5/93
Oct/Nov

# free flight • vol libre

# POTPOURRI

I haven't heard what it's been like in the rest of Canada, but for the last three weeks we in Edmonton, for a change, have been having some fairly decent soaring weather. Let's hope it continues for another three or four weeks so the clubs can generate some income.

The accident scenes are still haunting us. At last report, the cost of the claims was getting close to the amount of the premiums and we still have at least two months of flying to consider. This doesn't bode well for the cost of premiums next year. I hope those who have had the unfortunate experience of being involved have sent a full report to the Flight Training and Safety Committee so that the rest of us may be can learn the easy way what not to do.

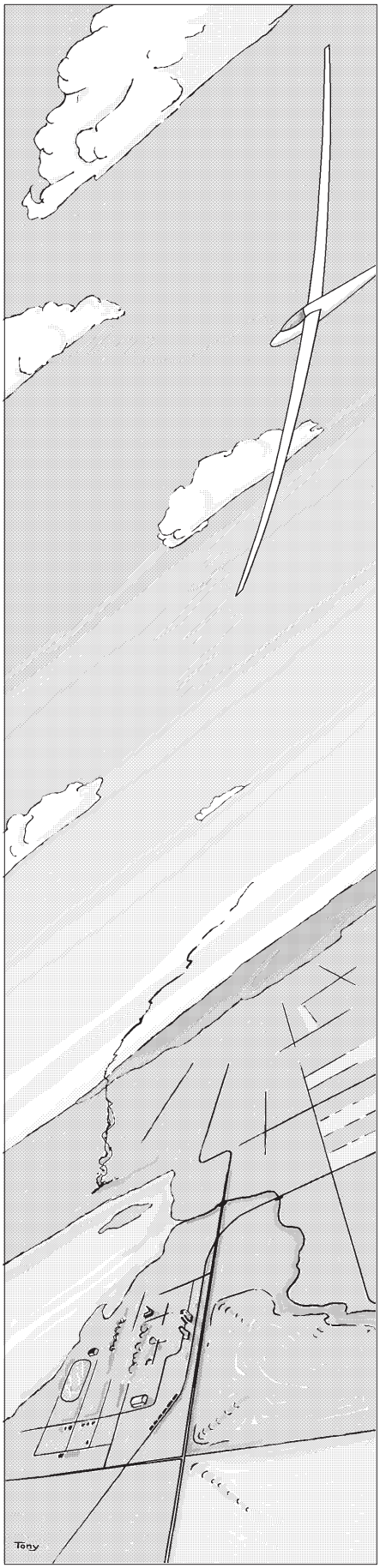
Speaking of the Flight Training and Safety Committee, I understand that Ian and his group will have the new instruction manual ready for printing this fall and it will be in the hands of the instructors by next spring. It has taken six years of effort and revisions to complete this new resource book which includes the latest thoughts on training. I wish to thank you, Ian, and your group, for all the work that has gone into it.

We will not be having an October directors meeting due to the tight budget restraints, but instead will be having a telephone conference to discuss such things as the EAA Young Eagles program, the Worlds Lottery Fund Raising Campaign that New Zealand is proposing to obtain funds for pilots competing in the Worlds to be held in New Zealand, proposals for a new five to ten year planning scheme, and other matters needing review.

Membership is still a matter of concern. We may reach last year's total or be close to it, but it's highly unlikely that we will exceed it. As has been stated before, the last few years' incomes have been largely dependent on membership revenues, so a change of one hundred members can seriously affect our budget and the amount of services provided.

Please fly safely.

*Al Sunley*




**At the turnpoint** by Tony Burton

# free flight • vol libre

Trademark pending Marque de commerce en instance

5/93 Oct/Nov

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

ISSN 0827 – 2557



**Cover** A temporary home away from home. Chris Eaves has parked his sailplane at Dinsmore airport, north of Swift Current, on one of his off days at the Nationals. Photo by Sue Eaves

# Club flying vs competition lifestyles

## why they often neither impress nor support each other

**Jim Oke**, Winnipeg Gliding Club

This letter was prompted by an editorial in the Canadian Advanced Soaring Association newsletter by Ed Hollestelle which discussed the problems of getting more support and funding for the Canadian Team and competition in general.

First of all, concern over the future of soaring is hardly restricted to competition and cross-country glider pilots, to SAC, or even to Canada. I think every club in the country has looked with alarm at its membership numbers and sought ways and means of drawing in more members. My own club has tried the whole gamut of devices such as shopping mall displays, open house information meetings, TV appearances and advertising, airshow participation, low cost introductory packages, and so on to try and generate public interest and membership.

In my view, getting people to take up soaring is like getting people to vote NDP in a federal election. There seems to be a core constituency that will come onboard fairly readily and remain loyal but expanding beyond this core group is quite difficult and may only draw in temporary supporters who drift off at the first opportunity. Worse, an intensive membership drive can drain so much time, money, and energy away from other club activities to even become harmful to a club. At some point, reality has to be faced and a gliding organization's size and operating philosophy tailored to the core audience that is really there; in other words, we should make sure that we are doing a good job serving our existing members and guard against putting too much effort into membership expansion schemes of questionable value.

With regard to world contest participation, I think you must be aware that you are preaching to the converted within the CASA membership/readership. The question might more properly be asked as, "What can be done to improve world contest support amongst Canadian glider pilots at large?" Clearly, unless we can get our fellow glider pilots firmly on side, CASA (or whomever) is going to have a tough time going after SAC, government, sports body, or sponsor money for world contest purposes.

In this connection, I think we have all seen signs that contest pilots do not come off very well in the eyes of most club pilots. It is my experience that many club pilots consider contests as more of a nuisance than anything else; perhaps all they see is that a club towplane disappears for a few weeks at peak season, or maybe a bunch of strangers invade their club (again at peak season) and the usual 2-33 flying is disrupted. That sort of thing. This "who needs a contest" attitude may be as much the problem in finding contest sites over the past few years as any other factor. In other words, club executives may be simply reacting to their members' wishes in refusing to consider hosting a contest.

A few years back I attempted to promote the idea that a host club ought to have something tangible to show for their efforts in hosting a contest (a new outhouse, base radio station, map board, or whatever) to provide an incentive for club members to become involved in contest organization. Probably not a bad idea but it would have cost a few bucks extra on the entry fee, the size of which is a hot item with contest pilots — besides, the move towards austere, multi-club organized contests also works to defeat this idea.

The noticeable lack of support for contests in general and world teams in particular is clearly a sad state of affairs, but why have things got this way? To start with, there is a basic attitude problem that I have seen at numerous clubs. Essentially most clubs are so geared to ab initio training and have such restrictive local flying practises that cross-country is often the last thing that club pilots are permitted to think of. The incestuous nature of most Canadian clubs allows this mindset to continue through generation after generation of instructors and club executives. We have all seen the symptoms such as harsh punishments handed out to anyone careless enough to land out in a 2-33, club gliders bent when scraping back to the airfield after overflying perfectly landable fields because the pilot was "afraid" to land out, refusal of the club to risk club aircraft on cross-country expeditions, and so on. I agree that there are some enlightened clubs around where cross country is genuinely encouraged, but these clubs are the exception.

concluded on page 21

**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.

For change of address and subscriptions to non–SAC members ($20 per year, US$22 in USA, and US$28 overseas), please contact the National Office, address below.



Deadline for contributions:

**5** January, March
May, July
September, November

**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.

***vol libre*** est le journal officiel de l'ACVV.

Les articles publiés dans ***vol libre*** sont des contri-butions 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 apparait 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 apparait au bas de la page à gauche.

**EDITOR**
Tony Burton
Box 1916 Claresholm, Alberta T0L 0T0
tel & fax: (403) 625-4563

Any service of Canada Post to above address. Commercial courier service, c/o "Claresholm Local Press".

**COMMERCIAL ADVERTISING**
National Office (613) 739-1063

Date limite:

**5** janvier, mars
mai, juillet
septembre, novembre

# letters & opinions

## WHY BOTHER WITH GLIDING? REFLECTIONS ON WHY WE DO IT

If ever there was a time for me to write to *free flight* magazine it is now, for I sit here with my neck supported in a collar, with nothing else to do except rest, think, read and write. The plethora of Canadian television channels is conducive to a unique form of remote-itis; TV becomes boring surprisingly quickly. Two days ago I was involved in a car accident in Winnipeg along with my brother, my two cousins and a friend. Fortunately we are all still alive; it could so easily have been a fatal accident. My brother and I are English and we are visiting relatives in Canada during our summer holidays.

I recently obtained my British Gliding Association solo licence at the Cambridge University Gliding Club. I had hoped to do some gliding here in Canada — I'd heard about the prairie thermals in Manitoba and the facilities of some clubs in Ontario. During my stay in Toronto, I was unable to travel to York Soaring Club due to family commitments. Then, I managed to get myself to the Winnipeg Gliding Club at Starbuck airfield. Alas, the runways were waterlogged and, perhaps worse still, mosquito ridden! So, when the car accident happened, I had not managed to sit in a glider in Canada, let alone fly. All this despite the hospitality of members of the York and Winnipeg clubs, to whom I am grateful.

Moments like this don't happen often, I'm glad to say. However, it is at times like this that I wonder why I bother with gliding. Why do I tolerate the hassle of getting airborne? Our sport can be the ultimate in frustrating activities. You are itching to get up in the air when the towpilot or winch driver is nowhere to be found. Sometimes you fail to centre on that thermal — everyone is up at cloudbase when you are back on terra firma. Every now and then though, you get that buzz. The exhilaration and beauty of a soaring flight, skirting columns of rain, panoramic vistas and the sense of freedom — it cannot be described, only experienced. There are challenges, goals, and dreams. As in life, when a goal or dream is fulfilled, the sense of achievement is often short-lived. But very soon there are new goals and new dreams to aim for. I am not a very competitive person, but this I believe is why one learns and progresses through life. Sometimes goals or dreams cannot be achieved no matter how hard one tries. Everyone finds themselves in this position once in a while.

So what does one do when this happens? To the adage, "if at first you don't succeed, try and try again", should be added "then give up". Knowing when to quit is as valuable as knowing when to try. Glider pilots understand this well, I believe. Bad incidents scar forever, but one must endeavour to push the scars into the background, where they belong.

As soon as I'm able, I'll be airborne again. I have many goals and dreams waiting for me — both in gliding and in other areas of my life. Will the accident stop me from driving? Certainly not. On the other hand, my cousin who was at the wheel of the car when the collision occurred feels that she never wants to drive again. I hope that she pushes her fears and scars into the background. Otherwise, Canada will lose one more of a dying breed — a safe and responsible driver.

**Harjinder Obhi**

## HABIT OR SKILL?

*"One view of skills is that they are simply habits. It is thought that a skill, once learned, becomes automatic and unconscious, fixing predetermined ways of seeing and behaving. But habits and skills are quite different sorts of things. While habit involves performing an action blindly, without thought, a skill involves just the opposite. Skilled performance involves being critical and careful, making adjustments according to changing circumstances, noticing mistakes and making efforts to improve. And the fact that skills are assimilated (or embodied, does not preclude control, but rather enhances it."*

Dr. Sharon Bailin
*Simon Fraser Alumnl Journal,* Summer 1993

Although many gliding instructors would say that they try to teach "good flying habits", I think that most would acknowledge that their aim lies closer to Dr. Bailin's definition of skills. Meanwhile, how many of us have formed habits (as opposed to skills) for rigging, daily inspections, or takeoff and landing checks? Take another look at that definition of a skill: it may help you to become a nice old glider pilot who bores his grandchildren with tales of uneventful flights to nice, dull landings.

**Brian Hollington**
Vancouver Soaring Association

## A BACK ISSUE NEEDED FOR PAUL SCHWEIZER

... As I get older, I am trying to gradually move my soaring files and collection of publications and books to our National Soaring Museum. One of my first efforts was to move my copies of *free flight* and the annual SAC reports to the NSM. Since we would like to see the NSM have a full set of copies of *free flight*, I wonder if .. SAC members have any of my missing ones? Could a list of my missing back issues be put in the next *free flight*? Perhaps some members might be willing to send any of the missing copies to the NSM...

Sincerely,
**Paul A Schweizer**

*All the missing copies of free flight have been found. Thank you for your help.*

# The UN-NATIONALS

## a beginners contest has promise



Carol King

**Richard Oflicer**
Gatineau Gliding Club

AS THE CANADIAN NATIONALS are expensive and beyond the reach of low time pilots, there is a renewed interest in contests that are more low key and which provide experience to pilots flying more modest performance aircraft. With this in mind, Glenn Lockhard has for the past several years been the focal point for several types of contests aimed at the low time pilots. Several cross-country contests have been success fully organized to provide pilots with the initial training to venture away from the home field for the first time in gliders of similar performance to the 1–26. Several local clubs have used this medium to upgrade pilots to cross-country soaring, and check–outs for cross-country in club gliders.

1993 was the year of change. Glenn, assisted by Beth McCollum and Bob MacPherson (all of GGC) organized a "Nationals" for the low time pilot. Invitations were sent to all clubs in Eastern Canada in an attempt to attract the largest number of contestants in the smallest geographical area. Emphasis was placed on gliders of low performance; those that inexperienced pilots will be flying at the club level. While no one was refused entry, the handicap system negated sailplane performance and pilot skill would provide the measure to win.

The opening day morning was spent on registration, task committee selection, and the myriad of other details that so fills the day of contests. It was decided that cameras would be used but the films not developed unless required for a badge flight. Ted Froelich provided the meteorology reports, and several club members provided extra ground/air aid as required. Landouts, it was decided, could be retrieved by air from selected airports.

Similar to the current trend in the Nationals, cost were kept to a minimum — in our case tows were $12, with no other fees at all. Four clubs participated. While the reasons for pilot entry are not clear, several wanted to upgrade their skills, while others wanted to fly in a contest setting with relaxed rules. Fifteen gliders were registered from Champlain, GGC, MSC and RVSS. Fortunately there was enough spare room in the hangar so no gliders had to be tied down outside. This made the gridding of the contest easier.

So — what happened? Like so many contests, the time of year was chosen to provide the best soaring conditions historically. What turned out after a great weekend was a hot hazy week, with only one exceptional flying day. Oh, the way of contests.

DAY 1 The day commenced sunny, but as the temperature climbed so did the humidity. The gliders were placed on the grid by 12:30, and there we waited. By 15:30, it was apparent that there would be no contest flying. The grid did launch however, and there was some soaring. Paul Fortier (1-34) scraped up 41 minutes. The Tern, piloted by Wolfgang Weichert, smoked to a stop near the finish line. Those who are familiar with the 1-26 brake system will be aware of what happens when it's applied too vigorously. No one was aware of the pilot's identity until the smoke cleared.

DAY 2 The day started hot and hazy, and the weather just got worse. The decision to grid was postponed until it was too late to launch. The pilots rallied and forged off to the pool for the afternoon, telling tales of the great flights that would be made next day. A spaghetti dinner was supplied by Jessie Milc and Sondra Brewin, and the dessert by Sylvia Tilgner.

DAY 3 It was a soaring day. A PST task was called. In order to give the greatest safety margin, the gliders were divided into three classes — notably 1-26, sports, and glass. For the day, the 1-26 had 1 hour; the sports had 1.5 hour; and the glass had 2 hours. Gilles Séguin had the longest distance of 133 km. The day's winner was Paul Fortier, and overall, the leader was Carol King.

DAY 4 Hot and humid returned. The task was a 100 hour inspection on the Blanik, and three laps around the pool. There was no contest since visibility was marginal at 1500 feet and no pilots wanted to fly in murk with other gliders in the same area. Dinner was the buffet at the local Chinese restaurant.

DAY 5 The task was similar to Day 3. While several pilots did not compete, those that did achieved surprising results in hot and hazy weather. The winner of the day was L. Vigeant–Langlois flying a 1-26. The overall winner was Beth McCollum and Frank Vaughan team flying an ASK-13. The closing dinner was hamburgers and salad provided from the proceeds of the spaghetti dinner. A new trophy has been started for the overall winner of the contest. As well, those that are familiar with the Flamingo will be pleased to learn that a "Team Hummingbird" has now been officially launched.

