

free flight • vol libre

1/94
Feb/Mar



HAPPY NEW YEAR EVERYONE and may you have better soaring weather than what we had available in 1993.

A reminder that our Annual General Meeting is being held in Montreal this year on 4-6 March at the Longueuil Holiday Inn. Further details are in this issue. Don't forget that the provincial associations also have a meeting at the AGM on the Friday. The 1994 Nationals are being held from the 5th to the 14th of July at SOSA and Ed Hollestelle is the contest manager.

Our accident record this past year has been dismal, with claims very close to equalling the premiums, and the underwriters are not happy with that situation. According to the reports, experienced pilots were involved in the majority of the accidents. This is not a good indication that these pilots were going through their situation, options, action, and review loop as often as they should have been. If they had, two of these accidents would definitely *not* have happened. All pilots should read George Eckschmiedt's accident review and analysis in the next issue and be thinking about improving their own flying attitude and skills during the coming season.

To those people who took the time and interest to advise us on the "Young Eagles" program, I wish to inform you that the Board has been trying to develop a procedure to allow clubs or individual members to implement an equivalent gliding program. We believe that the air cadets are the youths that we should be targeting as they are the ones interested in aviation. Also, don't forget that youngsters should have their parent's consent before being given a flight.

We have a very good accident and sickness insurance policy, which includes gliding injuries, for pilots making trips to the USA. It was drafted especially for SAC, but if we don't utilize it, we will lose it. The company who arranged this policy for us, Rozon Insurance Brokers, are very disappointed with the response last year. All the clubs were sent brochures and application forms last spring, so yell at your club executive for the details. If you get no results there, please contact the National Office. Thank you.

Jim McCollum, our treasurer, is sending a draft SAC budget to each club president to indicate what the Board's intentions are for the coming year, and to give some time for study and discussion prior to the AGM.

REMINDER, REMINDER — next year is our Fiftieth Anniversary. Don't wait until next year to start planning for it, you will be too late. START NOW.

Have a good soaring season, and please, plan ahead.

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Trademark pending Marque de commerce en instance

1/94 Feb–Mar

The journal of the Soaring Association of Canada
Le journal de l'Association Canadienne de Vol à Voile

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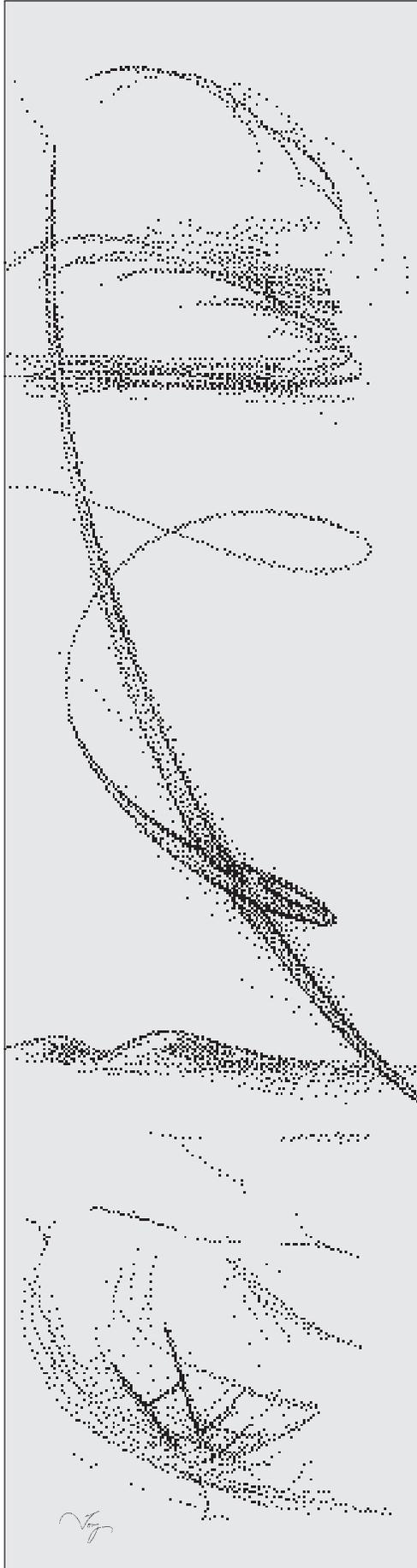
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Cover Panning the camera to blur the image of 54 on roll at the Swift Current Nationals conveys the sense of the frenetic action on the launch grid. 54's pilot is Jay Poscente and his speedy crew is Al Stirling. photo: David Brownridge



a curmudgeon's view

– examining some sacred cows

R. Salter

from *Australian Gliding*

THERE ARE SOME WIDELY HELD OPINIONS IN OUR SPORT which have achieved almost sacred cow stature. They need examining, and above all, rethinking in the light of the unpalatable facts.

One item that comes to mind readily is the concern about the lack of young people, and the belief that gliding will wither away unless this is remedied. Undoubtedly it would be great to have our clubs full of youngsters but the sad fact is that they lack the disposable income required to go flying. Unless dad pays or unless they belong to the air cadets or a similar organization, they are for all practical purposes precluded from taking part.

The matter does not rest there either. Once they join the workforce and then marry, they have their noses to the grindstone for the next fifteen years or so, getting established, raising a family, and battling with the mortgage. Not until they are in their thirties will they surface and breathe a little easier. Our potential market is therefore the age group from about thirty-five upwards, whether we like it or not.

Anybody involved in marketing will tell you that you need to ascertain the demographic section of interest to you, and that your product determines that. Trying to sell to a non-existing market is a waste of effort. You only need to look around our clubs to see the truth of this. Sad it might be, but our recruits join us at a mature age.

Another proposition often heard maintains that everything would be all right, if we only returned to basics. Now "basic" means different things to different people. Some of us long for the good old days when there was no "bureaucracy" for regulations, forgetting that things are no longer what they were then. They also forget the numerous accidents of that time. Others decry the cost of modern sailplanes, and want to go back to wooden aircraft with more moderate spans, believing that this would significantly reduce the cost of flying and thereby attract more people. This matter of costs is pretty doubtful. Unless you build the aircraft yourself, you would contend with today's labour costs and overheads. Just check out what a K-13 sells for now!

In any case, people quite clearly prefer to buy expensive craft for performance. There is a decided tendency towards motorgliders, in spite of the high costs. Just look at the import figures, if you want to establish where peoples' preferences lie.

Another idea currently being pushed is that if we only turned towards competition flying or advanced cross-country work, the loss of members will stop and all would be well.

This stirred vague feelings of guilt in me as I happen to be an unrepentant recreational pilot. My pleasure is to fly some three hundred kilometres or so on a day. Whether this takes a quarter hour more or less is of no interest to me at all. In fact, if the landscape underneath is attractive, I am just as likely to circle there for a while to admire it. Am I contributing to the decline of the gliding movement, while the racing fraternity is its salvation?

Now I have no desire to put down in any way those pilots who have the competitive urge. They are quite entitled to pursue their interests, and I concede readily that they fly more efficiently than I do. But are they the answer to our problems? Crunching some numbers reveals that less than a quarter of Australian glider pilots take part in any competition whatsoever, and that includes even the smallest local meets. As you go up the scale of prowess, the numbers of course thin out rapidly. At the highest level, competition pilots are totally absorbed in their activities, and they also have to fork out a lot of money. There are honourable exceptions, but as a rule, the top pilot is of little use to his club, apart from prestige.

The club scene quite clearly depends on the recreational pilot and the ab initio student for its survival ... (hence this is where useful effort can and should be concentrated). •

Two more articles on membership problems are in this issue on pages 8 and 9. ed.



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.

Material published in *free flight* is contributed by individuals or clubs for the enjoyment of Canadian soaring enthusiasts. The accuracy of the material is the responsibility of the contributor. No payment is offered for submitted material. All individuals and clubs are invited to contribute articles, reports, club activities, and photos of soaring interest. A 3.5" disk copy of text in any common word processing format is welcome (Macintosh preferred, DOS ok in ASCII). All material is subject to editing to the space requirements and the quality standards of the magazine.

Prints in B&W or colour are acceptable. No slides please. Negatives can be used if accompanied by a print.

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.

The contents of *free flight* may be reprinted; however, SAC requests that both the magazine and the author be given acknowledgement.

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letters & opinions

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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Les articles publiés dans **vol libre** sont des contributions dues à la gracieuseté d'individus ou de groupes enthousiastes du vol à voile. Le contenu des articles soumis est la responsabilité exclusive de leurs auteurs. Aucune compensation financière n'est offerte pour la fourniture d'un article. Chacun est invité à participer à la réalisation de la revue, soit par reportages, échanges d'opinions, activités dans le club, etc. Le texte peut être soumis sur disquette de format 3.5" sous n'importe quel format de traitement de texte bien que l'éditeur préfère le format Macintosh (DOS est acceptable). Les articles seront publiés selon l'espace disponible. Les textes et les photos seront soumis à la rédaction et, dépendant de leur intérêt, seront insérés dans la revue.

Les épreuves de photos en noir et blanc ou couleur sont acceptables. Les négatifs sont utilisables si accompagnés d'épreuves. Nous ne pouvons malheureusement pas utiliser de diapositives.

L'exactitude des articles publiés est la responsabilité des auteurs et ne saurait en aucun cas engager celle de la revue **vol libre**, ni celle de l'ACVV ni refléter leurs idées. Toute personne désirant faire des représentations sur un sujet précis auprès de l'ACVV devra s'adresser au directeur régional de l'ACVV dont le nom apparaît dans la revue.

Les articles de **vol libre** peuvent être reproduits librement, mais la mention du nom de la revue et de l'auteur serait grandement appréciée.

Pour changements d'adresse et abonnements aux non membres de l'ACVV (\$20 par an, EU\$22 dans les Etats Unis, et EU\$28 outre-mer) veuillez contacter le bureau national à l'adresse qui apparaît au bas de la page à gauche.

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QUESTIONS TO ANSWER ON THE LIVINGSTONE RANGE OUTLANDING

Just a few comments on the contents of the last issue of *free flight*. As always you provide a good mix of articles touching on many areas of interest to soaring pilots. I especially like the reprints of Tom Bradbury's articles on soaring meteorology from *SAILPLANE & GLIDING*. I always photocopy them and will eventually assemble them into a small booklet for my use.

Ed Hollestelle's remarks in *CASA News* regarding the weather during the Nationals at Swift Current seem to me a little too negative, especially when compared to weather conditions in other parts of Canada during the same period. I spent four days in the "Speedy Creek" area during the contest period, and sure, the super weather did not materialize, but it was certainly quite acceptable. A short distance to the west towards Calgary it was IFR most of the time and to the east I believe it was also wet, with flooding in Manitoba and long periods of thunderstorm weather in Ontario. Enough of a plug for the west.

A Rough Outlanding, the article by George "Moose" Szukala, certainly made for interesting reading especially for one who happened to be at Cowley during the accident. George gives a very detailed account of events as they unfolded after the pilots got themselves into a very nasty situation, but fails to give convincing reasons as to why they intended to ridge soar on the west side of the Livingstone Range in the first place. The country is mountainous and almost totally unlandable and difficult to access on the ground. These facts are known to everyone who has ever flown the Livingstones, and pilots treat the area with great respect.

Several questions come to mind when reading George's story, and perhaps by pondering the answers carefully, future incidents of this type can hopefully be avoided:

- was any advice sought from experienced pilots who were at the Cowley airfield at takeoff time?
- was the camp Safety Officer consulted before the flight?
- why did the tow pilot agree to tow the sailplane to the west side of the range into obviously unknown and possibly dangerous conditions at the beginning of the flight?
- hindsight is always 20/20 of course, but why was the flight direction not changed to an easterly heading and safe landing country when it became apparent that the intended course was leading into trouble?

Congratulations are in order to the pilots for their piloting skills during the final moments of the flight but nevertheless a valuable aircraft was written off and two fellow human beings were exposed to the distinct possibility of injury or even worse. "Moose" and "Bull" came out of this incident with valuable lessons being learned. But all of us, whether we are mere observers or are directly involved in the planning or execution of flights of this nature should always be aware of the possibility of disaster striking if things should go wrong. Let's fly safely, cautiously, and for a long time.

Hal Werneburg, Cu Nim

A CORRECTION

I am glad that my review article on the LD100 variometer was suitable for *free flight*. There is one minor detail I would like to correct however. The byline below my name states that I am a member of York Soaring. Close, but no glider. I have been a member of London Soaring for 16 years. We are about 70 kilometres away from York. Perhaps you were thinking of the days when Peter Masak, the designer of the LD100, was a member of York?

Michael Steckner, London Soaring

Nope, just a random goof.

Editor's notes

Only one letter from all of you this time, so I have the opportunity to fill a little space with a few words to pilots and clubs.

- 1995 is the 50th anniversary of SAC. A special issue of *free flight* is planned with colour photos and ...? The format is not fixed yet, but I will need good photos and interesting stories from people who have lots to say about soaring and SAC but haven't contributed recently. I am going to be building the special issue during this year, so don't wait to sent me stuff.

- Thanks to Hal for his letter above, which is one of the few which gives us direct feedback on what appears in *free*

flight. I know you read it, and I know glider pilots are a pretty opinionated lot, so keep the communication level up by writing a bit more to "Letters & Opinions".

- Be careful when you write on the back of photographs with a felt tip pen! The paper is highly non-absorbent and some marker inks take a long time to dry on them. It is not uncommon for photos to be ruined for reproduction use when wet ink from one is transferred to the front of another when they are stacked.

Let's hope we get more climate and less weather in 1994! See you up there.





Dave Baker

I

am down on Hope Mtn!

Joe Gegenbauer *CFI Vancouver Soaring Association*

THAT CHILLING MESSAGE ON THE RADIO sent shivers down my back. Standing at an airport, it means someone crashed with the glider into the mountain just three or four miles away from the very place we were operating from. Who is it? What aircraft is it? What has happened?—a million thoughts are racing through my mind

It's a nice fall day at Hope, blue skies, not a cloud to be seen anywhere. Hope is a small town on the Fraser River at the very east end of the Lower Mainland, about 150 kilometres east of Vancouver. This is the site where the Vancouver Soaring Association flies, just one hundred feet above sea level and surrounded by 5 to 7 thousand foot mountains in the middle of rainbow country.

The wind was light from the west and I had just landed and put the ASW-20 to the sideline. I flew for about one hour. After releasing on Hope Mountain at 2000 feet and struggling for half an hour, I spent the rest of the time finding thermals over the airport. The sun was strong enough to create weak thermals and as they interacted with the weak ridge lift it created some interesting turbulence at the Hope Mountain ridge.

On the ground, I was explaining the ASW-20 instruments to another pilot. With the power on for all the instruments, the radio was turned

on as well, but the volume adjusted lower so we could talk. What was that — a glider down on Hope Mountain — we just caught part of the message. We turned the radio up and listened to reports. Yes, a club Grob 102 has crashed on the mountain just a few miles away from where we were standing. We all looked up to see if we could spot anything. Who was it? We called over to the timekeeper: "Who was in VSV?" It was Christine, one of our recently licensed pilots on her first Grob 102 solo flight. Nick, the instructor, was on the radio asking the downed pilot if she was injured; the reply was: "Nothing to speak of." Christine told us very calmly that she and the glider were down on the ground between tall trees at the 3100 foot level on the west side of the ridge.

At this point the flying operation was halted and we dispatched the towplane to look for the downed glider. The towpilot was already getting on the way with a spotter with him. Our emergency procedures were implemented. Heidi left to run to the clubhouse telephone to notify Search and Rescue and the police. The towplane was searching in the meantime, but could not locate the glider. Christine was still in the glider and heard the towplane go by. As the towplane came by the next sweep, she called to the pilot just as the L-19 went abeam. The towpilot and observer still could not see a thing.

The rest of the gliders were called down to land in short order. One of the first gliders to come down was our Grob 103 two seater with Todd and his guest. This friend of Todd's turned out to be a visiting helicopter pilot out for a glider ride. What a lucky coincidence. Heidi prompted me to ask for his help. They opened the canopy, I explained the situation and asked for their support and help. Well, you could not want to meet a nicer fellow, and they dashed off to get the Jet Ranger helicopter ready for the search for our downed glider pilot.

While we pushed all the gliders to the tie-down area, I asked for the ETA of the Search and Rescue people and it was given as 45 minutes. By now it was 6 pm. I was really worried about getting Christine off the mountain before it got dark. A backup plan was now developed to possibly drop a club member, Mike, a glider pilot, instructor and experienced mountaineer, at a place close to the crash site, so he could make his way to the downed pilot. Club members started putting things together like a sleeping bag, a thermos of warm liquid and general survival gear. One has to remember that walking in or out was not an option as the slope of the mountain is much too steep.

All the gliders were put away and we made our way to the clubhouse. The red coveralls of the Hope volunteer search and rescue team were standing out and everybody was gathered in small groups discussing the event. We walked over to the helicopter parking area, where the chopper pilot was discussing a hook-up of a bucket to possibly rescue the pilot that way. In their search for the crash site they located the place and marked it with coloured tape above and below the downed glider. I discussed the possibility of one of the rescue fellows to lower himself down to the glider pilot who was at that time still in the glider with the canopy closed.

