency of the cycles, as will stronger winds which tend to trigger the cycles early and redistribute the heat horizontally through the atmosphere. In these conditions, smaller, weaker thermals or even incipient ones are favored, depending upon what's going on with the upper air masses. The variations in low level wind gradient will also exert an influence one way or another, for obvious reasons.

Once again , the problem is not when the cycle is switched on... but off. Which seems to be the case most of the time. What's really going on then? Is there still something there that we can use? Recall our searching sailplane pilot who was simply not low enough to utilize lift. The lift turns out to be there, essentially all the time, but at micro-rates and micro-altitudes. Think about it this way: What's happening at the top of the bubble while it's waiting to build enough total energy to break away from the surface? Is there some sort of firm barrier that prevents the warm air "in" the bubble from mixing or moving into the air above the bubble? Not that I'm aware of. In fact, as the temperature of the bubble mass builds, it's still subject to the laws of thermal dynamics and will therefore seek equilibrium with surrounding air. It's migrating, leaking off if you will, into the upper air. We might call the result leak-off microlift. Consider the example of a hot air balloon and it's definitive fabric barrier which is designed to contain a "thermal". In spite of the existence of the barrier, considerable leak off still takes place, necessitating frequent blasts of the burner to keep matters in check. In fact, the leak off is of a high enough order to allow soaring birds to sustain flight above the balloon's envelope.

But back to our bubble's cycle. In the very early stages of the process, the temperature differential may only be a few degrees, which is why the perimeter of the bubble may be encountered some 300' to 500' above the surface. Progressing a few degrees warmer now, the leak off may result in weak, disorganized lift which moves upward another few hundred feet. It might only amount to 75, or 100, or 125 fpm, but it's there. A little while longer, and the bubble's heated mass has accelerated rapidly from the surface contact and the whole mass begins to break away for another up cycle.

What I have found repeatedly is that if I will park myself over a good source when conditions are working, I'll eventually get my save. I can count on it. I might descend for a while through really

weak leak-off to 300' or 400', then just barely sustain on top of it for a time until it starts to break away. Or, I might find it starting to leak off for a slow climb rate to 700' to 900', waiting then at that altitude until it organizes and roars upward in a cycle. But it always seems to be there for me.
When barely sustaining and playing the waiting game, I have to be careful to fly as efficiently as possible and to utilize shallow bank angles. It would appear that the performance capabilities of the Carbon Dragon (circa 100 fpm minimum sink) in combination with the low speeds and small turning radii are just barely inside the parameters necessary to utilize leak- off microlift. Conversely, to circle too tightly introduces just enough degradation in sink rate to render the overall technique ineffective. Of course once the bubble breaks away, the structure seems to concentrate into a smaller column and then tighter coring is definitely in order.

A variation along this theme occurs in higher winds. Instead of the bubble building in time over a singular location, the surface winds regularly detach the weak leak-off bubbles early from their source and they begin drifting with the wind. Then another forms pretty soon over the original source, the wind tears it away, and on we go. What microlift technique can be utilized in this instance? Park yourself over the source, continuing to descend to the 500' level or lower if necessary, in the hopes that a big enough one will break free to send you back to the upper levels. If not, take the next one that leaves and commit to drift with it. What happens in these conditions is that the weak lift may take you a few hundred feet higher, but no more. Stay with it. You've made your decision. Sustain in the bubble, not over the ground source. Do not exit and try to find a stronger one. Not only is it unlikely that you will find a stronger one in a random search of these conditions, but you certainly don't have the altitude or time to explore for very long.

What happens in these situations is that the bubble you are with will eventually contact another good ground source, combine with it's heated potential, and nearly always provide you the energy to go back to the upper levels. In this instance, you'll find yourself working what we may refer to as cumulative thermals. It can actually be quite predictable... drifting along, barely sustaining over green fields... and spotting a big plowed one coming up in about a mile or so. Sure enough, when you get there, it all comes together and you're gone!

Without a doubt, there's usable lift to be found down here, in close proximity to the earth. Capturing it's potential requires a combination of the right equipment and the right techniques. Of course, nothing presented herein should be construed as a contradiction of the old soaring adage "Get high and stay high!". But when everything else has failed you, and you're just not yet resigned to landing, nap-of the-earth microlift may prove to be your answer.