Everyone had a great time, and had the weather cooperated, flying would have been even better. A number of pilots are now cross-country checked and on their own. The club is planning a similar contest next year — so come one, come all. •

**FINAL RESULTS**

| | | | |
|---|---|---|---|
| 1 | McCollum/Vaughan | ASK-13 | 767 |
| 2 | Peter Sulley | Skylark 3b | 718 |
| 3 | Paul Fortier | 1-34 | 685 |
| 4 | André Sirois | 1-36 | 578 |
| 5 | L. Vigeant-Langlois | 1-26 | 564 |
| 6 | Alaln Berlnstain | 1-26 | 555 |
| 7 | Carol King | Libelle | 474 |
| 8 | Rick Otficer | Austria | 467 |
| 9 | Gilles Séguin | DG-300 | 464 |
| 10 | Dave Cook | ASK-13 | 341 |
| 11 | Jim Perkins | 1-26 | 269 |
| 12 | Norman Fortin | LS-4 | 244 |
| 13 | Wolfgang Weichert | Tern | 162 |
| 14 | Ula Okapuu | 1-35 | 161 |
| 15 | Ted Froelich | 1-26 | 155 |

# CHOOSING CHAMPIONS

point spread is all we need to know about a task's value in determining the contest winner.

**Alan Reeter**
from SOARING

THIS ARTICLE attempts to clarify some of the issues related to tasking and scoring. It shows how the original Pilot Option Speed Task (POST), the Speed-Only POST, and the Assigned Speed Task (AST) differ in selecting winners. In the process, I've tried to present some concepts that will be useful to anyone interested in racing or participating in the debate over racing rules. Anyone wanting to compete effectively will also be interested. Preparing for racing begins with a clear understanding of what it takes to win. This allows you to priorize your training and concentrate on the important skills.

In preparing this article, I have analyzed four years of US national contests with the assistance of a colleague, Don Witzke. (He is the Assistant Director of Testing and Evaluation at the University of Arizona School of Medicine. Don's job involves analyzing the quality of testing and evaluation procedures, which is exactly what I hoped to do with sailplane races.) The data came from the four 15 metre nationals and three Standard class nationals during the 1989, 1990, 1991 and 1992 seasons. At times, I refer to the 1992 contest season separately because the Speed-Only POST replaced the POST.

Here is a short explanation of the tasks for those not familiar with racing. The AST requires that all contestants fly the same assigned course. The highest speed wins. The POST allows individual contestants to fly any course they desire using certain allowed turnpoints. The winner is chosen based upon a combination of speed and distance flown during a specified time interval. This task has a "scheduling" aspect because there is a penalty for flying longer than the specified time. The Speed-Only POST is similar to the POST except for the scheduling aspect. The pilots need only fly for a minimum interval. The highest speed wins. I have used the word "POST" to mean both the original POST and the Speed-Only POST.

### What's the goal of the contest?

The stated goal of the SSA contests is to choose a national champion. This article only looks at contests from this perspective. It does not consider other aspects such as a task's popularity, convenience, suitability to Sports class, or whether it gets the pilots back for the BBQ.

Are all tasks worth the same? No. To understand why, it is important to know that a task's value or worth is directly related to the point spread between competitors, not the maximum points awarded by the task.

For example, consider a five day contest with two pilots, Tom and Dick. Suppose you are told that Tom won four days and Dick won one. Can you say who won the contest? No, you don't have enough information. If on the other hand you're told that Tom won four days by 10 points each and Dick won one day by 100 points, you know that Dick won the contest. It turns out that the point spread is all we need to know about a task's value in determining the contest winner. The day that Dick won was more valuable because of the point spread. It doesn't matter what the maximum task points are, whether it was a hundred or a million points.

For selecting national champions, the original POST was generally worth more than twice as much as the AST (see the table below). Dividing the POST's point spread by the AST's point spread yields a ratio showing what the POST was worth relative to the AST in that contest. The average ratio for all five contests was 2.52. For a competitor, it is extremely important to do well on the POST days. The AST is much less important.

I used the spread between first and tenth place because that's about the range of finish positions that the contest winners typically must achieve each day. During the four years, the worst days for that year's national winners were 12, 20, 12, 12, 8, 24, and 13th place. The choice of range is not very critical because the point spreads are similar whether one looks at the point spread from first to fifth place or first to fifteenth.

The Speed-Only POST appears to generate point spreads similar to the original POST. At the 1992 Standard Class Nationals the spread for the Speed-Only POST was about 1.83 times greater than the AST. At the 1992 15 Meter Nationals the Speed-Only POST was worth 1.74 times the AST. This suggests that the "scheduling" aspect of the POST is not the cause of the large point spreads.

CONTEST POINT SPREADS AND RELATIVE VALUE

| Contest | Average daily point spread, 1st to 10th | | Ratio (POST/ AST |
|---|---|---|---|
| | POST | AST | |
| '89 15m | 96.5 | 56.0 | 1.72 |
| '90 Std class | 104.8 | 22.0 | 4.76[1] |
| '90 15m | 46.0 | 86.1 | 0.53[2] |
| '91 Std class | 448.0 | 191.5 | 2.34 |
| '91 15m | 152.0 | 49.8 | 3.25 |

Average ratio 2.52

1 May be atypical because there was only one AST day.
2 May be atypical because there was only one POST day.

You might want to evaluate the relative importance of the POST and AST in choosing the winner at your last regional contest. Try looking at the spread between the day's winner and the bottom of the top quarter. For example, in a contest of twenty pilots look at the spread between first and fifth place. In a few western and midwestern regionals that I have checked the POST had a greater value than at the nationals.

### Why does the POST count more?

Most pilots would agree that the POST and AST are different kinds of tasks requiring different pilot skills. This may seem obvious but some have argued otherwise. A simple statistical analysis would allow a person knowing nothing more of our sport than the contest scores to conclude the tasks are significantly different. He would use a "t-test" (difference between the means)[1]. When this test is applied to the national's results it concludes that the tasks are different events with a confidence level of 99%. But, this statistic is not particularly important because there are better ways of reaching the same conclusion.

For instance, the distribution of scores for the POST and AST are very different. A distribution is just another way of describing point spreads. The AST produces a lump of scores at the upper range with scores tailing off to zero. The POST produces a lump of scores in the mid-range. There are relatively few pilots with very high or very low scores. The difference at the low end may be due to fewer pilots landing out on POST. The differences at the upper range occur because similar scoring formulas are used to measure two different tasks. The AST primarily tests the pilot's ability to fly fast over a fixed course. The scoring formulas reward for speed by giving each pilot a score proportional to the speed of the winner. For example, A pilot flying 90% as fast as the winner gets 90% as many points. Since the day's leaders often finish within minutes or seconds of each other, the scoring equations yield a group of tightly packed scores.

1 The test was applied to the results of the 1989, 1990, and 1991 Nationals. The 1992 season was not included because of the switch to the Speed-Only POST. Data tor 1992 is insufficient to make a separate test. It included pilots having a minimum of five contests days each in the AST and original POST. The test was applied to the final placings of the pilots in each contest. Degrees of freedom = 54, t = 2.957, and level of significance, 99%.

POST is different because it is primarily a test of the pilot's ability to choose the right course with speed (in the AST sense) being less important2. More often than not, a few pilots find courses with much better soaring conditions. This produces large differences in speeds compared to the AST. Most experienced pilots would probably agree that the point spreads for a POST decreases as pilots choose more similar courses. In other words, as the courses flown by the leaders become more similar the more the point spreads look like AST point spreads.

Since the POST's scoring formulas are very similar to the AST formulas this creates large point spreads. (The scoring equations for both POST's appear as though they were borrowed directly from the AST.) To say that the differences in point spreads between the tasks are only due to the formulas ignores the differences in the tasks. Rather, it seems that we are measuring two different tasks with the same yardstick (ie. scoring formulas).

It's important to remember that the point spreads (ie. distributions) can easily be made to look any way we choose. The scoring formulas are arbitrary in the sense that they could be easily rewritten to produce different results. For example, the AST formulas could reward a pilot who flies 90% as fast as the winner with 80% as many points (eg. 800 points). It could even give him 50% as many points (eg. 500 points). The argument that large point spreads proves that the POST is a better test of pilot skill does not hold.

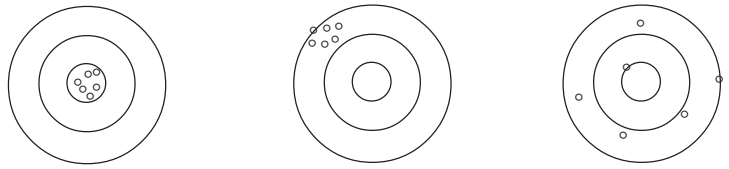
What makes a good task? There are two general concepts, reliability and validity, that are important in describing the quality of a test. Reliability describes the test's ability to give us the same result if it were repeated. Validity means the degree to which the task measures what it claims to measure. A target analogy is often used to describe the relationship between reliability and validity.

In Figure 1 the centre of the target represents a pilot's true score (ie. his true skills). If we had a highly reliable and valid test, his daily scores pattern would look like Figure 1a. Some of the AST-only contests at Uvalde produced examples of reliable and valid contests. Pilots were finishing in almost the same position every day After several days, most were convinced that the final standings were very representative of the true skill of the pilots. There was little doubt that the true champion had been identified. Such a contest has high reliability and high validity.

Figure 1b is an example of a pattern representing a high reliability, low validity task. An example might be a hypothetical task that is supposed to measure flying skill only, but actually measures local knowledge. (I assume that we are not interested in measuring local knowledge). The task is still reliable because the same pilots (the ones with local knowledge) would do well each day. However, the task would not be valid because it is not measuring the skill we are interested in. Some pilots might argue in favour of the task pointing out that the same "good" pilots won every day. This ignores validity.

Figure 1c shows what happens if a test lacks both reliability and validity. Such an event

Figure 1



a High reliability
High validity

b High reliability
No validity

c No reliability
No validity

measures very little of anything associated with pilot skill. The scores are produced by random variables, or luck. If you were in a contest consisting of such tasks you would notice that the standings differed significantly from day to day. The cumulative standings would never seem to "settle down" and the leader would change frequently. The contest ants would know that the cumulative winner would likely change if the contest went on one more day.

Notice that there is no figure representing no reliability, high validity. That's because there is no such thing. As we'll see later, we cannot have validity if there is no reliability.

In the real world, even a well-designed task will have some measurement error. The validity of the scores are almost certainly affected by some pilot qualities other than the one we are interested in. Also, the reliability of the scores is influenced by random variables. It's important to know that we can compensate for some measurement errors but not others.

In a contest made up of moderately reliable tasks, like ours, we can sometimes compensate by increasing the number of contest days. The scores may eventually converge on a valid result (or perhaps an invalid result). However, validity is limited by the square root of the reliability. In other words, validity is inherently limited by reliability. So, it becomes very difficult to reach a valid result when a contest becomes very unreliable. It's harder to compensate for a lack of validity. Extending the contest doesn't help. It just produces more convincing invalid results. So, it is essential that we begin by deciding which attributes we want in our contest winners. Tasks should be designed to measure these attributes. They should then be evaluated to see if they are doing what we intended.

Notice I haven't included "target" figures representing what really happens with our contests. There are not enough data to make that kind of analysis. For one thing, we need to know what each pilot's ideal score should be before we can even draw the centre of the target. If we knew that we wouldn't need contests. Most other types of analysis require that we account for things such as each competitors' experience level, local knowledge, equipment, and the day's weather. Those data are not readily available. Still, we know that validity decreases if a task's outcome is influenced by local knowledge. Most pilots know intuitively that local knowledge is more important for the POST than the AST. Knowledge of the local weather might help a pilot choose a course that takes advantage of shear, microfronts, or wave conditions. Also, he is more able to navigate without the distraction of reading and folding maps.

It's not clear just how important local knowledge is when POST is used to select champions. Local pilots (ie. those who presumably have the best local knowledge) do not dominate national contests. It could be that there is a threshold of knowledge that is necessary to compete effectively, but having much more than that is of little benefit. If all of the "good" pilots know the contest site, then local knowledge would not be much of a factor. If a potential champion were new to the site it would be. If you believe that the POST rewards for local knowledge you would expect this to decrease its validity and increase its reliability. Remember, reliability by itself is of no particular benefit.

Most pilots accept that random variables affect contests. On the AST, pilots encounter different weather because they start at different times and fly slightly different courses. Since pilots often fly much different courses during a POST, the influence of random variables, such as weather, must be greater, not less. This decreases both the validity and l reliability. In order for one to argue that the POST is more valid and reliable than the AST, one must believe that these measurement errors are insignificant compared to the POST's ability to test pilot skill.

The problem of mixing tasks At this point we can probably agree on two important points:

1. The AST and POST measure different pilots skills. The AST primarily tests speed–flying skills over a fixed course. The POST primarily tests course choosing skills.

2. The POST is valued much higher than the AST. These have important consequences when we try to combine these tasks within a contest.

Consider the Olympic pentathlon as an example. It consists of horseback riding, swimming, fencing, shooting and running. How-

concluded on page 17

2 Of course, there is overlap between the skills required by the AST and POST The AST requires some course choosing skills that are relatively minor deviations from the assigned course (eg. 10 to 30 degrees). Having speed-flying skills (in the AST sense) certainly helps with either POST. But, choosing the right course is what generates the point spreads.

# LET THE SPIRIT MOVE YOU

**Andrew McKittrick**

AS AN ACTIVE GLIDER PILOT for over fifteen years, I have always wanted my own ship. I've admired the German "glass slippers" and watched, much to my dismay, prices go up faster than a ten knot thermal. Ah well, I'll just have to rent, I thought, until I saw an ad in SOARING magazine about the American Spirit sailplane kit. A true 42 to 1 fibreglass sailplane for $17,980, made in America!

I phoned Advanced Soaring Concepts, Inc. in Camarillo, California and spoke with Tor Jensen, who as a long time soaring pilot himself, decided to build a modern sailplane and offer it as a kit to keep the cost within reach of normal working folk. Hence the name: American Spirit. Holding six patents in ultraviolet and infrared coatings for epoxy–based structures, Tor knew he wanted a sailplane that could benefit from the composite engineering knowledge his firm had developed while building various projects for both military and civilian customers. It has taken roughly two years to work out all the details of the design and produce the prototype currently flying and undergoing flight tests. After my tour through the ASC facilities, I would say this sailplane will set the soaring world on its ear. This is how a sailplane should be built.

Background The American Spirit represents the first all-out effort by a composite design and engineering firm to produce a state-of-the-art, easy to build, high performance sailplane kit. Prior to beginning the design work, six sailplane wrecks were pur chased to evaluate manufacturing techniques, including type and amount of materials used in construction. As a result, the fuselage of the "Spirit" was designed to provide more pilot protection than currently available any where in the market today.

The design has gone through a finite analysis program to determine load factors and stress points along the airframe. Combining the information and knowledge gathered during the design stage, this sailplane has some unique features including:

- Rounded spoiler openings which eliminates cracking at the corners
- Full sandwich construction for greater strength
- Cockpit reinforced with aramid fibre for greater pilot protection
- Large wing access panels to make assembly easier
- Turn down wingtips designed to protect wingtips during takeoffs and landings
- Cockpit designed for a 6'4", 260 lb pilot with a chute
- Aluminum honeycomb reinforcement
- Carbon fibre spar

Redefining Homebuilt As a pilot and not much of a builder, unless one can count numerous R/C gliders constructed over the years, I had some reservations about actually building my own full size sailplane. After seeing the factory, looking at the plans booklet and the way the sailplane goes together, I can tell all without reservation I can do this!