At a quarter to seven we asked the police in charge to get another ETA on the Labrador SAR helicopter. Through the Search and Rescue Coordination Centre in Victoria we found it would be 8 pm, and by that time it would be dark.

We had a helicopter sitting on the ground, a crashed pilot with light clothing and possible injury up on the mountain, and the police said they cannot authorize a civilian rescue when the military is on its way. I was frustrated and angry, here we had everything ready and the RCMP is holding us back. The volunteer people tried to calm the situation by telling stories of how the military helicopter has big search lights to light up a whole baseball field. I felt a little bit better, but too often I have heard radio reports like, "the search will continue in the morning since darkness set in."

I had a fear for our downed pilot going into shock and/or hypothermia setting in and we might lose her. The volunteer people recognized that too and got into action. The plan was to lower a rescue bag to the downed pilot, so she could stay and wait for rescue the next day. As darkness set in, we all watched the Jet Ranger helicopter hover over the crash area and we listened on our radios to see if the bag got to its right place. Christine could see the bag, but to reach it she had to

jettison the canopy and reach for the line and the bag; she had difficulties reaching the bag as it got caught under the glider. Eventually she had the bag and realized that the glider was very stably lodged amongst the trees and was able to just step out over the right side of the cockpit directly onto the ground; the left side was 5 to 6 feet over the ground although the glider was in a horizontal position. She was able to find a more level spot a few feet away and settle down for the night.

By 8 pm the Labrador helicopter arrived and landed at the Hope airport. The SAR people were briefed on the exact crash site and the

activity of the civilian helicopter and the Hope search and rescue people. A short time later a buffalo aircraft from SAR flew over but all decided that it was too dangerous to attempt a night rescue and all returned to Chilliwack to remain there overnight for a rescue in the early morning as soon as there was sufficient daylight.

Christine was lifted out at 7:30 the next morning. She did not have a scratch on her; well, a scrape on her arm from tree branches as she was lifted out into the SAR helicopter. The glider is a write off, the only undamaged part was the cockpit with the canopy.

THE REASONS

In the last two years we had two very similar accidents involving low time pilots just converting to a basic fibreglass sailplane. In both cases Lady Luck was smiling as there were no injuries, although in the last accident the glider was destroyed. If one examines how the stage for the accident was set, very similar circumstances can be found.

First we look at the weather conditions. A sunny day with light winds from the west, around 5 knots on the ground, not quite enough for ridge lift to be strong enough to sustain a glider. The sun was shining also with thermals developing. Now you get an interaction of weak thermals and ridge lift. If one visualizes that a thermal with its down, up and downdraft cross-section sliding across a ridge, serious conditions may develop in that area. The effect of a wind gradient close to the ridge surface may also act in this confusing air movement, since the ridgeside wing would be producing less lift as a result. Imagine yourself flying along a ridge in this fast changing situation — even an experienced pilot can have his or her hands full coping with this mess of up and down speeds and wind change.

If you put a person with limited experience in the same situation the outcome is questionable. If one changes the ridge profile with a ledge or protrusion, and a speed drop does not allow the pilot to lower the nose but is forced to bank, then the stage is set for a possible stall/spin accident.

We all learned to fly by a repetition of exercises and eventually acquired the skills to safely maneuver a glider through the air. But not all gliders handle the same way, and converting to another type involves relearning and practising of all the basic maneuvers again. The new type may have different stall or control characteristics and those new responses have to be explored and practised. A pilot who has just flown one type is not aware of this fact that different types do react and respond differently and that all the basic exercises like stall, spin, slow flight and steep turns have to be explored in a safe environment in the middle of the valley. If

a serious situation is encountered in a later flight, those practise maneuvers to become familiar with the handling characteristics and response of the glider at the edge of the flying envelope can get you out of trouble.

Now we throw a few more things in the accident bag. Let's say you forgot your sunglasses, squinting for hours can make you tired or give you a headache, or you left your hat at home. Now you have a couple of checkflights with an instructor looking over your shoulder and of course you want to do a good job, so you really concentrate and sweat. Then you push a few gliders back to the startline and you are getting dehydrated. If one does not recognize those little things piling up on oneself — the stage is set.

After an accident we can only speculate what really happened, each single cause could lead to a mishap, but all together will certainly increase the odds.

Experience is like a goodybag in your memory, the more you have, the more likely you will be able to find something to apply to the present problem you encounter. It is likely that you can solve the problem or not get into it in the first place.

In the last accident we had a pilot with a high skill level. I do remember having flown with the student at an early stage of the training program and I was impressed by the high standard. Also the enthusiasm was refreshing and the knowledge above average; that would make any instructor proud to teach such a student.

Nevertheless this pilot got into trouble, and it will be up to the instructors and the experienced pilots to set the stage for a safer environment for the fledgling pilots: to hold back where enthusiasm runs away, where the weather is marginal or deceiving, or where the skill level has to be proven or increased; to help out where judgement may be impaired due to lack of food, water, rest or experience.

The reason for this accident was not one but a dozen big or little things as it is in most accidents.

SOCIETY HAS CHANGED – GLIDING HASN'T

problems get solved by addressing causes, not effects

Louise Armitage
from *Australian Gliding*

CONCERN with the continual declining trend in gliding membership over the past years has been shared by many associations, clubs, and individuals. Indeed, just from my own personal involvement in gliding, particularly in the area of marketing and promotions, I can remember considerable concern about declining membership being expressed a far back as the mid-1980s.

Despite the membership problem being recognized for some time, it seems that little has been done on a broad scale to resolve it. This is not to say that individual clubs or State associations have not been successful in their efforts to secure membership and publicity for their clubs. A number have and through the efforts of their members, do it well.

The gliding movement as a whole has not been very effective in resolving the membership problem and has appeared to be at a loss to find a solution. Fragmented, inconsistent efforts, based more on "shot in the dark" approaches and guesswork have characterized our efforts to build a strong and ideally long term membership base.

However, what we tend to do is to concentrate on applying a perceived solution to fix the problem without firstly fully understanding the causes and nature of it. It's a bit like a doctor giving you a band-aid for profuse bleeding without looking for what's causing the blood loss. Therefore, instead of looking at specific case studies or marketing strategies which we could use to increase membership, I want to consider some of the likely causes of the problem — strategies can wait.

I believe there is not one key "problem" which can be identified as *the* problem in declining membership. The problem is an interplay of many complex and often interrelated factors.

I would say that the primary factors we need to consider before we even think about specific membership increasing strategies include:

- changes in society
- changing society attitudes to leisure and customer service
- increase in the range of leisure activities available
- how gliding is perceived by our potential market

- costs, particularly in a recessionary economic climate
- diverse nature of individual gliding clubs
- the competition a volunteer based organization has in an increasingly 'professional' environment
- lack of marketing knowledge, expertise and funds available to clubs and associations.

This is a considerable list, but a vitally important one. For the purpose of this article, I wish to consider the first four, which I consider very fundamental, but in the case of gliding, seemingly ignored.

Society has changed ... gliding hasn't.

We probably have all noticed that society has changed rapidly over the past twenty to thirty years and continues to change rapidly. Our own lives are constantly changing in response.

As a consequence, peoples' attitudes to leisure and patterns of leisure have altered considerably. The range and diversity of leisure activities have also changed and increased dramatically even over the past decade.

Has the nature of how we conduct gliding operations changed to respond to this? I think that it would be safe to say that generally, the answer is "no".

Considerable research into peoples' lifestyles, leisure and travel attitudes has been done in recent years and I believe that the findings of this research have important implications for the gliding movement. Very briefly, what this research consistently shows is:

- Many people are looking for a variety of experiences without necessarily being committed for the long term. Once they have reached a certain level in one activity, say going solo in a glider, they want to try something else. They will keep moving from activity to activity, experience to experience.
- People generally have less time to commit to travel and leisure activities. Tourism has experienced this pattern for some time now, with people turning away from long holidays to shorter breaks for two to three days. People want to undertake leisure activities that do not require considerable and unnecessary time commitment. Due to the many demands

on peoples' time, leisure/travel time also must be efficiently structured and spent.

- Leisure/travel activities must offer quality, value for money and good customer service. People are becoming more discerning and are increasingly demanding a better standard of attention and service irrespective of whether they are dealing with a professional business or a volunteer organization.

- People are becoming increasingly interested in environmentally friendly and 'adventure-style' experiences such as canoeing, gliding or bushwalking. That's good news for gliding.

- We live in an "instant" society. People now expect and are accustomed to having their needs delivered quickly whether it be instant food, instant entertainment, instant access to information or even instant access to leisure.

Can we look at our respective clubs and identify, right now, how we are responding to these changes? In the main, gliding clubs are still operating as they have done for the past twenty years, or perhaps even longer. We still demand that people commit a full day or even a weekend to the club.

From the potential member's perspective, we still have clumsy, time consuming systems of training, not in terms of quality, but in terms of time required. People are now far less willing to work hard all day for one training flight at the end of it. And how about on-field facilities and comfort? Standing around on a hot dry, shadeless airfield in mid summer is not really conducive to persuading people to stay with the sport.

I have heard some gliding people express the view that that's the way gliding is and if new people don't like it, they can lump it. To these people, I say look at the membership figures. It is the gliding movement, not the people who leave the sport, who's lumping it.

One club's research

The Adelaide Soaring Club recently conducted a detailed phone survey of new members who had joined the club in 1992 and did not renew their membership in 1993. Rather than being an exercise in asking why these people had not rejoined, the aim of the survey was to find out these peoples' attitudes to a range of club and gliding related issues and to gain a knowledge of areas of satisfaction and dissatisfaction.

Quality of training and the club itself were not given as the reasons why these people did not renew their membership.

The overriding reason why these trainees, although keen on gliding, did not rejoin was the time commitment that current gliding training practises required of them and the amount of field work required in relation to the amount of flying gained. They simply could not afford the time we currently demand of them.

Club facilities, or rather lack of them, were the second major area of dissatisfaction. Interestingly though, they didn't feel that courses

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Friday night flying



Gerald Ince
Cu Nim Gliding Club

OVER the past several years I have observed an ongoing discussion in *free flight* and among SAC members about what can be done about declining club memberships. While I don't claim to have a solution to the membership question, I would like to share a simple initiative which has helped Cu Nim attract new members.

Our marketing plan was based on the following premise: the sport of soaring pretty much sells itself. The first experience in a glider either awakens a desire for flight, or it makes people nauseous. Individual responses may vary, but few people walk away unaffected. Our campaign to attract new members therefore employed two strategies to reach people in the former category: 1) create advertisements which target people who have an interest in soaring, and 2) get them out to the field for an introductory flight. If the above is done properly, some of these individuals will be intrigued enough by the flight itself to consider membership now or in the future.

Cu Nim's 1993 membership drive began with one person who had a good idea and was willing to put in the time to make it work. Karin Michel, Cu Nim's Membership Director, believed that our club could do a much better job of looking after the visitors who come to our airfield seeking an introductory glider flight (intros).

Let me create a scenario for you at this point. A visitor to a Canadian gliderport has heard about the local soaring club through word of

mouth. They go out of their way to find the airfield and yet, on arrival, their reception is indifferent at best. After spending several hours of their weekend waiting for a flight, they leave the field without receiving any membership information. They do not even have the name or phone number of a contact person. Sound familiar?

These visitors don't always suffer in silence. The following are some complaints I have overheard while sitting around the flight line:

- It's hard to find out about the club. The club doesn't advertise and there is no phone listing in the telephone book.
- It's hard to find the airfield. Maps and road signs are non-existent.
- The club is disorganized. No one seems to be in charge, no one knows what is going on, and no one speaks to guests. When your name finally gets to the top of the flight manifest, no one has tow tickets for sale, and no one has the proper change.
- You have to wait too long for a flight. Worse, no one is able to accurately tell how much longer the wait will be.
- The club's facilities are inadequate. There are no bathrooms, food, drink, seating or shade on the flight line.

Given that the intro flight is generally the initial step towards club membership, first impressions are critical. Glider pilots often do a terrible job of selling our sport — failing to address the wants and needs of people who

are actively seeking us out. The perception of the sport that a visitor takes home begins to form the moment they step out of their vehicle. Are the people friendly? Is the flight line well organized or does it operate haphazardly? Is the equipment clean and well maintained? Do things look safe? A positive experience can, in some cases, be the difference between an afternoon in the country and a commitment to learning a new sport.

Together with an informal membership committee, Karin identified several potential markets for aspiring glider pilots (power pilots, professional/technical, recreational oriented, etc) and brainstormed a number of ways to reach these people. One of the ideas generated was to place an advertisement in the University of Calgary's Outdoor Programs calendar. This publication contains information on university clubs and private organizations (including parachutists, paragliders, hang-gliders, and balloonists) offering recreational activities to the public. While targeted at the university community, this publication is widely distributed (readership 42,000) among students, staff, alumni, and users of campus recreation services. The cost of the advertisement (with photo) was \$300.

Initially we were concerned that this publication might be missing our target market — university students are generally short of both time and disposable income. As it turned out, our fears were groundless as this single advertisement generated over 150 phone calls requesting additional information. These calls resulted in over 100 intro flights — all paid for

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POSITIONING YOURSELF

GPS – how it works and what you can do with it

• and Colin introduces “PathTracker”, his new GPS data analyzer •

Colin Bantin

Over the past few years we have witnessed the most significant advance in navigation technology since the chronometer first ticked its way out of Greenwich. Using the latest in satellite communications and microprocessors, the Global Positioning System (GPS) provides you with the means to accurately know where you are, in three dimensions, and what time it is, anywhere on the Earth or above it. The opportunities are exciting and the applications virtually endless.

We in the sport of soaring are particularly fortunate because GPS is ideally suited for flight navigation. We can all benefit by using this technology to know where we are at any time, but we can also use this technology to greater benefit by being able to verify where we have been. The old method of photography and barographs is one of the most failure prone aspects of our sport. GPS offers an easy-to-use alternative that is far more reliable and provides much more information. This article shows how we can take advantage of GPS and introduces the PathTracker™, a secure flight verification system based on GPS.

How GPS works

The theory behind GPS is not new. The methods that it uses to determine position have been used since the 1960s. What is new is the unprecedented accuracy that is now possible using modern communications techniques, and even more important is the low cost of the equipment made possible by the latest in digital technology.

GPS uses a “constellation” of satellites known as NAVSTAR (Navigation System with Time and Ranging). There will be 24 satellites in the constellation when the system is fully implemented. Most of these satellites are now in orbit and in use. They are all in circular orbits at 20,200 kilometres altitude (a little more than three times the radius of the Earth). The orbits are tilted with respect to the equator so that they sweep up and down to high and low latitudes, and also staggered around the Earth so that they uniformly cover the globe. The satellites each take 12 hours to complete an orbit and at any time you can receive signals from eight or more of them from any point on the Earth.

A GPS receiver can “hear” each satellite that is above the horizon, but it does not know

which direction the signals are coming from (at least not in the beginning). What the receiver does is work out the distance to the “best” four satellites at a given time (in fact once per second). It does this by measuring how long the signals take to get from each of the NAVSTAR satellites to the receiver. The receiver knows where the satellites were when they sent the signals because they have been given precise information on their orbits.

We can determine our exact position in two dimensions (such as on the surface of the sea) from measurements of three satellites. In three dimensions we need a fourth satellite to determine our position. As you can imagine there is a lot of number crunching going on inside the receiver. However, modern microprocessors and digital techniques are up to the task.

It is quite mind boggling to think that a small piece of contaminated silicon, not much more than three centimetres square, is simultaneously calculating which four satellites to use, the time it takes for the signals to reach it from these four satellites, where the satellites were when they sent the signals, how far away they were and then precisely where it must be. As if this is not enough it must then convert the calculations into position information that we can use, namely Latitude, Longitude and Altitude. What is even more amazing is that all of these satellites are transmitting their signals at the same start time and on the same frequency! It is rather like being blindfolded in a room full of people all talking at the same time and with the dishwasher running to boot. Because modern communications technology is so wonderful, the receiver can sort out each satellite and decide which ones to “listen” to. Imagine that one of the people in the room was to say your name in the middle of all the chatter. You can usually pick it out quite easily (and probably get some idea of how far away they are too!).