Hopefully there's something here which will prove useful to you whether you fly a hang glider, a standard class sailplane, or a Nimbus IV. And, I hope it gives impetus to those interested in exploring the emerging field of ultralight and light sailplanes. Whether it's the excellent soarability, the increased number of usable landing fields, the efficiency of micropatterns, or the reliability of a nap-of-the-earth save, this class has much to offer. In case you haven't already guessed it, I'm thoroughly enjoying myself in this regime!.

SYMPOSIUM 2005

By Christopher Thorpe

On Saturday, 14 May 2005, several members of the Australian Homebuilt Sailplane Association gathered at the Bacchus Marsh gliding clubhouse for a half day discussion about the new experimental certificate rules pertaining to amateur built experimental aircraft. This symposium, aimed at sailplane builders, was well presented by Mr Norm Edmunds who is a Technical Councillor for the Sport Aircraft Association of Australia and SAAA instructor for training authorised persons to issue experimental certificates for amateur built aircraft. Also in attendance was John Ashford in his capacity as GFA Chief Technical Officer Airworthiness.

By way of background, Norm advised that under the previous regulations, specifically ANO 101.28, home-builders had to build their aircraft to the 'Amateur Built Aircraft Acceptance' standard. This required the home builder to have an approved set of plans and drawings, and when modifications were required detailed drawings and specifications had to be prepared and approved by a 'Reg 35' aero engineer. Inspections by CASA representatives were mandatory during the construction stage and a thorough final inspection needed to be made of the completed aircraft. Once the aircraft was finished it then had to be maintained by a Licensed Aircraft Maintenance Engineer (LAME).

This all changed in 1998 with the introduction of new certification and airworthiness requirements for aircraft. The new regulations, CASR Part 21, allows for the issue of experimental certificates for specific operations of aircraft which are not by their very nature type certificated. Primarily intended for genuine experimental aircraft, the rules also encourage creative design and development by established manufacturers and individuals. An experimental certificate may be issued on an aircraft for research and development, air racing, operating amateur-built or kit-built aircraft, etc.

Unlike the previous regulations, the builder of the aircraft is now entirely responsible for its airworthiness. No formal approval is required to construct an aircraft and builders are free to create their own design or select an existing design from Australia or overseas. The aircraft can be constructed from anything you like, with the builder being solely responsible for the construction and integrity of the design. Of course builders are encouraged to use approved components and aircraft quality material, and to seek advice from knowledgeable persons or GFA Technical Officers/Inspectors from time to time.

Other salient points:-

All elements of construction, including welding, weight and balance, and engine fitting can be done by the builder. Progress inspections are not required but independent "pre-closure" inspections are recommended.

- While it is quite normal to use specialised or professional help during the construction phase, to be eligible for certification of an amateur-built experimental aircraft the majority (more than 50%) of the fabrication and assembly tasks must have been performed by the builder. This also applies to kit-built aircraft.
- An experimental certificate does not attest to the airworthiness of the aircraft. The Authorised Person issuing the certificate is merely attesting that all the requirements for the issue of an Experimental Certificate have been met.
- Aircraft must be registered in the usual way, must display registration markings, and must carry an "Experimental" marking near the cockpit entrance.
- To fly a home-built glider under the GFA system you must conform to GFA operational requirements, including GFA test flying regulations.
- Normal GFA maintenance practices apply unless the aircraft is operated outside the GFA system.
- If your aircraft is of unconventional design or has unproven features, the Authorised Person issuing the certificate may place restrictions on where you may initially fly your aircraft pending such time as it is proven to be safe and fully controllable. Such conditions are intended to only protect third parties and property, not the pilot.
- You must keep construction logbooks, records and photos, primarily to prove that you built the aircraft.

For further information, refer to CASR parts 21 & 45; Advisory Circulars ACs 21.3, 21.4, 21.10, 21.29 and 45.1; and CAR 262AP and 42ZC. These are available from the CASA website.