One of the goals of the kit designer was to make it easy for the first time builder to complete the project, hence everything one needs to do just that arc in the kit — including premolded parts. If one is familiar with the kit plane industry, the most important aspect of each kit is the quality of the parts and how many parts are pre-molded. I don't have to go through the laborious task of finding a ship to take a mould of the part I need to build and lay it up myself. (Don't laugh, this is what Long-EZ builders had to go through.)

With the American Spirit, all outer surface parts are pre-molded and ready for trim and fitting. Actually the entire glider can be cleco'ed (a temporary metal fastener) together before applying one drop of adhesive, ensuring proper fit and alignment. Part tolerances are approximately .020 of an inch, the highest in the kit building industry, bar none. This accuracy translates into ease of building. Epoxy adhesives and glass tape are neatly packaged and labelled.

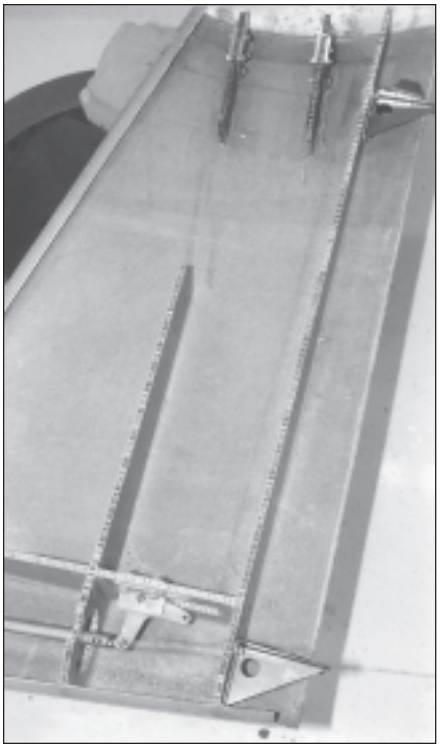
The metal box frame and landing gear is prewelded at the factory. All hardware is provided, and the canopy comes ready to trim and install to the canopy frame. Basic flight instruments are included such as airspeed indicator, altimeter and mechanical variometer. All materials are included for the control system along with templates and reamer for the bell cranks which the builder cuts out with a band saw. Material for the bulkheads and stiffeners are also included along with templates for cutting out all patterns.

### *American Spirit*
technical specifications

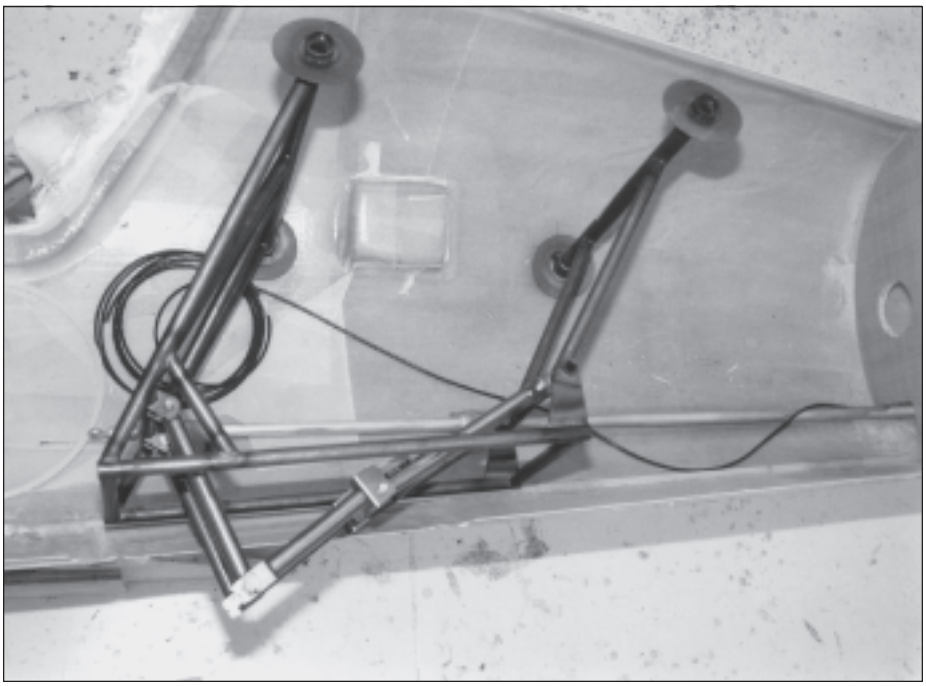
| | |
|---|---|
| Span | 15 m |
| Aspect ratio | 23.9 |
| Empty wt | 505 lbs (230 kg) |
| L/D max | 42:1 measured |
| Stall speed | 38 knots |
| Minimum sink | 1 knot @ 41 knots |

Price $US17,980 fob Camarillo, CA
info (805) 389-3434, fax (805) 482-3366

*Note: a flapped version of the kit, the FALCON, is being developed.*



Right side of vertical stabilizer with honeycomb spars, control linkages, and rudder hinge supports being installed.



The steel tube frame tranfers the loads from the wings into the fuselage and down to the undercarriage. The frame will be glassed into the right half of the fuselage shell along with bulkheads, antenna coax shown here, controls, etc. before the shells are mated.


Fuselage shell has been joined here on the prototype Spirit.

The instructions are simple and straightforward. There is also a builder hotline to answer any questions and help guide and advise during the building process.

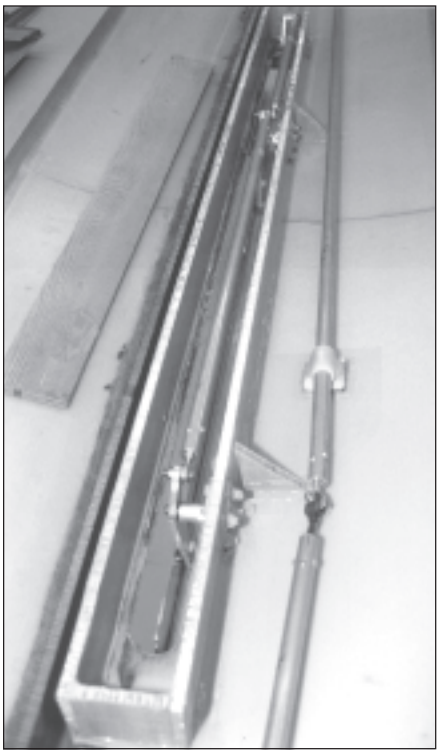
**Cockpit** Dedication to pilot safety has been a main consideration and feature of the sailplane's unique "cockpit enclosure". Fabricated from aluminum core honeycomb (the same material used in Indy Car tubs) with outside walls of sandwich construction reinforced with aramid fibre (the same stuff used in bulletproof vests), the American Spirit cockpit replaces the thin fibreglass shell found in other sailplanes. While no cockpit can ever be considered "crash proof", the design offers the strongest cockpit available in sailplanes today.

The standard European sailplane cockpit has always been a tight fit for the average North American male (5'10") with a parachute, so the American Spirit was designed to accommodate a 6'4", 260 lb. pilot with ease. This provides the pilot with unsurpassed comfort and makes those long duration flights much more tolerable. All controls are found in the right places, spoilers on the left hand side, a standard centre stick for elevator and ailerons and the gear handle on the right hand side. Rudder pedals are only adjustable on the ground to save costs. The control rods themselves are sleeved in Teflon making the feel very smooth.

**Fuselage** Its computer-generated shape is very graceful and contributes to the Spirits' outstanding performance figures. Benefitting from nose to tail sandwich construction reinforced with aramid fibre, the fuselage has molded return flanges for indexing and bonding, making the job of assembly a snap. Translated into non-builder term means that the halves of the fuselage have a flange in which the other nests, making the bonding process very simple. The fuselage incorporates a welded steel frame which carries the wing and landing gear loads. The bulkheads, equipment deck, and centre line stiffener are fabricated from aluminum core honeycomb. The entire unit can be assembled with temporary fasteners (clecos) prior to bonding so as to assure alignment and fit. This is very reassuring and necessary for a first timer.

**Control system** The rudder is controlled via a cable system tensioned at the pedals. All other control systems and landing gear are pushrod driven and all materials for the control system are included in the kit. The controls do not hook-up automatically as with some other high-end ships, but this was done to save money, after all this is a kit designed to keep more people in the sport of soaring.

**Wings** The airfoil was designed with performance in mind and yields a 42:1 L/D. The wing features a sandwich construction and carbon fibre spars, allowing the wetted surface area to be very small which contributes to the very low drag profile. The sandwich construction means that the wing comes to the builder finished with carbon spar in place, save for bonding the top and bottom halves together. The integrity of the airfoil is maintained because the ribs are already bonded in place in the bottom half of the



Honeycomb spoiler box, spoiler, and aileron linkage installed in the lower half of the wing. Note the carbon fibre shear web just to the left of the spoiler box.

wing panel, thereby eliminating another area where the homebuilder can make a major mistake — changing the shape of the airfoil while trying to build the wing.

The "Spirit" wing also benefits from a proprietary surface coat that is highly resistant to ultraviolet radiation and cracking which for many years has been the bane of fibreglass ships. The unique rounded spoiler opening eliminates cracks found on other glass wings at the corners of the spoiler openings. These two features are very important because they add many years of useable life to your sailplane as UV damage to glass wings causes the glass to become brittle and unserviceable and the cracks cause the gel coat to chip and peel. Turned down tips on the wing help protect the aileron and wing during landing. One of the benefits of technology gained from other projects is the use of high modulus carbon fibre in the wing which reduces the amplitude of oscillations caused by the flexing inherent in glass designs.

Final glide The American Spirit was conceived with the average pilot in mind who would like to make the transition from lesser performing ships to something more akin to a racer without putting up the house as collateral. The sailplane is not a racing ship (it does not carry water ballast), but a high performance Standard class ship for the average pilot, featuring a fully retractable gear, composite construction, 42 to 1 performance, and a reasonable price tag. Advanced Soaring Concepts, Inc. is to be congratulated for taking on an endeavour to which we all can benefit. The American Spirit is a terrific sailplane, and because it is a kit, it remains within reach to many pilots looking to move into a true high performance ship. •

# PILOT DECISION–MAKING OR JUDGEMENT TRAINING

This paper was originally taken from SAC's new training manual, *"SOAR AND LEARN TO FLY GLIDERS"*, and presented by Ian at the OSTIV seminar on glider flight training held in Alleberg, Sweden this summer. At the seminar, suggestions were adopted to give consideration to the possible negative consequences of flight options. This is the first time that pilot decision making has been an item in the flying training curriculum.

**Ian Oldaker**
Chairman, Flight Training & Safety Committee

Pilot decision making (PDM) is an important part of learning to become a pilot. While it would seem that we consider different options and then make decisions all our lives — whether to drive to the cottage late on a stormy night or wait until the next morning, for example, such careful weighing of choices seems to elude many of us when flying. This is particularly so when under added stress.

The purpose of judgement training is to add decision-making skills to the pilot's learning of the usual curriculum which includes mechanical (flying) and associated analytical skills, the acquisition of the needed aviation knowledge, long-term flight planning techniques, and so on. By adding the skill to assess the situation, to consider options and, based on predictions of what will happen, to make good decisions particularly when time is at a premium (for example when landing) you will achieve a higher level of learning and you will become more competent.

This all sounds very dry and uninteresting. However, learning the technique as it applies to flying is really easy, and it could save the day during some flight in the future.

Is it worth the effort? Of course!

The decision-making technique is surprisingly simple to learn and has many benefits. One of the benefits will be less stress on pilots especially when under a bit of extra pressure such as when faced with a low circuit and awkward approach. Therefore this will lead to safer pilots who will be thinking things through by considering different options and their con sequences. These better pilots will then enjoy their flying more.

While it may sound presumptuous to suggest that you can't make decisions, learning this decision-making process will enable you to evaluate options rapidly and then to make the most logical and hence safe decision. Not only will this achieve safer piloting, but will make everyday decisions easier too.

A benefit that may be a little more difficult to perceive is that, using this technique you will acquire flying experience more rapidly than a person who is not so focussed, and who flies around "just for fun". The focussed pilot will be able to predict from previous experience what is likely to occur next, and hence to make the right choices more quickly and easily. Try to emulate this type of pilot and learn the technique; then you will enjoy flying more, anticipating what will happen next and what actions you will be taking.

## THE FOUR STEP TECHNIQUE FOR MAKING FLYING DECISIONS

The technique is derived from Adaptive Management techniques which are used in making business decisions, and the technique serves our purposes very well.

- The first step is to assess or to see **the Situation** as it exists now.
- Next the pilot evaluates and rates **the Options** and predicts what is likely to occur for each option.
- Based on the predicted outcome that offers the best choice and the least risk, the pilot must **Act** on this one option.
- This action produces a new situation, so the pilot must **Repeat** the steps, part of which is to compare the prediction to what actually happens. This last action requires the pilot to re-assess the developing (new) situation.

Notice that these steps give us an easy to remember acronym:

**S O A R !**

## LEARNING THE TECHNIQUE

Your instructor will start you early in your flying training with an introduction to the technique along the following lines:

Assessing your situation Starting with the first step, on an early flight you will be shown how to assess and to see your situation. For example, on the descent towards the circuit entry area, you will be asked to assess where and how far you are from the club runway. Are you in an area of lift or sink, and what should be your next action, and so on?

When you are beginning to acquire some fly ing experience so that you can predict what is likely to happen next, including what the aircraft might do, you will need to start developing options.

continued on next page

**Evaluating the Options** A very important part of the process is to predict the outcome of each option. In the above example of assessing what to do next, we may have several alternatives: the first is to continue going straight; the second is to turn left, or to turn right, or to decrease our speed, etc. Why turn left?... Well, there is a good looking cloud and we "predict" lift; the chances of running into sink is low; so we can prolong the flight perhaps. If we go straight we'll conflict with several other gliders and the chances of a dangerous conflict are too high for us at this stage of our flying; and going right will get us to the circuit entry point — no negative consequences here. If the predicted outcomes are mostly for no lift or are negative in some way, we better choose the outcome where we will be safely closer to the circuit entry point. Then we choose to make a turn in that direction, and so on.

**Acting on the Best Option** Which option should be chosen? As hinted above choose the option based on the perceived benefit to you and which has the least negative consequences, and which also take into account the objectives for the flight. These could be immediate or longer-term, but in any case safety must take precedence. Safety should often veto what might otherwise appear to be an acceptable option.

The question then is: What is the best option? To decide, consider your goals, keeping safety foremost in your mind.

Having chosen the option that provides the best benefit, you now have to act. A word of caution must be included here. When choosing which option to act on, be more cautious than experienced pilots. This is because, as a low-time pilot you may have the skills to do the basic flying, but you will not have yet developed the judgement and anticipation skills that are developed by experience. As you develop more experience, more options will also present themselves. So too, the consequences of the different actions that you might be tempted to take will become more apparent. Always keep within your range of experience and skills.

**Repeating the Process** The fourth step is a very important part of this process, and it is to repeat the four steps. In this step you will be taught to see and assess the developing new situation. During this re-assessment, compare the results of your earlier decision to the predictions for that option. This builds what we call experience. By analyzing and comparing earlier predictions, it becomes easier to make better predictions in the future.

In the above example, if we had predicted that the turn would take us to lift, but all we see is strong sink, (if we are very low) we better act fast to evaluate new options, predict what will happen with each then choose the best and act on it! Then repeat and reassess again.

You have just read an example of repeating the **S O A R** steps in a few short lines, although it took a page or so to describe them first. Experienced pilots know they must make decisions in the air sometimes as fast as you read the above short paragraph! By practising the technique on each flight, you too will acquire the ability to make quick and well thought-through decisions which are based on all your flying experience.

There are other factors that must be considered in the different steps of the PDM process, and these are discussed next.

### *1 — The Situation*

Besides the important part of seeing the situation from the perspective of where and what the aircraft is doing, you should consider other longer-term factors. These are important and are: Pilot, Environment and Aircraft.

