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Liaison

First in many steps that will take our Canadian team to the 1997 World contest in France, I was able to organize, through a personal contact, favourable rates with a French gliding club, in order for our pilots to gain some much needed mountain flying experience. On September 10, I received confirmation from Pierre Albertini, president of Association Aéronautique Provence–Côte d'Azur that our team members will enjoy the same rates as their own members. Their field is situated at Fayence, a charming village 30 minutes away from Cannes, and just at the foothills of the Alps. Their equipment is first rate: ASH–25, carbon Janus, and ASK–21 just to mention the two–seaters. They have five towplanes and four staff instructors.

I have heard many suggestions relative to the world team and how to make it a more dynamic affair. The board is going to look into this issue this fall. If you have any recommendation to submit, please forward it asap to Hal Werneburg, chairman of the World Contest committee and a Director–at–large.

On the topic of memberships, it looks as if we have at last a turn for the better. You will see that some clubs have shown some fabulous increases. However some other organizations are sliding down year after year or staying put.

But also we find clubs that take advantage of SAC. Some years, they have only renewals, not a single new member. However, they order log books and student manuals by the basket. Sometimes we spot names of people on instructors courses we do not have on our list. I have instructed the office to have a much more rigorous position relative to these situations. I find it unfair that non–participants get the same services as fee–paying members. I find it deplorable that glider pilots take advantage of services paid for by others. This is even more important as we prepare SAC to face the challenges of the third millennium and become more and more a service organization.

We will be lobbying Transport Canada on a number of different issues in the light of their service cutbacks and fee increases. We want to see what we can do to ensure that we do not have to pay some of the very high fees proposed. How does $200 for instructor rating renewals feel? It may make sense for professional instructors, but for volunteers? Very few of us will want to pay that kind of money to be able to give instruction *for free*. And if we do not train new pilots, in twenty years or sooner our sport is history. We also want to be able to use the Experimental category to facilitate the importation, for private use, of gliders that are not type certified in Canada. It is done south of the border — why not here? Why do we have to be more stringent here than in the USA?

As these efforts may benefit the total soaring community, it is therefore important that we receive the financial support, ie. membership fees, of all those who will benefit.

May your fall flying be fun and safe and your landings be as smooth as the falling leaves.

Les chiffres de mi–saison démontrent que les clubs de la zone Québec ont eu une bonne année quant au recrutement. Les conditions ont été moyennes partout pour le vol voyage mais de belles fin de semaines ont donné des conditions propices pour l'entraînement. Ceci ajouté à un début de saison hâtif aura permis à tous les clubs de rentabiliser les opérations.

Nous aurons besoin de votre aide pour réviser la traduction du nouveau manuel d'instruction. Né d'une mise à jour du manuel anglo–canadien SOAR paru en 1994, nous allons le faire traduire au moyen d'un logiciel de traduction. Cependant, cette méthode est loin d'être parfaite surtout pour les ouvrages spécialisés. J'aimerais pouvoir séparer le travail entre des équipes ou des individus venant de plusieurs clubs. Il est important de pouvoir offrir un outil aux étudiants francophones de la même qualité que ce qui est disponible aux autres canadiens.

Bons vols de fin de saison et que vos atterrissages aient la douceur de ceux des feuilles d'automne.

Pierre Pepin president

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Le journal de l'Association Canadienne de Vol à Voile

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Cover

Tony Burton in his RS–15 glides over the Oldman Reservoir just south of the Cowley airfield during the 1995 Cowley Summer Camp.
photo: Gerald Ince

DEPARTMENTS

Omarama and the moral dilemma

Many pilots have major reservations about the way international gliding competitions are going. Perhaps it was the excellence of the Omarama organization that enabled pilots to focus on the difference between the form and the substance.

Justin Wills, from *Sailplane & Gliding*

Omarama proved conclusively that the ingredients for success in international competition now include not only skilled pilots, but also substantial financial backing, experience in local conditions, and a large integrated team, providing effective air to air and ground to air networks. Team flying is nothing new in competition gliding: the Poles have demonstrated its benefits for years, but the advent of GPS and its associated information have made it far more effective. Future developments of GPS related systems will increase this further. Significantly, for the first time in competition, following the introduction of GPS at Borlänge there was a tie for 1st place in the 15m class by the French, and at the 1994 European contest the German team managed triple joint winners in the Standard class. At Omarama the German Open class pair were 2nd and 3rd overall, 11 points apart.

Omarama undoubtedly emphasized the benefits of external aid, due to lift from slopes or wave remaining constant over long periods making relayed information particularly valuable. Furthermore, the tasks for all three classes overlapped extensively each day. Thus the clear competitive advantage of large teams posed many European entrants with an awkward choice: given the cost of competing in New Zealand (over $18,000 Cdn per entry) they had to send a large team or accept they were unlikely to do well.

The organizers contributed to this situation by allowing teams of up to nine pilots per country, and inviting further suitably qualified pilots to compete as individuals, but no doubt they needed additional entrants to help their finances. The outcome was evident from the entry list: whilst 91 competitors from 23 countries looked superficially impressive, over 40% came from just four countries and over 60% from seven countries. A number, including Belgium and all the former eastern block with the exception of Poland and Czechia, decided not to be represented. Other leading countries such as The Netherlands and Italy sent only two pilots each. The results appear to have vindicated their decision; of the nine medals, only one went to a team of less than six pilots.

Looking ahead, the major beneficiaries of this shift of emphasis from the individual to the whole team approach will be those countries with good funding and the facilities to train pilots intensively as a team, notably France and Germany — the hosts for the next two World Championships! Losers will include the USA whose geographical spread of pilots and their individualistic approach, reinforced by their local contest rules, renders the skills of team flying using external aid an anathema. Likewise, smaller countries with few pilots of the necessary calibre will find it almost impossible to be successful.

Many competitors at Omarama felt profound disquiet at this prospect. The switch from "may the best man win" to "the best financed and organized team will produce the winners" seems unfair (whatever that means), distasteful, and inappropriate; one of the principal attractions of gliding is the quality of individual self–determination, and this is reflected right up to national level. What justification can there be for a different approach in international competition? Part of the answer (or excuse) is money. With the cost of internationals so high, nearly all competitors receive external financial support. Undoubtedly, the pressure to produce results to encourage continuation of this support is a spur to producing a good team by whatever means possible. The introduction of the World Cup team prize further emphasizes this. Other facts include maintenance of the status quo. Given the special skills required to fly in international contests, it is increasingly difficult for newcomers to enter the arena successfully. Many of the contestants at Omarama (including over 50% of the British team) have been flying in world contests for over ten years. Only ten pilots were under 30 years old.

Herein lies the moral dilemma: the majority of pilots were members of teams of six pilots or more, enjoying a significant competitive advantage over the rest. ⇨ p17

The SOARING ASSOCIATION of CANADA

is a non–profit organization of enthusiasts who seek to foster and promote all phases of gliding and soaring on a national and international basis. The association is a member of the Aero Club of Canada (ACC), the Canadian national aero club representing Canada in the Fédération Aéronautique Internationale (FAI), the world sport aviation governing body composed of national aero clubs. The ACC delegates to SAC the supervision of FAI–related soaring activities such as competition sanctions, issuing FAI badges, record attempts, and the selection of a Canadian team for the biennial World soaring championships.

free flight is the official journal of SAC.

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Prints in B&W or colour are required. No slides or negatives please.

free flight also serves as a forum for opinion on soaring matters and will publish letters to the editor as space permits. Publication of ideas and opinion in *free flight* does not imply endorsement by SAC. Correspondents who wish formal action on their concerns should contact their SAC Zone Director whose name and address is given in the magazine.

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L'ASSOCIATION CANADIENNE DE VOL A VOILE

est une organisation à but non lucratif formée de personnes enthousiastes cherchant à développer et à promouvoir le vol à voile sous toutes ses formes sur une base nationale et internationale. L'association est membre de l'Aéro Club du Canada (ACC) représentant le Canada au sein de la Fédération Aéronautique Internationale (FAI), administration formée des aéro clubs nationaux responsables des sports aériens à l'échelle mondiale. Selon les normes de la FAI, l'ACC a délégué à l'Association Canadienne de Vol à Voile la supervision des activités de vol à voile telles que tentatives de records, sanctions des compétitions, délivrance des brevets de la FAI etc. ainsi que la sélection d'une équipe nationale pour les championnats mondiaux biennaux de vol à voile.

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Free cellulars for all!

— the first 1996 Nationals update

Dave Mercer, Contest Director

The preparations for the 1996 Nationals, hosted by Cold Lake Soaring Club, are intense. The date is firm at 25 June to 4 July in Red Deer, Alberta, with official practise days 23–24 June. The facilities and airport will be accommodating hundreds of Air Cadets and staff shortly after the contest ends. The Calgary Stampede, beginning 5 July, will eat up accommodations all the way up to Edmonton as well. We are aware that this may cause some competitors some difficulty with their children's schooling, but is unavoidable.

Our first major sponsor has been secured for the contest. *"AGT Mobility"* has graciously offered cellular phones and beepers for the majority of the contestants and crews. They will provide up to 70 cellulars, 35 beepers, free air time and free rental! Each pilot will be able to carry one cellular with them in their cockpit for competitive and safety purposes. Cellulars will be assigned to each pilot with the remaining phones going to the crews on a first–come, first–served basis on downpayment of registration. If you wait to the last minute they may be gone. If crews are not assigned a cellular telephone, they will have priority for a beeper. (If you own your own cellular phone, please offer the sponsored units to those who do not have one.) Ideally there will be two cellulars and a beeper assigned to each pilot/crew combination. As such, the crew will not have to carry the cellular with them at all times. They will be able to see the many sights carrying only a small beeper while their pilots race. Ventures as far away as Edmonton, Calgary and Banff are possible, and may in fact reduce the retrieve time, assuming the routing is in the proper direction. Should pilots land out, they will then be able to either beep to get the attention of their crew and/or phone directly to them to give the outlanding information. Hours can be saved for each pilot/crew plus a huge sense of security, thanks to *"AGT Mobility"*.

The aviation fraternity is a wonderful thing. We approached *"Air Spray"*, a Red Deer water bomber/fire suppression outfit, on the off–chance we could get some help from them during the contest, and we were offered virtually their entire hangar for use during the Nationals! The floor has twice the area of Gatineau Gliding Club's large WWII hangar. We will be able to house probably over fifty sailplanes as well as all the towplanes. Tiedowns will also be available if sailplane owners are unwilling to accept the chances of hangar rash etc, but Red Deer is notorious for Cbs and hail around that time of year. Understandably, Air Spray will not accept any liability in using their hangar.

The turnpoints have been chosen, photographed, and GPS verified. Turnpoint booklets and coordinates will be made available to each competitor upon receipt of a downpayment of $99 towards registration. Only one set will be issued to each competitor. Replacement sets will cost $25 should a pilot lose them. The 35 turnpoints are full colour map and photo booklets arranged for ease of use in a busy cockpit. With the downpayment a competitor will also receive a basic contest information package and the two VFR maps required for this area. Because of the cost involved in producing the high quality information packages, the downpayment will be non–refundable.

Still–to–be–confirmed hosting grants and pre–contest sponsorship will determine the full price of registration, and will be finalized by Christmas, but will be very similar to the previous few national contests. Cheques are payable to the *1996 Canadian National Soaring Contest* and are to be sent to the contest treasurer, Jeff Anderson at:

Cold Lake Soaring Club, 1996 Canadian Nationals
Box 2108, Medley, AB T0A 2M0

A 24 hour Nationals Hotline has been established. The number to call is (403) 594-SOAR. There is a voice mail system which will allow you to "surf" to the information you want to hear more about with your touch tone phone. For example, the system will say, "For information about hotel accommodation, press 'Hotels' followed by the pound sign (468357#). For a listing of the local camping facilities, press 'Camping' followed by the pound sign (2267464#), etc." If you don't own a touch tone phone, you will be able to leave a message, and the contest staff will return your call as quickly as possible. One last feature on this system is a fax–on–demand. The access number for the fax mail box is "FAX" followed by the pound sign (329#). "FAX#", which you will be able to call with your fax machine, will send pages of information on everything we will put in the voice portion (and more) at up to 14,400 bps. This way you can have a hard copy of it all. Updates and additions will be made on the last day of every month leading up to the Nationals. ❖

restoring the Scarlet Lady

why did it have to be done anyway?

Bruce Friesen
Edmonton Soaring Club

14 July 1985 ... six hours into a 300 kilometre flight and only two kilometres from home field. Flying at 45 knots and about 200 feet, on a straight glide into an unknown field, I suddenly realized I was not going to make it over the grove of trees ahead. Pulling into a tight left turn, I knew I was in trouble when I felt the left wing drop, but by the time I had the rotation stopped and the nose down, the ground had arrived. My beautiful Austria lay shattered ...

23 October 1993 All the checks and rechecks had been done. My Standard Austria, the Scarlet Lady, was ready to fly. As the tow rope pulled taut, I reminded myself to be ready to release if things felt wrong, but as soon as she leapt into the air — a little too eagerly! — there was no doubt. She was back where she belonged. Some tight turns, some side slips and Dutch rolls, exploration of the speed range from 43 knots to 80 knots confirmed it. She didn't fly perfectly. Better than that, she flew just as I remembered from eight years earlier. Back on the ground, as I relaxed at the end of the landing roll, the towpilot taxied by and gestured "Thumbs up?" Yes — thumbs up, definitely thumbs up!

Eight years is a long time. A long time to think. Why? Why did it happen? Why was I basically sitting there, waiting for the ground to arrive? Why did I plow ahead, putting us into a smaller and smaller box, until things were so bad a nasty outcome was inevitable? Why did I accept a situation which was clearly life–threatening? What could possibly make me willing to destroy a thing of beauty like my Austria?

I have some answers to these questions. They are not new, and they are not particularly clever, but I feel they are worth sharing. There is an expression, he who relies on learning from his own experience is a fool. Perhaps I can share my experience with others and thereby give some reality to things we have all heard.