Navigating with GPS

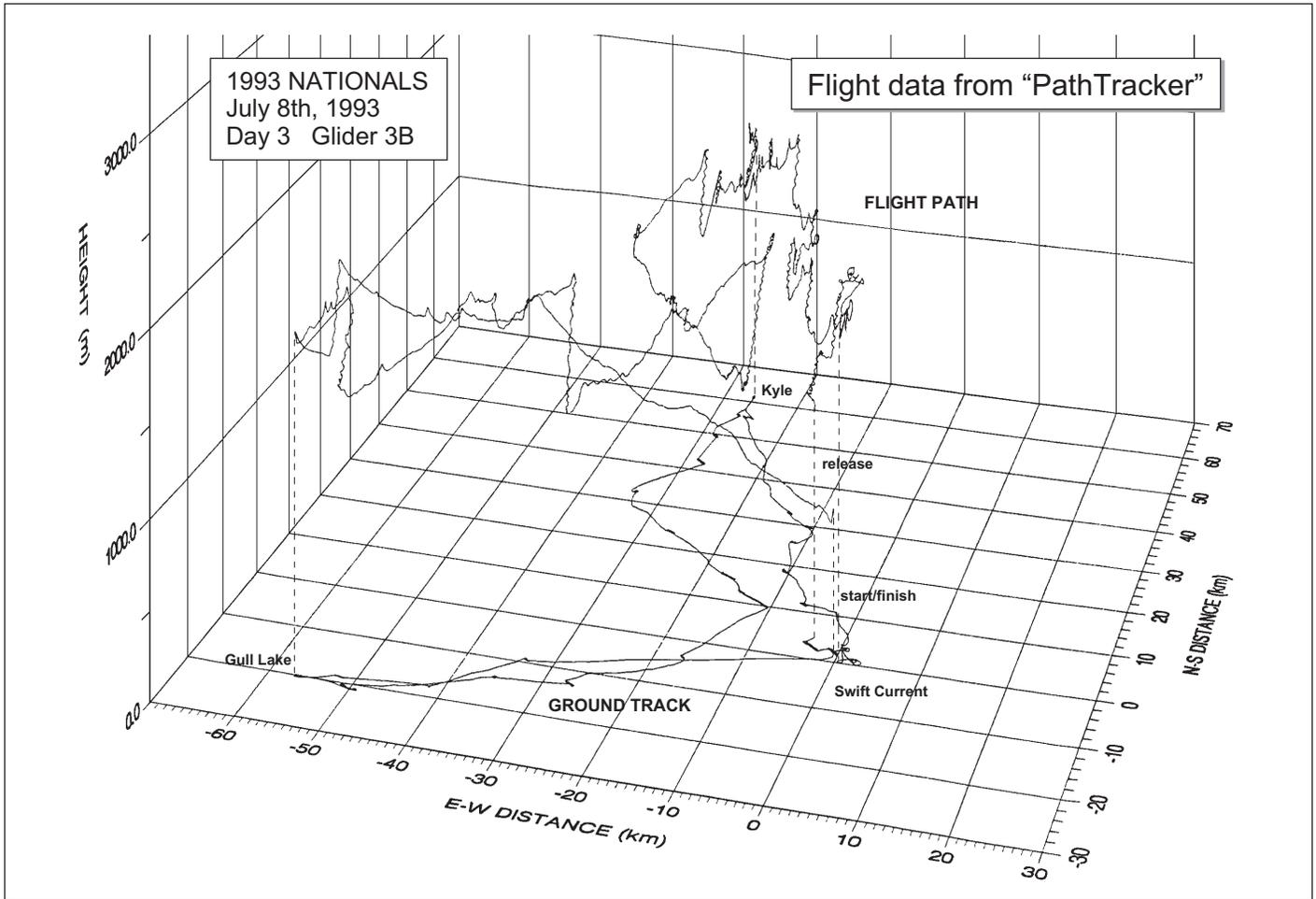
Earlier navigation schemes, such as LORAN, provided a position accuracy of a few hundred metres. While this is adequate for shipping it is not good enough for aircraft or land based vehicles. GPS allows you to calculate a location with much better accuracy. There are, in fact, two schemes contained within the present GPS/NAVSTAR system. The Standard Positioning Service (SPS) allows you to

determine a location based on a code word known as the C/A code. This code word is used by the receiver to determine which satellite it is listening to and precisely when the signal was sent.

There is also a Precision Positioning Service (PPS) based on a P-code. The P-code is longer, and therefore more accurate than the C/A code, and allows the user to determine a location to within 18 metre horizontally and 27 metre vertically. However, the P-code is only available to the US military and other approved users. The C/A code, on the other hand, is available to anyone and is designed to allow a location to be determined to within 100 m horizontally and 140 m vertically. As it turned out, the SPS scheme was providing better accuracy than planned. Position calculations to better than 36 metre were being obtained. Therefore the US government (Department of Defense) decided to deliberately contaminate the satellite position and time information with a scheme called Selective Availability (SA) in order to bring the accuracy back to the planned 100 metre. We do not know if the SA will be continued or not, but we are fortunate in our sport because we can achieve acceptable accuracy for our needs with or without the application of SA.

The NAVSTAR satellites are orbiting the Earth constantly and transmitting their signals for everyone to use. All you need to take advantage of them is a GPS receiver, a suitable antenna, and some means of processing and displaying the information. You can buy hand-held units today that perform all these functions in a small compact device that operates from batteries. You can also get small units that mount in the instrument panel of an aircraft. These units attach to a special antenna, usually mounted on the outside of the aircraft.

For gliders we are again fortunate in having aircraft that are made from materials that are mostly transparent to radio waves of the frequency used by the NAVSTAR satellites. For gliders made from glass fibre materials the antenna can be mounted inside with only a small loss in signal strength. Any location inside the fuselage, at the top and along the centre line, with the receiving beam direction pointing outward will be adequate. Most antennas are not very sensitive to surrounding metal objects as long as they are not directly in the beam. For gliders with fuselages made from carbon reinforced materials, which are



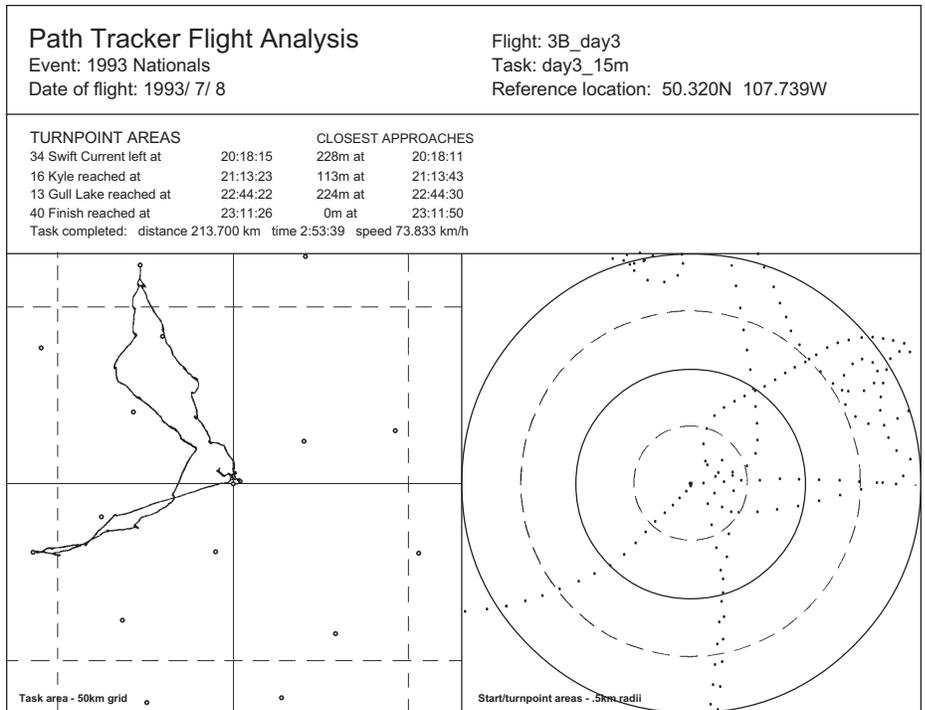
partially conducting at radio frequencies, it may be necessary to locate the antenna away from the carbon reinforcement. In these cases the front of the canopy is ideal since the signals can pass readily through plexiglass.

All of these GPS units provide a wide range of navigation features. For example, you can store a number of waypoints (turnpoints to us) and upon selection of any particular waypoint the unit will tell you how far away you are and in which direction you have to get to get there. The receivers can also calculate your speed and direction by comparing successive position calculations. These are useful functions for soaring pilots because they give your true ground speed and course rather than airspeed which is all we have available now. The speed calculations also include vertical speed. This information will be perfect for computing average climb rates, however, it may not be useful as a variometer because of the reduced accuracy in the vertical direction and the application of SA.

Most GPS receivers also provide output data. Gliding instrument manufacturers are taking advantage of this and are starting to provide a receiving port on flight computers in order to process the GPS data. The flight computers then have much more information to use in computing, for example, final glide information.

Useful things you can do with GPS

A GPS receiver can be useful to a glider pilot because it can tell you where you are so that



you can make more informed in-flight decisions. You can have an independent display of your position and velocity at all times, and you can also feed this information into a separate flight computer in order to do all the navigation functions. The computer can be programmed with a set of turnpoints and it can

tell you how to get to each one of them and when you have arrived. At the same time the computer can compile statistics on your flight to advise you on such things as average speeds achieved, estimated time to complete

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A DAY AT THE BEACH

By the nature of the airfield's site, pilots rarely get low enough around Hope to risk an outlanding ... there are exceptions.

Peter DeBay
Vancouver Soaring Assn

photos by Kalli Brinkhaus

It is the 19th of September, it is typical, raining everywhere except for over the field. Lift is enough to climb away from 1000 feet at the Knoll and climb to 3000 almost anywhere. Like so many of these days, the pattern is cycling, but with so many clouds around there are lots of whiffs to indicate where it's active.

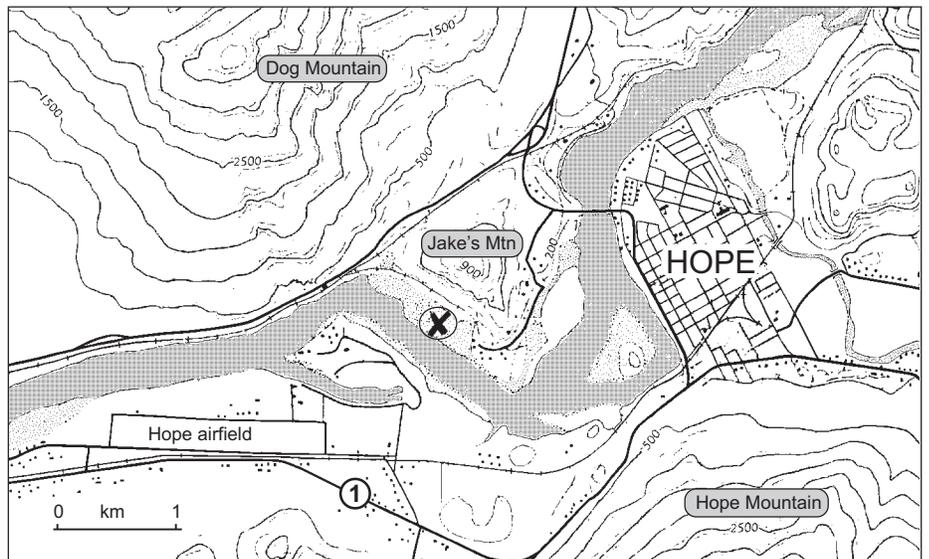
Time 1415, takeoff. Looking to the north a whiff indicates the start of a new wave behind Dog Mountain. Tiptoeing over to it, I discovered that Mother Nature had changed her mind. I turned around to head back only to discover that the rotor had moved in closer, the vario was reading over 2000 ft/min down, and the turbulence was extreme — this kind of activity called for more speed than the usual 50–60 knots! Pushing the Blanik up to 80–90 knots, I kept the rough air limit in mind as I moved back toward the field. As I approached Jake's Mountain the altitude was marginal. The choice was to move between Jakes and Dog Mountain and endure more sink going around the corner, or go east of Jakes and hope for smooth air and maybe even some lift. I flew east of Jakes, but by the time I was between Jakes and the airfield there was only 600 feet between me and the ground.

For those of you with glide calculators set at 20:1 you'll know that with only a mile to go you need only 300 feet or so at best glide speed, but the vario still registered 1000-plus down. So having just overflown the large sandbar on the north side of the river, I turned around for a downwind leg over the sandbar, then a U-turn onto final, cycled the gear back up again and executed a short field landing in the sandy part ahead.

Time 1515, landed. First order of business — the pilot is fine though a little irritated that the land is not green and not the field but okay otherwise — the plane is okay too. Next, I wait around for a sign that this has been noticed. Soon the towplane circles once, then it's on to the next problem which is to find an easier retrieve route than the 30 foot road embankment one kilometre ahead.

Backtracking to the eastern corner of Jakes where there are some houses, a Mrs. Thacker pointed out a road to the beach. Walking the road to see if it was accessible by vehicle and how close to the plane it gets I found that, luckily, it's accessible and ended only a couple of hundred feet from the Blanik. Next I began walking out to the main highway to guide in the retrieve crew, and I got about half way before meeting the first vehicle. Yes, the first vehicle — three arrived with eleven people to help out.

Using some scraps of plywood left on the beach by someone else, who knows when,





we made a movable road to push the glider up to the trailer where the road meets the beach. The assembly line of plywood movers made moving the glider no more difficult to push than it is at the field (except you had to stay on the plywood. This would have been great footage for a video if we had one. We took the glider apart, put it on the trailer and returned to the field. Time, 1715.

Reassembling the glider, wiping all the fittings and greasing before putting the wings on, took an hour. Tied down and ready for flying again with the help of four more replacement crew after two of the beach group departed, the day was finally over. Time, 1815.

Miller time! — but there's none in the club fridge ... not quite sure why. Out of fifteen people who helped, seven made it to dinner at the Savoy and a good time was had by all, especially the part where they ragged the pilot about landing out. The other eight will have to catch me at their convenience.

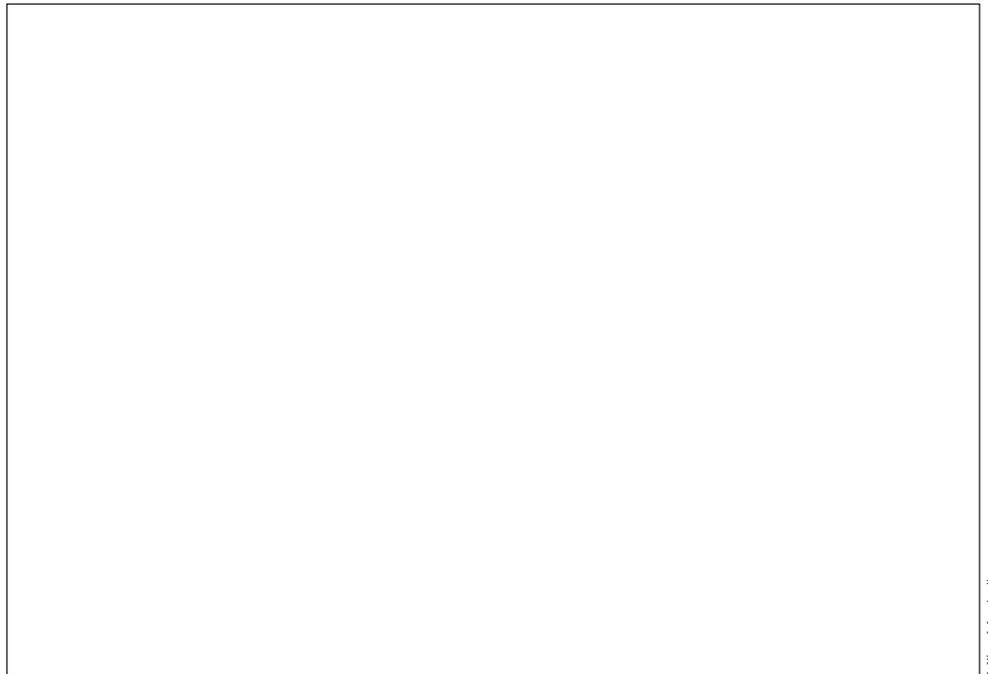


What kind of lessons were learned? I think two. First, as pilot you must make decisions about landing and it is better to land out than take a chance of a very marginal landing at the airfield. And two, you learn what it takes to go out and do a retrieve — there are lots of things to do before you leave, while you are there, and when you get back. Personally I feel I made the right choice in landing out, and I consciously decided about gear selection. All in all a good experience for my first landout in the dirt (all my past landouts were at airstrips).



FLYING THE ROCKS

CENTRE PEAK
and
GRAND TETON



Mike Maskell

Mike Maskell
Winnipeg Gliding Club

Soaring on the west face of the Tetons, with Grand Teton in the centre.

WOW! That's the only word to describe this flatlander's first "real" experience with mountain wave flying at Cowley. During a previous visit I was only fortunate to hear of other pilots tell of the wonders associated with the big mountains, but had not enjoyed them first hand. This year I promised myself that if the opportunity arose to fly in wave, I would do everything possible to hook up with it.

The spring of '93 brought to Manitoba what is starting to be the usual soaring conditions — dry, hot days during May, followed by days upon days of rain and cool temperatures in June and July. No sooner would it start to dry up at the gliderport but more rains would come, further adding to our aggravation.

As the days approached for departure to the Cowley Summer Camp, I grew more hopeful that this would prove to be the year of some spectacular mountain flying. Then, my wife Susan was not able to secure that full week off from her work. Well, you must be flexible in this sport, so a change in plans was needed. We left Wednesday night, and by 7 the next night were set up and camped at the airfield. Meeting up with other members of the Winnipeg Gliding Club who had arrived at the beginning of the camp made us realize that the weather had not been very kind with lots of rain and soggy conditions. So it turned out we hadn't missed anything.