**The pilot** You may be tired after a rough long flight, so make allowances by deliberately saying, "I will begin to plan for my landing early. I will allow lots of time to think the situation through", and so on. Understanding ourselves, our limitations as pilots, is a key item that we neglect too often in our flying. Remind yourself that as we get older reflexes get slower, and our tolerance to heat and altitude, and to lack of food and water also gets lower. We must admit this though we feel it goes against the Macho image. This leads to the second area to see and assess.

**The environment** is the weather, the wind, its direction (particularly when landing), the temperature (too hot or cold and we don't function at our best), and the terrain (lots or little to land in, or we may still be at our comfortable home field). All pilots must assess these factors before they can make good decisions. We need to know for example if the wind has increased since takeoff (stronger wind gradient?), to recognize that the selected landing area is tricky because the topography suggests that the ground has a slope to it, or there are trees on the approach. A little extra time to think through and to plan the landing pattern *will* pay off. We take it for granted too often that the same old circuit pattern, late decision and same speed will do. Accident statistics show they won't.

**The aircraft** The third part of seeing and assessing the current situation is to think about the aircraft itself. We forget that this one has stiff or ineffective brakes, or that it is slow to roll compared to our own. We do fly different types occasionally, to take a passenger for example.

The aircraft factor should help us assess the total situation — "What is my condition? What is the environment doing? What can I expect the aircraft to do in reply to my control inputs?" All this is in addition to the situation as seen earlier by the pilot; height, speed, position relative to runway, other traffic, etc.

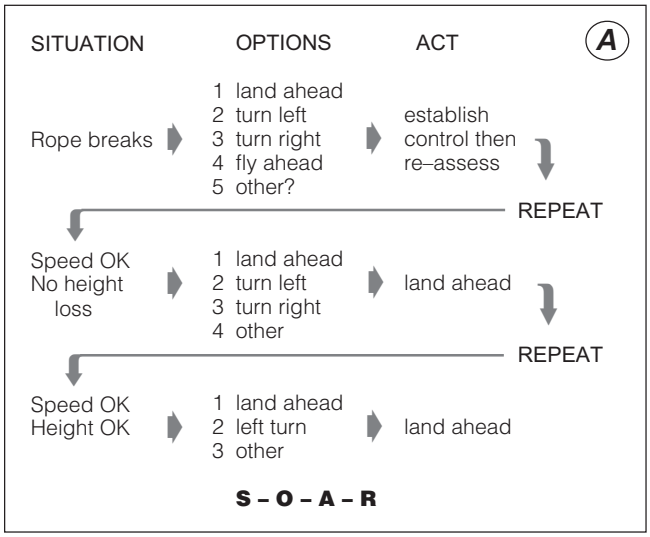
### *2 — Options*

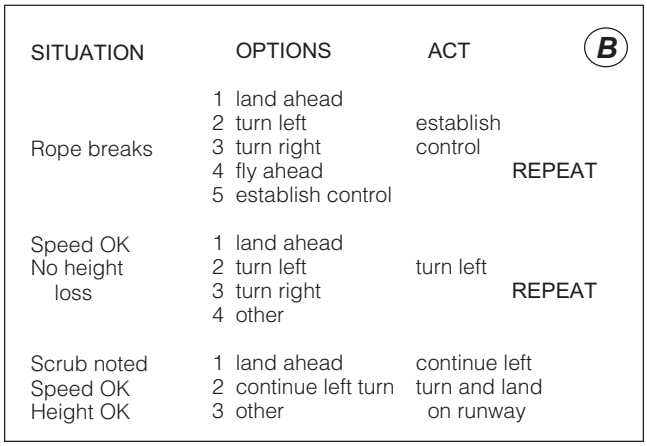
It is after you have flown a few flights that you start to gain experience. This experience gives you the ability to predict what will happen next. For example, you will know how you will react to certain inputs such as the sensations of stalling, or what the aircraft will do next. Also you will develop local knowledge, such as where there is likely to be lift, or even to develop an ability to predict what the instructor's reaction will be to your flying!

Using this experience, try to predict what will happen for each option you might choose. Each prediction must include two things:

- an estimate of the probability that you will gain a benefit for choosing that option,
- second, your guess of the probability that your choice will end negatively (the ultimate is that you will crash!)

The above options are of course strongly geared to the objective for the flight. The objective, or goal, could be short term, they might be simply to stay up, or long term such as trying to maximize the speed around a triangle. Other objectives could be, one of avoiding an outlanding, or of looking good (in front of your peers) or of playing it safe. One unfailing consideration must be that if there is a chance that your choice could get you into



trouble then that choice *must* be examined very carefully. Always! The chance that you could get into trouble should be weighed against the perceived benefits. As mentioned earlier, the option giving you the safest outcome should guide all your choices.

### *3 — Acting*

Having chosen the option that provides the best benefit, and that avoids any chance that you will create a problem for yourself because of the choice, you now have to act. You have been taught the skills to do this, however as already discussed, remember that as a low time pilot you must be more cautious than the experienced .

If you are an older pilot, however, remember that your reflexes slow down with the advancing years, and that what you might have got away with when younger will be ready to trip you up now. An example here is the older pilot who is very relaxed and makes late decisions about outlanding. A strongly competitive pilot also can make this type of error. Unfortunately, such late decision-making all too often ends in disaster.

So you act on the chosen option. This immediately leads to a new situation, and this gets us to the fourth step in this process.

### *4 — Repeating the Process*

When we repeat the fourth step we should be looking at the developing new situation. We must compare the results of our decision to our predictions for that chosen option. This builds up our experience which then makes it easier to make more accurate predictions in the future.

#### SAMPLE SITUATIONS FOR REVIEW

Two situations are given in the appendix to illustrate typical situations that will confront you as an early pilot learning the ropes. An example is given for the more experienced pilot who has become a bit complacent perhaps, and is thinking he or she can handle the developing situation. Review these and try to imagine yourself in similar situations. Review them later on during your training when they will mean more to you, when you will be able to relate more to the examples.

## APPENDIX
## THE PDM TECHNIQUE IN ACTION

To illustrate the technique in action, a few examples of situations are discussed. There are many situations which can be assessed using the PDM technique, and these go from considering whether you have adequately planned the flight and made all preparations in the first place, to assessing your final glide and upcoming circuit and landing after a five hour, cross-country flight. Situations can require slow, considered thought, such as before the first flight after rigging the glider, to ones that require very fast assessment and action such as being too low to fly the normal circuit pattern.

The following two situations are similar and are chosen to show how PDM can be used to safely modify what is an almost automatic series of actions following a low-level rope break. The last situation is chosen to illustrate that you do not have to be in the air to display good judgement by using PDM, in this case to decide on whether or not to fly.

#### EXAMPLE FOR A ROPE BREAK

The first situation refers to a low-level rope break. We are on aerotow at about 200 feet with a light wind. It is landable beyond the airfield, to the left is a stubble field and to the right a tall crop. The pilot is low-time and not too experienced on the glider. The rope breaks ... suddenly the pilot has no more pull ... How does this pilot react? What does the pilot see? What does he or she do? What should be done? Remember the automatic reactions. Here we go *(see box A at left)*.

Remember that a rope break can occur in the steep climb through the wind gradient. This requires the automatic reaction of lowering the nose to prevent the speed from dropping rapidly after the break. Also under this heading would come a low level waveoff by the tug when the speed could be marginal (spoilers or air brakes inadvertently left open).

Note that the pilot could have turned left towards the stubble field, but in this case, he was a low-time pilot and he considered the left turn more dangerous than going straight ahead onto a landable area. Here we see the pilot has also considered the negative aspects of a possible choice, and rejected it. We are also operating by the rule for a rope break below 300 feet, which is to land straight ahead with only a brief turn into wind if needed.

For a situation where a landing straight ahead is out of the question, the pilot must still react automatically, but his or her responses may be modified now by PDM, that is, by good judgement. The following example shows how this would be done.

#### EXAMPLE FOR A ROPE BREAK WHEN AUTOMATIC REACTIONS MODIFIED BY PILOT DECISION-MAKING

The situation is we are on aerotow at about 200 feet, and there is no wind. It is a hot day ahead it is unlandable, to the left is a rough scrub area and to the right is a tall crop. The pilot is low-time and not too experienced on the glider *(see box B at left)*.

In this case the pilot saw and knew that landing ahead would end in disaster. So he began the left turn even though the turn would lead towards rough scrub Note that the pilot sees that the speed continues to be OK at each repeat, and the continual repetition of the four-step process led to an acceptable change to the original rule to land ahead It has shown a good use of the pilot decision making technique added on to the basic automatic reactions that you learned for these emergency situations.

Another type of situation that occurs to higher time pilots concerns decision making while en route on a cross-country flight. The situation could go something like this: the pilot is flying a 15m glass fibre racing sailplane and is at a good height above the ground. This would allow for several more minutes before having to land. The pilot passed over a small landing strip a few minutes earlier. Lift has generally ceased because the pilot has had to fly under a large area of cloud to stay on course. But ahead the sun is shining and promises (?) lift. There are not many landable fields underneath. Sound familiar? I trust not.

#### EXAMPLE OF A CROSS-COUNTRY FLIGHT AND OUTLANDING

The pilot feels that the flight has gone well so far, in fact a few other gliders on the same course are behind, and there is lots of height ... However the second turnpoint has yet to be reached and there is a large developing storm area ahead (see box C).

| SITUATION | OPTIONS | ACT (C) |
|---|---|---|
| Lots of height in hand<br>Just passed a small landing strip<br>Some fields ahead, possibly suitable for landing in<br>Large storm developing ahead<br>Lift areas few; possibly sink. | 1 Turn back and search for lift.<br>2 Carry on and look for lift.<br>3 Go round the storm.<br>4 Negative consequences if he goes under storm. | Carry on, look for lift.<br>(Note he neglected to think of #4) |
| | | REPEAT |
| Sink continues,<br>Small strip now out of range if sink continues,<br>Storm appears darker ahead,<br>Height still OK, but can't now reach far edge of storm. | 1 Continue to look for lift.<br>2 Select area to search for suitable field in which to land.<br>3 Turn round and slow to conserve height.<br>4 Could crash if he leaves decision too late. | Continue to look for lift<br>(Again neglected #4) |
| | | REPEAT |
| Heavy sink; now quite low,<br>Dust devils show squall line,<br>Very dark. | 1 Plan circuit and choose best approach path into the field.<br>2 Fly straight-in approach. | Plan to fly straight-in approach to the field |
| | | REPEAT |
| Sink and headwind increase,<br>Appear to be undershooting the only available field,<br>Difficult to see well. | Increase speed to conserve height and improve control in the turbulence. | Just make it over the fence into the field. (Too often a crash is the result of this scenario.) |

In this example the pilot clearly left the decision to land too late. The lure of the sun ahead, promising lift to allow him to continue on his quest to reach the second turnpoint could have resulted in an accident. He was clearly a pilot who pushed his luck. Also he did not consider the negative consequences: if there is any chance that a choice will lead to even a low probability of a problem, it must be rejected. "It can't happen to me, I can handle it", he says. With luck on his side he avoided one this time.

Another way of looking at the choices is along the following lines (and I am indebted to Chris Rollings, the BGA National Coach for the suggestion) — if I continue under the storm the probability of the results will be:

a 75% – I'll find lift,
b 15% – I'll find sink,
c 9% – I'll find heavy sink, and
d 1% – I'll crash and perhaps kill myself.

This last result automatically means that many pilot's would reject the option of flying under the storm. Other pilots might weigh the 75% chance of finding lift against the rather remote chance of crashing, and select to continue "under the storm". But note that I said they weighed the chances. You too should consciously consider whether to take the risk, but because flying is so unforgiving of the foolish, you should err on the safe side when ever there is such a choice.

If you look at item 2 in the second block of options (marked with an asterisk*), this is the decision which would have been safest and best for this situation. The probability of landing safely is very high, and that of crashing is remote (at this stage the pilot probably would not even consider it as a possibility).

When the pilot decided to continue to look for lift we see that he was not looking ahead, he was not considering or thinking of what would be happening one minute ahead, two minutes ahead, and so on. The fact that he was in an area of the storm, sinking towards the inevitable landing should have warned him to look well ahead to the chances of the landing, and then to look at the consequences of the different options. Think about it!

### TO FLY OR NOT TO FLY? THAT IS THE QUESTION

Another question that occurs occasionally could be whether or not to fly at all. The situation could be that you had a rough week and, though the weather looks great for thermalling locally, you have a slight headache. May be a bit of a hangover? Not much problem you think, but how about predicting what would happen if you did take off. What is likely to happen to the headache? Are you going to be able to concentrate well? Bit of an increasing wind is predicted, and it is strong already. Tempted to say you can han-

BOOK REVIEW

## *"Turbulence"*

*a new perspective for pilots*

by Peter F. Lester

publisher: Jeppesen Sanderson Inc.
ISBN 0-88487-141-X, soft cover

*"Turbulence"* is a new aviation text book that helps pilots recognize the conditions favourable for aviation turbulence so that its effects can be avoided or minimized. The book is written for those who have some background in elementary aviation meteorology and flight experience. Although written for the power pilot, there is much of general interest for the glider pilot and would be a useful and readable addition to your library.

The text concentrates on turbulence causes, structures and effects using a minimum of mathematics and a maximum of practical in formation on the four basic types of turbulence: low-level turbulence such as wind shear (LLT), turbulence in or near thunderstorms (TNT), clear air turbulence (CAT), and mountain wave turbulence (MWT). These types of turbulence are well described using conceptual models, visible indicators, rules of thumb, large scale weather patterns, and descriptions of actual turbulence incidents. The book concludes by integrating this information into the flight planning process. The text is clearly written and profusely illustrated with line drawings and photographs.

Peter Lester has been a meteorologist for over 35 years and is presently a Professor of Meteorology at San Jose State University in California where he teaches courses in aviation meteorology and weather analysis and forecasting. His research experience includes many observational studies of turbulence and related atmospheric phenomena including boundary layer winds, lee waves, rotors, thunderstorms, and clear air turbulence.

Earlier in his career he was involved with studies of the Chinook arch at the University of Calgary, and recently was associated with the Chinook Project in which the Alcor sailplane was used as an instrumented flight platform.

Most recently he has been actively involved through a NASA-Ames cooperative research agreement to use digital flight data recorder information to study severe turbulence encounters by commercial airliners.

reviewed by Tony Burton

# the SOARING PERSONALITY

from the Seattle Glider Council *Towline*

A little
pop psychology
to confirm
your self-image

Ever wonder just what the right stuff is to soar with the hawks and eagles? Research was completed by Dan Matzke, PhD on the personality characteristics of soaring pilots. A random sample of both sailplane and hang glider pilots was made from active US members of the SSA and the USHGA, ranging from beginner to competition level pilots.

It was found that soaring pilots as a group (both sailplane and hang glider pilots) are psychologically healthy, well–adjusted, and highly functioning. No evidence of pathology was found, evidence was found which indicates that soaring pilots are similar to other high-risk takers such as parachutists and rock climbers. However, they are significantly different from other pilot groups.

Soaring pilots as a group scored significantly different from norms for adult males on a total of 18 out of 33 factors analyzed. These included scoring higher on scales measuring levels of personal adjustment, self confidence, ideal self, and leadership. Soaring pilots also scored higher on scales measuring the need/drive for Achievement, Exhibition, Autonomy, Change, and Heterosexuality. They scored lower on Aggression, Order, Deference, Support, and Inferiority.

Compared to general aviation and Navy jet pilots, soaring pilots scored significantly higher overall on scales measuring Autonomy and Nurturance, and lower overall on scales measuring Aggression, Order, and Deference.

In comparing sailplane pilots to hang glider pilots, a significant difference was found on only 3 of the 33 scales analyzed. Sailplane pilots were found to be more persevering, disciplined, analytical, and intellectual where as hang glider pilots were found to be more relaxed, easy–going, spontaneous, and imaginative.

An analysis comparing accident–free pilots to accident–involved pilots found that accident–involved pilots scored significantly higher on a scale measuring Exhibition. A trend was also noted suggesting a higher level of Dominance in the accident–involved group. •

dle things, eh? OK, so now we will summarize the four steps and see how to use PDM to come to a safe and logical decision.