Certainly, I had a severe case of get–home–itis. (1985 had been a good year for me, with several successful long flights, but two of them had fallen victim to the photo developers, and a couple of others had ended just short of the declared goal.) I could *see* the Town of Chipman, and knew the final glide was *close*. On the other hand, I had made several safe off–field landings and was comfortable with doing so again. It would have been a short retrieve, and I knew there were plenty of people at the club who would be willing to help.

No, there was something more. I have thought about my decision–making over the last half hour of that fateful flight many times. Many, many times. And I am convinced that, well before the crash, I was no longer fit to be flying.

Leaving my last good thermal, my prospects of a successful final glide were tight but reasonable. Things went downhill from there. I started flying slower and slower, hoping for gentle lift or zero sink. On at least two occasions, I reminded myself I should be flying faster, and made the mental effort to push the stick forward, but I kept relapsing, slowing things down, flying at 45 knots or less whereas the best glide ratio in the Austria requires 56 knots. In fact, had I flown at the best glide ratio, it is unlikely I would have had the opportunity to write this story!

I think I was having trouble with information overload. Reading the sky and the ground, navigating, using the information from the instruments, assessment and selection of landable fields — all those things we all do continuously while flying cross country — seemed on this occasion to be too much. I think I was subconsciously trying to slow the world down to the pace my poor brain was achieving. Of course, the world did not cooperate!

Preparations for the very real prospect of an off–airport landing were also, in hindsight, woefully inadequate. I started off doing all the right things. Passing through 2000 feet agl, I

satisfied myself there was a selection of landable fields around. Down to 1500 feet, I had picked out a likely looking field a couple of miles ahead, and when I passed by that field, I satisfied myself it would do and decided, since I was flying into wind and still had 1200 feet, I would poke ahead a little to see how things were going and, if necessary, a 180 degree turn would place me right on downwind. But things were not as rosy as this description implies. My selected field, although large, level and oriented into wind, was freshly plowed, a fact which normally would have me actively looking for a better choice. No such activity seemed necessary, and to this day I couldn't tell you if there were power lines or trees at the approach end. I couldn't tell you if there was any reasonable access for a retrieve. In short, I didn't bother to make any more than a cursory assessment of it as I drifted by.

Things got worse. Come the decision point to turn around, enter the circuit and land, I executed a brilliant "Oh heck, something will turn up, maybe even Chipman!" decision and kept mushing along. I did maintain a stream of grossly inadequate field selection thoughts, such as "no, grain's too tall" and "no, too many cows", the latter with respect to a field that was crosswind and with a significant slope. I remember it all so clearly, many of the specific thoughts, the absence of any sense of urgency or pressure, the complete lack of recognition that I had put myself in a position with major implications for life and limb.

Eight years later, I don't know whether I was tired, or thirsty, or hungry, or all three. I started out with the normal amount of sleep, water and food. I am sure of two things. One is that I was not fit to fly, and there was some physical reason for it. The other is that I didn't recognize it at the time.

I hope the description of what happened to me is of some value to others, and that having read it, you will be more alert to the same symptoms in yourself. But I doubt it will as one's degradation in mental performance is so insidious.

For myself, I have made two resolutions. First, from now on, all long flights will be accompanied by *more* than the normal complement of sleep, water and food. Of course, one can stock up with both water and food in two ways, before the flight and during the flight. Perhaps a medical specialist can recommend the right balance, but my objective will be to do both. A reasonable test of success would be to come back at the end of a flight with food and water left over. Why not err on the side of excess?

Second, I plan to establish, as a routine, a regular self–check. I will carry a countdown timer (available on many wrist watches these days) set to beep at regular intervals, and at each beep, I will allocate a few moments to step outside my immediate tasks and ask some objective questions about my current performance. In my case there was a substantial degradation of my mental state within a period of 30 minutes. This suggests the necessary frequency of self–check is, in my case at least, every 15 minutes or so.

I am not going to propose here a specific set of self–checks, partly because they will change from one phase of a flight to another, and I suspect they will vary from one pilot to another. I would be more than interested in suggestions, or knowing if this process has been the subject of expert analysis. My personal questions will include "Did I use that last thermal well?", and "Was I focused when I made that last choice of heading?", and "Have I revisited my flight strategy recently?", and "Do I have clearly formulated tactics at this moment?" If I am not doing these things, which are fundamental to a successful cross–country flight, I belong on the ground.

So there I was, at about 45 knots and probably less than 200 feet above ground on a straight in approach to a field I had never seen, with a standing crop of what looked like wheat about two feet tall, when I realized the grove of aspen trees between me and my 'chosen' field was growing alarmingly. I guess that's what happens when you fly a glider so slowly it is just mushing down out of the sky.

Suddenly, I was fully alert. An instant decision that the field below was now the safest choice led to a steep left turn. Unfortunately, I hauled the nose too high. The attitude of the glider, just as I felt the lower wing drop, is seared into my brain as one of those images — in my case usually associated with extreme stress — recorded from a vantage point outside my body. Collective action to stop the rotation was instinctive. I don't know how long it took, as time slowed right down, and I formed the impression of sitting on a fluttering leaf as every motion of the glider was stretched out. I do know I turned about 45 degrees more than intended. During the fluttering leaf stage, my thought was "People die from this". Then things firmed up, the nose swung down, and the ground expanded to dominate my vision. I thought "I don't have long to wait to find out".

I will never know for sure whether or not the Austria was ready to fly by the time we reached the ground. I didn't try to round out. Striking the ground at about a twenty degree angle, the fibreglass nose shattered and the canopy cracked, then we bounced off and up so that we found ourselves back in the air nose up about thirty degrees. Then we sank back down on the tail, snapping the fuselage in half, breaking it in two places about three feet apart. At some point the forward momentum of the wings was sufficient to poke the front wing attachment sockets through the number one rib on both sides, then they recoiled backwards to crush the fuselage former carrying the drag spar attachment points. Lastly we struck a fence and one post chewed a hole in the trailing edge of the right wing while a second broke the right ruddervator in half.

In short, the Austria was dealt a grievous blow. Luckily I was not — at least, not physically. My only wound was a scratch on a finger, incurred when I opened the cracked canopy in a less than gentle fashion.

I am now a believer in the value of crashworthiness in gliders, and in achieving a significant degree of pilot protection. I heartily recommend potential purchasers give this factor significant weight when selecting their next glider. In the case of my Scarlet Lady, a previous owner had, during earlier repairs, added an extra layer of fibreglass cloth to the bottom of the fuselage. This may have made a significant contribution to the fact that the shattering of the fibreglass nose cone stopped just short of my ankles. The same previous owner added a steel tube across the fuselage, interconnecting the front attachment fittings for the two wings. During the impact, the wings flexed backwards, crushing the rear fuselage, but did not flex forwards to converge about my head. That previous owner knows who he is and knows he has my gratitude for his foresight.

The Standard Austria also has, as a factory installed feature, a five point safety harness. I cannot prove that the fifth strap, the crotch strap, stopped me from sliding forward and breaking ankles or legs, but when I consider the dynamics of the impact I am awfully glad it was there. This is something which can be retrofitted to many gliders. It deserves strong consideration.

What was also damaged in the crash was my ego, my self–respect. At first, I was incredibly angry with myself that I had, by sheer stupidity, broken something with the beauty and classic value of the Austria. Later, whenever I tried to work on the glider to start the repairs, it put me in such a blue mood that I had to turn away from it. It took six years before I managed to get down to steady repair work.

At each step, the support given me by the soaring fraternity was outstanding. Friends came and helped me pick up the pieces in a remarkably nonjudgmental way. Other friends worked very subtly but very hard to ensure I was back in the air the next weekend. Yet other friends took the risk of letting me to fly their gliders as a partner in the succeeding years. And some people gently but persistently kept the pressure on me to glue her back together again until at last the job was done. Thank you to you all.

So, I do not recommend crashing a glider! But if you do find yourself with a broken glider, or if you know where there is a classic machine in need of repairs to return to its natural element, or in need of refurbishment to return to the beauty and grace of its youth, do it! Repairing my Scarlet Lady was one of the most educational and satisfying things I have ever done.

Carpentry is something I've dabbled in all my life, but my most successful effort was probably landscaping the garden. ⇨ **p21**

The Morning Glory

of the Gulf of Carpentaria

photo not available for pdf file

A Morning Glory passage over Burketon, 9:00 am, 24 August 1986
photo: Noel Henderson

Douglas Christie and **Russell White**
from *Australian Gliding*

THE MORNING GLORY, a spectacular propagating roll cloud which frequents the sparsely populated southern margin of the Gulf of Carpentaria, is one of the world's most exotic and interesting meteorological phenomena. Morning Glories are frequently observed during the spring months near dawn over the southern Gulf area between Sweers Island and the remote community of Burketown in northern Queensland. They often appear in the form of one or more rapidly advancing, rather formidable roll cloud formations which extends to each horizon in a long arc as far as the eye can see (as photo above shows).

The cloud is usually about 3000 feet in depth with a base at about 1000 feet above the surface. On occasion, the base of the cloud may lie below 300 feet agl and the depth may exceed 6000 feet. The leading roll cloud in Morning Glory disturbances tends to be very smooth along the front and turbulent along the back. Subsequent cloud formations, if present, are nearly always turbulent and often appear only in the form of scattered lines of irregular cumulus.

Recent studies have shown that Morning Glory roll cloud formations often extend in length for over 1000 kilometres (see Figure 1). Despite their ominous appearance, they seldom produce measurable precipitation but are almost always accompanied by a short–lived, but often intense, wind squall near the surface which may be a potentially serious wind shear hazard for aircraft. Morning Glories propagate on average with speeds of about 40 km/h, but occasionally are observed to travel at speeds of over 60 km/h. Morning Glories tend to occur on a daily basis at Burketown over periods of three to seven days in succession.

Solitary Waves Morning Glory roll cloud formations are the visible manifestations of large–amplitude solitary waves. Solitary waves are somewhat unusual in that they occur as singular waves with one isolated crest. Waves of this type propagate as exceptionally long–lived disturbances in waveguides created by stable layers in the lower atmosphere. A feature of larger amplitude solitary waves is the region of trapped recirculating cooler air in the interior of the wave which may be transported by the wave over considerable distances.

Solitary waves occur commonly throughout much of the arid interior of the Australian continent and elsewhere. Waves in inland areas almost invariably occur without cloud as clear air disturbances accompanied by a sudden wind squall at the surface, and a temporary increase in surface pressure.

When sufficient moisture is present near the surface, as is often the case over the southern Gulf of Carpentaria, large amplitude waves of this type may be accompanied by what appears to be a propagating roll cloud formation. This cloud is created continuously in the updraft along the leading edge of the wave as moist ambient air from near the surface is lifted to the condensation level. Cloud elements are then eroded away as air parcels descend in the downdraft along the trailing edge of the wave.

The clearly visible upward motion of cloud elements along the leading edge, and the downward motion of cloud elements along the trailing edge of the wave, combine to give the impression that the cloud formation is rolling backwards as it advances.

Conditions over the tropical southern margin of the Gulf of Carpentaria between the months from August to November prior to the onset of the wet season are particularly favourable for visible solitary waves. Indeed, the southeast corner of the Gulf is the only known location where spectacular roll cloud formations of this type can be regularly and predictably observed.

Roll cloud formations probably accompany more than 80% of all Morning Glory disturbances during the spring as they propagate offshore over the southern Gulf. Conditions are not as favourable over land; nevertheless, nearly half of all disturbances which occur within 100 kilometres of the coast are accompanied by roll clouds.

Origin Three distinct types of Morning Glory waves have now been identified: Northeasterly Morning Glory waves which appear most frequently just before sunrise over the Burketown area, southerly waves which can appear over the Burketon region at any time of day except during the afternoon and early evening, and southeasterly waves which tend to be active primarily during the early morning hours. More than half of all disturbances observed at Burketown are northeasterly. These disturbances originate during the previous evening in the collision between two opposing intense tropical sea breeze fronts over the highlands of the Cape York Peninsula. Waves of this type propagate at night towards the southwest over the Gulf of Carpentaria, arriving near dawn over Burketown.

The cloud associated with northeasterly Morning Glory waves dissipates fairly rapidly as the disturbance moves inland into drier air over northern Queensland. Even after the cloud dissolves, however, the disturbance continues to propagate inland, often for distances in excess of 200 kilometres, as a clear air wind squall. The genesis of southerly Morning Glories remains obscure. Some of these waves have very large amplitudes and may be accompanied by spectacular roll clouds; other southerly waves take the form of relatively minor disturbances with amplitudes of only

a few hundred feet. There is evidence to show that some southerly disturbances originate over the interior of the Australian continent in the interaction of a mid–latitude cold front with a developing nocturnal radiation inversion.

Little is known with certainty about the origin or properties of Morning Glory waves which arrive at Burketown from the southeast. Some of these waves appear to be generated by thunderstorms which often develop in the late evening over the region to the northeast and east of Mount Isa.

The genesis and propagation of Morning Glory waves is controlled by synoptic conditions which turn out to be nearly identical for all types of wave. Thus, northeasterly, southerly and southeasterly waves may occur simultaneously over the southern Gulf region. Favourable conditions for the occurrence of Morning Glory waves in the Burketown area include a significant pressure ridge over the east coast of the Cape York Peninsula, absence of storm activity over the Burketown region and a well–developed sea breeze regime over the southeastern Gulf area on the preceding day.

These conditions are enhanced by the presence of an inland heat trough and an advancing frontal trough system south of the Gulf of Carpentaria. The presence of an inland heat trough and ridging over the eastern Cape York Peninsula will almost always guarantee that a northeasterly Morning Glory will arrive at Burketown the next morning. It has proven to be fairly difficult, however, to predict the precise arrival time of northeasterly Morning Glories over Burketown, the size of these disturbances, and whether or not these disturbances will be accompanied by a spectacular roll cloud formation.

