6/98
Dec/Jan

free flight · vol libre

Liaison

The 1998 season is history in most clubs. Gliders, planes, picnic tables have been put away. However, a most important period is already under way, getting ready for 1999. The board of directors will have, by the time you read this, met in Ottawa to close some unfinished '98 business issues but, for the most part, to deal with the 1999 season. This three day session (from Friday am to Sunday pm) is a gruelling exercise as we go through a very agressive agenda. Managing SAC means dealing with a ton of various issues, some interesting, some others being a pain but nonetheless needed. We cram in as much stuff as we can as we want to minimize the number of live meetings to keep our costs to a minimum. Cut rate long distance calls and tons of Internet does the rest. As a matter of fact, it should be compulsary for board members to be e-mail accessible and capable. We have also experimented with virtual board meetings complete with voting on some specific and not too complex issues, again to drive costs down.

Currently, we are busy defending our transponder exemption from a motion brought to Transport Canada by ATAC (the Airline Transport Association of Canada). Once again we are fortunate to have within our ranks competent individuals who donate their precious time and expertise to prepare and present briefs to support our position. And once again, success for SAC will mean that the status quo is preserved, in plain language, that the current situation does not change. So when I am asked, "what does SAC do for me", quite often the answer is, "we make sure that nothing happens to our access to the airspace, and that nothing happens to make the practice of the sport involve more bureaucracy." And once in a blue moon, we work hard to make sure a little less happens. Our executive director, Jim McCollum, spearheaded an action that resulted in radio license fees being abolished as of 1999. That is real money in our pockets, people.

Looking at the SAC Roundtable on our webpage, I was pleasantly surprised to see the interest around GPS flight recorders at contests. Such discussions are healthy and are a net gain. We've got to love the Internet: that technology is a godsend to us, especially when you happen to live in the largest country in the world!

On behalf of (from west to east) Harald, David, Howard, Richard, Jim and myself, our very best wishes for a healthy happy and prosperous 1999.

Salut vous tous. Depuis deux ans, je note des progressions intéressantes dans le nombre de membres francophones. En 1997, nos amis de Québec donnaient un coup de barre important faisant sauter leur nombre de la trentaine à la cinquantaine. En 1998, ils maintenaient ce niveau, ce qui est exemplaire.

En 1998, c'est au tour de Champlain d'ajouter deux douzaine de membres. Sans crier à l'âge d'or du vol à voile au Québec, on doit au moins se dire que nous sommes dans la bonne voie. En 98, Les Outardes se sont relocalisés de la région de Lanaudière à Bromont. Ayant moi même vécu ces déracinements avec Champlain, je peux vous assurer qu'il s'agit d'un travail colossal et qui occasionne des pertes. Cependant en 99, Les Outardes seront en mesure de reprendre la croissance. MSC a connu une baisse mais leur président, Peter Trent m'assure que des mesures sont prises pour que 99 soient une année de forte reprise.

Les compétitions nationales 1999 auront lieu à Champlain. Les provinciales 98 ont été un franc succès et ont servi de camp d'entraînement pour voir les implications d'un tel événement. J'ose exprimer le vœu que des membres de partout au Québec s'impliqueront dans un effort collectif. Je souligne dès maintenant qu'il n'est point besoin d'avoir une super machine pour participer. Le comité sportif de l'ACVV, à partir de savants calculs, a établi un "handicap" pour chaque type d'appareil. Cette méthode permet aux 1-26, Ka6, Solo, Jantar, etc. de compétitioner ensemble à armes égales. On vous y voit?

Sur ce même thème, on m'a reproché, sur le babillard du site ACVV, d'avoir émis le regret de n'avoir pas vu de membres d'autres clubs du Québec. Oui de la visite, on aime ça! Loin de moi l'idée de faire des reproches à qui que çe soit. Si mes propos vous ont offusqué, je m'en excuse. Quant aux maux dont ont m'accuse dans cette sortie en règle, je dis seulement que dans un organisme de bénévoles comme le nôtre, il est important que les canons soient muselés. Le but premier de ce sport, c'est de s'amuser. Faut pas perdre cela de vue.

Au nom (d'ouest en est) d'Harald, David, Howard, Richard, Jim et de moi même, nos meilleurs vœux pour une année 1999 pleine de bonheur, santé et prospérité et pleines de fins de semaines où le cumulus est roi.

Pierre Pepin president

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Cover

A Cirrus sandwich. Three Cirrus pilots from Cu Nim; Gerald Ince (54), Al Hoar (4E), and Mike Glatiotis (JM), met up under a great cloud street just east of the front range of the Rockies on 4 October. With multiple climbs to 11,000 feet made easy, they made a few formation photo flights away from the clouds.