¼ Scale glider news

By C. Collyer

Homebuilt sailplanes, and vintage ones too, are a great inspiration for we aero modelers. Even in these days of instant gratification, there are still those that are prepared to go the extra effort, and build something that is rare, and not available thru the normal sources. Modelers make up a fair part of the Vintage Glider Club in the UK, and Bunjee Cord in the US. To a lesser extent they also study the home built groups, looking for that special subject. I have made a good start, already having modeled the Golden Eagle (original built in 1935/6, the model built to celebrate its 50th birthday in 1987. the model is still flying, as is the full size) and then the MOBA, done because I wanted a "modern" model. It has turned out to be a lovely flyer, having done 2 - over 3 hour flights.
I have also done ***(thanks to our editor James Garay who lent me the original full size drawings)*** a Woodstock as a club project (9 built and flown in the VARMS club), a Ka6cr NO, a Foka 5 EF . Now, what am I coming to, you ask. Well, the information on all these subjects came from magazine articles, sometimes a photo, some times a 3 view. Little bits are tucked away for future reference, one day maybe to turn up as a model. now the obvious benefits are a finished model of a local glider, but more importantly, the history of these gliders is being studied and recorded, and may well be very useful to future generations. Overseas, as well as here, there are models flying of aircraft that no longer exist, and this to helps preserve the history of these fine old timers. The stuff you guys are building now, will be an old timer one day.
So, what is on the back burner... I have already drawn up the Nimph and the Altair. What about a BG 12, 2 to chose from, I believe, or the Spruce Goose, a subject that definitely needs doing. What about the JG 1, a wooden sailplane built in Queensland, or what about the Hoinville Plank, or the 2 seat plank that was built in Sydney in the 50's, and there must be others. Just remember, that photo you take, or the article that may give mention of something a modeler is looking for.
Thanks guys....keep up the good work

A LITTLE BIT OF GLIDING IN AUSTRALIA

By Allan Ash,

WESTERN AUSTRALIA
Fremantle Gliding Club.

A meeting was held in Fremantle Town Hall in 1930 to form the Fremantle Gliding Club. The meeting was called by a man named Marsh who claimed to have flown gliders in England and suggested that the club should build a glider that he had designed. In addition he offered to provide flying training for the club members.

This' training' turned out to be a crude set of controls set on the floor of a room in his house. Twice a week for months, while they where building the glider, the club members paid a shilling a lesson for instruction on this device.

When the glider was completed, the members took it to Welby's paddock at Bibra Lake for testing. After several flights to about ten feet, the club captain landed it on a fig tree. It was repaired and flown again. Arthur Farmer; later to be a driving force of the Western Australian Gliding Club, was one of those who learned to fly on it.

THE FIRST ALL METAL GLIDERS

A small advertisement in the magazine *Popular Mechanics* in the latter months of 1930 caught the attention of a young engineer in Perth, and this small event began a chain of activities that contributed several interesting steps to the progress of gliding in Australia.
Gilbert Ford was then aged 24 and was operating a small general engineering company in Hay Street, Perth. Developing an interest in aviation. Ford studied aero engineering to the extent of qualifying for licenses to work on the aero engines then use on light aircraft.

Browsing through *Popular Mechanics* one day, he saw a notice advertising primary-type gliders for sale. There was a small illustration of one of the machines and the thought came to him that such aircraft could be built without much trouble and expense. The advertisement said the glider in the illustration had a span of 40 feet, and it didn't take long for the enterprising Ford to scale off the approximate dimensions of other vital parts of the airframe.

He decided he would build a machine slighty smaller than the one in the advertisement and settled for a span of 33 feet and a chord of 5 feet. Having no technical information on airfoils, the young eng9ineer sketched an outline of his own design that looked as though it would be suitable.

Being a metal worker, not a carpenter, Ford decided he would build hid glider from steel. The fuselage presented no problems and was quickly fabricated from one inch diameter tubing of 20 gauge mild steel, fixed together with tobin bronze brazing. For the

wings and tail he made up strips of 22 gauge black iron and formed them into half inch channel sections.

The two spars in each wing were fabricated from brazed channel sections, and strips of the channel section were used to make the ribs. A length of steel tubing made up the leading edge of the wings and a high tensile wire formed the trailing edge. The tailplane was of a similar structure and cotton fabric was used to cover the wings and tail unit. For control cable, Ford used 15 hundredweight cable, as used in the rigging of sailing boats. Empty weight of the finished aircraft was 130 pounds.