It is now Friday around 5 in the morning and I awoke in a near frozen state and half deaf from the canvas of the trailer flapping in the storm force winds. I crawled out to secure everything and saw that others were also up checking the tiedown ropes of the towplanes. Well, nothing to do but go back to sleep, this time with earplugs in and another blanket pulled up tight. By 7 or so I had all I could take and by now am sure that flying will be cancelled for the day. Stepping out of the trailer with every piece of clothing on that I

own I noticed that several tents had been blown over, including fellow club member Paul Moffat's. Paul was okay but slept the rest of the night in his car and the rest of the camp in his glider trailer. About this time I ran into Tony Burton, who upon looking out to the west assured me that there would be wave flying for some today and likely some pretty good conditions. Good, that is, if you could find a glider to rent and a pilot to check you out. I found neither and had to be content to sit on the ground monitoring the radio and listening as various pilots reported strong lift and great flying. Mountain flying at this point seemed even further away than it did while we were overnighing at Brandon. Discouraged, I resigned myself to the fact that next year I would organize our own club and bring out a two-seat something or other and enough pilots to give checkflights.

Another cold night spent in the trailer and by now I am ready to leave and give up for this year, but again reports of strong wave activity keep me there with the chance that this will be the day. After helping rig several gliders at the tiedown area and watching them launch I see that most of the remaining two-seat gliders are already booked for wave checkflights. Paul Moffat offers me his Ka6 for a wave flight after having been up for a few hours himself. I gratefully turn down the offer because I have never flown this particular glider, and I have never flown in wave and am not sure what to expect. As the day wears on I grow more and more frustrated when out of the corner of my eye I catch sight of a Grob 103 just landing and being pushed off to the sidelines, apparently done for the day. Going over to it I find Dave Fowlow sitting nearby and enquire of him who is next and he responds that he doesn't think there is anyone in line and that it could be mine if I can find a checkpilot.

Be still, my beating heart. Could this be my big break? Dave also mentions that Paul Pen-tek may be available for checkouts. And look,

here he comes now. Soon we are pushing out to the flightline and strapping in. As I had flown a 103 on several occasions in the past I did not take long to re-familiarize myself with the layout. Except one thing seemed to be missing. Where was the oxygen mask and regulator? Paul explains that there isn't any and that if we encounter wave we would have to limit ourselves both in height and time. Well, at least we are going flying. As we climbed, he gave a running description of the area and what we will likely encounter. Rotor is very possible and I should be ready for it. No sooner had he said that and, WHAM, all hell breaks loose. My straps, which I thought were tight enough, now seem useless and I feel as if I will fly out of the cockpit. I manage to tighten them even more. I couldn't believe that the worst was still to come. Paul, who doesn't seem fazed by the turbulence, explains that the primary rotor will be just up ahead ... I can hardly wait.

Sure enough, we enter the rotor and again I find myself barely able to hang on. It is all I can do to maintain some form of coordinated flight behind the towplane who is also having a time of it. The prairies never looked so good at this point. After an eternity we are approaching Centre Peak, closing in on our release height, and suddenly everything is calm and quiet and Paul is urging me to release. Without hesitating I follow his command and he expertly guides me into the primary wave. In no time at all we are climbing like the proverbial homesick angel. Passing through 12,000 feet, Paul asks if I smoke. I respond no, not sure what he is getting at. Smoking, he explains, will lessen your altitude tolerance and without oxygen should stay at the lower levels of the wave. However, because I am younger and healthy (his words) I should be okay for slightly higher altitudes.

We climb quickly to 13,500 feet and are finding lift everywhere. We explore the boundaries of the primary and are able to run up and

down the ridge line without losing any height. Several other gliders pass well above us and are soon out of the area. So this is what everyone talks about. What a rush. It is certainly nothing like flying back home in Manitoba where the closest we have to mountains is an old landfill site made into a park in the Winnipeg's west end. This was certainly worth the wait. We explore the secondary wave, which has moved further to the east and almost overhead the airport. With my hour up we still have over 7000 feet in hand, and must spoil off most of our height to reach circuit entry. My circuit planning was off a bit but I managed a clean landing. Paul signed me off for solo in the Grob and thanked me for the flight. Thank *me*? It is I that should be thanking you. I have now been bitten by the thrill of flying these rocks and made a vow to return.

THE TETONS

I had another opportunity to fly in mountains later on during our holidays in the Yellowstone and Grand Teton National Parks. I had seen several ads in SOARING for flying at the Grand Teton mountain with Grand Valley Aviation, located in Driggs, Idaho. We made plans to be in the Jackson, Wyoming area and had set aside a day to explore the possibility of flying there. What follows is likely to rank right up there as being one of my most memorable flights.

We left Jackson early in the morning and planned to spend all day either flying or hiking. Driggs is about 45 miles away on the other side of the mountain range. The town has only about 2000 people and on a Sunday I can tell you that not many of them stay around. It appeared to be a ghost town. We found the airport and quickly made our way to the operations building — at least they were open. I explained who I was and my intentions of wanting to fly. They thought it

would be possible later in the day and booked a slot for me and gave me a Blanik operating manual to study. Around noon we found the only hole-in-the-wall cafe open for lunch and relaxed over the special of the day.

Upon returning I was quizzed on the flight numbers of the Blanik and satisfied that I knew my stuff we set off. I was paired up with an instructor named Mike, who questioned my flight experience. I told him my hours and years of experience and this seemed to satisfy him. It may also have intimidated him as he had only been flying for less than a year. However, he said the proof of my experience would be in the aerotow. Before taking off I noticed that he went over to the towpilot and they had a brief discussion. As I was already strapped in, Mike quickly got in and away we went. At about 300 feet, the towpilot banked over about 45 degrees and I promptly followed as if nothing was out of the ordinary. I knew then what Mike had said to the towpilot: "Let's give this hotshot a workout." That was the extent of my checkflight. It seems they figure that if you can handle this kind of towing then you must know your stuff. To their credit they did give me some verbal notes on flying in the area which would prove to be handy.

Upon landing I was given the opportunity to change Blaniks for a new model with better instruments — ones that worked. I was also permitted to take Susan for a flight. Mike, the instructor, suggested that since this would be my only flight here that I should take a 5000 foot tow and go over to the Grand Teton mountain. Seeing the logic in this (but not the price tag) I agreed and off we went. I was told that the towpilot would know the way and once we released we would likely find good ridge lift in several areas. As promised we were towed into the proper area and were signalled to release. Instantly we were in 600 fpm up and

climbed steadily, all the while flying close to the big mountain which tops out at 13,700 feet. The view was magnificent and the visibility unlimited. There seemed to be lift everywhere and it didn't take long to close in on the Grand Teton peak.

Susan, who was also marvelling at the view, became concerned that we were getting too close for comfort, but I convinced her that I was also in the glider and not likely to put my butt in jeopardy. We continued towards the peak but it became apparent that we would not have sufficient height to get over the top which by now was shrouded in a thick cumulus. While still having over 2000 feet of freeboard over the lower peaks we made our way back into the valley picking up small areas of ridge lift as we flew. It took well over an hour to make our way back to one of the nicest landings I have ever done. I originally had been told to land short for the next flight but as I called in on downwind they advised me to land long. It only took a minor adjustment in circuit planning to hit the numbers at the threshold of the 6000 foot long runway with sufficient speed to float the entire length with a touchdown near the hangar at the opposite end. Susan was suitably impressed, enough to question if we were down or still floating in ground effect once I had touched down. Ah, the joys of flying off pavement.

It turned out that the cost of these two flights equalled what I wasn't spending at our club at Starbuck due to our flooded field conditions, but well worth every penny. Yes, the summer of '93 will go down in my history as some of the greatest flying that I have ever seen or will likely see for some time.

You can bet however that I will be back for more, hopefully with some of our club equipment to allow others to experience what I have and to view the magnificent rocks!

POSITIONING YOURSELF from page 11

the flight, average climbs achieved, thermal profiles and so forth. A clever GPS receiver can even remember a particular location, such as where that last good thermal was, and tell you how to get back to it after rounding the turnpoints!

A second, and unique, way that a GPS receiver can be useful to glider pilots is to be able to verify where you have been. If the data from a GPS receiver is stored in a microprocessor memory over a period of time then a complete three dimensional record of the flight would be available, along with a highly accurate time reference.

The PathTracker™ is a secure flight recording system that does this and more. We have been developing the PathTracker™ over the past two years for use in gliding competitions. The development has been supported by SAC members, the CAS group and the AeroClub of Canada. It has also been developed to meet the emerging requirements of the IGC, and other air sports within the FAI. The PathTracker™ system consists of a recording unit, based on a GPS receiver with a microprocessor, and a software package for use on a PC. The recording unit can store

many thousands of position records, and in a way which is secure from tampering. The PC is used to play back the flight, to analyze whether the turnpoints have been achieved and determined, for example, if the glider penetrated restricted airspace. The information can then be passed on to a scoring program.

The production prototype PathTracker™ was put through its paces at the Canadian Nationals in Swift Current last July. The unit was mounted behind the headrest in my ASW-20 along with a self-contained patch antenna. It was operated from the 14 Volt battery supply in the glider. The PathTracker™ unit made a successful recording of the flight on each contest day. There was no loss of data at all during any of the flights, and there were no malfunctions in the equipment. The flight data from each task was processed by a PC the same day and graphically displayed in the pilot's briefing room as a three dimensional flight path.

The trace from one of these flights is shown in the first accompanying figure. It shows the infamous Kyle — Gull Lake triangle on day 3. A small gaggle of us made a major diversion around a storm cell on the second leg and had the classic low save (of course the smart ones kept straight on course between two

cells and beat us all). This figure is an example of what can be done with the flight data and 3D graphics software. On the more practical side, the second figure shows a typical output from the PathTracker™ processing program (just to prove I made the turnpoints). The PathTracker™ recording unit is a "black box." Although it will securely record your flight path for later analysis, it does not provide any navigation functions. However, there is a data port that sends out the location information in a standard format. This information can feed any one of a number of existing flight computers. We also plan to introduce a small navigation unit that plugs into the recording unit and will provide navigation functions including a display screen.

The GPS system is here to stay, and the revolution in flight verification is underway. Devices such as the PathTracker™ are available now and will soon replace the barograph/camera scheme as the primary means of flight verification (for example at the 1995 Worlds in New Zealand). Navigation will not require the skill that it used to, however there are many new types of task that we can experiment with to take advantage of the equipment that we carry. How about turnpoints at a minimum altitude, or one 5 miles off shore in Lake Ontario?

CRASHWORTHINESS

BETTER COCKPIT/SEAT DESIGN NEEDED IN SAILPLANES

Martin Sperber
from *Soaring Pilot*

THE OCTOBER '93 *AEROKURIER* had an excellent article by Martin Sperber on energy absorbing materials and designs for sailplane seats. The following is a summary of the article (which is only part of a larger work). A point is made that flying gliders and riding motorcycles have much in common. The considerable risk while driving motorcycles is well acknowledged, however, the modern sailplane has little protection and the risk in case of an accident can't be overlooked. Even hard landings cause serious injuries, and passive safety devices can reduce the severity of injuries. German government authorities have ordered an investigation of restraining systems in gliders.

The present system consists of the seat belts, the seat belt anchors, and the seat shell. Analysis of glider accidents show a high percentage of spinal injuries compared with other injuries to pilots. The seat shell, the small space between the seat shell and the skin of the glider, and the fuselage skin are not designed for optimum energy absorption. The result is that shock loads of ground contact are transferred to the pilot's spine without damping, resulting in severe spinal injuries.

Accident Analysis An analysis of accidents from 1983 through 1986 was done. Four different accidents were studied. Another study was made for the years 1987 through 1989 for glider accidents in Germany, or by German pilots flying abroad. 558 accidents were registered during this time, 28 of which were fatal. 154 (27.6%) of the accidents involved injuries of some kind. Of these 154 accidents, only those involving ground contact were studied. This reduced the number to 84. Twelve of these accidents were still under investigation by the authorities, so the total accidents that were evaluated were 72.

Ninety percent of these can be classified under the following four groups:

Group 1 Accidents which followed failed launches, and final approach flaring too high, dropping the glider from 9 feet.

Group 2 Accidents during landings caused by levelling out too late, or not at all. The glider hits the ground with excessive speed, at about 10° nose down attitude.

Group 3 Off field landing accidents with rotation around the vertical axis due to turning stalls at low altitude, impacting the ground with about 30° nose down attitude and 8° yaw.

Group 4 Severe accidents caused by turning stalls or spiral dives from high altitude or hitting obstacles at relatively high speed.

Spine limit loads were established back in 1959 with tests done by Mr. Eiband and USAF Colonel Stapp. These persons were in excellent physical condition, but the results can be applied with reservations to glider pilots in general. Factors such as age, previous spine injuries, or an unfavourable seating position, can lower the tolerance limits considerably.

The Sailplane Seat Requirements for seats are established by the regulations for construction of sailplanes (JAR 22). The backrest must provide support for the starting acceleration. In some designs, the headrest is an integral part of the backrest. The rebound phase when the head whips back after impact brings with it considerable risk of serious injury to the cervical vertebrae. The loads can be as high as 41G! The transition from the seat to the thigh rest allows the pelvis to find support in case of sharp deceleration forces. If this seat/high rest transition is rounded, the pilot may slip across this rounding and "submarine" under the seat belts. This can lead to serious intestinal injuries. The main purpose of the thigh rest is to support the pilot in case of severe deceleration.

Current Practises A comparison of sailplane seats of different designs shows they differ mainly in size, the design of the headrest, the shape of the transition from seat to thigh rest, and the adjustability of the backrest. A critical area is the transition from seat to thigh rest. This transition is perfectly smooth in some models which must be criticized for the reason cited above.

The strongest criticism is aimed at insufficient support of the lumbar region. The load limits can only be tolerated if the spine can retain its normal curvature. There frequently is no support at all in the area of the spinal column during long flights. This causes a sagging of the spine during long flights which is further promoted by the reclining seating position. The individual vertebrae are no longer arranged in parallel to each other. A shock load in spine direction will then crack their edges already under light overloads.

It is common to all seat designs that the seat is mounted directly onto the floor of the fuselage. Some manufacturers bolt the seat directly onto the floor of the fuselage. Some laminate it with the fuselage. This design permits the direct transfer onto the pilot of shock loads impacted on the glider. A damping element for energy absorption between the pilot and plane is missing.

Energy Absorption Possibilities 2-3 cm thick foam could be glued onto the standard seat shell. This would be the simplest solution. The foam material must be able

to absorb pressure loads in all three possible directions. If this is not possible, its damping properties are much reduced because compressed foam material reaches the limits of maximum deformity quickly.

Measurements of the pressure distribution onto the seat shell show the main pressure points during normal flight are caused by the tailbone and hip. The area of the pressure points is greatly enlarged through the pressure of the body onto the seat due to the softness of the muscle tissue. If the contact area between the body and foam material changes under load, then foam material is not a suitable damping material.

Most foam materials show a relatively flat, and almost linear rise during the first phase of their damping reaction. This means only a small force is absorbed over a relatively long compression distance. The body is barely slowed during the first millimetres of compression. Thus, the body (pelvis) builds up a speed differential compared to the seat shell.

The foam material gets compressed strongly, and it solidifies. This happens during the first phase of the crash while the impulse from the impact is still rising to its maximum value.

The pelvis is stopped abruptly after full compression of the foam material. In addition, and simultaneously, the maximum delay value of the crash impulse is acting which leads to a higher G load. This means the pilot is exposed to smaller loads sitting directly on the seat shell than on a foam material!

Airbags Airbags are popular in automobile safety. The principle of the airbag is that the energy to be damped hits a fully inflated airbag, and the kinetic energy is changed into deforming energy. The size of the damping constant of the airbag is determined by the size of the air outlet openings.

One frequently mentioned proposal for sailplanes is to mount the airbag system underneath the seat shell. But, an airbag takes 13 milliseconds to inflate. Because of the extremely short distance in a cockpit, the airbag does not have time to inflate fully. The seat would impact the airbag while it is still inflating, thus sharply reducing the effectiveness of the airbag. Furthermore, the inflated airbag has a diameter of over 40 cm which exceeds the limited space available in the sailplane cockpit. The fact that the airbag system is electronically actuated also makes the use of the system in a sailplane more difficult.

Kinematic Solutions It is possible for the seat to be mounted in such a way that it moves through several degrees of movement upon impact. The forces would be absorbed in a variety of ways. Although complex, it is a possible solution to the problem.

Damping A damping device must utilize available space to the fullest. The space is small, therefore it would be best if the energy absorption should start only when the G level which is critical to the human body has been reached. This would preclude wasting precious distance during the initial phase of deceleration. With a linear compression device, ie. a spiral spring like a bedspring, distance is wasted under relatively light loads by pre-

mature compression. The best damping unit would be one which offers unlimited resistance up to biologically sustainable levels, and would hold this level without sudden collapse.