Situation Pilot does not feel too hot (rough week); perhaps is suffering from a bit of a hangover. Weather looks good for thermalling, and it is tempting. Winds are predicted to increase, and are already strong.

Options There are only two right now; to fly or, to stay on the ground!

The consequences of flying are perhaps a bit subtle to contemplate, but what about your reaction to a wing dragging on the ground during the takeoff roll? Ground loop and damage ... you bet! Don't take the chance because it is not a chance worth taking. What about after flying for a while? Still feel good? Probably not, and the probability of messing up the circuit and landing will be quite good – not a good choice either.

The predictions for the flying option are:

- the pilot will probably be able to climb away and have a flight of an hour or so.
- the winds will increase, making good piloting and good planning, prime requirements for the circuit and landing.
- the headache will get worse due to the altitude (and when did this pilot last eat?) and concentration will suffer; in fact the pilot will be distracted from "flying the airplane".

Probably he will make a poor circuit and hence a poor landing. With the increasing wind a serious situation could arise. The consequences are not pretty.

If this pilot stays on the ground the predictions are that he will gradually get to feel better. He can even do some useful helping around the club and the flightline and impress on younger pilots that if they don't feel well, it is best to stay on the ground. Get the water content back to normal for one thing!

Any one or two of the first set of predictions alone (the flying option) would suggest that this pilot should not fly. An extreme example perhaps, but it was chosen to illustrate that you don't have to be in the air to use the PDM technique to reach a decision.

**SUMMARY**

Before solo, aim to be able to go through the four-step process without thinking. Occasionally ask your instructor how you are doing and whether you are assessing the situations as he or she would, and if they agree with your decisions. Don't forget that there are many situations that call for continuous evaluation, in fact there should be very few occasions when you will not be assessing your options and weighing the consequences of one choice over another. Sometimes the process will be fairly relaxed, as when you are very high, but don't forget to practice the technique, as it will be vital to you when situations occur that call for rapid decision-making.

This Pilot Decision Making, as we now call it, will be based of course on your predictions for the options you choose and the acceptable consequences of those decisions. •

# MAKING YOUR BRAKE WORK

Here is a simple winter project if the brake installation in your sailplane is relatively useless.

**Karl Striedieck**
from *Sailplane Builder*

This is a brake improvement project for the ASW-19 and ASW-20. *(Karl originally wrote this article in 1980. This mod should work for any Tost brake. ed. )*

Having been impressed with the stopping capability of the Blanik. I modified the Tost wheel to operate in the "self energizing" fashion that characterizes the Blanik wheel. The results were too good in a way because after initial application the brake stayed on when the handle was released. This was corrected with a new return spring and now my wheel will skid on any surface and scrape the nose on concrete if the brake is held on.

Although installation of a larger brake handle is not necessary it is an improvement so this is recommended.

1 Disassemble brake.

2 Saw off head of pin that shoes rest on.

3 File away 1/4 of cam that expands shoes.

4 Make up a bolt to replace pin that was sawed off. Mine took a 3/8" but this could vary depending on how much shoe wear you have. The size that gives the shoes a close fit in the drum is what you want. File the bolt head down so it's round and flat so it doesn't catch the drum as it rotates.

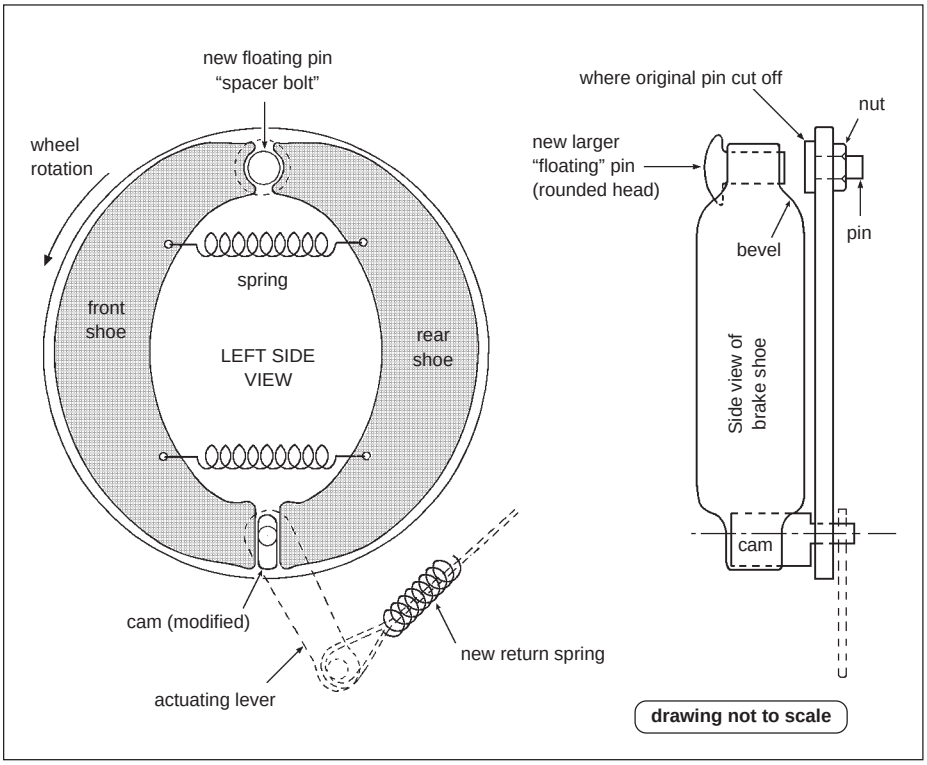
5 Bevel shoes so they don't catch on the remainder of the sawed off bolt when the shoes rotate on and off. See drawing.

6 Re-assemble. This is now a "one way" brake so the cam must expand the rear shoe. If you put it in wrong you will have no brake which is probably nothing new. If your replacement spacer bolt is too small there will be so much play the cam can do a 360 and this will of course result in no brake.

7 When hooking up the cable install a compression spring on the cable so it pushes between the thimble loop and the landing gear fork thus aiding in returning the handle to off when you release the brake. (Filing the cam reduces the return action.)

If you have problems give a holler. I have replacement cams and pins if you want to return to original or if you screw up the mod. If you don't have the ship any more, send this along to the new owner please.

Note: this modification is not authorized by Schleicher or the FAA. •



# hangar flying

## WORLD COMPETITION RESULTS

23rd World Championship, Borlange, Sweden 13-26 June 93. The top 10 pilots are:

Standard Class — 49 pilots — 9 Days

| | | | | |
|---|---|---|---|---|
| 1 | Andrew Davis | Gbr | Discus B | 7285 |
| 2 | Eric Borgmann | Net | Discus bT | 7059 |
| 3 | Tomasz Rubaj | Pol | SZD-55-1 | 7002 |
| 4 | Jirl Stepanek | Tch | Discus B | 6813 |
| 5 | Juha Sorri | Fin | LS-7 | 6802 |
| 6 | JC Lopitaux | Fra | Crystal | 6739 |
| 7 | Peter Fischer | Ger | Discus | 6694 |
| 8 | Erwin Ziegler | Ger | Discus | 6613 |
| 9 | Baer Selen | Net | ASW-24 | 6556 |
| 10 | Josef Kozar | Slk | Discus | 6534 |

15 Metre Class — 40 pilots — 10 Days

| | | | | |
|---|---|---|---|---|
| 1 | Gilbert Gerbaud | Fra | LS-6b | 8220 |
| 2 | Eric Napoleon | Fra | LS-6b | 8220 |
| 3 | W Janowitsch | Aut | Ventus b | 8216 |
| 4 | Stasys Skalskis | Lit | LS-6b | 8120 |
| 5 | M Theisinger | Ger | LS-6a | 8062 |
| 6 | Justin Wills | Gbr | LS-6 | 8049 |
| 7 | Janusz Trzeciak | Pol | SZD-56 | 8024 |
| 8 | Hans Obermeyer | Ger | Ventus | 7957 |
| 9 | Patrick Driessen | Nzl | Ventus | 7918 |
| 10 | Simo Kuusisto | Fin | Ventus C | 7887 |

Open Class — 27 pilots — 11 Days

| | | | | |
|---|---|---|---|---|
| 1 | Janusz Centka | Pol | ASW-22B | 9897 |
| 2 | Göran Ax | Swe | ASW-22BL | 9525 |
| 3 | Brian Spreckley | Gbr | ASH-25 | 9391 |
| 4 | Gerard Lherm | Fra | Nimbus 4 | 9292 |
| 5 | StanislawWujczak | Pol | ASW-22B | 9050 |
| 6 | Alister Kay | Gbr | ASH-25 | 9040 |
| 7 | Holger Back | Ger | Nimbus 4 | 8978 |
| 8 | Jan Andersen | Den | Nimbus 4 | 8873 |
| 9 | Ull Schwenk | Ger | ASW-22BL | 8784 |
| 10 | Klaus Holighaus | Ger | Nimbus4M | 8765 |

The principal feature of the competition was the scratchy and very unpredictable thermal and weather conditions, and the lake and forested countryside competitors flew over. Unlike past world competition results, no pilot was consistently good in interpreting the conditions, and the leaders changed quite a lot from day to day. In fact, only three pilots made it home every day.

The French 15m winners shared first place, the first time this has happened in a world contest — neither pilot won a day, accumulated a total of 10 landouts, and on a couple of days were down in the mid-30s, demonstrating the volatile nature of the daily scores.

## BYPASSING THE BUREAUCRACY ITALIAN STYLE

An article in Volo a Vela, the Italian soaring magazine, describes the torturous requirements involved in getting a glider pilot licence in Italy. It also noted and gave chapter and verse on the validity of flying in Italy using a PPL earned in a member state of the EEC. The author is working on getting details so Italian glider pilots can earn an "easy" licence elsewhere in Europe (Britain was mentioned) to use to fly in their own country!

from *Sailplane & Gliding*

## CHEATING AT THE WORLDS

"There was a flagrant violation of the photo start system used at the Worlds in Sweden. Bela Guraly, flying for Hungary, was disqualified for tampering with his clock camera. Guraly had rigged a camera so that he had control of when the time was printed on the film. The organizers set a trap for him by having a ground clock operating at the start point. The start point was a round traffic circle common in Europe. The organizers moved a white topped truck around the circle at a set time during the start. Guraly actually took his start photo at 12:27 pm, but he was able to stamp the time on the film as 12:46 pm. He did this by taking the photo, not advancing the film, then as the time he wanted printed on the film came up he could imprint it on the film. Guraly was ejected from the competition for this action and no score was given.

After this event the somewhat complicated clock camera system was made even more involved as a second photo within one minute of the start photo was required. The whole system has got more complicated as it has matured. You had to set the clock on your cameras, then have them sealed by the organization, then you were required to take a photo of the official clock, five seconds before the minute and five seconds after, then the photo board then the start point then a second photo to prove you were stamping the correct time on the film. Then the turn points. Upon return to the airport, you had to take your tail number, then return to the official clock and take two more photos five seconds before and after, then go to the organizers and open the camera in front of the organizer. On several days there were 20 to 30 people listed for photo problems."

from *Sailplane Racing News*
submitted by Walter Weir

# Coming Events

### GLIDER PILOT GROUND SCHOOLS

6 Oct 93 **Toronto, Fall session**, Weds evenings 7–10 pm for 10 weeks. Contact school at (416) 395-3160 for registration info, or Ulf Boehlau at (905) 884-3166.

12 Jan 94 **Toronto, Winter session**, Weds evenings 7–10 pm for 10 weeks. Contact info as above.

## PARACHUTE RECOVERY SYSTEMS FOR GLIDERS

A symposium was held in Aachen, Germany this March to continue discussions on pilot survival in emergency situations. The existing personal parachute provides a survival rate of only about 50%. The parachute is reliable but escape from the cockpit is statistically unlikely below about 1500 feet. Discussions concentrated on possible parachute systems for lowering the entire glider. The ballistic parachute systems which are currently being used with success on ultralights were reviewed. The "BRS" system was presented in detail.

One major problem seems to be regulatory, in that separate clearances would be required for each glider type. German aviation authorities is interested in improving survival rates, but any new system must have the same functional reliability as a personal parachute once deployed, and this includes landing.

A paper addressed the problem of ground impact, and improvements in cockpit restraint and seat design. Almost 1500 accidents in Germany from 1983 to 1939 were studied. There has been a large increase in spinal injuries recently. This increase is thought to arise from modern cockpit design, although higher speeds must be a factor. Injuries could be reduced by improved design though injured legs remain likely. Incorporating energy damping materials between the seat and the outer skin, alignment of seat anchors, and the re-design of the seat back would all improve crashworthiness. It was noted that if recovery systems for the glider were used, the seat back space now taken by the redundant personal parachute could be used to improve comfort and safety.

A stronger cockpit structure both allows for landing accidents and a higher parachute de scent rate. A total weight increase of 5-10 kg and a cost of 2-3% should be acceptable. A minimum deployment altitude for a parachute recovery system should be 300 feet, and a servicing interval of five years. Inadvertent initiation on the ground must be considered. A prerequisite for commercial development is reasonable licensing requirements.

After much formal and informal discussion, the symposium settled on an aircraft recovery system with pyrotechnic triggering as the most realistic solution, and stated that such a change in emergency systems was long overdue. The gain would not only be potentially life-saving, but cockpit comfort would be improved. Improvement in seat design would also increase comfort and reduce injuries in other accidents. Fewer mistakes would be made in real emergencies, and ground impact damage to the glider would be reduced, reducing insurance costs.

The open question is whether pilots are prepared to pay. Cost would be offset by the cost of a personal parachute as well as a potential reduction in insurance premiums. Manufacturers are only prepared to invest if customers show interest of course. Initially sailplanes could have the provision for a ballistic recovery parachute built in, with later retrofitting of approved systems.

from *Sailplane & Gliding*

CHOOSING CHAMPIONS from page 8

ever, the Olympic rules committee has attempted to make a scoring system that values each event equally. Most importantly, the mix of the events is never left to a "contest director's" discretion. The schedule of events is set well ahead of time. Otherwise the CD's beliefs and prejudices would be a significant factor in the outcome. Imagine the controversy if an "Olympic CD" who liked shooting called more of that task and dropped others. This would clearly favour the good shooters.

In a contest like ours, where the two events have greatly different values, the CD becomes an even more important player. By calling an AST on the last day, the CD can greatly reduce the chance of the current leader being displaced. Most experienced competitors know this intuitively. Late in contests, leaders hope for an AST and contenders hope for a POST. At one major contest a CD even called a POST by saying that he wanted to give the "good" guys a chance to win. It is hard to rationalize combining two fundamentally different tasks having different values into the same soaring contest.

What are the alternatives? If the consensus is to continue mixing tasks, then the scoring formulas should be modified so the tasks' values are as nearly equal as possible. One way to accomplish this would be to retain the 1000 point scoring for the AST and reduce the maximum points for a POST. This would compress the point spreads for the top 20%. Based upon the last four years' experience, the maximum points for a POST should be about 400 points. Keep in mind that a 400 point POST is not devalued in relation to the AST; it is of equal value in choosing the winner. Alternatively, the POST could stay at 1000 points and the maximum points for the AST could be increased to 2500. Another alternative is to devalue the POST (ie. less than 400 points) and reserve its use for thunderstorm days. It would become a fall-back task that a CD could call when the weather is threatening. Note that a 300 point POST would be worth almost the same as the AST is now. Of course, the soaring community could decide to drop one of the tasks completely or to use only one type of task in each contest. Regardless of what happens with tasking, we should look at the scoring systems used in other sports for alternatives. Under the current rules, the POST is "the make or break" task. Competitors wanting to compete effectively should spend their time preparing for and practising the POST.