At the time Ford had done no flying so he asked Harry Baker, a commercial pilot with Western Australian Airway, to teste the glider. Baker usually flew the airline's Vickers Viastra or De Havilland Hercules, but he was happy to try his hand at a glider. It was in November 1930 that he made several short hops in the all-metal glider by bungy and declared it airworthy.

Reading about the test flights in the newspapers a group of enthusiast in the gold mining tow of Kalgoorlie, 350 miles east of Perth. Wrote to Ford to ask what he would charge to build them a glider. The enterprising engineer promptly sold them his aircraft for 6o pounds.

After taking delivery of their new asset, the Kalgoorlie enthusiasts spent almost a whole afternoon rigging it and admiring it at the local aerodrome. It was then tethered to a fence post for the night, in readiness for flying the next morning.

It was unfortunate for them that a strong wind during the night tore the glider from the fence and blew it wildly across the aerodrome, scattering bits everywhere. The glider was a complete write off and the incident put a temporary end to gliding activities at Kalgoorlie. After the sale of his first glider, Ford decides to build another. Construction took three weeks. It had a span of 40 feet and a chord of 5 feet and the basic construction followed the method used on the first glider, though some changes were made with a view to reducing its weight.

The fuselage was a framework of steel tubing and a spring steel skid was provided to absorb landing shocks. In place of the wire bracing of the first glider, the new machine had four parallel struts. The wings had solid Oregon spars and the ribs were made from 3/8"x 3/8"x20 gauge galvanized steel channel. Ribs were nailed and glued to the spars. A 3/8" diameter steel tube formed the leading edge and a high tensile steel wire formed the trailing edge. The empty weight of the complete machine was 120 Pounds.

The most unusual feature of the glider, which was called *Bluey* because it was painted blue, was that it had no ailerons. Instead, it used an original concept in which the entire wing swiveled on the front spar fitting to provide lateral control. An ingenious system of levers and fittings on a saddle on the top longerons, near the fuselage/rear spar junction, and the rear strut/wing junction altered the angle of incidence of the wings so that, as the control column was moved sideways, one angle increased and the other decreased. The design was simple, light and quite effective.

Since building his first glider, Gil Ford had exchanged some maintenance work on aero club aircraft for several hours of dual instruction in a D.H. Moth, so he was able to make the test flights of *Bluey* himself. After providing the glider would fly safely, Ford set up a small gliding school, charging 1 pound a year for instruction and flying. It was enough to cover the costs and he continued in this way for several years. Later, he added a Zogling and a Rhon Ranger primary to his fleet. One of his early pupils was John Lilly, later to be very active in several gliding clubs.

WHO IS SERGIO JACOBI Also known as "SEJA"
By James Garay

If you have been reading this humble Newsletter for a long time, you may have noticed that every issue includes a cartoon in the front page accompanying the Editors Corner, which relates our interest in Home Built Sailplane since September 1996.

Through this time, I have mentioned that I have a very capable team helping me with the production of the Newsletter.

The man behind all these cartoons is Sergio Jacobi, who is a very good friend of mine whom I have known for many years. I asked for his help when I took the task as Editor of this Newsletter. He found it hard to refuse and agreed to do it.

Sergio is in his early sixties, married with two children He is grandfather to three grand children and is happily married to his wife Victoria.

He decided to migrate from Chile to Australia with his family in September 1977, looking for better opportunities for him and family.

His expectations when he decided to leave his country where very thoughtful. He possessed a great deal of enthusiasm and had prepared himself with the confidence that you need to confront any situation that could alter his aim in life.

After having studied in San Bernardo (CHILE) and completed his secondary education, he went to the Chilean Air Force where he spent three years studying and specialising as a Structural Aircraft Mechanic. Later, as he worked with the Chilean Air Force for more than ten years he decided it was time to change his life and seek a better future for his young family.

Once settled in Australia, he studied Art and Decoration at R.M.I.T for the 2 year duration of the course. Sergio is a great entrepreneur; he has run his own business for a number of years painting Flora and Fauna Australiana on leather. He also creates a number of items related to Arts and Craft such as: pyrography on leather, metal designs. Teddy Bears and porcelain dolls are also his specialty and besides all of this he finds time to do the cartoons for our Newsletter.