Liquids and Gases The main problem of mounting a damping unit under the seat shell is the available distance must be utilized 100%. Located between the seat shell, which will be forced down, and the skin of the fuselage, which will be forced up, the damping material will have to escape outwards. Liquids or gases would therefore be the only materials available if the element is to be mounted underneath the seat shell. Gas would have to be in a hermetically sealed container. The damping level would be controlled with a valve system that would have to work very precisely over a long period of time. The gas would also have to maintain a constant volume despite temperature and barometric pressure variations. Gases would also rebound after a load is released. This would have to be controlled. Valve control, constant volume, leakproof container, are also problems with liquids. An additional problem is that a short, strong impulse forms a pressure wave which leads to an uneven pressure distribution in the container. This can cause a total loss of damping action.

Foam Materials Most foam materials do not show the best damping curves because the initial resistance is too small, and the total reaction is not constant. Temperature dependence is also detrimental because temperature changes may strongly change the mechanical properties of the foam material.

Honeycomb Material Honeycombs are special because of the hexagonal structure of very light weight materials. Honeycombs can withstand very high axial loads despite their light weight. Preferred materials include paper, aluminum, and fibre reinforced composites. The great advantage of honeycombs is their constant damping curve. They don't deform prematurely under loads which are below the local range which is to be damped. Two factors must be considered:

- 1 the load which leads to deformation of the honeycomb is much higher than the force which should be absorbed, causing an initial load spike. It is possible to pre-deform the material so that one obtains the desired constant curve.
- 2 the force must act axially. Honeycombs cannot absorb stronger dynamic shearing forces.

Comments from Tom Knauff

It seems obvious to me that a standard needs to be established to provide adequate space for impact absorbing devices. Manufacturers could be required to design glider fuselages with enough size for these devices, and minimum weights should also be established, so the designer has no benefit to build at minimum weights (meaning minimal materials). Some new gliders are nearly 20% lighter than other gliders with no benefit in performance except perhaps a slightly reduced minimum sink rate and yet with reduced materials for pilot protection. If manufacturers were required to build fuselages with a 10 cm space under the seat shell, and 75 cm of space in front of the pilot's feet, impact absorbing devices and materials would save serious injuries. •

Nellie

Bob Welliever
from New Zealand *Gliding Kiwi*

SHE SAT THERE beside the runway all afternoon, soaking up the warmth of the sun as she watched the sailplanes drift high over the field. Her name was Nellie Clemmons, and she hailed from down south.

Two arm crutches hung from the back of her chair. It didn't take a doctor to diagnose the twisted disfigurement of her arthritic limbs. Thick lenses told of failing eyesight, and creases spoke of many winters. The passing seasons had taken their toll on Nellie's body, but not on her spirit. She was 84, and today she had come to fly—for the first time.

"Young man", she asked as I walked past her chair, "can you take me for a ride in one of those things?"

The instructor beside her spoke, "I don't know about this. I don't think you can climb into the front seat."

"I don't intend to climb in. Two young fellows like you ought to be able to lift me in there."

It was slow and tedious, but she never complained of the pain that flashed across her face. Once she was strapped in, there were none of the timid questions seeking reassurance. She didn't ask, "Are you sure this is safe?" or "How long have you been doing this?" She had no need to be pampered. This woman had made up her mind, and her own courage and confidence were the only reassurance she needed. Oh, there were the questions, all right, lots of them, but they were relevant and to the point. She wanted to know what things were and how they worked and why. The years had not dimmed the uniquely human instinct to learn.

After takeoff, she was silent for a few minutes. Then she murmured, "Well, I'll be damned."

"I beg your pardon?" I said.

"I'll be damned. That's the most beautiful thing I've ever seen. It's kind of a God's eye view of things. Sorta helps you put it all together, doesn't it?"

"Yes, I guess it does."

After release from tow she asked how could we fly without an engine, and "What do those dials mean?" and "How high are

we?" and "What's it look like from 15,000 feet up?" and a flood of other questions. She was alive, sparkling; her enthusiasm glowing with a million volts of excitement.

"Nellie, what made you decide to take a sailplane ride?" The question refused to be suppressed any longer.

"Well I guess I always wanted to try everything at least once. Last week, I took a ride in a yacht, like one of those over on the lake. Always wondered how those things worked against the wind.

"Made my grandson take me for a ride on his motorcycle last year if I promised not to tell his mother. We went so fast I lost my glasses and couldn't tell anyone how I had lost 'em. I've done so many things I won't even try to tell you. Some of them may not be much to skite about, but I'll tell you one thing: I don't regret a single one of them. Now it's too late for a lot of things, but I'm still going to try everything I can."

"That sounds like a good idea. Would you like to fly the plane for a bit?"

"I don't know anything about flying."

"Well, you'll never learn any younger."

"Guess you've got a point there. What do I do first?"

It would be a pleasant fantasy to say she learned quickly and did well, but time cannot be ignored, and the eyes and limbs simply did not respond. But the spirit did.

She laughed at her own mistakes, and then made them again, and kept on laughing. But she kept on trying, like she always had, and always would. Finally ... "We're at circuit height now, Nellie."

"I think you'd better let me have it now." We coasted along downwind and she was silent. As we turned towards final and carved a low arc in the evening sky, she once again said, "Beautiful."

Nellie Clemmons thank you! Thank you for showing me again the indomitable human spirit, and that age and illness have no bearing on dignity. You taught me too, that you don't have to fly airplanes or ride rockets into space to have the "right stuff." The right stuff comes in all shapes and sizes, and you've got it Nellie. You've found something that most of us seem to have missed. Perhaps it is that for which we search in the lonely skies. •

club news

WINNIPEG GLIDING CLUB

Today is October 29. For the last several hours I have been watching the snow falling outside my window and have come to the obvious conclusion that another soaring season has come to a close. Not that we had much of a soaring season mind you, but rather a season filled with frustration at the weather and concern over how the general club members would react to more dismal flying conditions. It seemed that for most of the midsummer months our field was under flood conditions (as was most of Winnipeg and southern Manitoba) and it was not until mid August that we were able to aerotow our 2-33s to Portage-la-Prairie and manage to operate out of the ex-military base.

The base has been shut down for a couple of years and the flying training for the military has been taken over by Canadair. We approached the Airport Manager and explained our situation of wet runways and they were more than happy to allow us onto the airport and use the facilities. I have never seen so much concrete from the air! We operated mostly from an abandoned section of runway 13/31 which is 4000 feet long and 150 feet wide. With a displaced operation line we were able to land and taxi up to the launch point with little or no retrieve needed.

Operating off concrete also provided a unique opportunity to try a double aerotow. With the wind right down runway 31 we lined up both 2-33s, one on either side of the runway; one on a short normal length rope and the other on a double length rope and our Citabria had little problem taking on the task. It was comforting to have over 6000 feet of concrete ahead in case something didn't look right. We managed a slow climb (200 fpm) up to 1500 feet agl. Overall the procedure was quite easy although we did have a very good ground briefing and laid out all our options prior to takeoff.

With the end of a flying season comes the usual flight statistics. Due to the poor weather we only managed around 750 flights which is 25% less than last year. Had the weather been more cooperative, we would have been close to 1100 in total as we had many keen members and several new students.

It was encouraging to see more use of our ASW-15 in the latter part of the year and several pilots got their conversion checks done. Hopefully '94 will see a resurgence in cross-country flying by some of the newer pilots. A look at the badge claims in *free flight* shows a rather disappointing absence of the Winnipeg Gliding Club.

On the promotion end of things, we had another successful season. We had a very good response to our information evening held in February and signed on several new students. We also participated in a mall display and had a Jantar Standard 2 sailplane on view. In September we tried a different angle to promotion as far as glider displays go. In con-

junction with the annual goose migration at the local nature centre in South Winnipeg, we had Jim Oke bring his ASW-20 to the site and with other club members were able to answer many questions about the sport. Unfortunately the weather did not cooperate and the attendance for the day was down considerably. It was interesting enough and we managed to hook a few intro rides from the day.

Mike Maskell

APPALACHIAN SOARING

The picture of last year's flying should have an account of CVVA's activities. We started with eleven members including three enthusiastic former Air Cadets with their licences burning holes in their pockets, and one chap who sounded enthusiastic but who rarely turned up.

Because of the youngsters we got off to a fast start, but their departure to summer training or work left the old timers flying the towplane and making most soaring flights. By the end of June we had made only 96 launches and our year end total was 196. There were good reasons why our established members were not their usual busy selves, including heavy work demands and illness. In autumn the young fellows' return helped, but we found ourselves dissatisfied with our club situation. Several proposals were made, and it looked for a while that we might not be able to celebrate our 25th anniversary, however the final decision was to continue to operate while looking into the purchase of a motorglider to replace our conventional fleet.

CVVA had its beginning in the winter of 1968-69 operating a Gehrlein winch and a Bergfalte II. Two of the most active members were Wolf Seufert — founder, president, instructor and winner of the Instructor of the Year award in 1969 — and Roger Provencher, maintenance man extraordinaire. In 1970 Robert Gaucher and Adolf Scherbaum joined. Robert has been a steady supporter ever since, becoming instructor, and president twice. Adolf shaped the club for nine years until his death in a motorglider crash.

Like many clubs, CVVA has operated out of several sites, one a former RCAF training base at Windsor, Quebec. We finally settled down at the Sherbrooke airport, scrapping the winch and buying a Cessna 150 for towing in 1985. The members had become skillful at repairing the old gliders: in 1978 a homebuilt Pioneer II was launched, and last year a fine Briegleb 12-16 was pulled out of a basement and test flown. The Eastern Townships has many powerplane builders, but these two gliders are unique as there have been only three unpowered aircraft completed here. The third, a Woodstock, was flown once or twice, then sold. Whatever happens next season, CVVA will still be flying and will have celebrated its 25th anniversary.

Kemp Ward



Heidi Popp

WINTER PROJECTS

What does a Vancouver Soaring Association pilot do when the cold winds start to blow over the home field of Hope, the sun doesn't quite rise over the South Ridge anymore and, eeeeggad!, the flying season takes a break? Spend some long-awaited time off with family members? Get ready for another type of flying with long thin boards strapped to their feet? Get a jump on Christmas shopping? Maybe for some.

This year VSA is trying out a new "pilot" project for our four month hiatus by leasing a more or less centrally located mini-warehouse to work on all those things that were, over the season, put on the "winter projects" list — polishing, waxing, repairing, replacing, and installing, ... whew! At about 1400 square feet, the space can house two disassembled gliders and a trailer. Members meet on a regular basis two nights a week, but often enough some are there on weekends as well. Not only is the work being done under cover in a heated environment, but the warehouse has become a winter clubhouse, and we often sit and chat at length about plans and projects for the coming year. So far the work has gone exceedingly well. "Official" VSA winter social functions are also on the agenda as we have an active and enthusiastic core group who want to keep the enthusiasm going the whole year through.

Heidi Popp

MSC's TALES OF WOE

The death of our president Günther Geyer-Doersch in May was the saddest event of a year full of misfortune. A hail storm shredded the wing fabric of a member's Cub. A freak wind squall flipped two house trailers in our residence park, damaged one single Astir trailer (fortunately empty), damaged an HP-11 trailer and the glider inside it (moderately), and felled a large dead tree in front of the clubhouse — a complete loss. The new chil-

dren's playground was also tipped over, and subsequently rebuilt.

In August, one of our three L-19 towplanes locked a wheel brake on rollout, flipped over and left the pilot dangling upside down, unhurt. The prop strikes on the ground added to the wincing, as the engine had about 10 hours on it. Contrary to the accident report in *free flight* 5/93, C-FIMJ was not a total write-off. At the end of October, Bob White of White's Aviation returned the Bird dog in pristine shape with new wings, vertical stab and numerous other parts. August greenery ground-looped our best and newest single seater, the DG-300, in an outlanding that all but tore the tail off and buckled the port fuselage aft of the wing. The poor bird went to London for repairs. I was just preparing for my first solo in it, too. We're anxiously waiting for ITD to return in the spring.

The good news is that our membership grew slightly, recovering to 1991 levels. Total kilometres flown were 4894, up from 3550 in 1992. This despite a May 1 late start and a November 7 finish to the season. The weather was on the whole slightly better than 1992. Total tows were 2758, just a tad down from 1992. There were 111 flying days. Weekday flying accounted for 35% of our total, also down slightly from the year before.

Lots of enthusiastic newcomers with time on their hands brought the weekday instruction to 38% of the total. Intros accounted for 19% of all flights. We had 11 solos on the 2-33s, 5 "B" and 5 "C" badges, plus one Silver "C" pending. I know a bunch of us are going to push up that total in '94. Two of our new ab-initio members got their licences within months, and by season's end were the proud owners of a Skylark as well. Talk about motivation! The fleet is up to 11 club ships, three towplanes and 19 private sailplanes.

Some selected notable events:

- Bernie Palfreeman flew his PIK from Keystone, PA a total of 727 km on April 23.
- our intrepid explorer Pierre-André Langlois also had his first ridge experience.
- his daughter Laurence did her five hour endurance.
- I managed an unofficial best height gain for the season on May 9, going to 9500 feet from a 3000 foot tow, at 5 pm in a club single Astir. Guess who didn't pack a barograph?
- Jacob Eich flew the DG-300 in June to a fly-in breakfast at St Lazare, where he wowed the ultralight and power crowd with ITD's fine lines.
- the longest flight from the Hawkesbury field went to John Bisscheroux on June 18, flying a 376 km Mt Tremblant/Lamacaza/Buckingham/Mt Tremblant course.
- Gilles Séguin and Laurence Vigeant-Langlois flew in the Gatineau Gliding Club's "Un-Nationals", in a 1-26 and a private DG-200, placing 5th and 9th respectively in a field of fifteen (*free flight* 6/93).

We are hoping to accomplish lots of good things in '94. March brings the SAC AGM to Montréal, with members from MSC and other area clubs hosting. July 25-29 will be another MSC Soaring Contest for sport and club ships. See you there.

Peter Kom, Montreal Soaring Council

IN MEMORIAM

After a long battle with cancer our friend Ed Ashe finally left us all behind to go to cloud-base and wait for us. Ed will be missed and our sympathy goes to Helga and the family. In his quiet way Ed enjoyed our sport to the fullest, and was always one of the first ones up in the trainer with a student and one of the last ones down late in the afternoon in his RS-15. Ed did not make a big deal out of issues but worked quietly to solve them. Right up until two weeks before his death Ed was flying the Blanik with a checkpilot in the back seat. We'll miss you Ed.

Ed Hollestelle, SOSA

SOME PILOTS DON'T FLY ENOUGH

The 1993 statistics show that the average VSA pilot (not including private owners) flew 14 hours each. Do you think this is sufficient, in particular when most of this flying was done by the students and a few hardy members? I hope not!

from *Vancouver Soaring Scene*

This stat is not unique among gliding clubs and is potentially a safety concern. Perhaps CFIs should nudge members that aren't flying much, and maybe some club incentives can be invented to jolt them out of their lethargy. Perhaps a club flying membership fee schedule which, for example, builds in 15 hours of flying whether you use it or not? editor



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DESIGN CONTEST

members are invited to submit a SAC design/logo for pins, bumper stickers, *free flight* cover page, etc. in celebration of SAC's 50th anniversary in 1995.

Prize - a year's SAC membership.



Coming Events

- 9 Feb **Bramalea Glider Pilot Ground School**, winter session Weds evenings 7:30-10:30 for 12 weeks. Terry Miller Recreation Centre, Bramalea. Registration on first night. For info call Bill Tom, Erin Soaring Society (905) 853-1787.
- 6 Apr **Toronto Glider Pilot Ground School**, spring session, Weds evenings 7-10 pm for 8 weeks. Contact the school at (416) 395-3160 for registration info, or Ulf Boehlau (905) 884-3166.
- 4-8 Jul **"Un-Nationals" Novice Soaring Contest**, with realistic handicapping for lower performance sailplanes. Pendleton, ON hosted by GGC. Contacts: Richard Officer (613) 824-1174, Glenn Lockhard (613) 692-3622.
- 5-14 Jul **Canadian National Soaring Competition**, SOSA. Contest manager will be Ed Hollestelle, (519) 461-1464 (H), (519) 455-3316 (W).
- 23 Jul - 1 Aug **22nd Cowley Summer Camp**. Canada's largest gliding event every year. Mountain, thermal and wave flying in a spectacular setting. Call Tony Burton, (403) 625-4563.
- 25-29 Jul **MSC Soaring Contest** for sport & club sailplanes. Contact Gilles Séguin (514) 377-5737.

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UPDATE ON THE GENESIS 1

Bob is very impressed!

Recently while flying back and forth across the Atlantic, my First Officer, Jock Proudfoot, who is also a glider pilot of long standing, asked me if I had seen the article in *free flight* on the "Genesis 1". Earlier we had been discussing where the designs of 15 metre and Standard class might evolve to improve them, or had they finally reached the apex of design without some radical change? All of a sudden here was the story on Genesis 1.

We discussed the fact that the designers and builders of the Genesis project were very well known and respected in the aviation community and that the ship was probably well worth a "look-see". Having just retired from my flying job of 37 years, time wasn't a factor, so off I went to Marion, Ohio. I arrived January 6 amidst a winter storm, and upon entering the nice warm hangar my first impression was "there's nothing going on here". Was I ever wrong! The hangar and shop facility were so clean, without any clutter and nothing out of place, it gave the impression of a hospital lab, not an aircraft manufacturing facility. (I wish my workshop was like that!).