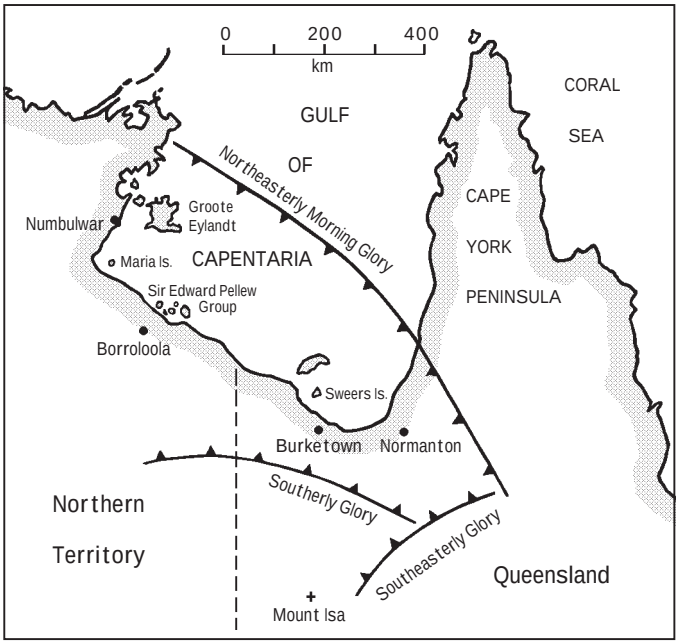


Figure 1 Map of northeastern Australia illustrating the home of the Morning Glory.

Soaring on the Morning Glory

The art of soaring on the Morning Glory was pioneered in an historic flight by Robert Thompson and Russell White on 13 October, 1989 in a motorized Grob 109 glider. Robert and Russell and other experienced glider pilots have since completed more than a dozen successful flights on Morning Glory waves, some of which have lasted for more than three hours and have covered distances of over 300 kilometres.

These flights have generated considerable interest in the gliding community and it appears that Burketown is set to become a Mecca for gliding enthusiasts from around the world. A photograph of a Morning Glory disturbance which was taken while soaring in the Grob 109 is shown on the next page.

Soaring on the Morning Glory at speeds which are comparable with existing world record speeds is one of the most exciting and exhilarating experiences that the gliding world has to offer. A typical flight starts with a motor–assisted takeoff at first light from the sealed strip at the Burketown aerodrome. All flights to date have been carried out on northeasterly Morning Glories.

In most cases, the Morning Glory is first encountered over the Gulf as a moving mountain of cloud while the aircraft is still at a fairly low altitude. At this point the aircraft is directed along the axis of the wave and the engine is switched off. The glider then ascends very rapidly in the strong updraft along the face of the advancing roll cloud. This is perhaps the most exciting and scenic portion of the flight.

The strong updraft along the leading edge of the wave extends over a broad area ahead of the wave above the top of the cloud and provides useful lift to heights of at least 10,000 feet. This means that the flight direction along the axis of the roll cloud can be safely reversed with ease at any time. Flights of more than 300 kilometres along the length of the wave may be possible in some cases, but the pilot must always keep in mind that the wave is eventually going to disappear as it moves inland over inhospitable terrain with very few possibilities for a safe landing. It is for this reason that we strongly recommend that soaring on the Morning Glory should be restricted in most circumstances to motorized gliders.

Glider pilots should also be aware that the trailing edge of Morning Glory waves harbours potentially dangerous downdrafts which could leave any aircraft which has been unfortunate enough to end up on the wrong side of the wave in a precarious position. Attempts to fly under Morning Glory roll clouds could also lead to disaster and should be avoided.

One other potential hazard which glider pilots should steer clear of is the large amplitude disturbance in the form of a localized breaking wave which may appear at the point of intersection between two independent interacting Morning Glories. The point of intersection where these isolated breaking waves occur is often obscured over the Gulf by a developing thunderstorm triggered by the large amplitude of the disturbance at that point.

The 1994 Morning Glory season

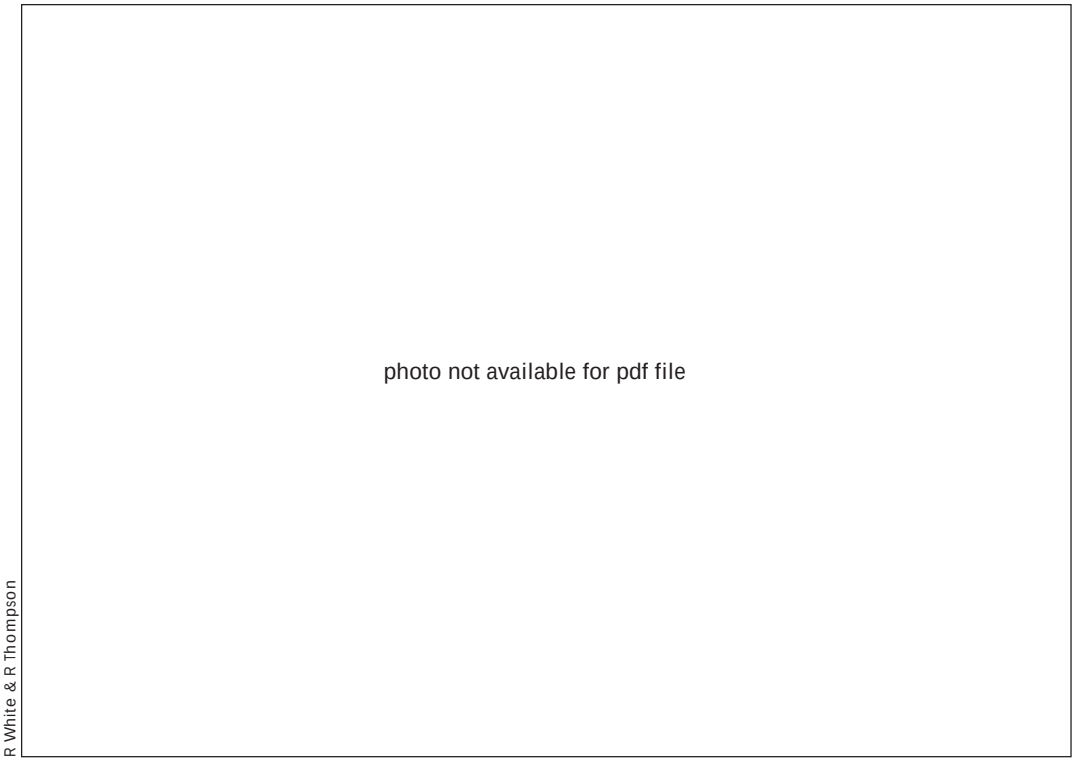
The most spectacular Morning Glory waves seen in recent years occurred during the months of September and October, 1994. Several successful flights on these waves were made by a number of sailplane pilots.

A particularly spectacular Morning Glory occurred near dawn on 20 October. Russell White and co–pilot Karin Jurgenson, who normally pilots the Burketown Pub's Cessna 337, launched in the Grob 109 at first light, and almost immediately encountered a strong clear air Morning Glory wave with strong turbulence. Having radioed a warning to the other glider pilots not to launch, they feathered the propeller and headed northwest into the gloom towards a developing roll cloud which was illuminated by the full moon with just a hint of colour from the rising sun. It was astonishingly beautiful.

By dawn they were near Point Parker on the coast at 6000 feet, with the cloud now well–formed ahead and continuing out to sea in the general direction of Gove. A sheer wall of cloud several thousand feet high designated an area of extremely strong lift, so a speed run over the next 100 kilometres was deemed essential. This led to ground speeds in excess of 125 knots. The lift was so strong it was impossible to keep the glider from climbing at 400 feet per minute even at speeds close to VNE in the impeccably smooth air during this phase.

As the glider passed the Sir Edward Pellew Group of islands the roll cloud evaporated leaving only some scattered clouds to indicate the position of the wave. With some trepidation, the pilots cautiously picked their way across a large expanse of blue sky towards what appeared to be a developing cumulonimbus in the direction of Groote Eylandt. This proved to be a reforming visible Morning Glory cloud line with cumulus breaking through on top.

Soaring along the front of this line at 8000 feet at high speed was spectacular, with cloud tops, accompanied by isolated lenticulars, rising to well over 10,000 feet. This particular Morning Glory was by far the largest one ever seen from the air at such close quarters.



R White & R Thompson

The flight continued past the southern side of Groote Eylandt to less than 30 kilometres out from Numbulwah on the western side of the Gulf with the coast of Maria Island just visible to the south. At this point the cloud line started to disintegrate again and so the pilots reversed direction and soared along the wave back to the southern coast which they crossed in the vicinity of West Island, some 30 kilometres east of Borroloola. Shortly after, the cloud evaporated as the wave moved inland and the lift died.

It was time to celebrate. The pilots had established a long distance record for soaring on the Morning Glory. They had soared a touring glider over 700 kilometres in not much over four hours, mostly over water, at an average speed more in keeping with that of a racing glider out for a world record. Karin quite enjoyed her first glider flight.

The unusually large amplitude Morning Glory on 20 October was not the only spectacular wave during the 1994 season. On 29 October, a Baron departed Normanton after the first wave of a northeasterly Morning Glory went through and experienced a climb rate of 3000 ft/min along the leading edge of the second wave. As the Baron's usual climb rate is about 1200–1500 ft/min, it would be safe to conclude that the lift along the front of the primary wave in this event could have been as high as 20 knots. This northeasterly disturbance comprised at least ten visible roll clouds.

At almost the same time, a set of three southerly Morning Glory waves passed over the Burketown airstrip at about 30 knots, each perfectly formed and stretching from horizon to horizon. From the air, a 360 degree turn in the glider revealed literally dozens of waves in nearly every sector of the sky as yet another set of Morning Glories arrived over the southern Gulf region from the southeast. Claude Nowland, a resident of Burketown, claimed that the Morning Glory display on that morning was one of the most spectacular displays that he has ever seen during his seventeen years living there.

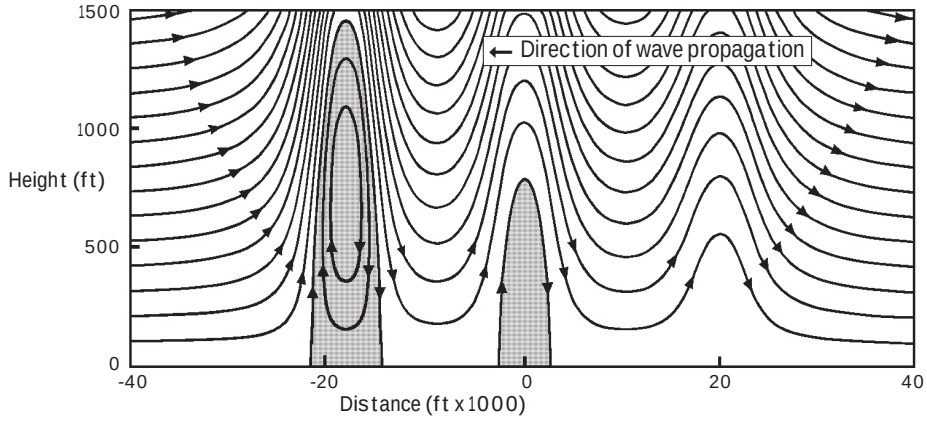


Figure 2 The structure of a family of Morning Glory solitary waves.

Wind Shear and Air Safety

Studies of Morning Glory solitary waves have provided considerable insight into the wind shear problem posed to aircraft. Potentially hazardous wind shear occurs whenever variations in either horizontal or vertical wind components cause an aircraft to deviate from its intended flight path. Convective microbursts, solitary waves and thunderstorm gust fronts are generally regarded as the most serious forms of wind shear hazard in the airport environment.

In contrast with microbursts and gust fronts which are always associated with thunderstorm activity, solitary waves are a particularly insidious threat to aircraft because they may appear without warning over runway areas during final approach or takeoff, when safety margins are minimal, as sudden transient clear air disturbances. The leading updrafts and trailing downdrafts in intense solitary wave disturbances may exceed 20 knots and the horizontal wind component near the surface can vary by more than 30 knots during the wave passage.

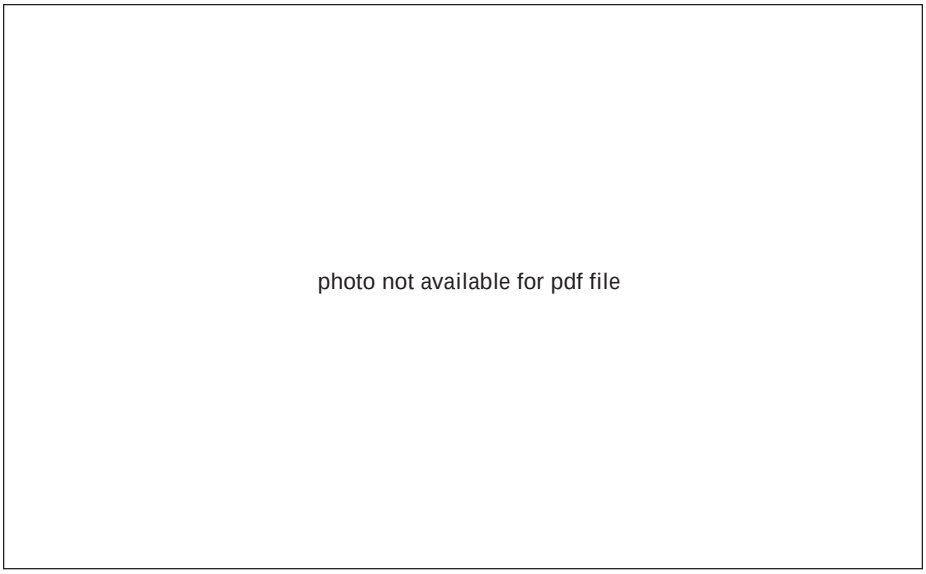
Aircraft which encounter a solitary wave from the front (the structure of a typical family of solitary waves is shown in Figure 2) will rise above the intended flight path under the influence of the leading updraft and increasing headwinds. The natural reaction of a pilot at this point is to attempt to return to the normal glide path, but this action, when combined with the sudden loss of headwind and increasing downdrafts behind the wave, can leave the aircraft perilously close to ground, well short of the runway threshold.