I'm sure that this analysis has only confirmed what many competitors already suspect intuitively; the AST and POST measure different pilot skills, and the POST is valued higher than the AST At the very least, our future discussions should consider the concepts of relative task value, reliability and validity. •

**TWO RESPONSES TO THE POST/AST POINT SPREAD ANALYSIS**

*Alan Reeter has presented an excellent analysis on what seems to be a topic of intense discussion. His work provides a rational, technical basis for the discussion, rather than an emotional one. His premise that the point spread is the key feature of the scores to study is exactly right. There is one point Alan didn't bring up that deserves comment.*

*The narrow point spread for ASTs is caused, in large part, by one factor — gaggle flying. Gaggle flying reduces the validity of the AST compared with POST by emphasizing skills that we don't really want to measure. Gaggle flying provides a more efficient search process for the strongest lift and raises the speeds of the whole group, but undesirably compresses the point spread. It is very difficult for the most skilled pilots to establish a lead as less skilled pilots are able to tag along and achieve higher scores than they would on their own. It reduces the chances of a landout by anyone, regardless of skill. All these effects tend to compress the point spread of the AST.*

*It is probably true that POST rewards local knowledge or luck somewhat more than the AST does, but I think that it is also true that the POST emphasizes the skills we are really trying to measure: understanding the terrain and weather, searching for and using lift efficiently, and all the strategic and tactical decisions that are necessary to achieve high cross-country speed. It is probably desirable for the POST to have a more dominant effect than the AST on the final point spread.*

*Many of the criticisms of POST seem to be connected with the claim that it is most often used when the weather is less predictable. One way to solve this is to call for POST more often. I doubt that is a welcome suggestion to the loudest critics of the POST, they may be the pilots that don't do as well when they must think and fly on their own.*

Steve Smith

*... The POST should have a greater range of scores for a number of reasons. First, it prevents the scoring levelling effect of leeching. Second, it adds the test of weather/terrain knowledge. Third, the POST is generally longer in duration and, fourth, it favours experience.*

*There are other aspects of the POST that recommend it to sailplane racing. The reduction in pre-start and on-course gaggling reduces the mid-air collision potential. The higher completion rate reduces accidents. There is less pressure to fly into dangerous weather. Pilot skills are broadened.*

*With the arrival of GPS we see yet another loss of pilot skill through technological substitution. The POST is one way to slow this erosion and the Inevitable loss of interest as pilots find something more challenging to do.*

*We should continue to refine the POST, which is relatively new and evolving, but simply making its scoring range equal to the AST is not warranted.*

Karl Striedieck

mountain scene, photo unavailable

**A NEW COMMERCIAL OPERATION IS SETTING UP IN PEMBERTON, BC**

Just a note to keep you up to date on soaring opportunities in British Columbia. Peter Timm, long-time member of the Vancouver Soaring Association is branching out as his retirement looms on the horizon (next March). Together with Rudy Rozsypalek, he is starting up a glider operation in Pemberton. Rudy is a Czechoslovakian who was so elated at being free to soar over the United States at the 1992 Ephrata Regionals where he team flew with Peter in the Vancouver club's Standard Jantar.

Rudy is now living at the Pemberton airport while Peter will be commuting and they both look forward to greeting old friends and new ones who can take the time to escape to this most scenic of soaring locations. Thermals are the main source of lift, with wave providing opportunities for even higher flights. At the moment they have a Blanik L-13 which is primarily intended for student training and sightseeing flights, and their towplane is a 150 hp Citabria. Private gliders are welcome and, if some further plans come to fruition, they hope to have single seaters available to qualified pilots.

It takes about two hours to drive north from downtown Vancouver along one of the most scenic routes in Canada, through the famous ski resort of Whistler where excellent, but expensive accommodations, etc. are available. In Pemberton, bed and breakfasts are available and, of more interest to most pilots, there is a picnic area with fire pits and a large covered area right at the airport where pilots have been permitted to camp in tents. RVs have also parked right alongside but there are no hookups available.

**Christine Timm**, VSA

*For more information, contact Pemberton Soaring Centre, (604) 894-5727.*

# THE 'STRATOW' PROJECT

## Kiting a sailplane on a 10 km towrope.

from Delft Technical University OUTLOOK

A GROUP at the Delft Technical University in the Netherlands are planning to record atmospheric data in the stratosphere using a sailplane. The unique aspect of the project is that the sailplane is to remain on tow above 30,000 feet at the end of a 10 kilometre towrope attached to a towplane flying at about 15,000 feet!

Professor and Dutch astronaut Wubbo J. Ockels wants to make earth observation flights in a sailplane in the rarefied air of the stratosphere. He is planning to tow a glider from the Lelystad airfield to an altitude of eleven kilometres. Both planes take off from the runway in the normal manner. The initial length of the towrope is about a hundred metres, but when the tow has reached an altitude of 10,000 feet it will pay out a 2.5 mm rope from a drum, so that the sailplane begins to rise like a kite. The winch has a counter, so that the length of rope paid out can be accurately determined, and will also be equipped with a tensiometer and a rope angle indicator. Both planes have means whereby the connection can be severed at any time.

The sailplane will be equipped with instruments for determining the composition and the ozone concentration of the stratosphere after the trial flights. It will also carry equipment for earth observation, such as an infrared camera to identify areas of deforestation and other ecological problems. Such measurements are usually performed using balloons, but these are not navigable and pretty well out of control, once in the air. Besides, a sailplane can be launched repeatedly.

The towplane is an Ayres Turbo Thrust S2R T34, a 850 hp cropduster. The plane has a somewhat unusual shape, because a large chemical tank is installed between the cockpit and the engine. The drum holding the tow rope is mounted within the tank. The original tank bottom has been replaced by a special cover plate and below it is the winch for paying out and rewinding the rope. The observation window in the instrument panel, normally used by the pilot to monitor the liquid level in the tank, has been removed and through the opening the pilot can see the rotating winch. The rope is guided backwards past the rudder through a tube.

The cover of what used to be the pesticide tank has been unscrewed to facilitate access to the space. The Ayres is a one-man plane, but room has been created behind the pilot for the test conductor who performs the measurements and keeps an eye on the winch.

The towrope is made by the DSM chemical company of very high strength polyethylene fibres (Dyneema SK–65) and impregnated with orange coloured polyurethane to give a certain stiffness. During the start the rope has to sustain high loads. To prevent it from breaking, the first hundred metres have been reinforced with an additional sheath, so that this part is somewhat thicker. "The tensile strength of the rope is 580 kilograms. We hope that by attaching it carefully to both planes we can maintain a strength of at least 500 kilograms. A rope of this length has never been made before. Its manufacture presents a challenge to the maker, especially because the strength has to be as nearly uniform as possible."

**Initial flight trials** The trial flights were intended to show whether the idea of a towed stratosphere glider is feasible. The object of the 'proof of concept' flights, as Ockels and his colleague Joris Melkert call it, is to obtain data on the shape of the sagging rope and the static and dynamic behaviour of the configuration. Last year the two scientists performed extensive computations and carried out measurements in the faculty's wind tunnel, but only a series of trial flights can provide answers to questions on the actual performance and maneuverability of the combination.

Melkert emphasizes the experimental nature of the trial flights: "Before the sailplane actually carries out measurements, we first wanted to find out whether such a configuration could be controlled and, if so, how? We're interested in the practical feasibility of the tow plane/sailplane combination. For the actual measurements we may need another combination of aircraft."

During the first few trial flights at the end of May 1993, professor Ockels reached an altitude of two kilometres, flying an ASW-19. A higher altitude was impossible at the time because heavy clouds completely blocked the pilot's view. During the second flight the team managed to fly with a 3.2 kilometre rope with the glider at an altitude of some 2500 feet higher than the towplane. "Although we fell short of the planned altitude of 25,000 feet, these trials did demonstrate that we can reach the stratosphere in a glider. When about five hundred metres of rope had been paid out, the glider showed a tendency to oscillate, but at a thousand metres it was stable again", says Ockels.

During the third trial flight above the Wadden Zee unwinding of the rope still presented problems. A camera installed above the winch showed that, after a jerk from the sailplane, the drum speed became too high and the rope thus began to unwind in an uncontrolled manner. The loops so formed got tangled around the drum and eventually blocked the winch. The rope was then cut, as agreed. Ockels landed with the sailplane on the nearby airforce base at Leeuwarden while the tow plane returned to Lelystad.

Since the sailplane can only accommodate the pilot, the measurements can no longer be performed manually. Accordingly, the glider pilot is not directly responsible for the measurements, but will be guided by the test conductor from the towplane flying below. The primary task of the two pilots is to keep the two planes on course.

A. Roelen, one of the researchers involved, has made a special safety analysis, paying a lot of attention to the safety of the planes and their occupants. His description of the trial flights is based on a 'conservative approach'. Throughout the series of trial flights neither the fliers nor the people on the ground must be exposed to any risks. "In this approach", Roelen explains, "a minimum of three serious faults would have to occur simultaneously for the situation to become dangerous for either of the planes. The towplane has two means of cutting the rope, the glider can unhook the rope or cut it and even melt it through with a small electric heating coil."

When the sailplane is flying more than 4500 feet above the towplane, the latter is no longer visible to the sailplane pilot, and he can see only about 150 metres of the orange towrope, disappearing into a fathomless depth. Melkert: "The towplane makes 'rails in the sky'. The built-in laptop computer indicates the path to be followed by the sailplane. The pilot simply has to follow the track, not too high, and certainly not too fast. A change in direction of the towplane isn't followed by the glider until minutes later."

ESTEC, the research centre of the European Space Agency, where Ockels is also working, has made available two costly positioning systems especially for use in turns. Differential GPS is used onboard both planes to determine their relative positions to an accuracy of less than a metre.

After the first few trial flights performed in the spring of this year, Ockels' group will not resume its flights until October as the towplane was needed for cropdusting again during the summer. In the autumn the team will have another go at the eleven kilometres. •

# training and safety

## INTRO FLIGHT– OR FRIGHT?

The whole purpose of the introductory flight is to introduce people to gliding so that hopefully some will get interested enough to join your club. It is NOT a chance for free flying at the public's expense, a chance to brush up on the old aerobatic routine, a chance to show off the pilot's dazzling skills, or the first flying lesson. It is; however, an important part of your operation and all members can see if it's being done properly. For example:

• Did the pilot doing the intro ride have a good look and a bit of a conversation with his passenger, or say, "Aw, just hop in?" Our "customer" is an unknown quantity, could be on drugs or booze, have clog shoes that may jam in the rudder pedals, a camera around his neck that may jam the stick, or fly up to the canopy in turbulence. Is he under or over the C of G limits for the aircraft.

*Don't fly anybody or anything you have doubts about.*

• Has he requested "the full routine — what ever that is — I can take it?" That's not a future club member, that's a thrill speaker.

*Do not oblige.*

• Is our pilot giving a great explanation of the panel? The merits of a well compensated vario?

*Why? There will be lots to see outside the aircraft than having the passenger trying to focus on the dials. They'll get airsick.*

• Is somebody telling the passenger he can release the tow and how he's to do it?

*That's very foolish.*

• Is the passenger being given a quick flying lesson before the takeoff?

*Why?* This is an introductory flight. The passenger should not touch the controls. This is the first flying contact that the club has with this individual. When you go for a ride in a limousine, does the driver offer you a turn at the wheel? Besides, all it will prove is that a guy who doesn't know an elevator from an aileron has no idea what he's doing in trying to fly the aircraft. So pinkies off the controls and levers. The passenger will be much more happy if he is allowed to be just that — a passenger — with his hands on his knees. The pilot then is free to escort his charge through the gentle joys of gliding, and the passenger has more of a chance to relax and absorb what's going on.

• Is the flight smooth with gentle turns? The passenger will be more impressed after his 20 minute flight which, with a serene pace will seem to last longer than the 40 minutes you blast him around the sky.

• Does the pilot wind him up in a thermal? Don't bother. He'll be impressed, but his stomach will tell him he didn't enjoy himself.

*One more potential pilot lost to the sport forever.*

• Aerobatics?

*You're crazy! That covers that.*

• Are you a pilot who is too busy with the circuit, other traffic, ... to be able to carry on a conversation with the passenger at the same time? Or from 800 feet to the ground is there an icy silence? The poor passenger wondering what's going on, but too afraid to ask and distract you?

*If so, don't carry passengers.*

• Do you ensure that the passenger is helped out of the glider with as much care as they got in?

*If not, you're asking for the glider to be damaged.*

• Finally, do you allow the passenger's friends to mill around and wander through your operation before and after the flight?

If the intro flight is kept simple, the passenger who is putting his life in your hands — somebody he just met — will be much happier. Fly for his benefit. *If you've done lots of intro flights but never one for somebody who then became a member, you're in need of a re-examination of your intro flying technique.*

If the club has a wrong approach, or allows intro flying as a sloppily run sideline to the main operation, don't be surprised if it doesn't generate members.

**Stephen Newfield**, from *free flight 4/82*

## DIVE BRAKES AND OTHER GLIDE PATH CONTROL DEVICES

The Incident/Accident reports are arriving slowly — with the emphasis on slowly. Nevertheless, two of the reports have confirmed one of my convictions.

Let me explain. I have been advocating for better than a quarter century that dive brakes and spoilers should not be used during the turns in the circuit. All turns should be done as cleanly as possible, without any unnecessary distraction from making those turns perfect. Too many pilots have spun-in while turning on to the final approach.

The basic precept is, that if a circuit was set up correctly the only time the spoilers or dive brakes become necessary is when the glider is on the final glide. Well, I have to admit that at Hope one often ends up higher at the start of the base leg than at the beginning of the downwind, but this condition is often predictable, therefore it can be compensated for. However, many pilots just love that "Stuka" turn; lots of speed, full dive brakes, nose down, "because we have lots of altitude to burn off". I suppose they like the feeling they get while doing this and they may also think that it looks good from the ground. It does not.

In a straight flight, one can judge the extra rate of descent introduced by the dive brakes, but in a turn, especially without a horizon, (who is looking at it anyways) the rate of descent becomes much harder to judge. The contra-argument I am receiving is that the use of none of the controls should be "disallowed" at any time. Therefore, the use of dive brakes is legitimate at any stage of the flight.

In a turn, especially in the turn to base leg and to the final the pilot's concentration is, or should be, on where he is in relation to the touch-down point and on his speed. In normal circumstances this provides a normal workload. Now add the condition that the pilot is too high. The workload increases. Add another distraction, such as another aircraft in sight and now the pilot is or can become overloaded.

Now the pilot is watching what he considers as the most important distraction. It could be the other aircraft or the extra sink or the extra lift and the circumstances that are usually normal, become abnormal. What we can forget is the item that we think is the least important element of the flight: the glide control device. We may never know what that distraction was, but the result is a botched up flight.

Two recent events this summer in Canada prove this point. Both pilots were flying fibreglass gliders, both landed short of the runway and both were observed to have the dive brakes open from the base leg onward. Both pilots submitted an accident report; these kind of reports are the one that are very useful. Their misfortune may save someone from an other misfortune.

The dive brakes of most modern gliders are effective enough to get a glider down even from a very poorly started circuit. It can and should be used to let you down to about 5–600 feet in line with the aiming point but never on a short base leg. If it is done, it is done to save the poorly started circuit. Therefore the workload is already higher on the pilot than under normal flight. Maybe it is automatic for some experienced pilots, but then again the automation can be distracted. Another glider, a bird, anything. Ever tried stalling a glider with some dive brake applied? It stalls at a higher speed than clean. Now the pilot is in a condition where he is turning to final, he is just a bit slower than usual, just a bit lower than usual and is in the habit of using the brakes on the turn to final. Bingo! Another spin-in as a result of poor habits.

Obviously there are many other implications than what was reported for those two accidents. The purpose of this discussion is to highlight one of the possibilities and to try to present it, so that pilots recognize the possibility of it recurring and take preventive action.

In summary — keep those turns clean, especially in the circuit. The degree of descent can be much easier judged in straight flight than in the turn. The workload in the circuit is high, especially on the last turn to final. Do not add more than needed and allow for possible distractions ... Just something to think about.