I was then introduced to Jim Marske and his staff. These gentlemen gave me the royal tour and answered all my questions, which when finished took a full half-day out of their busy schedule. I came away with the impression that these people really know what they are doing. The background of this project, as I understand it, would appear to be that a Mr. Jerry Mercer (no relation to myself) felt that he would like to do something for American soaring. He assembled a team of designers and craftsmen to design and build an American sailplane that would meet, and if possible beat, the current batch of high performance gliders out there, but at an affordable price. To do this successfully, it was apparent that a fresh design approach had to be taken.

What has come out of this is an optimized 15 metre sailplane, with the stable airfoil of a "flying wing" but with a very short-coupled tail for elevator control and increased stability over a range of CGs.

The wing's airfoil has been computer optimized every ten inches along the span and it is totally laminar on the bottom surface. The wing incorporates double slotted terminal speed brakes, and also well-baffled internal wet wing ballast tanks having a 400 pound capacity. The spar is a combination of foam, carbon fibre and glass in a flanged box-beam configuration. I saw a small test piece 3/4" wide and 1-1/2" deep by 48" long, weighing less than a pound, that was supported on the ends and centre loaded to 1034 lbs without fracturing. The glider spar is at least four times that size, being 6 inches deep at the root and tapering to the wingtip.

The very short tadpole shaped fuselage with high fin and rudder reportedly gives about

one-third the drag of a conventional fuselage and also considerably less weight. Due to the stable airfoil of the wing, the stabilizer atop the fin and rudder will act as an elevator only, giving little drag, and near-zero aerodynamic loads are anticipated at max L/D.

The production aircraft will be built with pre-impregnated epoxy resin and glass which gives a precise ratio of resin to glass, its main advantage being that it is strong and light. The aircraft has several areas reinforced with carbon fibre and the cockpit has a double layer of Kevlar imbedded in the glass for strength and safety.

Another novel standard feature is a ballistic parachute, which when deployed by an explosive charge, lowers the whole glider. This system is expected to be usable above 200-300 feet agl and is intended to provide a margin of safety greater than that of a personal parachute.

It is anticipated that the kit will come with the wings virtually complete. The ailerons and control runs will have to be built and added. There will also be some filling and painting to be done as well as profiling. The fuselage is expected to be in two halves, easily joined, with bulkheads, controls, landing gear, instruments, etc. to be added as well as sanding and painting. There will be no gelcoat as it is felt that sanding and painting occasionally is a lot easier than repairing gelcoat.

The performance figures the Genesis people have designed to (and quote) are excellent, but they anticipate that the aircraft will, in all likelihood, exceed the design numbers. But, as they say, "the proof of the pudding is in the eating." The ship is going to be displayed at the SSA convention in Chicago in February, and after that to Arizona where it will be "wrung out" by a graduate from the Edwards Test Pilot School, after which the actual performance numbers will be published.

My own impression is that this aircraft is a well thought-out and well executed design that is long overdue. It is past time that a competitive ship was built in North America that we can afford. I am sure the machine will do very well and they will have a ship of which they can be justifiably proud.

I intend to stay in touch with this project and will gladly talk to anyone about it. My telephone number is (514) 458-4627.

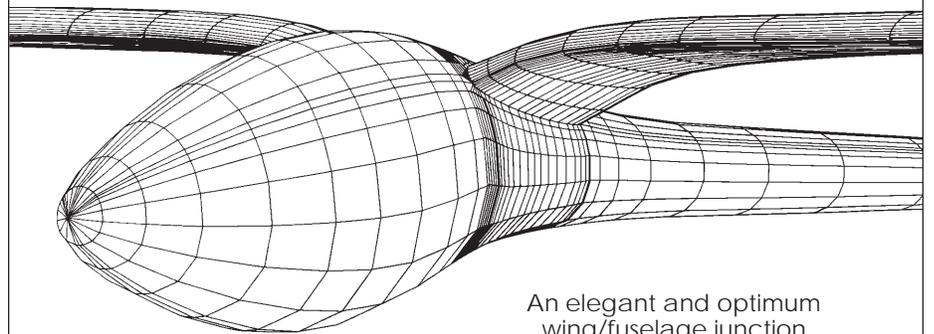
Bob Mercer,
Gatineau Gliding Club

THE OVERNIGHT FLIGHT TO MOROCCO

The brothers who flew 1420 km from France to Morocco in an ASH-25 last April are working on an even longer one. They now plan to begin about midday in the French Alps, fly to the Pyrenees where they will "park" in a wave all night, then continue into southern Morocco. The distance will be about 2000 km.

from *Soaring Pilot*

THE SHAPE OF THINGS TO COME?



from a paper by Loek Boermans and K. Kubrynski, "The Aerodynamic Design of Wing/Fuselage Combinations"; presented at the '93 OSTIV conference, and reported in *SAILPLANE & GLIDING*

With the conventional layout, there is an increase in the angle of attack near the wing root due to increased upwash along the fuselage side. Also, the turbulent boundary layer on the fuselage causes separation as air approaches the wing root stagnation point, producing a vortex wrapped around the wing root. The first of these effects can be greatly reduced by using a shoulder wing curved as shown along a line perpendicular to the streamlines of the cross flow component of the airflow. The result is a "gull wing", with a very short "gulled" portion near the root. This shape is hardly compatible with a straight flap hinge line, so an alternative geometry is to use the conventional uncurved wing with subtle changes of airfoil section shape and twist towards the root. Wind tunnel tests will take place soon.

SAC affairs

CONTEST RULES REVIEW

Charles Yeates
Chairman, Sporting Committee

A review of the National Competition Rules and Regulations is always triggered by problems encountered, and comments or suggestions made during the actual competitions each year. This time information has been received from George Dunbar, Terry Southwood, Jim Oke, Ulli Werneburg, Tony Burton, Ed Hollestelle, and Jay Poscente as well as articles in *free flight 4/93 (1993 Nationals)* and *free flight 5/93 (Choosing Champions)*. All comments were thoughtful, substantial and appreciated. After absorbing the opinions and ideas of the many writers, the Committee has recommended to the SAC Board the rules changes that are given below. One item remains unresolved and it will be brought up for discussion at the AGM.

General Rules are meant to apply scoring points to flights by each pilot consistently and fairly, and which reflects their relative performance. In the heat of battle there seems to be some tendency to blame the rules for "unexpected" results, however, legitimate questions are raised. It is my impression that the rules worked surprisingly well in 1993, although the often weak weather made soaring a challenge (I recall that 90 of 220 flights resulted in outlandings).

Sports Class The 1993 "Open Class" approach was an experiment to easily allow a Sports Class competition at the same time and location as the Nationals without our having to rewrite rules yet again at the last minute. Because the event was very successful, the Sporting Committee has agreed that a Sports Class will be added to the rules with the following caveats:

- 1 These competitors will not qualify for the Canadian WTC Team Seeding lists.

- 2 Sports Class will always be launched after the 15 metre and Standard Classes.
- 3 Scores will be computed on a handicapped basis.
- 4 This class will not be included in any "combined winner" calculations.

Navigation Aids It is proposed to allow GPS units in future competitions. Although we are told that the Swedish experience showed it may be a while before they replace turnpoint cameras, they are useful nav aids.

PST task scoring Day 6 of the 15 metre competition at Swift Current raised the question of whether or not a finisher should always earn more points than a non-finisher on a PST flight.

In Jim Oke's words, a pilot's "main strategy is, of course, to arrange the flight to achieve the best average speed over the assigned task interval; if conditions remain good near the finish and it is clear that many will finish, then there is an obvious incentive to finish. The speed/distance point split depends entirely on the number of finishers, and a fairly simple analysis shows how quickly speed points come to dominate the scoring and how much extra distance will have to be flown to score well as a non-finisher. True, nobody can know how many will finish until after a task, but weather and any finish line activity should be adequate indicators." Robert DiPietro noted that in the US competitions, task setters try and set PST time intervals so that 80% finishers can be reasonably expected. Then speed wins the races/points (task setters please note.)

As far as the scoring formula is concerned, we can make a revision so that the day's results would have appeared to be or would have been more reasonable. This must be done carefully so that a revised formula doesn't give a large points premium (potentially contest winning) to a few pilots on a tough day when most land out.

Table A shows Day 6 results from the 1993 rules and those earned from some formula variations. It is intended that these variations will be discussed at the AGM so that the most appropriate revised formula can be chosen and implemented for future competitions. Formula A would have moved A1 from a narrow first to a third position for the day. The other revisions would increase the point differences steadily. Which revision do you feel would be appropriate? This question will be asked at the AGM and the answer will choose the revised scoring formula for future PST tasks.

Further comments from Chief Scorer, George Dunbar:

The day factor reduced the maximum daily points to 800 so this maximum was assumed in all cases shown. The calculation procedure is to calculate the maximum daily speed points from the daily maximum points from the various formulas, and then taking the distance points as 800 less the speed points.

In all cases scoring is based on both speed and distance points, with the main differences being how the ratio of speed to distance points changes with the number of pilots who finish. The share of the maximum speed points for each pilot is based on his speed in relation to the maximum speed of the day (though a pilot must finish with at least 50% of the winner's speed to be eligible for speed points), and distance points are in proportion to the pilot's distance.

Maximum points awarded for speed and distance vary in a straight line relationship from what is earned when all pilots finish, to what is earned when no pilots finish. The maximum and minimum points in each case above are shown in table B. With the 1993 rule, speed points went right to zero if there were no finishers. This produces large changes when there are many outlandings, and a high distance non-finisher will outscore a finisher. For this reason I personally prefer case C.

**WAIVERS DO HAVE VALUE
• but be careful •**

Douglas Eaton, FIC,
member, SAC Insurance Committee

I was asked by the members of the Ontario Soaring Association, at their meeting last October, to write something about liability waivers. OSA had circulated an article written by someone at Cooperators Insurance which suggested that liability waivers were basically a waste of time and paper. With respect, I suggest that this is not necessarily the case, but if the waiver is poorly drafted (as most such documents are) then that would be true. It is necessary to examine what it is that a gliding club is trying to achieve when they ask a guest passenger to sign a waiver. The list would include:

- make it unnecessary for the insurance company to pay for any damages,
- give everybody in the club a nice, warm, fuzzy feeling.

If damages do happen to exceed the amount of insurance protection, the waiver should also:

A	distance km	speed km/h	'93 Nats points	points awarded using 4 other formulas			
				A	B	C	D
CJ	161.3	80.7	795	800	800	800	800
MZ	153.3	76.6	748	749	747	741	737
A1	198.6	0.0	800	719	661	531	441
2W	183.1	0.0	738	663	610	489	407
PM	97.6	48.8	424	399	380	338	309

Formulas:	'93 Nats	$P_{ms} = 2P_m \cdot (Ns/Nc) / 3$	$Ns =$ # pilots finishing
A	$P_{ms} = P_m \cdot Ns/Nc$		$Nc =$ # pilots competing
B	$P_{ms} = P_m \cdot (8Ns/(Nc+1)) / 10$		$P_{ms} =$ max speed points
C	$P_{ms} = P_m \cdot (Ns/(Nc+1)) / 3$		$P_m =$ max points available
D	$P_{ms} = P_m / 2$		

B	Case	'93	A	B	C	D
all finish:	speed pts	667	1000	900	667	500
	distance pts	333	0	100	333	500
none finish:	speed pts	0	0	100	333	500
	distance pts	1000	1000	900	667	500

- absolve the club from any or all liability for injury sustained by the guest passenger,
- protect the club's directors from liability,
- protect the pilot from liability, and
- protect those who serviced the aircraft from liability.

The first thing the club must consider is the difference when the guest is a minor or infant, rather than an adult. Most clubs who use waivers have included a provision for the permission of an adult before a minor is allowed to fly in a club aircraft. There is also a general misconception that this 'permission' by the adult waives the minor's right to claim. I suggest that our courts will not permit one person to waive another person's rights.

I also suggest that when someone knowingly agrees to waive any rights that they may have, it matters far more that they are in full possession of their mental faculties, and are fully informed of the hazard they are accepting, than whether they are legally an adult.

Courts in Canada have generally held that when someone knowingly accepts a risk when partaking in an activity, and understands the risk they are accepting, then that person may not subsequently claim damages if they are injured while so participating. The big problem that most defendants in lawsuits have to overcome, is proving that the person understood the risk before accepting it.

Most of the law in regard to passenger liability has its roots in jurisprudence relating to 'tickets', and what a club does when it agrees to allow someone to ride as a guest in its aircraft, is to sell a 'ticket'.

The courts of Canada, the USA and Great Britain have interpreted the terms of any written ticket, or posted warning notices, very strictly against the person, organization or company who wrote the document, using a legal principle called '*contra proferentum*', which says that any person who wishes to protect themselves from claims for negligence by written agreements will have any ambiguity or unclear meaning interpreted against them, if they are the person who wrote the document, and when the injured party did not have any say in what was written.

Much of the recent activity in this area has centered around the issue of how well the warnings have been conveyed to the passenger. Clearly, if you have written a clear, well worded warning, which would be understood by any person of normal intelligence, but have posted the warning on a sign in such a place that it might not easily be seen, or printed it in such small type that most people would need a magnifier to read it, then you cannot guarantee that everyone has read it.

The Supreme Court of Canada found in the 1956 case, *Union Steamships vs. Barnes*, that it is not required that the defendant (the issuer of the ticket) establish that the plaintiff (ticket holder) was aware of the conditions. What is required is that the defendant establish that it has taken *reasonable* steps to draw the terms of the ticket to the attention of the plaintiff.

Ski resort operators have frequently been sued when someone is injured on their premises while skiing, and usually the plaintiff has been successful. Skiing is generally regarded as involving inherent risks of injury, yet if the ski operator is sued, he must establish that he has taken all reasonable steps to warn the person of the hazards which everyone already knows. (I personally feel that there is no more danger involved in flying than there is in skiing. No one who flies will argue that the activity is free of danger or that, in the event of an accident, there is no risk of injury.) The BC Supreme Court ruled in October of this year, in *McQuary vs. Big White Ski Resort Limited*, that the ski operator had taken reasonable steps to warn of possible dangers. Mr. Justice Blair said, "Mr. McQuary admitted he knew there was writing on the ticket and that the writing contained a liability waiver." He went on to say, "I find the plaintiff's failure to read the conditions on the ticket irrelevant in the instant case." The judge concluded, "The plaintiff appears to have had the opportunity to read the ticket but did not take the time to do so. I find further on the facts before me that the defendant took reasonable steps to bring the exclusionary conditions to the plaintiff's attention ..."

The defence lawyer, who is General Counsel for the Western Canadian Ski Areas Associa-

tion (an organization of ski resort operators), had spent some years refining the wording of the clauses, and the design of the tickets and warning signs used by resort operators. The warnings are printed in blue and red ink and capital letters on the face of the tickets. In addition there were garish yellow, red and black signs posted around the resort. I therefore feel that if our gliding clubs take the trouble to word their documents well, and make sure that any warnings are very obvious, they can continue to protect themselves by means of waivers when the passenger is an adult.

Clubs must be aware that a minor has no legal capacity to enter into contracts, other than contracts for necessities, eg. food and shelter. Since they have no capacity, they cannot enter into a contract to waive liability. The parent may contract to waive liability to the parent, for such things as the infant's medical expenses, and their own losses, but can't waive on behalf of the infant. Accordingly, if you accept a legal minor as a passenger, you do so at your own risk. The age of majority in Ontario is eighteen, but may differ in other provinces. It is possible to draft a wording where the parent agrees to hold the club harmless and protect the club from any suits by the child, but I do not think it would be wise to use this approach to the issue.

If your document is well drafted, and the warnings are clear, then you can be protected from much of the dangers of a lawsuit, but you will still need insurance. The biggest benefit a liability insurance policy gives you, is to pay for the best defence possible. If you want a warm, fuzzy feeling, make sure your limits of liability are high enough and your premiums are paid. Also, protect the Board of Directors of your club with Officers and Directors liability coverage.

The best way to protect yourselves is to make sure your aircraft are always maintained in top shape, and your pilots are the best they can be. Ensure that your club has clearly stated, written safety procedures and rules, which are strictly enforced, and ensure that every member acknowledges that they have read and have understood them. That way, you may never have to find out just how good your waiver document really is.

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WINTER BOARD OF DIRECTORS MEETING NOTES

The meeting was held 8-9 January in Ottawa. Current club status was reviewed:

Maritimes: no change

Quebec: some clubs were consolidating and others have lost members. There was disappointment with the delay in holding the French instructors course.

Ontario: new clubs were increasing in members while older clubs dropped, and two were consolidating.

Prairies: clubs are doing well and there is interest in a club in Swift Current as a result of the Nationals.

Alberta: Cu Nim increased members but others decreased, with Grande Prairie holding on with the bare minimum.

Pacific: there is interest in a club in the Salmon Arm area as a result of a BC Soaring Safari stop there last year. Other clubs are static with two commercial operations in a building stage. Bulkley Valley was able to get a life extension on their Blanik which should be of interest to other clubs with this ship.