Photo: Mike Glatiotis

Did the "Pterodactyl" migrate north?

a history of the Pratt–Read sailplane, and some help sought

Norb Wethington

It was a really strange experience. I was sitting in the left seat of a "pterodactyl" — a very large and very old training glider which was perfectly airworthy. I had reached a milestone in my quest to fly the Pratt-Read LNE-1 but this big yellow bird was going nowhere. The weather was garbage! Calling it a pterodactyl is quite appropriate. It was designed during the start-up of World War II and it had an expected shelf life of two years. Here I was, meeting up with one — some 56 years after it came off the assembly line and 46 years after it set some amazing performance records.

The original prototype was designed in late 1941 by a team of six well known aeronautical engineers and glider designers. Pearl Harbor brought some urgency to the project and the original NX41802 was quickly finished and presented to the US Navy in response to a "Request for Proposal" for them. An advanced training glider was needed in sufficient numbers to prepare Navy and Marine pilots for glider-borne invasions of the Pacific theater islands.

The contract was awarded to the Pratt-Read Company which then created their Gould Aeronautical Division at Deep River, Connecticut. The Navy purchased NX41802, designated it the XLNE-1 and allocated a serial number (31505) to it. The company was then assigned 100 serial numbers: 31506 for the production-prototype XLNE-1 and 31507 through 31585 and 34115 through 34134 to the LNE-1 itself.

The production prototype XLNE-1 (#31506) came off the line in late July, 1942 and the remaining were manufactured at regular intervals. The success of the Guadalcanal campaign (Jul - Oct, 1942) and the speed with which the Pacific theater of operations was moving, doomed the glider-borne invasion strategy mid-stream; seaborne invasions became far more practical. Production was stopped at the completion of #31579 or 73 of the LNE-1. With the two XLNE-1s, this put the total at 75. (There was, however, a "phantom" 76th ship constructed by a Pratt-Read employee out of inspection-rejected parts. The Navy ordered it to be destroyed; no indication whether the employee was ever disciplined.)

As World War II wound down, those which still existed in the Naval inventory (very few of which had any serious flight time) were transferred to the US Army Air Force for disposal through civilian contract sale. For administrative purposes, they were all redesignated as the TG-32 and many were repainted from the Navy "International Yellow" colours to Army silver. Memos describing the necessary upgrades one needed to obtain US civilian registry for the Pratt-Reads were quickly distributed by the Soaring Society of America.

From 1945 until 1952, the Pratt-Reads lived an obscure life barnstorming and training pilots. The Sierra Wave Project changed all of that. A contract was released by the USAF Cambridge Research Center (ARDC), at Hanscom Field, Massachusetts, for meteorological flights in the desert of California on the lee side of the Sierra Nevada mountains. Two Pratt-Reads (N63174 and N63195) owned by Southern California Soaring Association were part of this effort to determine the size, strength and complexity of wave and roll clouds. In fact, on 19 March 1952, one of the project Pratt-Reads with pilot Larry Edgar and co-pilot Harold Kleiforth took it to an absolute altitude of 44,255 feet (13,489 m). This

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.

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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 listed in the magazine.

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world record for multiplace gliders Absolute Altitude still stands. (See the SSA website at *http://www.ssa.org* for this and other record flights by the Pratt-Read.)

A few years later, a follow-up study was also sponsored by the Cambridge Research Center. It was entitled the Mountain Wave Project and used the same equipment and personnel. It was unexpectedly terminated as a result of a now-famous accident. A singularly vicious rotor disintegrated Pratt-Read N63195 in mid-air over Bishop, California on 25 April 1955. Pilot Larry Edgar — this time flying solo — managed to parachute to safety. USAF flight surgeons who examined Larry afterwards determined that his retinal damage was caused by forces in excess of negative 15 g for about 0.4 second. (See Carl Posey, *In the Grip of the Whirlwind*, Air and Space, Smithsonian, July 1996.)

There is a gap in information available on the Pratt-Reads from 1955 until 1970.

In March 1970, the SSA's special issue of Soaring, the *US Sailplane Directory*, listed 20 Pratt-Reads as active. A subsequent directory in August 1974 stated that approximately 25 were still active. The most recent directory published in July 1997 listed 15 as still active.

Perhaps the most complete current data is available from the Vintage Sailplane Association which lists twelve "intact" Pratt-Reads in the USA as of October, 1998. Of those, only four are rated as airworthy and two of them are on permanent display in museums. The one which I visited and is ready-to-fly is based in the Virginia hill country west of Frederick, Maryland. A second is airworthy, but undergoing some needed repair, and is based near Lansing, Michigan. Of the eight identified as "not airworthy", one is on permanent display in an air museum, two others are owned by similar museums but are in storage gathering dust, and five are in private hands in various states of repair.

The two airworthy ones which are on permanent display, however, can provide at least a framework for a longitudinal study of the overall history of the Pratt-Reads.