He is a multifaceted skilled person and since an early age he was interested in aviation. As a young lad he used to go to the nearby Air Force Aerodrome in Chile to watch the airplanes landing until he found himself involved with the Chilean air force.

After five years in Australia, Sergio and his devoted family adopted Australia as their country and became citizens, they now feel deeply in their hearts that they have become truly "Fair Dinkum Aussies".

BEACH COMPLETES SCUD GLIDER REPLICA.

An excerpt from Aeroplane Monthly. August 1995.

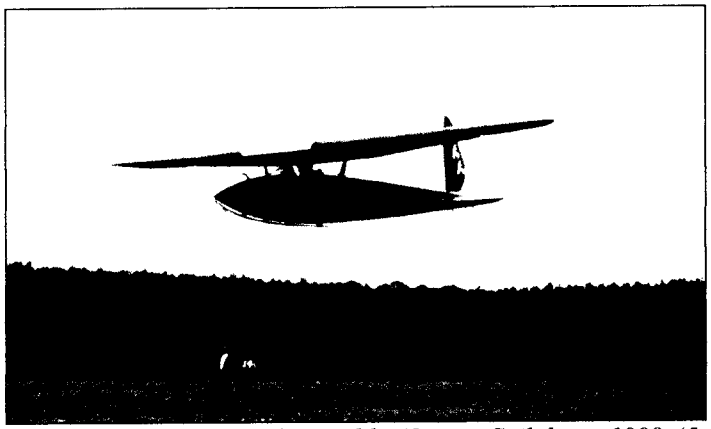


Photo by Peter Selinger The World's Vintage Sailplanes.1908-45 Martin Simons.

Another distinctive machine has emerged from the Twickkenham workshops of glider collector and builder Mike Beach, in the shape of a diminutive 1931 Baynes Scud 1 replica. Beach constructed the tiny aircraft at 25 ft span and just 13 ft long, surely one of the most minimal ever to take to the air over the last three years to commemorate the pioneering days of British gliding.

The Scud was one of the first private owner's gliders in the UK", says Beach. "I wanted to recreate first one hour flight of a British glider, which is why I built it"

The original flight was made by renowned sailplane pilot Edward Mole, who recalls: "The Scud, introduced in 1931, was a revolutionary conception with its size and weight reduced to an absolute minimum. In fact, it weighed 40 lb less than I myself as it pilot. On February 5, 1931, I tested the Scud at the request of Mr L.E.Baynes, its designer. After a few bungee launched ground hops at Dunstable, I took a launch from the top of the ridge and made a slope soaring flight of one hour, so proving its capability as a glider. It handled beautifully".

The replica, nicknamed the "Beach Bullet" by it creator weighs in at about the same figure as the original, a mere 40lb-"or ten stone", says Breach, "which really puts it in the context of a person". Other ridiculous figures include the fact that the fuselage's ash longerons are a mere ½ in square. Despite its model aircraft proportions, though, "it's the most difficult thing I've ever built", says Beach, the complex metal fittings having proved a particular headache.

All the Scud I now awaits is a pilot- and unless Beach decides to try and find someone "small and expendable", he intends to do all the flying himself. "It's very tiny inside, with a very uncomfortable seating arrangement" says Beach, "although it's easier to get into than a Scud II"- an example of which he rebuild four years ago (see Grapevine.April 1991), and which at 40ft span dwarfs the Scud I. "we're going to bungee it off a flat area to begin with to make sure it goes all right, and then press on from there"

The project was sparked off by the late Frank Costin, the legendary racing car designer and aeronautical engineer , who owned the last original Scud I and flew it at Dunstable in 1949-50. "He was an extraordinarily talented man, and an excellent pilot" says Beach. "He used to say the Scud was superb; it was so small it would turn in the tiniest bit of lift".

SMILE ☺

Two zebras were debating. "Were they black with white stripes, or white with black stripes?' So they went to see the King of the Jungle, Leo the Lion.

"Are we black with white stripes, or white with black stripes?, they asked.

The Lion pondered the question and replied, you are what you are,"

This confused the zebras, who sought clarification from the wise old Owl.

"It means that you are white with black stripes" said the Owl," otherwise he would have said, "Yo is wath yo is".

Eds note: if you get this, please explain it to me.

SHOP TALK.