Insurance Richard Longhurst reported that as of 6 November the ratio of hull losses to hull premiums was 110% and the total losses to total premiums (which includes liability) was 76%. The 1994 contract is out to tender to underwriters, an increase in rates is expected. The broker for the Medical policy is very disappointed with last year's response but has agreed to cover for another year. There was discussion on coverage for commercial glider operations and how SAC might be able to assist these operations obtain better rates.

Finance Jim presented the draft financial statement. Both membership and investment income were down. The only reason we were not reporting a deficit was as a result of savings in office expenses and below-budget Flight Training & Safety committee expenses. There was considerable discussion on the fee structure and revenues. To increase fees or not? Jim will be sending a proposed budget to clubs to allow time for evaluation and comment prior to the AGM.

Nationals Richard indicated that planning was well along for the 1994 competition. Competition organizer is Ed Hollestelle and the CD will be Larry Springford. George reported on proposed changes to the rules which will be discussed at an AGM workshop.

SAC Logo At the present time there are three versions of the SAC logo in use. The Board agreed that the official logo be the "two gull" version with no "SAC" within the wreath and with "Canada" printed centred and straight below the wreath.

Trophies Book A new SAC Book of Trophies with records & diamonds by Ursula Wiese will be photocopied on 8-1/2" X 11" paper for storage in a 3-hole binder (not supplied). Distribution is being discussed.

Terms of Office There was discussion on the terms of office for committee chairmen and SAC representatives to external organizations. Where practical, terms of office for these positions will be limited to five years.

1994 SAC AGM

MONTRÉAL, MARCH 4-6

LOCATION: Holiday Inn, Longueuil, Québec
reservations call 1-800-HOLIDAY or (514) 670-3030
ask for SAC AGM rate (\$65 single or double)
hotel is easily reached from Route 132 by car or take the Metro (subway)
to Longueuil station – the hotel is adjacent to the station

AIR travel: Air Canada, phone 1-800-361-7585 or your travel agent
and refer to SAC reference code **CV940614**
(ensure code is entered in the "tour code box" on ticket)

CAR rental: official supplier is **AVIS Rent-A-Car** call 1-800-331-1600
ask for SAC AWD # **D143058** — rates from \$22.95 per day.

AGM schedule

friday	SAC and provincial directors meetings in afternoon President's reception (evening)
saturday	0900 – 1700 workshops, aviation exhibition and flea market 1800 – 1900 pre-dinner cocktail 1900 – 2400 banquet, awards presentation and guest speaker
sunday	0900 – 1200 Annual General Meeting 1300 – 1700 SAC directors meeting

About the 1994 AGM

Welcome — Bienvenue à tous. This may be one of the best AGMs yet. With a number of exhibitors with a full range of products, including gliders, continuous videos, special guest speakers, and even an aviation flea market, there is sure to be something for everyone. The flea market and exhibition are open to the public at no charge with drawings held for door prizes. For the flea market, please bring aviation related goods that you wish to trade, sell or barter. A "for sale" board will be provided for larger items. Exhibit space may still be available — call Chris or Svein.

All events related to the AGM are free, except for the banquet and cash bars. To register for the banquet send cheque or money order for \$30.00 per person (wine included) to the **SAC office**. *Tickets sold after February 20 or at the door are \$35.00.* Space is limited so reserve early.

Air Canada has graciously donated one round trip ticket anywhere in Canada. This ticket will be given away at the awards banquet on Saturday, on the basis of a chance draw. Each attending member will receive one entry with bonus entries given to those who fly in with Air Canada, and one bonus entry for purchasing your banquet ticket before February 20.

The main seminar theme is SAFETY. Other topics covered to include the SOAR technique, product information, 1993 accident record. Additional seminar themes are being developed; call SAC office or the AGM organizers for information. Robert Pearson, recently retired Air Canada pilot, is our planned banquet speaker (subject to availability).

AGM contacts: SAC office and,

Chris Ashford (registration/communication co-ord)

home (613) 226-5708, work (613) 722-4226, fax (613) 722-7695

Svein Hubinette (AGM coordinator)

home & fax (514) 649-0750, work (514) 468-8663

International Gliding Commission A letter will be written to them expressing SAC's concern that our representative is unable to obtain an agenda of IGC meetings in sufficient time for SAC to study the debate items, hence national recommendations cannot be given to our representative before a meeting is held. Our representative will be reimbursed up to \$500 to attend the next meeting in Spain.

Maritime Zone The zone will be renamed the Atlantic Zone to recognize the fact that Newfoundland is not a Maritime province.

CASA NEWS

Another season is approaching and we are getting ready for our SAC AGM and convention in Montreal. The worst part of winter is behind and before we know it we will be centering our first thermal of the new season.

I just finished the 18 m wingtips for the HP-18 (well, 17.7 to be exact) and all I have to do is connect the water ballast system and make some mods to the trailer and we are all set for some serious cross-country flying.

The first PW-5 World Class sailplane is on order and should be here in May/June.

Our first Nationals-'94 committee meeting was held on January 16 and the CASA also met to discuss dates for the cross-country clinics in Ontario. I sincerely hope to see the Westerners out in force to fly at the Nationals at SOSA over 5-14 July. We can have good soaring conditions here too, you know. In 1989 we managed eight respectable days of racing.

It looks like Toronto Soaring will host the Ontario Provincials. Chris Eaves has volunteered to make a new set of turnpoints for the area, and we will publish a list of their coordinates so pilots with GPS can pre-program them.

As mentioned earlier, we will try again to get a team together for Uvalde, but will ask qualified pilots first to see if there is any interest before we start organizing this time.

Sue Eaves has managed to get another newsletter out in time for Christmas. We always need articles, so if you have an interesting gliding story please send it.

Ed Hollestelle

SAC Directors & Officers

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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
24 Holliday Drive
Whitby, ON L1P 1E6
(905) 668-9976 (H)

FAI Records

Russ Flint
96 Harvard Avenue
Winnipeg, MB R3M 0K4
(204) 453-6642 (H)

Fit Training & Safety

Ian Oldaker, RR 1
Limehouse, ON L0P 1H0
(416) 877-1581 (H)
Mbrs: Mike Apps
Ken Brewin
Geo. Eckschmiedt
Fred Kisil
Paul Moggach
Richard Vine
Harold Yardy

Free Flight

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

Historical

Christine Firth
23 rue Barette

Hull, PQ J9A 1B9

(819) 770-3016 (H)

Medical

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

Meteorology

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

Publicity

position to be filled

Radio & Comm

Paul Moffat
1745 King Edward Street
Winnipeg, MB R2R 0M3
(204) 633-5221 (H&F)
(204) 957-2827 (B)

Sporting

Charles Yeates
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Mbrs: George Dunbar
Robert DiPietro

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Randy Saueracker
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(519) 452-1240 (B)
Mbr: Herb Lach

Trophy Claims

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

OFFICIAL OBSERVER CHECK SHEET for a record flight attempt

Date _____ Record attempted _____

Pilot _____ Glider (type & reg.) _____

PREFLIGHT Barogram signed by OO
Barograph hack time _____ (hr:min:sec)
Barograph sealed

Clock & camera in sync
Camera(s) sealed (2 places)
Cameras(s) sealed to mount

Declaration signed by OO
Canopy marked
Declaration photoed with mounted &
sealed camera(s)

FLIGHT Takeoff time _____ (hr:min:sec)
Start gate time _____ (hr:min:sec)
Finish time _____ (hr:min:sec)

POSTFLIGHT All seals intact
Clock & camera(s) in sync
Declaration with new time photoed

Above data certified by OO _____
name signature

NOTE: Must finish _____ hrs _____ min after start

INFO ON WALTER'S OO CHECKSHEET

The barograph hack time is the time the stylus is jogged before the barograph is sealed for the flight. From this hack mark the barograph can be run after the flight to determine the point, and thus the altitude, at which the start line was crossed. Camera and clock synchronization is really only needed for speed to goal attempts but it doesn't take long and is useful for any record flight.

Friday night flying continued from page 9

in advance! An informal poll of the respondents indicated that less than five percent were students.

The second strategy of the membership campaign was to provide the intros with a quality experience at our airfield. This necessitated changes in the way we performed intro flights. The basics of the intro program we developed were as follows:

- Intro flights occurred on evenings dedicated to intro flying. We chose Friday nights to avoid conflicts with other activities that people might have. Six evenings were required to handle all the individuals responding to the advertisement. At Cu Nim we are fortunate to have a location that is just about ideal for evening flying. Summer evenings are long (sunset after 10 pm), winds are generally light, and the panoramic views of the sun setting over the Rocky Mountains provide plenty of value in a 20 minute flight.
- Cu Nim charged \$32 per flight (versus our normal rate of \$48) for a 3000 foot tow. In a Blanik this normally provides for an 18 to 20 minute flight.
- Intros paid for their flight in advance to ensure that they made a commitment to show up (at 6 pm sharp) on the night scheduled. Prepayment also eliminates the problem of dealing with tow tickets and making change on the flight line. Upon receipt of payment the intros were mailed a letter explaining a little about Cu Nim, the ground school that would be starting shortly, and what to expect on

their flight. They also received a map showing the location of the club.

- The club operated with three Blaniks, two towplanes, and a ground crew of five, including an efficient field manager. Using the above contingent of volunteers we were able to complete as many as 20 flights in less than four hours. Besides running the flight line, the ground crew was responsible for greeting the guests and answering questions.

Members put on mini-seminars in the hangar to explain various features of sailplanes while daily inspections were performed. By the time the intros made their way to the flight line to meet their instructor, they already knew a little bit about the flight controls, instruments, and how sailplanes stay aloft.

The enthusiasm of the intros was truly infectious when they were together in a group. There was generally a bit of apprehension as everyone watched the hook-up of the glider to the towplane and the first flight departed.

Apprehension turned to anticipation and then to excitement as the first brave soul made his or her way back to the flight line with a smile from ear to ear. It is all too easy to forget the sights and sensations of our own first experience with flight — not the sanitized experience of commercial aviation but the wonder of turning, climbing and diving in soaring flight. Intros discuss their flight and compare their individual experiences in terms unconstrained by the technical jargon of pilots. Knowledge and experience may be essential to becoming a good pilot, but they often leave us jaded participants in the magic of flight.

As well as being a great success for the intros themselves, the evening flying program also breathed new vitality into a number of our members. Our crew of volunteers finished off the evening with pizza and beverages at a nearby restaurant, comparing stories about the best or worst of the would-be aviators. The volunteers who came out to help (whether they were flying or running tow ropes) developed a new sense of camaraderie by working together as a team to accomplish a task in a short time period. Several members liked the idea of being able to make a contribution of time to the club without taking another whole day away from their family on a weekend. In addition, the intro flying can help to keep instructors and towpilots current and increased the utilization of club equipment.

In summary, I believe all glider pilots should make an extra effort to ensure that intros feel welcome at our clubs — intros can be a good source of future members. Cu Nim's evening intro program was very successful in attracting new members to our club. The intro program was largely responsible for the increase in our club membership from 59 in 1992 to 71 members in 1993. Five of the evening intros attended ground school. The number of student pilots in the club increased to 19 in 1993 from 11 the previous year.

Finally, the intro program had a "trickle down" effect in terms of interest in the club. Word of mouth advertising led to many more intros over the course of the summer as our evening flyers came back with friends, relatives, and neighbours on weekends. We even sold a number of gift certificates to persons wanting to give an intro flight to someone else! •

Society changed ... continued from page 8

which crammed in a substantial amount of information in a few days were either preferable or the answer to the problem.

Cost was not cited as the major factor for non renewals, although some of these people had changes in personal circumstances such as buying a home which meant that gliding was now an unaffordable luxury for them. However, most said that they would like to return to gliding at a later stage when their circumstances permitted. I would say if other clubs undertook similar research, they may find some similar results.

Range of leisure activities

Compared to a decade ago, people have a far wider choice of accessible leisure activities. That's more activities gliding has to compete with in terms of attracting membership.

As far as aviation is concerned, gliding competes with power flying, hang gliding, paragliding, micro- and ultralights, parachuting, ballooning and to a lesser extent, radio-controlled models. For a person on an "average" budget who is interested in aviation, that's a lot to choose from. While some of these activities would only be able to be pursued by higher income earners, some of them are more accessible, less time consuming and, in some cases, are as expensive (or even cheaper in the long term) than gliding.

The challenge for us is to evaluate how we compare with these activities and how we can become more competitive and attractive, so that more people will choose gliding as their preferred aviation interest.

How gliding is perceived

Let's leave the aviation-minded person aside for the present and consider the many people who know very little about flying and even less about gliding. What is their image of gliding? How is it perceived by the market place?

As we don't have any concrete research in this area, it is hard to accurately say. However, many of us have come across comments and beliefs about gliding such as these:

- dangerous (they fall out of the sky, especially when the wind stops)
- a 'daredevil' sport for 'thrillseekers'
- you wouldn't get me up in one of those. They don't look safe / strong enough / big enough / etc.
- I don't feel safe unless there's a motor in front (how little these people know!)
- how can they stay up? (it's that wind)

If gliding is really perceived by the general masses as a dangerous sport for thrillseekers who like to take to the skies in flimsy, motorless aircraft that crash to the ground when the wind stops, we've got a big image problem on our hands. No amount of general "glid-

ing" promotion or advertising will persuade people to think otherwise, let alone persuade them to try it!

Marketing people use the term "positioning" to describe how they want their product or service to be perceived by the marketplace. The gliding movement would do well to undertake some research and embark upon some positioning exercises of its own.

What do we do?

I strongly believe that before the gliding movement embarks upon any promotion or marketing initiatives with the aim of increasing membership, it needs to address the changing needs of our potential members in the '90s and beyond.

We need to pay attention to and come to grips with the changes that are continually taking place, and take a fresh and creative look at how they operate in order to respond to them. This means that we have to look at every area of how we operate, including training structures, facilities and our expectations of members in order to find more appropriate and efficient ways of servicing them. This is the place to start if we want to build a stronger membership base in the long term.

Without addressing these fundamental problems, any single effort to promote gliding will be a waste of both money and time. •

FAI badges

Walter Weir 24 Holliday Drive
Whitby, ON L1P 1E6 (905) 668-9976 H

The following Badges and Badge legs were recorded in the Canadian Soaring Register during the period 4 November to 31 December 1993.

DIAMOND BADGE

82 David Key York

SILVER BADGE

845 Douglas Eaton Air Sailing
846 Michael Morgulis Air Sailing

DIAMOND DISTANCE

David Key York 507.6 km Grob 102 Julian, PA

SILVER DISTANCE

Douglas Eaton Air Sailing 56.0 km Ka6CR Belwood, ON
Michael Morgulis Air Sailing 59.1 km Ka6CR Belwood, ON
André Sirois Gatineau 63.0 km 1-36 Pendleton, ON

SILVER ALTITUDE

Mark Schneider Montreal 1403 m LS-1 Hawkesbury, ON
Michael Morgulis Air Sailing 1036 m ASK-13 Belwood, ON
Peter Chanachowicz York 1036 m Grob 102 Arthur East, ON
Chris Luxemburger COSA 1066 m Grob 103 Chemong, ON

SILVER DURATION

Calvin Gillett London 5:05 1-23 Embro, ON
Mark Schneider Montreal 6:37 Astir CS Hawkesbury, ON
Alex Upchurch York 5:12 1-26 Arthur East, ON
Paul Mercier Montreal 5:27 LS-1 Hawkesbury, ON
Douglas O'Connell SOSA 5:18 Blanik L-13 Rockton, ON
Douglas Eaton Air Sailing 5:20 ASK-13 Belwood, ON
Dean Toplis Air Sailing 5:17 Jantar Std 2 Belwood, ON
Kathryn Burary SOSA 5:05 1-26 Rockton, ON
André Sirois Gatineau 6:00 1-36 Pendleton, ON

C BADGE

2401 Calvin Gillett London 5:05 1-23 Embro, ON
2402 Simon Benzekri Montreal 2:01 Blanik L-13 Hawkesbury, ON
2403 Mark Schneider Montreal 6:37 Astir CS Hawkesbury, ON
2404 Paul Mercier Montreal 5:27 LS-1 Hawkesbury, ON
2405 Dean Toplis Air Sailing 5:17 Jantar Std 2 Belwood, ON
2406 Peter Chanachowicz York 1:12 Grob 102 Arthur East, ON
2407 Kathryn Burary SOSA 5:05 1-26 Rockton, ON
2408 Stephanie Kramer Toronto 1:19 2-33A Conn, ON
2409 Daniel Duclos Gatineau 1:15 ASK-13 Pendleton, ON
2410 Danniell Cook Gatineau 1:45 1-36 Pendleton, ON
2411 André Sirois Gatineau 6:00 1-36 Pendleton, ON

PILOTS HAVE CHECKLISTS — SO SHOULD OOs

Careful preparation is essential for record flights to ensure that you don't screw up and forget some detail which will cause an otherwise valid flight to be rejected.