The situation faced by a pilot may be more complicated when the aircraft encounters more than one solitary wave while on final approach. In this case, the winds acting on the aircraft may give the appearance of alternating head and tailwind components, thus compounding the problem of aircraft control. It seems clear that, given the choice, pilots should avoid landing or flying through propagating roll cloud formations like the Morning Glory.

Conclusion The remote, sparsely populated southeast corner of the Gulf of Carpentaria is the only known location where Morning Glory roll clouds occur regularly and predictably at certain times of the year. A visit to Burketown or Sweers Island in September or October to view, or perhaps even to soar on, this unique natural phenomenon can be a very exciting and rewarding experience. ❖

Nap of the Earth Soaring

a brand new soaring technique for light and ultralight sailplanes



The Carbon Dragon. Note the "elbows–out" cockpit and partial canopy.

Gary Osoba, from *Sailplane Builder*

MANY QUESTIONS take 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?" And the question so frequently asked 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 ultralight 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, these 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 Carbon Dragon. In fact there wasn't a single unplanned outlanding in the first 100 hours of cross–country flying. I was well into the second 100 hours before the first and only one finally occurred.

I was flying a quick 100 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 crosswind began to develop. Shortly thereafter the sky, which had been spotted by small and infrequent cu, began to develop a threatening darkness to the west. I aborted the triangle, and turning into a strongly building headwind, sped toward the home gliderport. 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 eight miles from the airport.

But let's get back to all the unplanned landings which could have occurred but 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 is not the top design priority in an ultralight. They stay up when nothing else can. They launch very early, sometimes hours before conventional sailplanes are soaring. And they land 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 return to earth, 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 I 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. This put me right next to a paved highway with a farm road by the field. After landing into a negligible wind, I stepped off my landing roll at 21 feet. Although the short roll out was not needed in this field, it will come in handy in others. Consider the difference in inertial mass between a glider touching down at 20–25 knots with a gross weight of 300–500 pounds and one weighing 800 or 1000 pounds landing at 40–50 knots on unimproved terrain!

Also helpful are the shorter spans and good maneuvrability possessed by these designs, allowing them to squeeze down into smaller fields surrounded by trees and other obstacles, and to use areas with somewhat undulating grades which are otherwise unlandable. Of course, the excellent soarability 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 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 make the planned landing.

Micropatterns also affect average flight times and the frequency of landings. How so? Well, consider the rationale behind a typical 1000 foot high 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 circuit is to provide time for accurate perception of current sink rate, perception of resultant glide, perception of field layout, any obstacles or other dangers such as other aircraft, and gives the pilot a grasp of perspective. 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. As such, his 1000 foot pattern is flown to provide the *time* necessary to size up all the variables. The sailplane has a good sink rate, but with its higher speed, needs much more area to land in. In this case, the time provided by a 1000 foot pattern gives him the ability to fly a sufficiently large pattern to thoroughly delineate his landing.

But with ultralight gliders, 1000 foot circuits are just not necessary. A pilot beginning at that altitude might as well set his alarm five 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 feet is certainly adequate. I like to express it this way — why enter a circuit at an altitude higher than I climbed away from at the beginning of the flight? Would the pilot of a 15 metre racer think of entering a circuit at 3000 feet after a soaring flight initiated from a 2000 foot aerotow? Hardly.

Here's how it usually works for me. I take a 600 to 800 foot autotow by static line. If I contact lift above 200 feet during the tow, I release early and fly away. If I take the full tow to 800 feet 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.

So entering a circuit at a 1000 feet is 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 feet. 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 only loses about 20–25 feet 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 feet (if you can entice it to even enter one in the first place). It's really most genteel, without a dissonant note in its entire repertoire.

So what kind of net effect can be expected from using 500 foot micropatterns instead of the standard 1000 footer? The sum, in this case, is dramatically greater than the parts. It's not as if the extra 500 feet on a day with 5000 foot thermals give you 10% more time to contact another and that consequently, you will avoid, on average, 10% of the unwanted landings with 10% more air time. No, the dynamics of micrometeorology enter the picture now and the whole formula begins to change. For here, within 500 feet or so of the surface, the magic of microlift phenomena is truly alive. It's vibrant, and can give birth to a microsave 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 have scratched, and hunted, and struggled to stay up only to commit to an early landing. And sure enough, there's the lift on final — too low to do anything with but high enough to play havoc with your approach. It's not that you missed it earlier or 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 most frequently are found flying, their technique is truly inspiring. What soaring pilot has not watched in wonderment and remarked that surely the laws of physics must have been temporarily suspended in its location.

photo not available for pdf file

Kansas is just one big airport after another. That's a soarable ridge in the background.

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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 within 500 feet or so of the surface. Due to the low flight speeds and the light wing loading, flying the glider in a convective environment is like taking out a magnifying glass and really studying thermals closely. 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 most days when convection is working as a result of solar heating, every likely thermal source can provide you with a save, whether it's "cycling" or not. Every time. I say this because it's been my experience 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 been shut down, it won't be reliable. Otherwise, it's there for you, guaranteed.

It amazes me that at this point in soaring history there is still a fundamental debate 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 discrete air mass, floating upward. The ring vortex model fits into this latter category. For those arguing against this approach, it's pretty hard to convince pilots who have entered a thermal right below another glider, only to find the lift gone!

We should be able to agree that these concepts of thermal structure, and many variations in between, all exist at various times. In the case of the columnar thermal, it would seem that consistently strong conditions, under direct and strong sunlight, with light winds, would favour their formation. In these instances, the powerful energy of the sun just continues to pour onto a ground source, and enough of a temperature differential exists between the source and its surrounding terrain 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 kinds of conditions pose no particular problem for any of the types of soaring craft mentioned in this discussion and they are sought after. The guaranteed save will be there at 500 feet, and 1000 feet, and it will probably be there at 5000 feet.

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, and stronger winds will tend to trigger the cycles early, redistributing the heat horizontally through the atmosphere. In these conditions, smaller, weaker thermals or even incipient ones are favoured, depending upon what's going on with the upper air. Variations in low level wind gradient will also exert an influence one way or another, for obvious reasons.

"Carbon Dragon" ultralight glider
designer: Jim Maupin

span	44 ft (13.5m)
area	150 ft2
weight empty	144 lbs
weight gross	300 lbs
minimum sink	100 ft/min
Vstall @max wt	~21 knots
L/Dmax	~25/1

Information package $5 from
Jim Maupin Ltd, 24201 Rowel Court, Tehachapi, CA 93561.

A materials kit is available. Send SASE for info to HF Blanton, 4785 Esquivel Road, Vacaville, CA 95688.

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 during this building stage? 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 our thermal is building 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? No, in fact, as the temperature of the bubble mass builds, it's still subject to the laws of thermodynamics 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 which has a definite fabric barrier, the function of which is to contain a "thermal". In spite of the existence of this barrier, considerable leak–off still takes place, necessitating frequent blasts of the burner to keep matters in equilibrium. In fact, the leak–off is of a high enough order to allow soaring birds to sustain flight above the balloon's envelope. How much more so will this effect take place with thermals that are building in a free atmosphere?

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 3–500 feet above the surface. Progressing to 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 ft/min, 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 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 feet, 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 7–900 feet, waiting then at that altitude until it organizes and roars upward in a cycle. It always seems to be there for me. When I first started doing this, a few local sailplane pilots expressed something akin to dismay over the practise. But now, after witnessing the efficacy of the technique, they just shrug it off with the remark, "He's doing the Osoba float again!" and go about their business. They know that the next time they look up, I'll probably be specked out.

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 of the Carbon Dragon (about 100 ft/min minimum sink) in combination with the low speeds and consequent small turning radius are just barely inside the parameters necessary to utilize leak–off microlift. Conversely, circling too tightly introduces just enough increase in sink rate to render the 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 to this occurs in higher winds. Instead of the bubble building in time over a single location, the surface winds regularly detach the weak leak–off bubbles from their source and they begin drifting with the wind. Then another soon forms 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 foot level or lower if necessary, in the hopes that a big enough one will break free to send you back up. If not, take the next one that leaves and commit to drift with it. In these conditions 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, but you certainly don't have the altitude or time to explore for very long. The bubble ⇨ **p21**

A BC Mountain Contest

Mike Glatiotis
Cu Nim

THE SKIES of the Columbia valley were as thick with gliders as they have ever been, as Golden, BC saw it's first ever Western Regional Sports Class Soaring Contest from May 24–28, 1995. The event was hosted by the Rocky Mountain Soaring Centre, and generously supported by the Vancouver Soaring Association. Golden has become a national competition capital for hang gliding and paragliding, with many national and international records broken, and the valley is now slowly revealing its potential to western sailplane pilots.

This was the first competition in British Columbia in 15 years, and the organizers are hoping to make it an annual event. Eleven pilots with ten ships from across Western Canada arrived for the four day event, although only five ships were able to compete all task days. The contest was intended to provide some low key and safe competition flying as well as to introduce pilots to a new and exciting region to fly. By all accounts, it was a great success.

Uwe Kleinhempel of Golden cleaned the field by winning each day, and scored a perfect 3600 points in his Pilatus B4 ship. Although Uwe was helped along by the handicap of his ship, his great skills and comfort with flying in the mountains with the stick to the stops was certainly deserving of the victory, Jos Jonkers and Mike Glatiotis of Calgary team flew to a second place finish (JJ on day 1, MG days 2,3,4) in their Standard Cirrus, and Mike Cook, from Kimberley BC, flying his homebuilt Jantar/Pik hybrid came in third.

The event was run as a Pilot Selected Task contest and every contest day was soarable, which follows the Columbia Valley's envious record this year of having only 12 non-soarable days through April, May, and June. Compare that to this year's prairie flying! As a matter of fact, the spring soaring at Golden has got to be among the most consistent around. Although the weather was not optimal (two days were blue sky mountain thermals), the tasks generally resulted in some significant flights.

Meet organizer Mike Cook undertook this event as an effort to establish a few more "mountain" pilots, and encourage sociable flying in this newly–developing soaring Mecca. Although slated as a contest, the event was not intended to force inexperienced pilots to extremes, but rather to bring more people out to experience the beauty first hand. The contest proved to be a valuable learning experience for all involved, both in terms of meet organization, and in safe and efficient mountain flying. However, the conditions were challenging and, although they did test pilot skill, to everyone's credit there were *no outlandings*!

Contrary to popular belief, there are many suitable landing fields, and with ridge tops 6500 feet above the valley floor, many options are available. Daily tasks were chosen by participant consensus, with turnpoints located throughout the valley and surrounding areas, enabling the possibility of 1000 kilometre record flights, or short local distance legs for those who were not keen to venture too far. Many thanks go out to George Dunbar who gallantly put aside his Cirrus, GEOD, to take on the formidable task of scorekeeping and making sense of each day's results.

Some problems arose the first day after a three hour task with staggered release time starts was called. Normally, a late start draw would offer certain advantages; however, the day overdeveloped and shut the valley off before all competitors could fly the full time limit. Penalties for under–time flights were originally agreed upon in order to prevent quick and dirty local final glide flights.

Kevin Bennett ended up flying one of those quick and dirty ones, being forced to land an hour early, achieving a fifth place finish for an amazing 302 kilometre out and return jaunt in only 2:12 hours that would have been a record anywhere else. The rest of the event was flown in blue to weak cu thermal conditions, which still provided very fast and enjoyable runs up and down the valley. The staggered start time was abandoned for a timed start with a photo of the start gate opening as the cue to head out. This provided an even start, and was manageable with the number of gliders there. Databack cameras will be a great improvement to starts next year, eliminating the rush to the finish that could conceivably occur. We organize and learn.

Uwe outshone the entire pack throughout the contest, piloting his B4 to victory each day. Although certainly aided by its handicap, it was obvious that Uwe's experience in local mountain flying paid off. He taught me a valuable lesson in mountain cross country flying. As I was tooling along at 10,000 feet looking for my next thermal, I spotted the red, white and blue Pilatus about 3000 feet below contouring the ridge above tree line, and apparently not turning. Well, if that tin can wasn't going to turn, then I sure wasn't, especially up that high. It was comforting to see someone below, but every time I stopped to top up when I lost that comfort, there would be Uwe: catching up, still not turning, still below. The lesson paid off when I came screaming past Mike Cook at 90 knots and 8000 feet just as he was starting a top–up turn. "Don't turn now, you weanie, there's straight–flying tin below!" Alas, with a little negative flap, Cookie caught up and left me in the dust.

When all the dust had settled, Uwe took home the biggest engraved mirror trophy. The trophy mirrors (beautiful oak and engraved glass) were awarded at a grand feed. Mike Cook even managed to create some great golf shirts to commemorate the event, a job well done.

Let's hope this event will bring out even more pilots to the Columbia Valley, if not to compete, then just to enjoy the spectacular flying and camaraderie it brings. Perhaps this could eventually rival Cowley as an early season gathering place where many clubs can meet and fly together. ❖

1995 WESTERN REGIONAL SPORTS CONTEST					Day 1 – 3h PST				Day 2 – 1.5h PST				Day 3 – 3h PST				Day 4 – 3h PST				total
					km	km/h	day pts		km	km/h	day pts		km	km/h	day pts		km	km/h	day pts		pts
1	Uwe Kleinhempel	MS	Pilatus	1.31	293.3	97.8	1000	1	117.1	78.1	600	1	231.4	77.1	1000	1	204.9	68.3	1000	1	3600
2	Glatiotis/Jonkers	JM	Std Cirrus	1.02	220.9	73.6	310	6	138.0	92.0	520	2	290.3	96.8	962	2	222.9	74.3	745	2	2537
3	Mike Cook	Z1	K5	0.95	302.8	100.9	580	3	123.0	82.0	369	3	298.8	99.6	895	3	215.3	71.8	604	3	2448
4	Trevor Florence	R2	ASW–20	0.94	301.8	100.6	563	4	115.3	76.9	316	4	280.6	93.5	784	4	207.5	69.2	545	4	2208
5	Vaughan Allan	91	PIK–20E	0.99	301.8	100.6	629	2	91.2	60.8	202	5	227.8	75.9	573	5	191.6	63.9	512	5	1916
6	Kevin Bennett	X1	Ventus	0.93	301.8	100.6	550	5	dnc		0	6	dnc		0	0	dnc		0	6	550

LATERAL TUG UPSETS

David Starer, from *SAILPLANE & GLIDING*

WE ARE ALL AWARE (or should be) of the risks when a glider on aerotow gets too high behind the tug. The resulting instability about the pitch axis has been extensively researched and written up, and unfortunately a few tug pilots have found out the hard way. I would like to describe a phenomenon I recently experienced, which can best be described as a lateral upset. I was flying a 180 hp Super Cub towing a K21 which was being flown by an instructor. The wind was light and there was no turbulence or thermals. At about 1500 feet the glider was well to the left of centre as the instructor demonstrated the recovery from "out of position". The glider remained in this position for a few moments, then moved a little further still to the left.