**George Eckschmiedt**
member FT&S Committee

# SAC affairs

### RADIO COMMITTEE UPDATE

I recently heard that one glider pilot was having problems with radio interference with his electric vario. It seems that every time the transmitter was keyed, the vario indicated UP. The root cause for this is usually conducted RF currents feeding back through the power lines from the battery. Here is how to combat this problem:

1 Make sure that the RF from that transmitter is routed away and separate from any other electrical lines. If the speaker and battery line come down one side of the cockpit, route the RF cable on the opposite side.

2 The installation of RF suppression chokes on the power lines; Radio Shack #279-8201 is very good at stopping this interference ($4.46 for two). If you have several electrical devices besides the radio, locate this choke at the back of the radio; wind both power lines several times around the choke and secure the cores right over the entry to the radio. Maximum suppression is affected by locating the choke right at the rear of the vario being affected.

I checked today at Radio Shack, and apparently this item is being discontinued; check your local stores to see if old stock is left. Alternatively, try your local electronics supply shops.

Need 14 volts for your radio — but can't find any 2 volt cell to add to a 12 volt battery? Most battery makers have discontinued the manufacture of the 2 volt cells, but how about combining two 4 volt cells with a 6 volt? Several manufacturers make this combination: PowerSonic and Yuasa/Exide, to name two. The cells are available in 4AH, 6AH and 10AH capacities and are generally the same physical height and make stacking easy.

PowerSonic is available from: WES Electronics in Winnipeg (204) 632-1260

Yuasa is available from Exide Industrial (Battronics Inc.)
Ontario (416) 669-9326
Alberta (403) 279-4905
Quebec (819) 478-1401

**Paul Moffat**
Chairman Radio & Communications

### MORE WORK ON THE "5 FLIGHTS" PROBLEM

After the March AGM and CFI seminar, discussions have been held on several occasions with Transport Canada regarding the requirement for all pilots who wish to "carry passengers" to have flown five takeoffs and landings within the previous six months. As many pilots know, this means that an instructor, for example, must do these five takeoffs and landings before instructing (even before doing a checkflight with a licensed pilot), and if he or she is also a tug pilot, must do five takeoffs and landings also in the towplane before checking out towpilots at the start of the season!

Different proposals have been discussed, the most recent being a suggestion that an "equivalency" be implemented. We had proposed "competency" checks (as equivalent to the typical checkflights done by clubs at the start of the season) be considered as equivalent to the five solo takeoffs and landings, however there are problems for TC who would wish to make any changes also applicable to other branches of aviation! This complicates the issues, as the competency check would have to be defined and agreed. It would likely meet opposition too. TC personnel also would feel uncomfortable with glider pilots being required to do "less" than power pilots for example. However, I believe we are approaching an understanding.

At the most recent meeting in Ottawa in August at which I was joined by Rick Officer, CFI of the Gatineau Gliding Club, a simple alternative was discussed. In fact, TC personnel suggested the scheme and felt it would have a good chance of being accepted within TC. The suggestion is that pilots carry out two takeoffs and landings with an instructor, during which they demonstrate "satisfactory" performance. This is very simple and it would permit clubs to become fully operational much more easily. It does not address the larger issues of whether the pilots are competent, but this is handled now by the clubs who require checkflights with all pilots after each winter in any case. When more news is available I will report it to all members.

**Ian Oldaker**
Chairman, Flight Trainino & Safety

### NEW SAC SOARING INSTRUCTION MANUAL

A new student's manual called "SOAR and Learn to Fly Gliders" (or "The Art of Soaring") is to be available shortly. The draft of the manual was discussed at the spring Annual General Meeting and Seminar held in London.

A question was raised at the seminar: "What does a student have to look forward to, having completed his or her training to licence standard?"

One of the first answers to come to mind is cross-country flying, and with that in mind a program to implement the required type of training is to be set in motion. The training for field landings will be done most efficiently within the clubs, and it is hoped that many experienced instructors will jump in with both feet, as it were, to encourage young pilots to extend their horizons, and to become enthusiastic cross-country pilots.

Even if you are not interested in this type of flying, the training is well worthwhile, as it gives pilots added competence and confidence in handling unusual situations, such as arriving back at the club with insufficient height to make a standard circuit. This has happened in the past too often. It is hoped that this type of flying training will become more routine within clubs in the coming months and years, and that having read and understood the article you will be more at ease with the idea of breaking the ties to the club field.

**Ian Oldaker,**
Chairman, Flight Training & Safety

### 1993 ACCIDENTS

| | |
|---|---|
| 8 Mar | Champlain, Jantar, C-GGEA Damaged nose and wingtip landing in freshly plowed field. |
| 3 Jun | Golden BC airport, DG-300, C-FEQH. Landed gear up. |
| 11 Jun | Aero Club des Outardes, PA-18, C-GVGJ. Towplane stalled on final approach, hard landing and struck car. A write-off. |
| 27 Jun | COSA, Blanik L-13, C-GOQQ Windy with very severe sink on final, glider landed short, went through a fence and struck another club glider. A write-off. |
| 30 Jun | RVSS, 1-26, C-FYAA Hit a utility pole and came to rest in small tree. Significant general damage, a write-off. |
| 3 Jul | RVSS, Puchacz, C-GHGW Landed short of runway in the Rideau River. |
| 11 Jul | Gatineau, LS4, C-GIZT General damage when wheel came off rim of trailer on highway. |
| 17 Jul | SOSA, Std Jantar 2 C-GEMF. Ground loop off-field landing. |
| 17 Jul | Guelph, 1-26, C-FQVU Off-field landing with groundloop. |
| 24 Jul | SOSA, Astir, C-GSOD Strong sink on final of outlanding approach and struck trees. A write-off. |
| 25 Jul | Outardes, Blanik, C-FCVQ Towplane ran out of fuel during take-off, glider released but ran off end of runway. Some wingtip damage. |
| 29 Jul | Cowley AB, Lark, IS28B2 C-GXML. Forced landing on rough road in mountains. A write-off, no injuries. |
| 1 Aug | MSC, L-19, C-FIMJ A wheel brake locked on rollout, extensive damage. A write-off. |
| 7 Aug | Alberni Valley, 2-33, C-FWMT Glider struck wingtip of another aircraft during ground handling. |
| 18 Aug | MSC, DG-300, C-FITD Off field landing with groundloop. |

## SAC Directors & Officers

**PRESIDENT & ALBERTA Zone**
Al Sunley (1992)
1003 Keith Road
Sherwood Pk, AB T8A 1G2
(403) 464-7948 (H & F)

**VP & PACIFIC Zone**
Harald Tilgner (1992)
50090 Lookout Road
RR2, Sardis, BC V2R 1B1
(604) 858-4312 (H)
(604) 521-5501 (VSA)

**MARITIME Zone**
Gordon Waugh (1993)
5546 Sentinel Square
Halifax, NS B3K 4A9
(902) 455-4045 (H)

**QUEBEC Zone**
Pierre Pépin (1993)
590 rue Townshend
St–Lambert, PQ J4R 1M5
(514) 671-6594 (H)

**ONTARIO Zone**
Richard Longhurst (1993)
100 – 1446 Don Mills Road
Don Mills, ON M3B 3N6
(416) 391-2900 (H)
(416) 391-3100 ext 250 (B)

**PRAIRIE Zone**
Paul Moffat (1992)
1745 King Edward Street
Winnipeg, MB R2R 0M3
(204) 633-5221 (H&F)
(204) 957-2827 (B)

**Director–at–Large**
George Dunbar (1993)
1419 Chardie Place SW
Calgary, AB T2V 2T7
(403) 255-7586 (H)

**Director–at–Large**
Chris Eaves (1992)
185 Canterbury Drive
Dorchester, ON N0L 1G3
(519) 268-8973 (H)
(519) 452-1240 (B)

**Executive Secretary**
Joan McCagg
306 - 1355 Bank Street
Ottawa, ON K1H 8K7
(613) 739-1063 (B)
(613) 739-1826 (F)

**Treasurer**
Jim McCollum
6507 Bunker Road
Manotick, ON K4M 1B3
(613) 692-2227 (H)

## Committees

**Insurance**
Richard Longhurst
100 – 1446 Don Mills Road
Don Mills, ON M3B 3N6
(416) 391-2900 (H)
(416) 391-3100 ext 250 (B)
Mbr: Doug Eaton

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

**Airspace**
position to be filled

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

**FAI Awards**
Walter Weir
24 Holliday Drive
Whitby, ON L1P 1E6
(416) 668-9976 (H)

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

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

**Statistics**
Randy Saueracker
1413 – 7 Avenue
Cold Lake, AB T0A 0V2
(403) 639-4049 (H)
(403) 594-8673 (B)

**Technical**
Chris Eaves
185 Canterbury Drive
Dorchester, ON N0L 1G3
(519) 268-8973 (H)
(519) 452-1240 (B)
Mbr: Herb Lach

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

# CLUBS vs CONTESTS

continued from page 4

For this reason, I feel any attempt to promote World Contest participation using an "improve the breed" sort of argument will fail unless the case is made quite carefully. Yes, you and I know this to be an excellent reason to support a world team, but the average club pilot not being much exposed to cross-country flying in the first place will see little personal connection with Canada missing the Worlds. Some drastic change in the status of cross country flying, such as introducing a Silver C badge requirement to gain a glider pilot licence as the Germans have, would be necessary. Recalling the howls that result whenever the present very minimal licensing requirements are adjusted, I doubt that such a change will happen soon.

Another non-starter is a world contest surcharge on the annual SAC membership fee. The BGA does this with (as I recall) some thing like £2.50 of each member's dues going to world contest support.

Assuming each SAC member made a (tax deductible) contribution of $10 to the World Contest fund, this would raise about $28,000 every two years which would be a reasonable start on fielding a world contest team. Although this is equivalent to a few beers, a package or two of cigarettes, or a 1000 foot aerotow at most clubs, I feel the possibility of such a motion ever being passed at a SAC AGM is effectively zero due largely to the average club pilot's perception of the relevance of world contest participation to him or herself. Approaching a commercial sponsor for support when even such minimal support from one's fellow glider pilot as described above is non-existent seems unrealistic.

Regrettably, past world team members have not helped matters much with post-event publicity. For instance, I recall a SAC AGM several years ago where the afterdinner entertainment was a world team pilot giving a slide show of his experiences at the Worlds. Unfortunately most of the presentation was a nice tour of beaches and foreign sights and places with not much on the contest itself. Yes, of course, the guy was far too busy during the contest to be taking photos but I fear the impression to the attending average SAC member was of a nice vacation with some gliding thrown in. "Wonderful, that's just what I would love to do myself, but why should I put up my money so "Charlie" can go on another nice gliding trip again," was a general after-talk perception. This is terribly unfair because I know that Charlie put up most of the money himself and I know how much energy is required to fly in a world contest. However, in any kind of fund-raising, whether it be for a glider contest or to feed the starving in the third world, perception is everything.

World contest publicity definitely requires more attention than it has received in the past. For instance, how about a pre-departure photo graph to appear in *free flight* of the team in neat team clothing with some notable (politician, aeroclub president, hopefully a sponsor someday) in front of a glider trailer? The British Gliding Association always manages to do this with a shot of the boys with Prince Phil or some Royal in front of a palace. Hard to do and everyone will be crying, no time, no money, etc. but this is the sort of thing that needs to get done. How about a post-event brochure in the form of a contest report with decent colour pictures to go to everyone who donated to or supported the team? How about a nice photo signed by the team pilots "with thanks" to go to contributors over X dollars? Any corporate sponsor should get a large framed photo suitable for display in the company lobby. This is, I know, the last thing on one's mind during the contest or when looking at all the bills afterwards but again this is the sort of basic legwork that needs to be done for effective fund-raising.

You mention the need for sponsorship but I wonder how well we really looked after our last sponsor, Bacardi. Yes, I know Bacardi wanted a lot from the national contest organizers and didn't put up a lot of cash in return, but they were a bona fide sponsor who needed to be cultivated carefully if only in hopes of someone else noticing us and wanting to pick us up post-Bacardi. Unfortunately some contest pilots and organizers considered the Bacardi more of a nuisance than anything else and often said so which is hardly the way to set the stage for bigger and better sponsors. Recognition along the lines of the paragraph above is also important. I recall that Molson was a one-shot of the 1980 or so Nationals — what were their results from the event? What could have been done to increase Molson's "bang-for-the-buck" quotient? The BGA usually seems able to line up a sponsor for their team but I don't recall too many repeat sponsors, so perhaps they are in much the same boat. The SSA, in the land of the Los Angeles corporate sponsor Olympics, seems to be sponsorless more often than not, so perhaps it is even less realistic to expect a Canadian sponsor to come forward with our lesser exposure, etc.

Finally, here is my idea for fund-raising. How about a big ticket lottery for a sailplane or similar prize? This is perhaps a blatant appeal to greed but these things are regularly run in Winnipeg for quite expensive houses and seem to be sold out more often than not. I am suggesting something like 300 tickets at $500 each to draw for an LS-6 or similar ship with runner-up prizes such as a car and/or some item of glider equipment. The idea could be that the ship is first flown in the Worlds by a team pilot and then handed over to the lucky winner. The economics would run some thing like $150,000 from ticket sales against prizes of $80-$100,000 netting $50,000 plus. This may be too long a shot because 300 tickets is over 20% of the 1400 SAC members who complain heavily about $10 fee increases. (Cross border sales to American pilots?) Perhaps the idea bears some thought, although it is too late for Sweden this summer. •

# FAI badges

**Walter Weir** 24 Holliday Drive
Whitby, ON L1P 1E6 (416) 668-9976 (H)

The following Badges and Badge legs were recorded in the Canadian Soaring Register during the period 24 June to 3 September 1993

**DIAMOND BADGE**

| | | |
|---|---|---|
| 80 | Mike Thompson | Vancouver |
| 81 | Francisco Diaz | Champlain |

**DIAMOND ALTITUDE**

| | | | | |
|---|---|---|---|---|
| David Fowlow | Cu Nim | 5270 m | Blanik L13 | Cowley, AB |

**DIAMOND GOAL**

| | | | | |
|---|---|---|---|---|
| Paul Scott | Edmonton | 321.5 km | Pilatus B4 | Chipman, AB |

**DIAMOND DISTANCE**

| | | | | |
|---|---|---|---|---|
| Mike Thompson | Vancouver | 518.6 km | HP-14T | Golden, BC |
| Francisco Diaz | Champlain | 500.9 km | DG-202 | Julian, PA |

**GOLD DISTANCE**

| | | | | |
|---|---|---|---|---|
| Paul Scott | Edmonton | 321.5 km | Pilatus B4 | Chipman, AB |

**SILVER ALTITUDE**

| | | | | |
|---|---|---|---|---|
| Ian Chaun | Vancouver | 1480 m | Blanik L23 | Hope, BC |

**SILVER DURATION**

| | | | | |
|---|---|---|---|---|
| Ian Chaun | Vancouver | 5:12h | Grob 102 | Hope, BC |
| Claude LeBlanc | Gatineau | 5:20h | 1–36 | Pendleton, ON |
| Tom Jerrard | York | 5:38h | 1–26 | Arthur East, ON |
| Peter Morgulis | Air Sailing | 5:30h | Ka6CR | Belwood, ON |

**C BADGE**

| | | | | | |
|---|---|---|---|---|---|
| 2378 | Ian Chaun | Vancouver | 1:25h | Blanik L23 | Hope, BC |
| 2379 | David Chamberlain | Regina | 1:08h | 1–26 | Strawberry Lake, SK |
| 2380 | Claude LeBlanc | Gatineau | 5:20h | 1–36 | Pendleton, ON |
| 2381 | Arthur Mansfield | Montreal | 1:03h | Blanik L13 | Hawkesbury, ON |
| 2382 | Martin Renters | SOSA | 1:08h | 1–26 | Rockton, ON |
| 2383 | not used | | | | |
| 2384 | Milosz Zemanek | York | 1:10h | 2–33 | Arthur East, ON |
| 2385 | Mike Barry | Rideau | 1:30h | 2–33 | Gananoque,ON |
| 2386 | Neil Gegenbauer | Vancouver | 1:12h | Blanik L23 | Hope, BC |
| 2387 | Michael Coombs | Borden | 1:11h | 2–33A | Borden, ON |
| 2388 | Peter Morgulis | Air Sailing | 5:30h | Ka6CR | Belwood, ON |

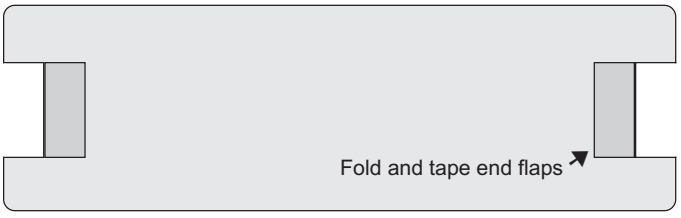
## MAILING YOUR “UNCUT NEGATIVE”

You’ve finally done that Gold distance, Diamond goal triangle and have all the stuff ready to package up to send to the badge chairman. Your precious, irreplacable uncut negative has to be mailed. Just the idea of abandoning it in one of those red boxes is enough to make you break out in a cold sweat.