The factory prototype XLNE-1 (#31506) is completely airworthy and is on permanent display at the National Warplane Museum at the Corning-Elmira Regional Airport. Documentation exists in the archives of the National Soaring Museum at nearby Harris Hill which tell a great deal about its production history. Photographs taken with this aircraft in US Navy colours do exist from the war years. It was totally restored by Bob Dart of Mayville, New York — flown for several years — and then donated to the museum in the Spring of 1998.

A later version LNE-1 (#31561) is owned by the National Soaring Museum but is on permanent loan to the New England Air Museum in Windsor Locks, Connecticut. Documentation also exists in the NSM archives which can trace this aircraft back into the mid-70s. There is a published photograph which shows this aircraft on the ground during World War II. It had been totally restored by Jan Scott of Lovettsville, Virginia — and donated to the museum in 1988. The history of both of these two airworthy museum aircraft have a major gap from the time of the salvage sales at the end of World War II until a few years prior to their acquisition by the individuals who restored them. Both are known to have been registered and flown in Canada during that time.

Now for your help. Information from SAC have identified at least two Pratt-Reads which did migrate northwards: CF-ZCZ was known to be at RCAF Station Cold Lake in August of 1959 and CF-ZAN was known to have been owned by the London Soaring Society prior to July 1977. I have no other information about Pratt-Reads in Canada. If any readers want to contribute to my ongoing study, please contact me. By the way, I will fly that pterodactyl one of these days! ❖

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est une organisation à but non lucratif formée d'enthousiastes et vouée à l'essor de cette activité sous toutes ses formes, sur le plan national et international. L'association est membre de l'Aéro-Club du Canada (ACC), qui représente le Canadaau sein de la Fédération Aéronautique Internationale (FAI), laquelle est responsable des sports aériens à l'échelle mondiale et formée des aéro-clubs nationaux. L'ACC a confié à l'ACVV la supervision des activités vélivoles aux normes de la FAI, telles les tentatives de record, la sanction des compétitions, la délivrance des insignes,ainsi que la sélection d'une équipe nationale pour les championnats mondiaux biennaux de vol à voile.

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Not last!

Hotel Tango moves up the ladder in the contest scene.

by **Hotel Tango**

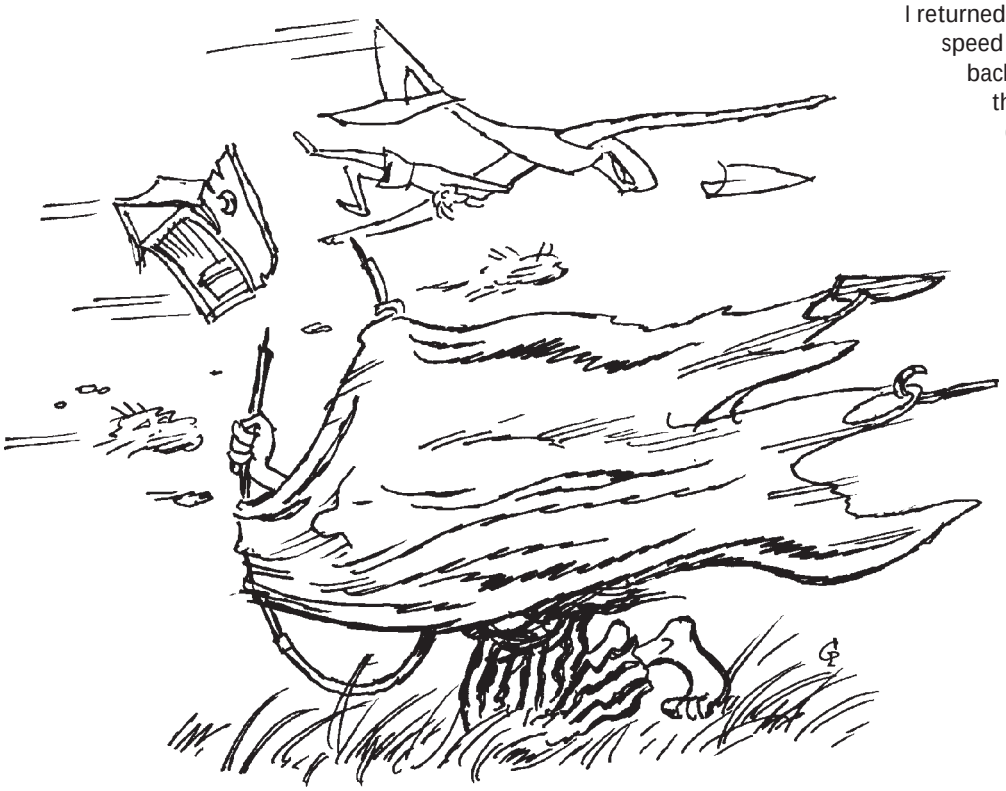
I'd like to share some experiences I enjoyed while at the Labour Day weekend combined Provincials at AVV Champlain near St. Dominique, QC. To quote the club motto, *"Ça plane pour moi",* I wish I knew how to make that into the past tense. The whole weekend was well organized, I had lots of fun, was made to feel very welcome, made some new friends, and benefited from flying in an unfamiliar area.