The tug immediately yawed sharply to the right and simultaneously dropped the right wing. With full left stick and rudder applied, I was still rolling to the right, so at about 60° of right bank I released the glider and recovered to straight and level flight. The entire incident had lasted no more than two seconds. Thinking about it later, I realized that it is possible to induce a condition somewhat similar to a pitch upset, though about the yaw axis. Though I am a fully rated instructor of many years' experience, I have never seen this event described, so here is what I believed happened.

When a glider on tow is off–centre, the tension in the rope has a lateral component which acts on the tug's tail, tending to cause the tug to yaw. The tug pilot would normally use opposite rudder to maintain his heading and keep the ball central in the slip indicator. (See Figure 1 below) So long as the tug's rudder has sufficient authority to counteract the lateral pull of the rope, the tug does not sideslip, the situation remains laterally stable and the two aircraft continue to fly on the same heading, though offset. If the glider moves even further from the central position, the tug pilot applies still more rudder until he has used up all the available rudder travel (Figure 2). An important point to appreciate is that the limit of effectiveness imposed by the rudder stops puts an upper limit on the angle which can be maintained between the tug's longitudinal axis and the rope.

Once this angle is reached, the rudder is no longer able to oppose the lateral component of tension in the rope. Under these conditions, the tug's heading begins to change and it starts to sideslip. The tug is now in a condition impossible to achieve except when towing (See Figure 3). The rudder is fully deflected, but the effective angle of attack of the fin and rudder is still increasing beyond that intended by the designer when the rudder stop position was determined. The fin/rudder will eventually stall, and as it does so most of its lateral force is suddenly eliminated. (Many towplanes have a fin/rudder which is essentially a flat plate. On this kind of airfoil section, the airflow detaches very suddenly once the critical angle of attack is reached. The result is an immediate and total stall.)

The opposite lateral pull due to the rope is now almost totally unopposed and a violent yaw results. One wing is now traveling forwards much faster than the other, and this differential airflow over the wings causes the aircraft to roll uncontrollably in the same direction as it yaws. The rate of roll I experienced in the Cub was considerable. In aircraft with dihedral, such as a Robin or Chipmunk, it might be violent enough to turn the aircraft on its back. Recovering from this position risks overspeeding the engine and overstressing the airframe, not to mention the possibility of colliding with the glider.

While the direct consequences are not as drastic as they can be in a pitch upset, I would nevertheless like to make some observations and a few recommendations:

- A crosswind takeoff on aerotow has the potential to produce a similar incident if the glider gets airborne well before the tug, since the glider can drift a long way out to the side while the tug is still firmly on the ground. In this case, even a momentary loss of control could be disastrous for the tug. Instructors should set a firm limit on how far off centre is acceptable during the takeoff ground run; beyond this point the pilot must release. Tug pilots should unhesitatingly dump any glider which is sufficiently off–centre during the ground run to require nearly full rudder to compensate.
- Many aircraft require right rudder in the climb to oppose the asymmetric prop wash. This means that the tug has already used up some of its rudder travel and has less in reserve to cope with an out of position glider. In these types, expect fin stall to occur at a smaller rope angle when the glider is out to the right.
- As instructors, we should avoid excessive rope angles at the tug end when teaching out of position aerotowing, otherwise we should expect to be dumped. If a student gets excessively out of position we should teach the same remedy as when too high; *don't try to recover, just pull the release knob immediately*. The maximum acceptable rope angle will vary from one tug to another, but a rule of thumb can be developed by noting the glider's position relative to the tug's wingtip. Any turbulence reduces the maximum acceptable angle.
- Sustained high forces on the rudder could cause control surfaces to distort, cables to stretch and who knows what other damage, leaving you with a prematurely unserviceable tug and a bill for maintenance. ❖

Figure 1
Small rope angle

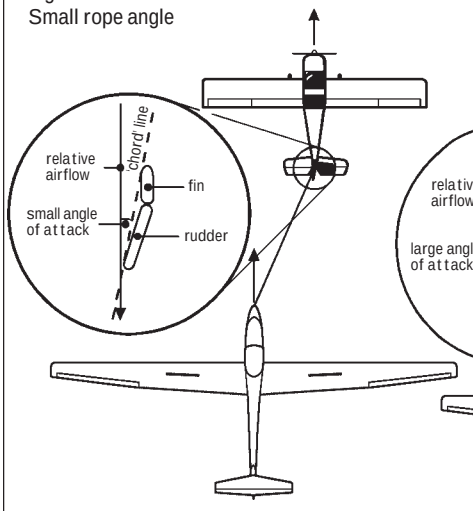


Figure 2
Large rope angle – rudder on stop

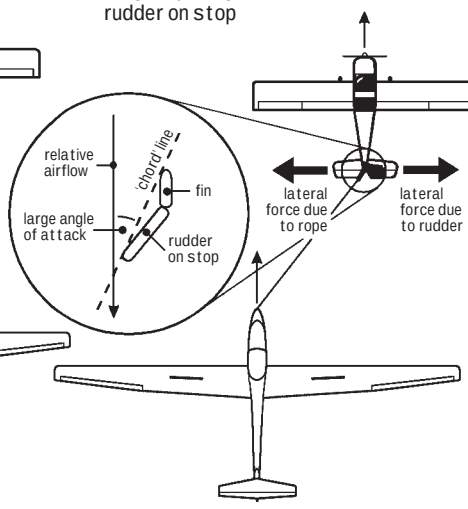
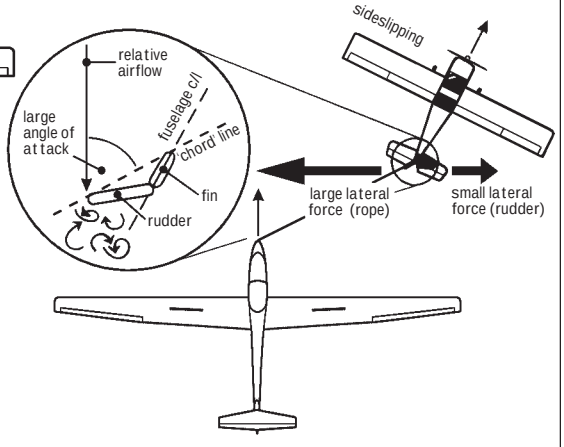


Figure 3
Large rope angle – tug and glider diverging



club news

ONE MILLION CADET FLIGHTS!

On 11 August, the Air Cadets celebrated their 30th anniversary and one million glider flights. The celebration was held at Penhold, Alberta, the birthplace of the Air Cadet gliding program with the support of the Alberta Soaring Council, in conjunction with the graduation parade of the Prairie Region's gliding scholarship course.

This event was attended by many past and present members of the program from most of the gliding regions across Canada. The guest of honour was Paul Schweizer, co–founder of Schweizer Aircraft, which built all the gliders used in the 30 year history of the air cadet gliding program.

The Cold Lake Soaring Club was well represented with five members present. In fact, Dave Mercer and Mark Brassard (with myself clinging to a back seat) were to do a flypast of the parade with two CF–18s, but poor weather forced the parade indoors. The "official" one–millionth glider flight was flown later in the day in somewhat improved conditions, followed by two flights for Paul and Virginia Schweizer.

Randy Blackwell

A WINNIPEG SAFARI SOUTH

The first Bottineau Soaring Safari on 21-23 July was a good time with a dozen WGC members and five gliders making the trip southwest to this small North Dakota town just south of the border and south of Brandon (we were the largest group there). Other glider pilots came from Colorado, Minnesota, North Dakota, and Washington. The soaring was excellent and the hospitality was hard to beat. For a town of 2800 people, the Bottinians(?) are very aviation minded, and several locals came out to have a look at gliding and 17 had rides in our Lark. The area is very picturesque with low rolling hills to the north (the Turtle Mountains) and the airport is well suited to glider operations. Next year we may go again, perhaps trying a goal flight there on the way.

Our second Krosno, C–FVTI, is now in action at Starbuck. It's a nice glider to fly. At the moment, we have a fund–raising campaign on to raise $3000 for their radios.

from the WGC *"Flight Lines"*

TORNADOES MISS COSA

Friday night and Saturday morning of 14-15 July brought tornadoes to the COSA area. Locals said that at least eight small tornadoes touched down within 20 miles of the club. A famous large barn west of Omemee was destroyed and there was significant destruction to boats and a marina at Bridgenorth. The town was closed to traffic for four days after for clean–up work. Our airfield just suffered some broken branches.

The week following all this was our July Flying Week. The weather didn't cooperate much with only 40 flights made, with the best soaring on the last Friday. At least it was better than our June week, when we had no flights at all!

from COSA *"Cross Winds"*

EDMONTON SOARING CLUB

ESC is enjoying a considerable increase in membership this year. There were fourteen students in training — about half of them achieved solo flight. One student from 1994 is now licensed and one who took most of his flight training in Hawaii completed his training with us and is now licensed also. Some of the solo students will likely proceed to licence this fall.

Our publicity coordinator has done a great job of getting information to the media with follow–up phone calls. The publicity went to city outlets and to local papers in the area northeast of Edmonton. The result has been an increase in the number of people coming for familiarization flights. Some of our new members have joined because of this publicity. The 50th anniversary "Longest Day" promotion resulted in a record number of flights (62). There was a good turnout for the BBQ held as part of the anniversary celebration.

The "winter works" was finally completed with the return of the ASW–15 to the field on 22 July. Long delays in obtaining information and parts from Germany set back the work schedule four months. The 1–23 was repainted and the cockpit relined.

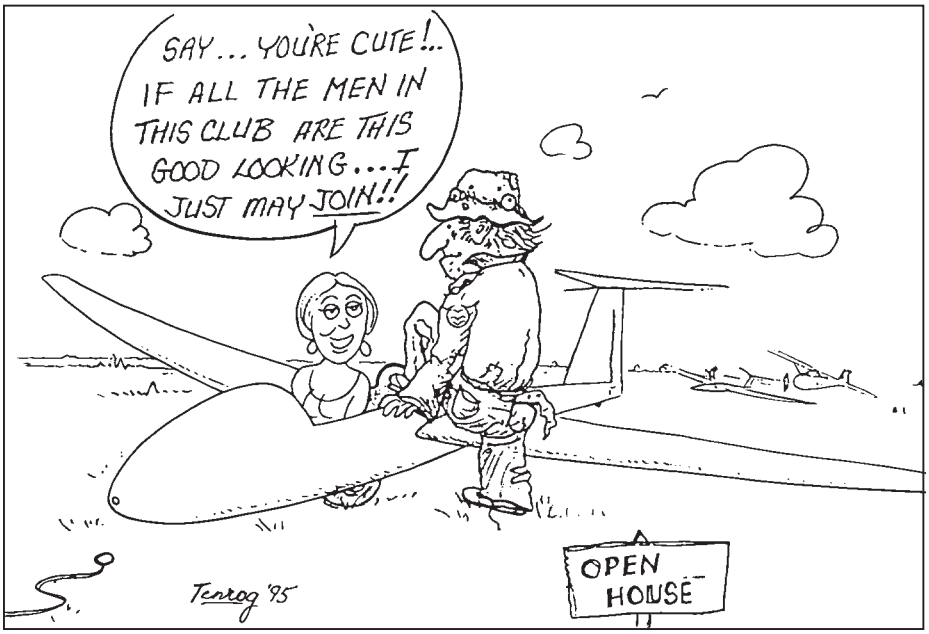
Proposed changes to the eastern boundary of our airfield have been delayed. The correction line "jog" in the road is to be redesigned and widened for higher speed traffic resulting in some encroachment on the SE corner of the ESC property. The construction will likely take place in 1996.

Jack Towers

CU NIM GLIDING CLUB

We actually got started with our checkflights in late March this year, but the early part of our season was dominated by strong northwesterly winds and snow, with a majority of April's flying grounded due to the white stuff. Fortunately, on the days we could fly, our new cross runway allowed us to operate into the stiff northwesterlies.

May finally brought sunshine and good soaring, and our second annual cross–country week was easily the highlight of the season. The format this year was expanded to include student instruction, and almost everyone in the club took part at some point in the week. We enticed Dave Morgan out on his first ever cross–country, for an unsheparded 107 km triangle. Alan Daniel in his Phoebus enjoyed three of his best flights ever, which ranged from 150 to almost 300 kilometres. Kurt Edwards flew a Jantar around an undeclared 376 km triangle and said he would continue to avoid the hassles of badge declaration and fly cross–country just for the fun of it (what a breath of fresh air)! Meanwhile, freed from last year's sheparding role, Tony Burton topped the week's achievements by racking up a total of 1623 kms in five flights.



Garnet Thomas, Edmonton SC *"Towline"*

The May long weekend featured the Alberta provincial contest at Innisfail once again. Its sparse attendance did not do justice to Cold Lake's level of organization. After an overnight snowfall(!), Cu Nim's Rod Crutcher bagged his first contest win on Day 1, but on Day 2 wasn't able to hold off a charging Tony Burton for the championship. June brought with it more dismal soaring conditions, but our dozen or so students began to blossom nevertheless, with a handful soloing. With other students threatening to go solo, I'll soon be out of a job!