Most people think it will break if its folded and therefore mail it in a film container with lid on, safely rolled up. But it makes such a lump in the envelope, the envelope gets torn by those friends at Canada Post — the film container drops out and the envelope arrives without it! Nightmare!

Actually, if you cut a piece of cardboard about 3x10 inches, then make two cuts in the ends wide enough apart for the film to fit betweeen them and then fold and tape the resulting end flaps, you have a “reel” that the film can be taped to and safely mailed on without fear of breaking due to tight folding.

As long as that film eating troll at the post office doesn’t get a whiff you’ll be okay.



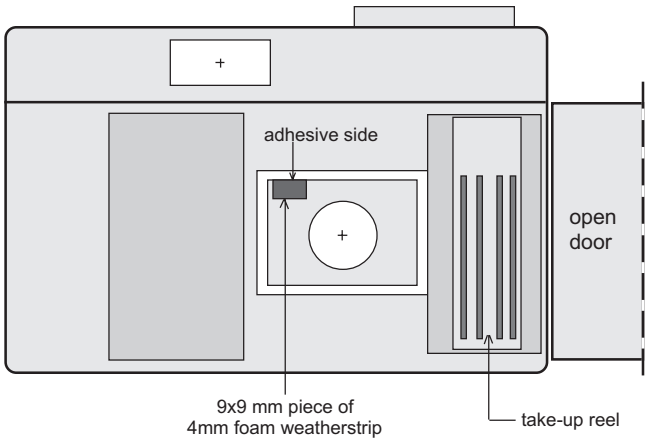



## TIME BACK CAMERAS

One of the problems with time back cameras is that if you take a picture where the corner in which the time is printed has a very light background, the time imprint will not be readable.

To eliminate this problem, Jim Carpenter suggested several years ago that a triangular piece of tape be put across the throat of the camera in the corner where the time was printed, just in front of the film. I was wary of this idea because I felt the film might rub the tape off and then jam the shutter or something. Instead, I cut a 9 mm x 9 mm piece of black 4 mm foam weather strip (with its self-adhesive on one of the 9x9 sides), and stuck this on the side of the throat of the camera just a fraction of a millimetre clear of rubbing the film. If the time imprint appears in the lower right corner of the picture the weatherstrip is put in the upper left corner of the throat (see figure). This seems safer because of the large area of adhesive, compared to the very small area available on the edge of the throat.

I did both my cameras this way in March and so far no problems. Of course, you also have to keep your button battery fresh and clean the contacts between the backdoor and the body with alcohol.




Rear view of a Konica time back camera with door open

# Trading Post

## SINGLE SEAT

**SKYLARK 4B**, 18m, O2, T&B, radio, parachute, trailer, very good condition. Soars on a puff – the best L/D for your dollar. Bev or Dave Lewtas (514) 455-7786.

**Ka6CR**, C-FRWO, good condition, full instrumentation, O2, chute, trailer radio, hangared, 1/3 share, located at Rockton, ON. Reg Nicholls (519) 927-3645 evenings.

**HP–11A**, C–FUKB, 518 h, standard instruments, CB radio, open trailer available. Highest performance for your dollar. For quick sale as is, only $10,900 (After spring cleanup with fresh inspection, $12,900. Bob Patterson (416) 457-5238 (9 am to 9 pm).

**HP11A**, about 40h, new Schreder trailer, new instruments, 720 chan radio, O2, Security 150 chute. One–person towing gear. $US13,500. Horst Dahlem (306) 955-0179.

**OPEN CIRRUS (modified)**, CF–SNZ, 500 h TT, with homebuilt fibreglass fuselage, retractable gear. Factory water, tinted canopy, radio, O2, Ilec vario system, encl alum trailer, tail dolly, wing stands. Never damaged, $15,000. Fred Wollrad (403) 479-2886 or Harold at (403) 474-0139.

**DG–300**, fully equipped, Cobra trailer. Dave Webb (416) 871-3411.

**LS6b**, excellent condition, 220 h, Dittel radio, Schuemann SV, ASI, Hamelton compass, O2, ground handling equipment, Cobra trailer with 3rd rail, Smiley bags. (215) 953-2412 day, (215) 721-4977 evenings.

**ASTIR CS**, C-FIUR, formerly N-127SS, 545 h, never damaged, excellent condition, Ball vario with audio netto/cruise, 720 chan hand-held radio, aluminum enclosed trailer. Marc Gallanter (416) 848-7900 or (613) 224-3255 any time.

**ASW-20**, C–GRKX, Cobra trailer, final glide computer, Dittel radio, $42,000. For details phone Chris eaves, (519) 268-8973 (H), (519) 452-1240 (W).

## TWO PLACE

**2–22E**, G–FYPC, very good condition, annual May '93, no trailer. Excellent trainer, asking $8000 obo. COSA, c/o Bob Leger (416) 668-5111.

**LK10A/TG4**, CF–ZAJ. A classic, taught some of the best in Canada how to fly; with trailer and spares. Ben Lochridge (416) 278-4765 work or (416) 271-3097 home.

**Grob 103**, 920h, all ADs done, standard instruments front and rear, custom fittings for trailer (trailer available separately. Alberta Soaring Council, (403) 625-4563.



**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.

**CHRISTMAS CARDS**
**ON A GLIDING THEME**

**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.

## MISCELLANEOUS

**Winch wanted**. A self–contained winch for glider club and a **winch bridal** for a Blanik. Gravelbourg Gliding & Soaring Club, Box 213, Lafleche, SK S0H 2K0 or call (306) 472-5668.

**Van for hire**. Privately owned in South Island, New Zealand. Modern diesel powered vehicle with all mod. cons. Airport transfers and home stays available. GW Bailey, 58 Te Ngawai Road, Pleasant Point, NZ. phone 064–3–6147722.

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

## 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.

## 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 (F).

**XU Aviation Ltd.** Repairs in wood, metal and composites. C. Eaves (519) 452-1240 (B), 268-8973 (H).

**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.

**SZD–55–1, Jantar, Jantar 3, Puchacz, Puchatek.** For Polish gliders, contact Josef Repsch, (403) 488-4446, fax 488-7925.

**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.

## PROVINCIAL ASSOCIATIONS

**NOVA SCOTIA SOARING ASSOCIATION**
5546 Sentinel Square
Halifax, NS B3K 4A9
(902) 455-4045
President: Gordon Waugh

**FEDERATION DE VOL A VOILE DU QUEBEC**
5140 St–Patrick
Montréal, PQ H4E 4N5
(514) 362-7363
President: Pierre Pépin

**ONTARIO SOARING ASSN**
94 Willcocks Street
Toronto, ON M5S 1C8
(416) 964-5810
President: Lorna Novosel

**MANITOBA SOARING COUNCIL**
67 Granada Cresc
Winnipeg, MB R2Y 0P9
(204) 837-7280
President: Lloyd Davies

**SOARING ASSOCIATION OF SASKATCHEWAN**
78 Schneider Crescent
Regina, SK S4R 7R5
(306) 545-6856
President: Gary Bozek

**ALBERTA SOARING COUNCIL**
Box 1916
Claresholm, AB T0L 0T0
(403) 481-3866
President: Marty Slater

**BC SOARING SOCIETY**
9280 – 168 Street
Surrey, BC V4N 3G3
(604) 589-4552
President: Dave Parsey

### ATLANTIC ZONE

BLUENOSE SOARING CLUB
Ron Van Houten
17 John Brenton Drive
Dartmouth, NS B2X 2V5
(902) 434-1032

### QUEBEC ZONE

AERO CLUB DES OUTARDES
Jean Richard
876 Bergeron
Ste-Thérèse, PQ J7E 4W8
(514) 441-2120

AERO CLUB SPORTAIR LANAUDIERE
Gaetan Trudel
131 Perron
St-Bsile-le-Grand, PQ J3N 1H5
(514) 653-1945

CLUB DE VOL A VOILE APPALACHIAN
David Lord
2910 Robert
RR 1, Lennoxville, PQ J1M 2A2
(819) 566-6529

ASSOCIATION DE VOL A VOILE CHAMPLAIN
Claude Gosselin
30 des Orties
La Prairie, PQ J5R 5J3
(514) 444-3450

CLUB DE VOL A VOILE DE QUEBEC
Jean-Guy Helie
85 Route de la Jacques-Cartier
Ste-Catherine, PQ G0A 3M0
(418) 875-2005

MONTREAL SOARING COUNCIL
Box 1082
St. Laurent, PQ H4L 4W6

CLUB DE VOL A VOILE MONT VALIN
3434 Ch. Ste Famille
Chicoutimi, PQ G7H 5B1

### ONTARIO ZONE

AIR SAILING CLUB
Richard Longhurst
100, 1446 Don Mills Road
Don Mills, ON M3B 3N6
(416) 391-3100 ext 250 (W)

ARTHUR GLIDING CLUB
10 Courtwood Place
North York, ON M2K 1Z9

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

BEAVER VALLEY SOARING
Box 394
Thornbury, ON N0H 2P0

BONNECHERE SOARING
Box 1081
Deep River, ON K0J 1P0

CENTRAL ONTARIO SOARING ASSOCIATION
Bob Leger (416) 668-5111
866 Hyland Street
Whitby, ON L1N 6S1

ERIN SOARING SOCIETY
Box 36060, 9025 Torbram Rd
Bramalea, ON L6S 6A3

GATINEAU GLIDING CLUB
Rick Officer (613) 824-1174
1085 St. Jovite Ridge
Orleans, ON K1C 1Y6

GUELPH GLIDING & SOARING ASSOCIATION
G. Ritchie (519) 763-7150
259 Cole Road
Guelph, ON N1G 3K1

KAWARTHA SOARING CLUB INC,
Box 168
Omemee, ON K0L 2W0

LONDON SOARING SOCIETY
Brian Keron
RR 2, Thamesford, ON N0M 2M0
(519) 285-2379

RIDEAU GLIDING CLUB
Box 307
Kingston, ON K7L 4W2

RIDEAU VALLEY SOARING SCHOOL
Bruce McGlashan
885 Springland Drive
Ottawa, ON K1V 6L1
(613) 738-0064

SOSA GLIDING CLUB
BOX 81
ROCKTON, ON L0R 1X0

TORONTO SOARING CLUB
Stephen Foster
10 Blyth Street
Richmond Hill, ON L4E 2X7
(416) 773-4147

WINDSOR GLIDING CLUB
Box 2172
Walkerville, ON N8Y 4R8

YORK SOARING ASSN
10 Courtwood Place
North York, ON M2K 1Z9

### PRAIRIE ZONE

GRAVELBOURG GLIDING & SOARING CLUB
Henri Lizée, Box 596
Gravelbourg, SK S0H 1Y0
(306) 648-2744

PRINCE ALBERT GLIDING & SOARING CLUB
219 Scissons Court
Saskatoon, SK S7S 1B7

REGINA GLIDING & SOARING CLUB
Shane Crerar
Box 4093
Regina, SK S4P 3W5
(306) 584-1232

SASKATOON SOARING CLUB
Box 7943
Saskatoon, SK S7K 4R6

SWAN VALLEY SOARING ASSN
Sam Namaka, Box 1827
Swan River, MB R0L 1Z0
(204) 734-4677

WESTMAN SOARING CLUB
Box 1294
Brandon, MB R7A 6N2

WINNIPEG GLIDING CLUB
Susan or Mike Maskell
489 Lodge Avenue
Winnipeg, MB R3J 0S5
(204) 837-8128

### ALBERTA ZONE

COLD LAKE SOARING CLUB
Box 2108
Medley, AB T0A 2M0

CU NIM GLIDING CLUB
Keith Hay
7 Scenic Glen Gate NW
Calgary, AB T3L 1K5
(403) 239-5179

EDMONTON SOARING CLUB
Box 472
Edmonton, AB T5J 2K1

GRANDE PRAIRIE SOARING SOCIETY
Walter Mueller
10317 - 82 Avenue
Grande Prairie, AB T8W 2A6
(403) 539-6991

### PACIFIC ZONE

ALBERNI VALLEY SOARING ASSN
Doug Moore,
Site 310, C6, RR3
Port Alberni, BC V9Y 7L7
(604) 723-9385

ASTRA
9280 - 168 Street
Surrey, BC V4N 3G3
(604) 589-4552

BULKLEY VALLEY SOARING
BOX 474
Smithers, BC V0J 2N0

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 *(available from your club)* | $ 5.00 |
| 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 |
| | *Items 7–12 ordered through FAI awards chairman* | |
| 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 |
| | *Items 10, 11 not stocked – external purchase approval given* | |
| 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 *(also stocked by club)* | n/c |
| 14 | Official Observer application form *(also stocked by club)* | n/c |
| 15 | SAC Flight Trophies application form *(also stocked by club)* | n/c |
| 16 | FAI Records application form | n/c |
| 17 | SAC Flight Declaration form *(also stocked by club)* per sheet | $ 0.15 |
| 18 | SAC guide "Badge and Records Procedures", ed. 6 | $ 5.00 |
| 19 | FAI Sporting Code, Sec 3, Gliders, 1992 *(Payable to **ACC**)* | $ 7.00 |

Please enclose payment with order; price includes postage. GST not required. Ontario residents, add 8% sales tax (items 15–18 tax exempt). 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 | |
| Insigne FAI 'B', plaqué argent | |
| Insigne ACVV BRONZE *(disponible au club)* | |
| Insigne FAI 'C', écusson de tissu | |
| Insigne FAI ARGENT, écusson de tissu | |
| Insigne FAI OR, écusson de tissu | |
| *Les articles 7–12 sont disponibles au président des prix de la FAI* | |
| Insigne FAI 'C', plaqué argent | |
| Insigne FAI ARGENT | |
| Insigne FAI OR, plaqué or | |
| *Les articles 10, 11 ne sont pas en stock – permis d'achat externe* | |
| Insigne FAI OR, 10k ou 14k | |
| Insigne FAI DIAMAND, 10k ou 14k et diamands | |
| Certificat FAI de vol à voile (receuil des insignes) | |
| **Frais de services** pour chaque formulaire de demande soumis | |
| Formulaire de demande pour insignes *(disponible au club)* | |
| Formulaire de demande pour observateur officiel *(disponible au club)* | |
| Formulaire de demande pour trophées de vol de l'ACCV | |
| Formulaire de demande pour records FAI | |
| Formulaire de déclaration de vol de l'ACCV | |
| ACVV guide des procédures pour FAI certificats et insignes (éd.6) | |
| FAI Code Sportif, Planeurs, 1992 *(cheque payable à l'**ACC**)* | |

Votre paiement dévrait 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 15–17 exempts de taxe). Les articles 1–6 et 13-18 sont disponibles au bureau national de l'ACVV.

**SAC National Office, 306 – 1355 Bank Street, Ottawa, ON K1H 8K7 tel (613) 739-1063 • fax (613) 739-1826**