When I'm making a record attempt I give my OO a clipboard with a digital watch and an OO checksheet. If all the items on the checklist are completed I'm certain the OO has witnessed all the things necessary for the claim. (A sample checksheet is on page 24. It may be photocopied at 150-160% for your own use.) I write in the must-finish time at the bottom so the OO knows when he can quit waiting around to witness the finish.

I have another form which I use for record task preparation which I will explain in a future issue.

Significant flight (plus GST?)

This notable 398.6 kilometre flight was flown by Sue Eaves on 4 October 1993 in an LS-4 from Thompson to Churchill, Manitoba! As proof of the flight, Sue provided an invoice she received from Transport Canada for landing fees at Churchill of \$7.09 and "they" can't possibly be wrong, right? I wonder what the 9¢ is for?

SOLAIRE //// CANADA

2371 Dundas St E, London, Ontario N5V 1R4
Phone/Fax (519) 455-3316

Announcing

the **affordable** soaring GPS / Computer System

SOLAIRE US and SOLAIRE Canada have been appointed the exclusive **FILSER Electronic** dealers for the North American market! There are two models – the LX400 GPS only, and the full system LX4000. The LX400 has an RS232 data port and will run all computers on the MNEA protocol including the *Cambridge S/L Nav* and the *Ilec*. It is a panel mounted 2-1/4" instrument with full GPS functions with a USA and Canadian database, and the whole Canadian VFR Supplement and the SW Ontario turnpoint database is being loaded. Data can be updated any time with a PC. Some other features include:

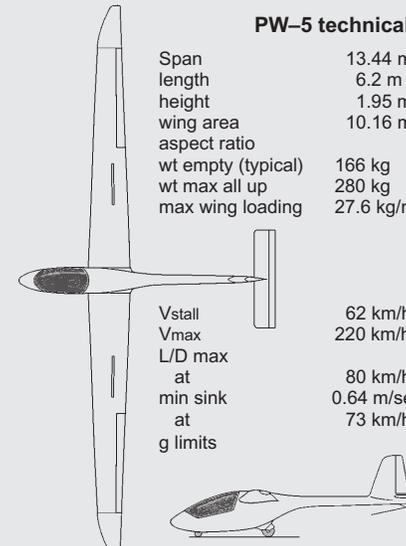
- alticoder
- full flight data recording capability
- in-cockpit programmable
- emergency setting with 10 closest waypoints
- pre-programmable task with up to 10 turnpoints

The LX4000 GPS / flight computer system has all of the above functions plus a complete LCD display of important information usually found on final glide computers and then some It displays the calculated wind, single or double arrows show current course deviation, the next turnpoint, speed-to-fly, glide slope deviation, distance to go, wing loading, MacCready setting, and more. The LX4000 consists of three units: the 2-1/4" GPS, a 3-1/8" computer unit, and an analog vario indicator.

Target price for the **LX400 \$1695**
For the full system **LX4000 \$4295**

These are about half the prices of the Cambridge system!
Order now and be prepared for the soaring season.
The manuals are currently being translated,
but for more info please call me anytime.

We are also Canadian dealers for: Super Dimona Hk 36 R motorglider, SZD-55-1 Standard Class winner, the new PW-5 World Class glider, the SZD-50-3 PUCHACZ, and the KR-03A KROZNO.



PW-5 technical data		
Span	13.44 m	43.6 ft
length	6.2 m	20.2 ft
height	1.95 m	6.3 ft
wing area	10.16 m ²	109. ft ²
aspect ratio		17.8
wt empty (typical)	166 kg	365 lb
wt max all up	280 kg	616 lb
max wing loading	27.6 kg/m ²	5.65 lb/ft ²
V _{stall}	62 km/h	33 kts
V _{max}	220 km/h	119 kts
L/D max		32.5:1
at	80 km/h	43 kts
min sink	0.64 m/sec	125 ft/min
at	73 km/h	39 kts
g limits		+5.3/-2.65

Please call or write for a quote on your "soaring" needs.

Trading Post

SINGLE SEAT

1-26C, C-FRSD, 1965, no damage, 2200h, condition 7/10 inside & out, always hangared. \$7000. CVVQ c/o Claude Rousseau (418) 875-4395.

1-26C, C-GNYB, 1260h, basic instruments, no trailer. \$6000 obo. MSC club ship. Call O. Maranta (613) 678-5197.

Monerai, C-FEUQ, very good condition, basic instruments, Cambridge audio vario, netto, TE, panel mount TR-720 radio. Encl steel trailer. \$7200. Struan Vaughan (403) 362-5837.

Ka6CR, C-FURK, 1070h, fuselage refinished in 1993 incl new canopy. O2, Becker radio, Winter barograph, Security chute, encl metal trailer. Very clean aircraft, well maintained. \$10,000. Call Jerry Vesely (403) 625-3155 work, 625-3871 home.

Ka6CR-PE, C-GJUA, #6310 954h. Better L/D than CR with the pendulum style elevator. Standard instruments, 2 varios (one with audio), 8 day clock, G-meter, encl wood trailer. \$9200 obo. Call Joseph (519) 354-4206 (Chatham, ON)

HP-11A, new instruments, O2, Security 150 chute, 720 chan radio, new Schreder trailer. \$12,500. Horst Dahlem, (306) 955-0179.

RS-15, C-GPKH, estate sale - trailer, instruments, chute. Contact Ed Hollestelle (519) 455-3316 (B), or Chris Eaves (519) 452-1240 (B)

RS-15, C-GPHZ, only 485h. One of the finest looking RS-15s flying in Canada. Won the 1993 Open Class (handicapped). Winter audio vario and basic instruments, Niagara chute, ballast capable, Schreder trailer. Will deliver anywhere in Canada. Great bang-for-the-buck with 38:1 performance. Whole lot (except delivery) \$15,500. Dave Mercer (403) 594-0199.

ASW-15b, with basic instruments, alum trailer. Needs repairs due to lack of maintenance and the spar AD (have all the materials for the AD). \$5000. Robert Smolka, (613) 596-6828 eves, fax (613) 763-5730.

Ventus B/Turbo, C-FMVA, with 15/16.6/17.6m wingtips, Masak winglets, Ventus C wing root fairing mod, Westerboer computer, Dittel radio, O2, tow-out gear, Komet trailer. All in excellent condition. Ed Hollestelle (519) 455-3316 (W), 461-1464 (H).

free flight non-commercial advertising

- Personal sailplane and sailplane equipment ads are free for SAC members, \$10 per insertion for non-members.
- Ad will run twice. If ad is to continue, notify editor for each additional two issues. Notify editor when item is sold.
- Normal maximum length is 6 lines. Ads are subject to editing if space is limited.
- Send ad to editor, NOT to National Office.

MISCELLANEOUS

Trailer, steel tube frame, galv. steel cover, good condition. Internal dimensions: 28' x 3' wide x 4' high, (5'-2" for fin). Tows well. \$2000 or offer. Bob Gairns (514) 691-4754 (Montreal).

Varicalc Vario, final glide, speed-to-fly, averager, clock. One season old. \$700. Gilles Séguin (514) 377-5737 evenings.

Parachutes, three Cu Nim club military chutes, \$250 each. Dave Fowlow (403) 289-9477 (H).

Winglets, kit for HP-18 or HP-16/RS-15 without the aileron counterweights. Lowers thermalling speed by 5 knots, improved roll rate and other benefits. Kit contains molded fibreglass skins and materials to custom fit to your ship. \$500. Ed Hollestelle (519) 455-3316 (B), (519) 461-1464 (H).

Turn coordinator, 12/14V, 3-1/8", like new, \$200. Andrew Jackson (403) 435-4425.

Video quest Does anyone have a copy of the Walt Disney film, "The Boy Who Flew With the Condors", circa 1970? Will pay for full tape and shipping cost. Mike Maskell (204) 831-8746 collect.

TWO PLACE

2-22E, C-FACC, 1965, good condition. \$4500. Covered trailer (needs work), \$500 with glider only. Call Steve Patton, (604) 536-2819.

2-33, C-GXGX, 1968, 4100h, no damage, condition 7.5/10 inside & out, always hangared. \$14,000. CVVQ c/o Claude Rousseau (418) 875-4395.

USED SAILPLANES WANTED FROM CLUBS & PILOTS

If you are considering selling, call **FREE FLIGHT** immediately, don't wait for the magazine to appear! The sailplane market is tight, and the editor regularly gets calls to see if anything has become available.

MAGAZINES

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

SOARING PILOT — bimonthly soaring news, views, and safety features from Knauff & Grove Publishers. \$US20, add \$8 for foreign postage. RR#1, Box 414 Julian, PA 16844 USA.

NEW ZEALAND GLIDING KIWI — the official publication for the 1995 World Gliding Championships at Omarama and the bi-monthly journal of the N.Z. Gliding Association. Editor, John Roake. \$US25/year. N.Z. Gliding Kiwi, Private Bag, Tauranga, N.Z.

SAILPLANE & GLIDING — the only authoritative British magazine devoted entirely to gliding. 52 pp, bi-monthly, and plenty of colour. Cdn. agent: T.R. Beasley, Box 169, L'Orignal, ON K0B 1K0 or to BGA, Kimberley House, Vaughan Way, Leicester, LE1 4SG, England. £15.50 per annum (US\$30) or US\$40 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.

NON - SOARING ADS

To increase SAC advertising revenues, *free flight* will accept personal advertisements in "Trading Post", your house and Chevy included. (The Italian soaring magazine has a full page ad for *toilet seats - in colour - they are fibreglass*, though.) With a *free flight* circulation of 600 in Ontario alone, most in or near Toronto, a market is there. Tell other pilots what you have.

non-soaring ads
\$10/issue for max. 5 lines

TOWPLANE

L-19, 2000h TTSN, remanufactured in 1975, always hangared, clean, 8/10 condition inside & out, no damage, mogas STC, Continental 0-470-II-B, 700h SMOH by Continental (good cylinders). Sale includes a stripped, run-out 0-470-II (running in aircraft when removed). \$55,000. CVVQ c/o Claude Rousseau (418) 875-4395.

SUPPLIERS

REPAIRS & MAINT.

Sunaero Aviation. Glider repairs in fibreglass, wood, & metal. Jerry Vesely, Box 1928, Claresholm, AB T0L 0T0 (403) 625-3155 (B), 625-2281 (H).

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INSTRUMENTS & OTHER STUFF

Variometers, winglets, mylar seals — all products designed and built this side of the Atlantic! Peter Masak, Performance Engineering, Inc. tel (713) 431-1795; fax (713) 431-2228.

Variometer / Calculator. Versatile pressure transducer and microprocessor based vario and final glide calculator. Canadian designed and produced. Skytronics, 45 Carmichael Court, Kanata ON K2K 1K1. (613) 820-3751 or 592-0657.

Firmal Electronics. Cambridge variometers, L Nav and S Nav now both available with Global Positioning System (GPS) option. You need never be lost again! Write for list or phone John Firth, 542 Coronation Avenue, Ottawa K1G 0M4 (613) 731-6997.

MZ Supplies. CONFOR foam, Becker radios, most German soaring instruments. 1450 Goth Ave, Gloucester, ON K1T 1E4 tel/fax (613) 523-2581.

SAILPLANE DEALERS

Lark. Single, two place, motorglider and parts, Flite-Lite Inc. (gliders), (305) 472-5863, fax 473-1234.

Schempp-Hirth. Nimbus, Janus, Ventus, Discus. Al Schreiter, 3298 Lonefeather Cres, Mississauga, ON L4Y 3G5 (416) 625-0400 (H), 597-1999 (B).

Schleicher. ASK-21, 23, ASW-22, 24, ASH-25. Ulli Werneburg, 1450 Goth Avenue, Gloucester, ON K1T 1E4 (613) 523-2581.

Schweizer parts. Walter Chmela, (416) 221-3888 (B), 223-6487 (H), #203, 4750 Yonge Street, Willowdale ON M2N 5M6.

Solaire Canada. Ed Hollestelle (519) 455-3316 tel & fax. SZD-55-1, Krosno, PW-5, trailers, GPS, and other sailplane stuff.

PROVINCIAL ASSOCIATIONS

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(514) 653-1945

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2910 Robert
RR 1, Lennoxville, PQ J1M 2A2
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Claude Gosselin
30 des Orties
La Prairie, PQ J5R 5J3
(514) 444-3450

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Ste-Catherine, PQ G0A 3M0
(418) 875-2005

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St. Laurent, PQ H4L 4W6

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3434 Ch. Ste Famille
Chicoutimi, PQ G7H 5B1

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c/o OC Rec. Platoon, CFSPER
CFB Borden, ON L0M 1C0

BEAVER VALLEY SOARING
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Thornbury, ON N0H 2P0

BONNECHERE SOARING
Box 1081
Deep River, ON K0J 1P0

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SOARING ASSOCIATION
Bob Leger (416) 668-5111
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Whitby, ON L1N 6S1

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Box 36060, 9025 Torbram Rd
Bramalea, ON L6S 6A3

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1085 St. Jovite Ridge
Orleans, ON K1C 1Y6

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Ottawa, ON K1V 6L1
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(403) 239-5179

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Grande Prairie, AB T8W 2A6
(403) 539-6991

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Port Alberni, BC V9Y 7L7
(604) 723-9385

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Surrey, BC V4N 3G3
(604) 589-4552

BULKLEY VALLEY SOARING
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Smithers, BC V0J 2N0
(604) 847-3585

VANCOUVER SOARING ASSN
Membership Secretary
Box 3251
Vancouver, BC V6B 3X9
(604) 521-5501

SAC SUPPLIES FOR CERTIFICATES AND BADGES

1	FAI 'A' badge, silver plate pin	\$ 5.00
2	FAI 'B' badge, silver plate pin	\$ 5.00
3	SAC BRONZE badge pin (<i>available from your club</i>)	\$ 6.00
4	FAI 'C' badge, cloth, 3" dia.	\$ 4.50
5	FAI SILVER badge, cloth 3" dia.	\$ 4.50
6	FAI GOLD badge, cloth 3" dia.	\$ 4.50
	<i>Items 7-12 ordered through FAI awards chairman</i>	
7	FAI 'C' badge, silver plate pin	\$ 5.00
8	FAI SILVER badge, pin	\$39.00
9	FAI GOLD badge, gold plate pin	\$35.00
	<i>Items 10, 11 not stocked - external purchase approval given</i>	
10	FAI GOLD badge 10k or 14k pin	
11	FAI DIAMOND badge, 10k or 14k pin and diamonds	
12	FAI Gliding Certificate (record of badge achievements)	\$10.00
	Processing fee for each FAI application form submitted	\$10.00
13	FAI badge application form (<i>also stocked by club</i>)	n/c
14	Official Observer application form (<i>also stocked by club</i>)	n/c
15	SAC Flight Trophies application form (<i>also stocked by club</i>)	n/c
16	FAI Records application form	n/c
17	SAC Flight Declaration form (<i>also stocked by club</i>) per sheet	\$ 0.15
18	SAC guide "Badge and Records Procedures", ed. 6	\$ 5.00
19	FAI Sporting Code, Section 3, Gliders, 1992	\$ 7.00

available from and payable to Aeroclub of Canada
Please enclose payment with order; price includes postage. GST not required. Ontario residents, add 8% sales tax. Items 1-6 and 13-18 available from SAC National Office. Check with your club first if you are looking for forms.

ARTICLES ACVV POUR CERTIFICATS ET INSIGNES

Insigne FAI 'A', plaqué argent	\$ 5.00
Insigne FAI 'B', plaqué argent	\$ 5.00
Insigne ACVV BRONZE (<i>disponible au club</i>)	\$ 6.00
Insigne FAI 'C', écusson de tissu	\$ 4.50
Insigne FAI ARGENT, écusson de tissu	\$ 4.50
Insigne FAI OR, écusson de tissu	\$ 4.50
<i>Les articles 7-12 sont disponibles au président des prix de la FAI</i>	
Insigne FAI 'C', plaqué argent	\$ 5.00
Insigne FAI ARGENT	\$39.00
Insigne FAI OR, plaqué or	\$35.00
<i>Les articles 10, 11 ne sont pas en stock - permis d'achat externe</i>	
Insigne FAI OR, 10k ou 14k	
Insigne FAI DIAMAND, 10k ou 14k et diamands	
Certificat FAI de vol à voile (receuil des insignes)	\$10.00
Frais de services pour chaque formulaire de demande soumis	\$10.00
Formulaire de demande pour insignes (<i>disponible au club</i>)	n/c
Formulaire de demande pour observateur officiel (<i>disponible au club</i>)	n/c
Formulaire de demande pour trophées de vol de l'ACCV	n/c
Formulaire de demande pour records FAI	n/c
Formulaire de déclaration de vol de l'ACCV	\$ 0.15
ACVV guide des procédures pour FAI certificats et insignes (éd.6)	\$ 5.00
FAI Code Sportif, Planeurs, 1992	\$ 7.00

disponible et payable à l'Aéroclub du Canada
Votre paiement devrait accompagner la commande. La livraison est incluse dans le prix. TPS n'est pas requise. Les résidents de l'Ontario sont priés d'ajouter la taxe de 8%. Les articles 1-6 et 13-18 sont disponibles au bureau national de l'ACVV.

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