Terry Southwood

Omarama and the moral dilemma from page 4

Everyone enjoys flying in a world championships with its privileges and financial support. Thus there is a strong temptation to follow the Victorian mother's advice to her daughter when faced with inevitable rape: lie back and enjoy it. This seems an unworthy epitaph for such a magnificent sport as international competitive gliding, but it is not inevitable.

The problem of limiting in–flight external information could be solved at present by simply locking all competitors' radios on to a single frequency to be used only for safety and communications with the organizers. The necessary policing procedures would need to be established, but given the element of widespread collusion required to break the rule to advantage, violations should be very rare. Pilots would still be able to fly in visual contact with others, but this would not provide an unequal competitive advantage. The reversion to competitors competing as individuals (incidentally as specified in the rules) may also lead to an improvement in international camaraderie.

Reduction of costs has been the object of lip service from time immemorial. However, the high costs incurred at Omarama produced a new spate of suggestions. First, out of twenty–four world championships, four had been held in the southern hemisphere, which contains less than 10% of the world's gliding population. The implication is that for at least the next twenty years the contests should be held in the northern hemisphere.

Secondly, whilst a lot of attention is paid to the entry fee and cost of aerotows (around $33 Cdn at Omarama), the real focus should be on the total cost incurred by the various competitors. Thus world championships should be held in places where there is an adequate supply of competitive gliders available for those coming from afar, and the entry fee structure should be graduated according to the distance competitors have to travel.

Thirdly, reducing the scale of world contests would make them safer (for the first time in ten years the 1995 WGC, with its reduced entry, suffered no midair collisions) and limiting the size of national teams would reduce the advantage of those able to send larger contingents. Smaller contests should also be cheaper and simpler to run. It was reported that over 3000 volunteers were involved in the administration at Omarama compared with 75 at Wiener Neustadt in 1989. This numerical progression is obviously unsustainable and needs to be reversed.

Finally, major savings might be achieved if world championships took place on a regular circuit. The present system of one–off venues has produced little evidence of long term benefit to the host countries in terms of membership, funding, publicity or airspace concessions. The investment required has to be recouped from the single event and the expertise gained is lost. By returning to regular venues there should be substantial savings in costs and enhanced prospects of sponsorship. Sites discussed included Rieti, Châteauroux, Leszno and Uvalde. Repeated visits to these venues would reduce the home advantage as the local conditions would become well known internationally.

Although these topics were keenly debated at Omarama, all were unanimous on one point — it will prove exceptionally difficult to persuade the various governing bodies of our sport to alter the present system. This gulf between competitors and organizing bodies is no stranger in sport — look at tennis and motor racing. Competitors want to concentrate on what they do best, the sport itself, and usually make inept politicians (a comment they would regard as a compliment!). So the real dilemma that confronts our sport is that which besets the western world; with a gliding philosophy as imprecise as "Liberty and Equality", how can government attract the appropriate governors and the approval of the individuals concerned?

Failure to do so is reflected in countries crammed with talented and skilled populations ranging from the USA to Italy. International governing bodies suffer from the additional "Swiss Lover Syndrome" as recounted by an Italian — the proposition that asserts the European ideal as English policemen, French cooks, German mechanics, Italian lovers and Swiss organizers, whilst political reality produces English cooks, French mechanics, German policemen, Italian organizers and Swiss lovers — a view based not on cynicism but on historical realism. Those of more extreme political or religious views ascribe the dilemma to Western decadence.

If one rejects that view, then either the system must be made to work or we must acquiesce like the Victorian daughter. Which is it to be? ❖

Since Canada is one of the "minnows", it is in our interest to shift the competition scene back to an emphasis on individual rather than team effort. It seems clear that there are sporting and financial gains to be had. SAC must develop a national consensus on how world competition ought to be structured, and pass strong recommendations on to the IGC. *Tony Burton*

When are the Diamond days?

Michael Steckner

As we all know, there are relatively few sailplane pilots in Canada. Consequently, relatively few 500+km flights or 5000+m height gains have been completed in the country. Ursula Wiese has spent a great deal of time over the years compiling a record of completed diamond badges into two books, *"Canadian Soaring Sites, Records, Diamonds"*, and *"Book of the Best"*. With this information it was possible to research the weather conditions that made the flights possible and learn to recognize a good day when it materializes.

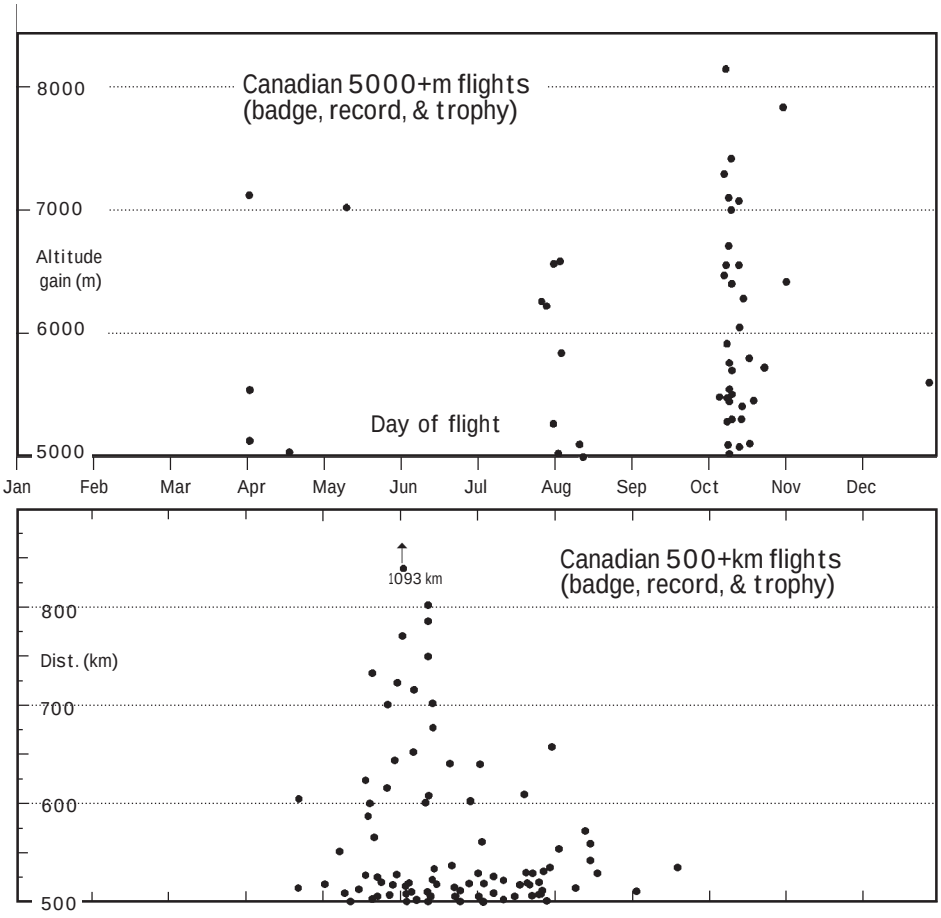
My goal was to gather as much flight information as possible and graphically analyze the data in search of trends. Unfortunately, since relatively few flights have been done in Canada, I was only able to produce a few meaningful graphs, of which two are reproduced here:

1) What is the best month in Canada to fly a 500+ kilometre flight?
2) What is the best month to achieve the diamond altitude climbs?

I think the two graphs are self–explanatory, and do not need any commentary.

I have done much more exhaustive work along the same direction for the USA because I have nearly 30 times more flight information. Most of the information in my database, from which the Canadian graphs were produced, was derived from *"Book of the Best"* (each club has a copy) and the FAI badge register, courtesy of Walter Weir and Larry Springford. Some of the information was also gleaned from various copies of *free flight*. Unfortunately, the information provided in *free flight* was not as detailed as I would have preferred.

The following two tables show the number of flights per province (Table 1) and the purpose of the flight (Table 2). The "purpose of the flight" entry is a rough indicator on the accuracy of flight information. The accuracy of flight information for the database entries is quite high because the majority of flights are for badges or trophies. However, the "Purpose of Flight" information was useful when I examined the American data because many cross–country flights are listed in the "Just for fun long flights" column of SOARING.



	500+km flights	5000+m flights
Newfoundland	0	0
Prince Edward Is	0	0
Nova Scotia	0	0
New Brunswick	0	0
Quebec	1	4
Ontario	33	1
Manitoba	4	0
Saskatchewan	6	0
Alberta	49	88
British Columbia	12	3
Unknown	2	10

Table 1 *Flight data by province*

	# Dia dist flights	# Dia alt flights
Diamonds	58	80
just for fun	4	2
records	18	6
SAC trophies	27	12
unknown	2	10

Table 2 *Flight data by purpose*

For the future I look forward to seeing more flights posted in *free flight*. Perhaps Tony Burton (the editor) and Walter Weir (FAI badge chairman) could set up a "Just for Fun" long flight listing as is found in SOARING. Perhaps such a "brag" column would encourage people to report their accomplishments. In addition, I hope that more flight information could be provided in the FAI badge column such as: date of flight, absolute altitude for the diamond altitude flights, turnpoint information, and flight time.

Perhaps SAC might want to consider a Provincial record register along the lines of the American state record register. There are many provinces in Canada which have not accomplished 500+km flights, according to my database, which might have the potential. Anyone who accomplishes the flight is certainly deserving of recognition. I hope to produce a book relatively shortly which presents all of my graphs and a printout of the Canadian and USA databases. Some of the trends are rather interesting! Happy badge hunting! The update in ten years promises to be exciting.

Request for information

I would appreciate it if pilots who have flown 500+km flights, or achieved altitude gains in excess of 5000m, would send me information pertaining to their flights so that the data on long fun flights can be expanded. Those pilots who have completed their diamond badge need not submit because *"Book of the Best"* has recorded all completed Diamond badges. I am specifically interested in flight information from pilots who have not yet completed their diamond badge, or those pilots who have completed 500+km flights or 5000+m altitude flights for their own personal enjoyment. Information documenting the flights would also be welcome. I'm looking for the following flight data: date, pilot's name, point of takeoff,

sailplane, purpose of flight (for fun, record, badge, trophy etc.). Additionally, for 500+km flights, the length of flight or the average speed, and the turnpoints. Additionally, for 5000+m height gain flights, the absolute altitude achieved, and the altitude gained. Send to:

Michael Steckner
418 Eagle Trace
Mayfield Heights, OH 44124
mkst@mr.picker.com (216) 473-9365

references:
1 *Canadian Soaring Sites, Records, Diamonds* by Ursula Wiese, Soaring Association of Canada, Edition 1, March 1983. Out of print. (no ISBN or Library of Congress Catalog No.)
2 *The Book of the Best (1945 – 1993) Canadian record flights & diamond badges* by Ursula Wiese, Soaring Association of Canada, '94 edition (no ISBN or Library of Congress Catalog No.)

THE POSITIVE CONTROL CHECK

There are those pilots for whom the positive control check is a test of brute force, a chance to show everyone that they can rip an aileron off its hinges while another pilot holds the stick steady in the cockpit.

The positive control check is not for pitting one's brawn against another. The purpose is to ensure that all controls are "positively" connected, there is unrestricted movement of the controls, and the movement is in the correct direction. Gentle pressure is all that's required. Remember, control surfaces are delicate. The best place to apply this gentle resistance is at the point where the control mechanism connects to the control surface. To apply resistance elsewhere may twist the surface enough to damage it.

It's important that the person doing the positive from the outside indicate to the pilot that the controls are moving in the correct direction. For example, on the left wing the aileron should go up when the stick is moved left, and the person at the wing should state that it has done so. The same goes for all the other control surfaces.

One last note: this check should be done *at the tie–down or rigging area*. If the glider gets pushed to the line before this vital task is completed, it is likely that it will be forgotten in the distraction of ongoing events. It happens all the time.

Renee Machat
from the *Vancouver Soaring Scene*

NEW HAZARD PROTECTION FOR YOUR SKIN

The skin is the largest organ of the body and the one first exposed to environmental irritants. Dermatitis is a major occupational disease while many other illnesses result from noxious substances entering the body through the skin. A new product called *Skin Coat ™* is on the market which may be very helpful to everyone using harsh solvents, epoxies, hydrocarbons, fibreglass, paints, glues and other nasty materials in maintaining, repairing, or building gliders.

Skin Coat is a liquid which is rubbed into the skin where it quickly dries and produces a continuous impervious membrane within the outer layer of skin. The skin does not lose its normal flexibility and can still breathe and perspire normally, but most dirt, dust, and chemicals cannot pass through the barrier.

While nothing can give protection against all caustic substances, *Skin Coat* provides an excellent second level of defence with other protective clothing and can reduce or eliminate skin irritation often associated with wearing such primary protectors (ex. health care people are getting skin reactions from extended use of latex gloves).

Suggested Canadian retail price is $7.95 for 4 oz. bottle, $15.95 for 12 oz and 40% off by the dozen, FOB Los Angeles. For more info on prices, Canadian dealers, contact: Skin Coat North America, Box 533, Verdugo City, CA 91046-0533. Tel (818) 247-2170, fax (818) 247-2253.