WE VISIT THE AVIATION MUSEUM

By "The erudite"

On Saturday 1st August a number of AHS members and other gliding oriented persons availed themselves of the opportunity to visit the Pt Cook Aviation Museum; about 30 minutes drive west of Melbourne's Central Business District. It is about halfway between Williamstown and Werribee, on Port Phillip Bay and Pt Cook is of great significance to aviation in Australia as it is the birthplace of the Royal Australian Air Force.

Arriving a little earlier than our 11am deadline we signed in at the gate and received our visitor pass. A high level of security is still maintained on the base which while not operational is still under the control of the Defence Department. The airfield is also still used on a regular basis by a number of flight schools. Once we were in the car park the presence of the Bristol Freighter and Hercules aircraft parked on the hardstand leave no doubt that we were in the right place. Shortly after John Biggs arrived in his classic 1951 Austin A-40. John is one of our long standing AHS members and also an active member and Volunteer Host Officer of the museum. He had arranged to be our guide for the day.

Upon entering the museum entrance ones course to the full sized aircraft is via a meandering series of dioramas and displays distributed over two levels and that chronicle the history and growth of military aviation in Australia. Videos triggered by motion sensors play on approach adding a degree of animation to the displays. This coursed leads us to the Training Hangar where CT4, Tiger Moth, and Machi Trainer are but a few of the aircraft used in training roles that are on display. Moving toward the back of this building we transition to the Technical Hangar via an adjoining corridor. Just some of the notable aircraft residing here are the Walrus, Vampire, Phantom and Boston. The quality of presentation and restoration of the aircraft is superlative a theme throughout the entire fleet. After spending some time wandering amongst these aircraft we reluctantly withdrew to the picnic area for a little lunch and the anticipation of seeing some aerial activity.

Every week the Museum provides a demonstration flight of one of its airworthy aircraft. The Interactive Flying Displays feature a heritage aircraft in flight and may include an aerobatic display. Regular aircraft featured include the Winjeel, Mustang, Harvard, CT4a, Sopwith Pup (replica) and Tiger Moth. Visiting aircraft,

The Editor shares a ride in a C130

The Mustang rests after its sortie.

such as the DC3 or even a modern-day PC9 are sometimes featured. The display is only done using aircraft that are not unique due to their obvious value and because they are irreplaceable. On this occasion we were treated to a very spirited display performed by the P-51 Mustang. As the aircraft was put through its paces we were able to hear a commentary by the pilot over the Public Address system describing the conditions and maneuvers he was performing. After the pilot had landed we were then presented with the opportunity to ask questions related to the operation of this aircraft. It was obvious that the pilot really enjoyed the opportunity to display this aircraft.

One of the highlights, particularly for those with an interest in wood construction, was to be able to see close up, the work being done on the De Havilland Mosquito PR Mk XVI project. A52-600 is the only surviving PR Mk XVI Mosquito aircraft, and the only Australian-operated Mosquito of any marque still in existence that has a combat record. While this aircraft will be too valuable to fly, no effort is being spared in restoring the aircraft as authentically as possible. One can only admire the dedication of the volunteers to such a mammoth task as for us in the homebuilt movement it is difficult to reconcile that all this work and material will ultimately result in a flightless bird. Nevertheless much discussion was generated amongst our group on this part of the tour as we could identify with the enormity of the task and the breadth of skills required to do the work.

The final part of our tour took us to another hanger full of aircraft which contained the Catalina, Boomerang and Sabre to name just a few. It would be difficult for anyone to name the entire contingent of aircraft on display in this museum, an excellent representation of Australia's Air Force development. With the current proposal to establish the National Aviation Heritage Centre at Point Cook and the opportunity that Vintage Gliding Australia has to develop a gliding branch there it will be a real challenge to see if we can match the quality of displays with one of gliders.

Thanks must go to James Garay for coordinating everyone before on the day and to John Biggs for his informative guidance throughout the displays. I am sure I speak for everyone in saying that we had a very enjoyable albeit all too short visit to the museum.

Tour the Museum

Tuesday to Friday: 10.00 am - 3.00 pm
Weekends and Public Holidays: 10.00 am - 5.00 pm
The Museum is closed on Mondays, Good Friday and Christmas Day
Every Tuesday, Thursday and Sunday at 1pm, see one of the heritage aircraft in flight and learn about the process in close-up detail. Best of all, it is absolutely free! Bookings are not required.
www.raafmuseum.com.au

Visitors up close and personal with the Mosquito.