MISC INTELLIGENCE

- Glider pilots are getting older (by a day per day!). The average age of New Zealand pilots is 45.6 and it's 47 in the USA. In the 1960s, 18% of US glider pilots were student members — in the 90s it is down to 3%. There are now more members of the Soaring Society of America over 70 than under 30, a sobering statistic.
- The first 1000 km flight has been completed in the UK. On 21 July, Chris Pullen and Chris Rollings, sharing the flying in an ASH–25, took 12:03 hr to achieve the task.
- World record pilot Hans Werner Grosse is demanding that the FAI change the rules for record flights to ensure that no landing is made after legal sunset plus 30 minutes. Given the length of current records, he says new records should not go to the boldest pilot but to the fastest one.
- Does your towplane occasionally have a flat battery because the master switch was left on accidentally? A simple solution is to hard–wire the rotating beacon or nav lights permanently on (like motorcycle headlights are). It lets everyone around know that the aircraft is either "active" or that someone has left the master ON.
- The Masters Class European Championships Cup was held in France this year. This was an invitational contest similar to the Hilton Cup with all world class pilots competing. Seven days were flown and the scoring rules allowed pilots to drop their worst day score. *(This idea was tried in the Western Interprovincial Competition held in Claresholm in 1989. Coupled with a simpler set of scoring formulae with fewer day devaluation factors, the pilots liked the system on the whole. Perhaps this could be tried again in the Sports Class. Tony)*

from NZ *"Gliding Kiwi "*

Name	*Club*	*Glider*	*Call Sign*	*No. Flts*	*Total Kms*	*Points*	*Place*
Sue Eaves	LSS	LS–4	SU	7	1423.6	1280	1
George Wilson	LSS	Libelle 201	JK	4	881	1122	2
Fred Hunkeler	SOSA	Std Jantar	1M	6	977.4	1012	3
Chris Eaves	LSS	ASW–20	XU	6	1194.4	1000	4
Jörg Stieber	SOSA	LS–4	JS	2	587	715	5
Ian Grant	GGC	LS–4	ZT	3	607.7	683	6
Gilles Sèguin	MSC	DG–200	GS	4	466	462	7
Norman Fortin	GGC	LS–4	ZT	1	315	312	8
Matthew Keast	LSS	Std Austria	ZDO	1	1250m	211	9
James Adamczyk	SOSA	Std Jantar	1M	1	96.7	100	10

Note: points are awarded for the four highest scoring flights.

ONTARIO SOARING LADDER

The Ontario Soaring ladder is a season–long soaring contest that anyone can participate in. You can claim flights that begin anywhere in Ontario (other than in SAC or OSA sanctioned contests) and submit flight claims up to Dec 31 of each year. Points are awarded for cross–country distance and speed and for altitude gains. Your four best flights determines your score. The pilot's word is accepted for flight claims but basic flight evidence is required to support the final top placing. Registration fee is $15 payable to the Ontario Soaring Association.

Send fee and flight claims to: Ian Grant, 41 Gillespie Crescent, Ottawa, ON K1V 0C1 (613) 737-9407 (home), 943-0253 (office), 995-2609 (fax).

SAC affairs

SAC "MEMBERSHIP METER"

Club	Membership (6 Sept)		
	90-94 avg	1995 to date	% avg
ASTRA	2	17	871
Air Sailing	32	22	69
Alberni	11	15	136
Aero Club Outardes	28	35	125
Base Borden	15	14	93
Beaver Valley	11	11	100
Bluenose	42	32	76
Bonnechere	9	6	67
Bulkley Valley	14	8	57
Central Alberta (new)		10	–
Champlain (+ App)	55	57	104
CVV Quebec	38	35	92
Cold Lake	28	22	79
COSA (+ Kawartha)	46	26	57
Cu Nim	63	70	111
Edmonton	68	65	96
Erin	30	42	140
Gatineau	87	92	106
Grande Prairie	7	10	143
Gravelbourg	6	6	100
Guelph	31	27	87
London	45	35	78
Mont Valin	5	3	60
Montreal (+ Ariadne)	103	93	90
Prince Albert	8	10	125
Regina	33	25	76
Rideau	19	7	37
Rideau Valley	41	29	71
Saskatoon	12	17	142
SOSA	120	132	110
Swan Valley	6	6	100
Toronto	19	19	100
Vancouver	105	79	75
Westman	4	1	25
Windsor	12	9	75
Winnipeg	70	69	99
York	91	74	81
Individual	9	3	33
totals	*1325*	*1233*	*93*

CHANGES IN CATEGORY 4 MEDICAL

With the leadership of the Aero Club of Canada and important briefs from Drs. Peter Perry and P. Saundby, both working on aeromedical issues for the FAI, the proposed removal/alteration of the Category 4 medical has been confined to editorial changes of the form for soaring and ultralight flying.

The Category 4 medical for the recreational pilot permit will be modified to include some expanded evaluations starting at age 40. The important issue is that these evaluations can, for the most part, be conducted by the pilot's family physician without recourse to Transport Canada. Pilots/students who wish to obtain an RPP should review the new form with their physician, and for those near or over 40, the additional age evaluations. Note that the soaring and RPP Category 4 medicals will be different from age 40 onward; pilots should not assume they are the same. Personal review and adherence to these requirements is paramount.

Because there is such a dearth of reliable statistics on the relationship between accidents and the medical state of pilots involved, the Aero Club and COPA will be putting together requests for data from organizations and pilots to establish and maintain a reliable pilot medical performance database for this important aspect of recreational aviation. Pilots, clubs, and all recreational aviation societies will be asked to assist and support this venture.

Fly well, sagely, safely, and often.

Bob Carlson, President ACC

FOR NUMBERLESS NUMERICALLY PERPLEXED SAC MEMBERS

From time to time members contact the SAC office asking for their SAC membership number, or expressing dismay that they have lost or forgotten theirs. SAC has not issued membership numbers for several years. This is because there is sufficient information in the SAC database to uniquely identify each member and this information is readily accessible. Membership numbers were used some years ago as an aid to filing; they are no longer needed for this purpose and hence have been dropped.

Jim McCollum

AD OUT ON FRENCH PARACHUTE

Transport Canada has sent SAC an Airworthiness Directive from the French DGAC on certain emergency parachutes made by "Parachutes de France". As TC is unable to identify the owners of this equipment, our help is solicited in passing this directive on to the eventual owners. A translation of the text follows:

AIRWORTHINESS DIRECTIVE 95–131(AB)
Tightening of the "French" connector links.

This AD applies to emergency parachutes PARACHUTES DE FRANCE model P512( )01 delivered within the last twelve months with the following serial numbers: DE039 to DE046, DF001 to DF024, DG001 to DG017, DH001 to DH006, DJ001 to DJ019, DM001 to DM025, EC001 to EC031. ED001 to ED025 and EE001 to EE019.

During a periodic check, a parachute was found on which the connector links were not tight and secure.

The following measures are mandatory: before next use, verify the tightness of the four "French" connector links between the canopy and harness container. Enter this inspection in the parachute logbook.

Effective date: upon receipt after 21 Jun 95.

Ref: PARACHUTES DE FRANCE ASB-P512-25-002

Paul Fortier
Chairman, Technical Committee

IT'S TIME TO GET YOUR SAC TROPHY FORMS IN

Now that the end of the season is here, don't delay in getting your good flights of the year down onto the SAC Trophy application form and mailed off to the Awards Chairman. Don't wait until 31 December!

Harold Eley has been the chairman for several years now and had officially resigned from the position as of the AGM in March. However, no one has offered to take over so he has agreed to act as a post office for entries this year.

He is looking for a replacement, and asks that someone take over this modest annual job. See his address and phone number in the list opposite.

FAX IT TO ME BIG

The *free flight* editor has OCR software for scanning text. Because of the low resolution of fax machines, OCR of faxed text will have far fewer read errors if senders would use a "sans serif" font such as Helvetica in at least 12 point size. Thanks. Tony

Coming Events

10 Jan 96 **Toronto glider pilot ground school**, Weds evenings 7-10 pm for 10 weeks. Contact Ulf Boehlau at (905) 884-3166 for registration information.

8-10 Mar, 1996 **SAC AGM**, Regina, SK

23 Jun – 4 Jul 96 **1996 Canadian Nationals**, Red Deer, AB. Contest organizer: Randy Blackwell (403) 594-2171.

SAC Directors & Officers

PRESIDENT & QUEBEC Zone
Pierre Pepin (1995)
590 rue Townshend
St–Lambert, PQ J4R 1M5
(514) 671-6594 (H)

VP & PACIFIC Zone
Harald Tilgner (1994)
50090 Lookout Rd, RR2
Chilliwack, BC V4Z 1A5
(604) 858-4312 (H)
(604) 521-5501 (club)

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Karl Robinson (1995)
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(902) 865-5352 (H)

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(416) 391-2900 (H)
(416) 391-3100 ext 250 (B)

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Winnipeg, MB R2R 0M3
(204) 633-5221 (H&F)
(204) 957-2827 (B)

ALBERTA Zone
John Broomhall (1994)
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Edmonton, AB T6J 6H2
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(403) 423-4730 (B)

Director–at–Large
Hal Werneburg (1995)
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(403) 686-6620 (H)

Director–at–Large
Chris Eaves (1994)
185 Canterbury Drive
Dorchester, ON N0L 1G3
(519) 268-8973 (H)
(519) 452-1240 (B)

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(613) 829-9497 (F)

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(416) 391-2900 (H)
(416) 391-3100 ext 250 (B)
Mbr: Doug Eaton

Air Cadets
Bob Mercer, Box 636
Hudson, PQ J0P 1H0
(514) 458-4627 (H)

Airspace
position to be filled

Contest Letters
Robert Binette
5140 St–Patrick
Montreal, PQ H4E 4N5
(514) 849-5910 (H)

FAI Awards
Walter Weir
3 Sumac Court, RR 2
Burketon, ON L0B 1B0
(905) 263-4374

FAI Records
Dave Hennigar
404 Moray Street
Winnipeg, MB R3J 3A5
(204) 837-1585 (H)

Flt Training & Safety
Ian Oldaker
RR1
Limehouse, ON L0P 1H0
(905) 873-6081 (H)
(905) 823-8006 (F)
Mbrs: Ken Brewin
Geo. Eckschmiedt
Fred Kisil
Paul Moggach
Richard Officer
Gilles Séguin
Terry Southwood
Richard Vine

Free Flight
Tony Burton
Box 1916
Claresholm, AB T0L 0T0
(403) 625-4563 (H&F)

Historical
to be filled

Medical
Dr. Peter Perry
64 Blair Road
Cambridge, ON N1S 2J1
(519) 623-1092 (H)
Mbr: Dr. W. Delaney

Meteorology
Stephen Foster
10 Blyth Street, Stn B
Richmond Hill, ON L4E 2X7
(519) 623-1092 (H)

Publicity
to be filled

Radio & Comm
Paul Moffat
see Prairie Zone Director

Sporting
Charles Yeates
110 - 105 Dunbrack Street
Halifax, NS B3M 3G7
(902) 443-0094 (H)
Mbrs: George Dunbar
Robert DiPietro

Statistics
Randy Saueracker
1413 – 7 Avenue
Cold Lake, AB T0A 0V2
(403) 639-4049 (H)
(403) 594-2139 (F)

Technical
Chris Eaves
see Director at Large
Mbr: Herb Lach

Trophy Claims
(pro tem)
Harold Eley
4136 Argyle Street
Regina, SK S4S 3L7
(306) 584-5712 H

Nap of the Earth

from page 13

you are with will eventually contact another good ground source, combine with its heated potential, and nearly always provide you the energy to go back up. You'll find yourself working what I may refer to as cumulative thermals. It can actually be quite predictable — drifting along, barely sustaining over green fields, spotting a big plowed one coming up in about a mile or so, and 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 in close proximity to the earth. Capturing its potential requires a combination of the right equipment and the right technique. Of course, nothing presented here should be construed as a contradiction of the old soaring adage, "get high and stay high", something which is accomplished with ease in ultralight gliders. For example, at the time of this writing, my most recent flight in weak spring conditions lasted seven hours. The thermals only averaged about two knots. Even so, other than using microlift techniques to climb away from the 600 foot autotow, I spent the entire flight within 1500 feet of the 4500 foot cloudbase. But when everything else has failed you, and you haven't yet resigned yourself to landing, nap–of–the–earth microlift will prove to be your save.

Hopefully there's something here which will prove useful to you whether you fly a hang glider, a standard sailplane, or a Nimbus 4. 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 nap–of–the–earth lift, this class of glider has much to offer. In case you haven't already guessed it, I'm thoroughly enjoying myself! ❖

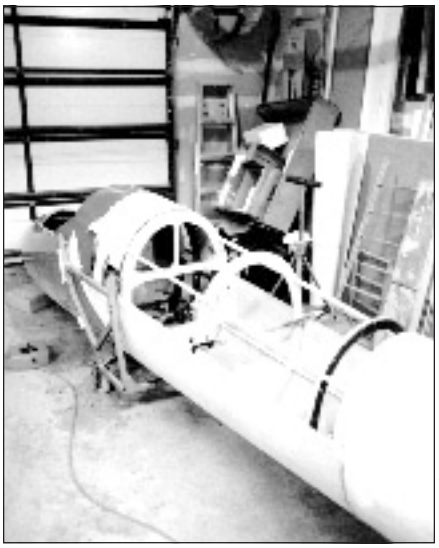
the Scarlet Lady

from page 7

Working on an aircraft exposed me to a level of detail and precision I found very satisfying. The elegance of slender members crafted out of a piece of sitka spruce six feet long, and not one growth ring running out over that length, is good for the soul. The simplicity and competence of modern epoxy glues is mind–boggling.

It was not unusual to spend two hours working on one small piece, precisely scarfing the mating surfaces at ten or even fifteen to one joint length to member thickness. After several evenings, there would be a collection of half a dozen pieces ready for assembly, and then another evening would be spent carefully clamping them in place with an assortment of clamps and weights and staples and blocks and wax paper. The broken ruddervator required a total of fifteen individual connections from one half to the other — each connecting piece with two mating surfaces, and matching mating surfaces on the undamaged portions — plus many other little bits and pieces required to reconstruct shattered ribs and spars.

The single largest task was splicing in a four foot section of the 3mm birch plywood that makes up the rear fuselage. This required a jig the length of the fuselage, in which the undamaged portions of the fuselage, nose and tail, could each be supported, front and rear, by a ring of adjustable pads. By moving each pad in or out, the relative orientation of the nose and tail could be adjusted — up and down, side to side, in rotation, and fore and aft. Many hours were spent selecting appropriate datums, and installing measuring references for each degree of freedom. Many hours were spent gradually easing the parts into perfect alignment. Two replacement fuselage formers were constructed, and replacement sections of the four fuselage stringers prepared. At this stage, a pattern was taken and the replacement plywood skin cut to shape. The



Bruce Friesen

joint required a scarf joint at fifteen to one; the new section of 3mm skin had to be sanded to a precise plane 45 mm wide, the six plies of the plywood showing as six bands of even thickness. Elegant, simple, precise, and thank goodness for the peace of mind that comes from the gap filling capability of modern epoxy glue.

The total repair time was about two and one half years of steady work — perhaps a thousand hours in all. The most time consuming job was stripping all the old paint off the aircraft down to bare wood, sanding, filling, and sanding some more. With instruction from Jerry Vesely, the glider repair expert in Claresholm, and generous use of his shop and tools, I was even able to do my own fabric work.

So far the effort seems worthwhile. I have had many compliments on the ship, and claims for two diamond flights are pending. Thanks again to all who helped in so many ways. Now, I've got eight lost years to make up. See you in the air! ❖

FAI badges

Walter Weir
3 Sumac Court, RR2, Burketon, ON L0B 1B0 (905) 263-4374

The following badge legs were recorded in the Canadian Soaring Register during the period 20 June to 3 September 1995.

DIAMOND BADGE

84	Bruce Friesen	Edmonton

GOLD BADGE

273	William Park	Gatineau

SILVER BADGE

861	Robert Leger	COSA

DIAMOND DISTANCE (500 km)

Sue Eaves	London	509.2 km	LS–4	Embro, ON
Nick Pfeiffer	Vancouver	510.5 km	Std Cirrus	Ephrata, WA
Bruce Friesen	Edmonton	554.8 km	Std Austria	Chipman, AB

DIAMOND GOAL (300 km declared)

William McArthur	?	305.9 km	Astir CS	Ephrata, WA
Bruce Friesen	Edmonton	320.5 km	Std Austria	Chipman, AB

GOLD DISTANCE (300 km)

William McArthur	?	305.9 km	Astir CS	Ephrata, WA
William Park	Gatineau	300.5 km	Skylark 4B	Pendleton, ON

SILVER DISTANCE (50 km)

Karla Hopp	Regina	89.9 km	1–26	Strawberry Lks, SK
Daniel Daly	Bluenose	61.2 km	Blanik L13	Golden, BC
Werner Amsler	COSA	62.2 km	Pilatus B4	Omemee, ON
Robert Leger	COSA	62.2 km	ASW–15	Omemee, ON

SILVER ALTITUDE (1000m gain of height)

Andrew Corrigan	SOSA	1250 m	1–26	Rockton, ON
Daniel Daly	Bluenose	2180 m	Blanik L13	Golden, BC
Derek Brewin	Gatineau	1262 m	Blanik L13	Pendleton, ON
Dennis Descoteau	Westman	1520 m	1–23	Chipman, AB
Richard Noel	Quebec	2300 m	Blanik L13	St Raymond, PQ
Martin Vanstone	Vancouver	2100 m	Astir 77	Invermere, BC

SILVER DURATION (5 hours)

Andrew Corrigan	SOSA	5:04 h	1–26	Rockton, ON
Derek Brewin	Gatineau	5:15 h	Blanik L13	Pendleton, ON
Dirk Schmekel	Montreal	6:48 h	Astir	Hawkesbury, ON
Simon Fleury	Quebec	5:34 h	Grob G102	St Raymond, PQ
Richard Noel	Quebec	5:06 h	Pilatus B4	St Raymond, PQ
David Woodhouse	SOSA	5:10 h	1–26	Rockton, ON

C BADGE (1 hour)

2474	Andrew Corrigan	SOSA	1:09 h	1–26	Rockton, ON
2475	Daniel Daly	Bluenose	3:18 h	Blanik L13	Golden, BC
2476	H. (Skip) Watson	Regina	1:06 h	1–26	Strawberry Lks, SK
2477	Roger Taylor	Vancouver	1:19 h	Blanik L23	Hope, BC
2478	Thomas Brenneur	Quebec	1:18 h	Blanik L13	St Raymond, PQ
2479	Pierre Brousseau	Quebec	2:07 h	Grob G103	St Raymond, PQ
2480	Carroll Garayt	Montreal	2:32 h	1–26	Hawkesbury, ON
2481	Martin Vanstone	Vancouver	1:30 h	Grob G102	Pemberton, BC
2482	Gregory Dwyer	Regina	1:04 h	1–26	Strawberry Lks, SK
2483	David Woodhouse	SOSA	1:04 h	2–33	Rockton, ON

Thanks to Alex Krieger, the Senior Official Observer of Club de Vol à Voile de Québec, for the perfectly prepared badge applications which he submits, making my job so much easier. Many badge applications are still being sent to the National Office which causes delay, confusion, and extra expense. Please send your applications directly to me at the above address. Make cheques payable to SAC.

On 22 May, Sue Eaves flew her Diamond distance. Her husband Chris said to me, "You don't know what it's like living with someone who's done her 500 when you haven't!" Congratulations also to Bruce Friesen who completed his Diamond badge with a flight from Chipman, AB to Lanigan, SK. Half way there Bruce photographed his single declared turnpoint, resulting in an increase of his achieved distance from 554.3 km to 554.8 km!

Lastly, **DO NOT WAIT UNTIL 31 DECEMBER** to mail me your badge flight forms. If you do, you'll have to wait until spring for my response because I'm on holidays in the sunny south!

See the previous issue of *free flight* for SAC Badge supplies. For those of you who think you may be in line for a SAC flight trophy this year, now is the time to fill in a trophy application form (your CFI or SOO ought to have them) and send it off to Harold Eley. See the note on page 20 — he is looking for a replacement and you could be it.

FAI records

Dave Hennigar
404 Moray Street, Winnipeg, MB R3J 3A5 (204) 837-1585 H

The following record flights have been approved:

200 km speed to goal, Open (not FAI), citizens, 143 km/h, 6 May 95, Walter Weir, ASW–20B, C–GGWW. Flown from Julian, PA to the goal at Seneca Rock, VA. No previous citizen's record claimed.

Free distance, Feminine, 508.7 km, 22 May 95, Sue Eaves, LS4, C–FAOS. From London Soaring Society to Hanover a/p to Tillsonburg a/p to Shelbourne helipad and return. No previous record claimed.

Note: the existing **100 km speed to goal** multiplace territorial record stands, as the record claim of Uwe Kleinhempel was withdrawn due to camera problems.

Trading Post

Personal ads are a free service to SAC members (please give me the name of your club) $10 per insertion for nonmembers. Send ad to editor, NOT the national office.

Box 1916, Claresholm, AB T0L 0T0
tel/fax (403) 625-4563

Ad will run 3 times unless you renew. Please tell me if your item has been sold sooner. Maximum length is 6 lines, ads subject to some editing as necessary.

single seat

1–26E, C–GMJM, #626, 976 h, Alpha 100 radio, open trailer. Peter Skensved (613) 376-3491 H, (613) 545-2676 W.

Ka6E, CF–VMX, full instruments, 2 radios, battery & charger, chute, misc. items, new fabric & paint, alum trailer. $12,500 firm. Walter Kunster (604) 589-1087.

Pioneer II, C–GLUV, 35/1. Fun to fly, excellent shape, all rigging aids, nice enclosed trailer. $8000 obo. Ron McCullough (613) 547-7802.

Duster, C–GHEU, 226h, excellent cond. Magnetic compass, 3-1/8" and 2-1/4" altimeters, 2 ASI, Genave 100 radio, mechanical varios, 10ah Gel-cell battery, Garmin 55 GPS with database, encl metal trailer. $6500 Harold Weidemann (403) 474-0139.

HP11, CF-CMZ $12,000; lovely ship to fly and great for cross-country. Standard class performance for half the price, excellent trailer. Full panel incl Varicalc computer. I'm abroad and must sell. Mike Apps (403) 436-9003 H, 435-7305 W.

HP11A, C–FUKB, 518h, std instruments, CB radio, open trailer available. Highest perf/$ with completed gold and diamond flights. For quick sale as is, first offer over $8500 – after clean-up and inspection $9900. Bob Patterson (905) 457-5238, 9 am–10 pm.

HP11A, 55h TT, new instruments, 720 chan radio, O2, Schreder trailer. $11,000. Horst Dahlem (306) 955-0179.

HP–14, 450h TT, good condition, single piece canopy, filled wings, TE vario, chute. New Imron paint. US$10,500. Keith Pritchard, (519) 570-9437, e-mail kpritchard@sstech.on.ca.

Monerai, C–GHRE, 110h, vg cond, basic instruments, comes with Zenoa engine and encl trailer. $6000. Hans Kruiswyk (604) 763-1788 W.

Monerai, C–GJUT, excellent cond, low hours, basic instruments with audio vario, TE, encl trailer. Must sell, $5300 obo. David Ellis (705) 687-2365 H, (705) 645-5272 W.

KW–45, CF–SNZ, 500h, homebuilt glass fuselage with Open Cirrus wings, tinted canopy, radio, O2, llec vario system, encl alum trailer. $17,000. Fred Wollrad (403) 479-2886 or Harold (403) 474-0139.

M100S, C–FRIV, aerobatic, well–balanced controls, 30:1, excellent visibility. Cambridge audio vario and PZL, chute, O2. Encl metal trailer. $8700. Gar Ingram (416) 239-7465 H, 239-9740 W or Dave Harper (905) 896-3758 H, 669-9598 ext 241 W.

SH–1 Austria, good condition, current c of a, audio vario, radio, wing and tail covers, encl trailer. Ted Radvany (905) 697-3484.

Phoebus, C–FVKY, 17m, 42:1, O2, radio, two elec varios. 750h, recent paint, alum trailer. An excellent low budget cross–country ship. $15,000 Alan Daniel (403) 547-5116.

VES–1, homebuilt by AME (Pik–20 with HP–18 wings), 120h, new polyurethane finish in 1994, very nice encl metal trailer. $16,000. Jerry Vesely (403) 625-3155 W, 625-3871 H.

Std Cirrus, 1170 h, beautiful ship, complete refinish, All ADs, Winter and Cambridge with audio, Schueman box, O2, T&B, chute, Radair 10, 5 point harness, Pfeiffer trailer, barograph. $24,000. (604) 475-3495.

Std Cirrus, N770R, 1970, 1200 TT. Good condition, refinished with Prestec. Rico vario with cruise, Terra 720 radio, water ballast, Minden trailer. Great Sports class racer. Based in Ephrata, WA. US$17,000 Nick Pfeiffer (604) 850-9345, fax 854-0104.

Nimbus II, C-GAJM, 860 h. Excellent cond, super performer. Factory trailer, full panel incl radio, 2 varios, Cambridge computer, mylar seals, wing and fuselage covers. I'm abroad and must sell. $35,000 Mike Apps (403) 436-9003 (H).

two place

2–22C, 2028h TT, completely refurbished 1992 (Ceconite 103), new cables. $3500. Aero Club des Outardes (514) 621-4891.

2–33A, #170, 1970, 4900h, basic instruments and Radair 10s radio. Sturdy open trailer. Avail immediately. US$11,700 obo. Contact Winnipeg Gliding Club. e–mail: <wgc-info@lark.magic.mb.ca> or leave message at (204) 837-8128 (24 hrs).

Blanik L–13, C–FCXC, 300+h. $20,000. Doug Munro (416) 466-1046.

Lark IS28B2, C–GVLI, 1400 h. Basic instruments, Cambridge vario & back seat repeater, Alpha 100 radio, Varicalc flight computer, g–meters, professionally built open trailer. Available immediately. $US19,500 obo. Contact Winnipeg Gliding Club. e–mail: <wgc-info@lark.magic.mb.ca> or leave message at (204) 837-8128 (24 hrs).

miscellaneous

L–19 parts, wings and fuselage plus other bits, no engine. $15,000. Ozzie Maranta (613) 678-5197.

HP–18, kit partially done, spars inspected, tail 90%, rear fuselage ready to be closed, cockpit section needs finishing, no canopy. Some fasteners included. All other parts and materials incl. Encl trailer. $4500 complete. Ruth Thumm (519) 599-6749.

Ogar motorglider, C–GZNM, 600h, 150h on Subaru EA81 70 hp autoconversion. 20:1, dual O2, new Cleveland wheel and brake, full set of covers. C of A amateur–built category. Asking $25,000. Deirdre Duffy (403) 439-2260 or Hugh Waller (403) 486-0993.

Wanted – Winch with large block gasoline V8 engine in good working condition. Prefer tandem axle unit with good tracking. Send photos and info to Saskatoon Soaring Club, Box 7943, Saskatoon SK, S7K 4R6. Call Roy (306) 947-2830 evenings.

Clearance of Cambridge and other items CVS-50 vario, 5/10 kts or 10/20 kts, 1 yr guarantee – $250. Cambridge integrator prototype (true average rate of climb) – $50. Fuselage mount TE probes – $20. JMF MkII 30,000 ft barograph, large 14 hour drum, smoked foil calibration incl – $350. Pneumatic switches for netto on/off etc. – $15. John Firth, 542 Coronation Ave, Ottawa, ON K1G 0M4 (613) 731-6997.

Blanik L13 parts, 2 sets of wings and fuselages, damaged. $5000. Ozzie Maranta (613) 678-5197.

magazines

SOARING — the journal of the Soaring Society of America. International subscriptions $US35 second class. Box E, Hobbs, NM 88241 (505) 392-1177.

NEW ZEALAND GLIDING KIWI — the bi–monthly journal of the New Zealand Gliding Association. Editor, John Roake. $US25/year. NZ Gliding Kiwi, Private Bag, Tauranga, NZ.

SAILPLANE & GLIDING — the only authoritative British magazine devoted entirely to gliding. 52 pp, bi–monthly. Canadian agent Terry Beasley, Box 169, L'Orignal, ON K0B 1K0 or to BGA, Kimberley House, Vaughan Way, Leicester, LE1 4SG, England. £15.50 per annum ($US30) or $US40 air.

AUSTRALIAN GLIDING — the journal of the Gliding Federation of Australia. Published monthly. $A40.50 surface mail, $A55 airmail per annum. Payable on an Australian bank, international money order, Visa, Mastercard. (No US$ personal checks.) Box 1650, GPO, Adelaide, South Australia 5001.

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