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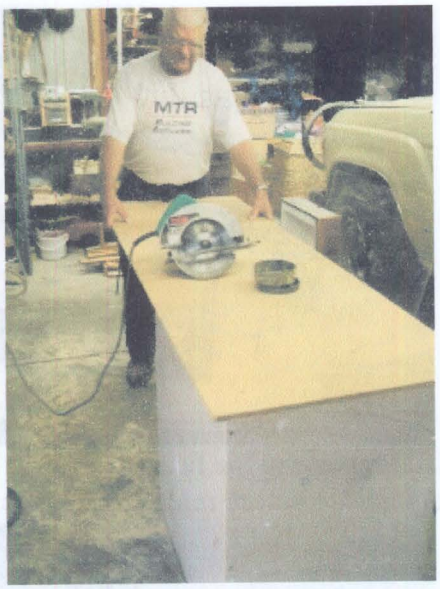
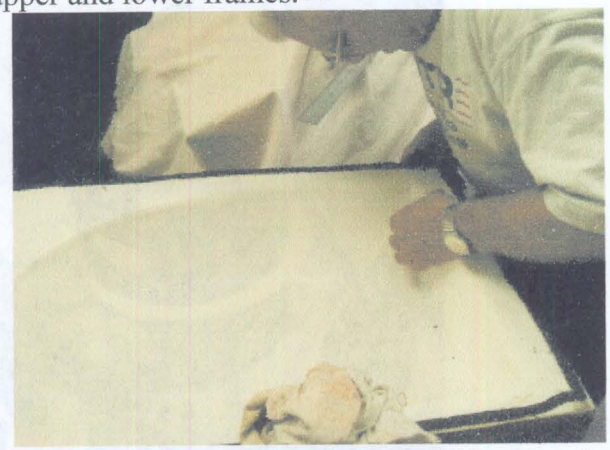


Preparing the heating cabinet using chipboard and MDF.>>

Fitting the inner supporting frame to the top of the box.

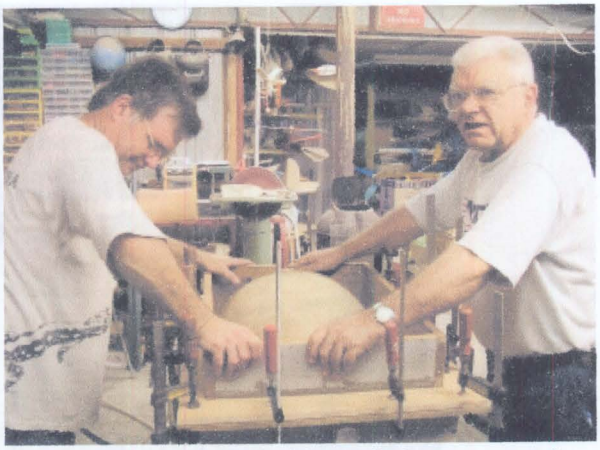
A panel of cast acrylic is clamped between the upper and lower frames. >>

Two burner stove is positioned under the box that has been raised on bricks to allow airflow.



The formerly prepared tophat mould is cleaned and the gasket checked.>>

Heating is commenced pending placing of the mould



Once the acrylic is suitably soft the vacuum is applied and pressure maintained.>>

After removing the heat the acrylic is allowed to cool a little before releasing the vacuum.

Clamps are removed to reveal the final product.>>

An angle grinder and metal cut-off disc are used to cut away waste material

Vacuum rig consists of an old fridge compressor, a scuba tank for storage and an automotive vacuum guage, Mole grips clamp the delivery line.

Compressor is capable of 28-29 inches of vacuum but needs assistance from storage to draw the acrylic quickly.

Malcolm Bennett and Mike Williams trial fit the wing skin and check the jig

Peter Raphael spreads glue

Mike Williams scrubs the skin with scotchbrite.

Ribs and spar go in.

Peter Raphael and Jim Garay prepare the frame. Note the wooden strip at the leading edge.

Wing all clamped up. Note wooden stick at leading edge. The sheet of balsa wood adjusts a defect in the jig.

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