As an example of the hospitality, I got invitations to join trips to Lake Placid and Pennsylvania. That was before they saw me fly. I'm a low time glider pilot whose only previous contest experience was this summer's "Dust Bowl" contest at SOSA, my home club, where I came last, and was beaten by a pregnant woman flying a 1-26. I originally volunteered to visit Champlain to crew for her husband, so I could gain more contest experience by osmosis. She wouldn't let him go, and since that freed up the club Single Astir, I went with it as a contestant as part of "Team SOSA". And, since SHE wasn't going, my objective of not being last was a very real possibility.

I got a late start on Friday and had the interesting experience of driving a long trailer through Montreal during rush hour on a holiday weekend. Not being familiar with the route led to many last minute lane changes with this rig, cutting off lots of cars in the process, and the Ontario plates probably set federalism back considerably.

I arrived at the club after dark but fortunately my crew were already there and they helped me erect my tent. Now, the tent figured greatly in my experiences. It was almost too windy for gliders to fly all weekend, which made it perfect for tents to fly. This particular tent was dome shaped, with a fly on top. The loyal crew helped reposition the tent with the door out of wind after it filled up with air and blew around the first time. What happened then was that the wind strained the rigging and blew the fly so it was sort of half off the lee side of the tent. My crew suggested that I should tie the fly down with extra pegs, but I seemed to have less pegs than I thought I had started with. The crew must have come prepared, because they were busy double-pegging their own tent with some extra pegs that they seemed to have handy. Now, if you can picture the dome tent, shaped like an airfoil, and the wind blowing fiercely and the fly stretched out and hanging over the trailing edge, the whole thing looked and behaved like a wing with a Fowler flap.

Day One of the contest started out with a howling crosswind, which enhanced the presence of the nearby field spread with fresh manure. My crew suggested that IF I returned to land, I could tell wind direction and speed by how far my tent had gone. I did come back, having made only one turnpoint, and they suggested my tent might be capable of going farther than me. A bunch of people had trouble with the day and, through the miracles of handicapping, neither the tent nor I came last.



You may have seen the discussion on Champlain's website about their "extended" runway of alternate landing sites. One of the gliders tried them all out during the impromptu contest for the most relights. They were awarded the Spot Landing prize for the show they put on for the folks in the camper parking area.

The evening was a delightful gathering, involving a meal you had to cook yourself. (They didn't tell you that when you bought the ticket.) I'm not sure if this was a tactic by Champlain to save labour or to encourage camaraderie, but it sure illustrated the theory of what too many cooks can do. Picture seven ⇨ **p11**

Catchin' the BIG KAHUNA express

Some big time fun for a couple of newbies

Behzad Shroff

Behzad Shroff
Montreal Soaring Council

The final weekend of the 1998 MSC Wave Camp at Lake Placid dawned with a clear blue sky and promise of at least some picturesque flying over the Adirondack Mountains, if nothing else. But as we had hoped, Mother Nature confirmed that autumn was here as she orchestrated her usual wind dance at this time of year. Our faithful workhorse, the Twin Astir, was being prepared for the wave fishing expedition one last time. The first flight for the Twin proved successful as Pierre-André Langlois and Emilie Lessard snagged the wave and rode it to ten grand. By the time Hicham Hobeika and I strapped ourselves into the Twin, the wind strength had increased while also gusting schizophrenically at various angles from a direct cross to 45 degrees and ranging between 15-20 knots across runway 32.

At 1415 hours the carnival ride began as we started our takeoff roll. It was a battle to keep the main wheel on the centre line as the powerful hand of the crosswind tried to swat the Twin off the runway. The runway lights are only inches from the reach of its 17-metre wingspan. On the initial climb to altitude, we felt the whiplash-inducing onslaught of the wind as it jolted us around the sky, seemingly furious that we had invaded its territory. But as soon as we climbed above the peaks, the turbulence vanished.

We released at 5000 feet agl (6700 asl) near Heart Lake into lift that registered at about 1.5 knots. For over an hour we bounced about like a worn-out tennis ball between 7500 and 8000 feet asl in a sorry-excuse-for-a-wave that teased us every time we fell to 7500 by lifting us back up and then shutting down at eight thousand. The 8000 foot glass ceiling seemed impossible for either of us to crack. I almost fell asleep in the back as Hicham valiantly negotiated the wave for a way up and over the ceiling.

But good fortune was bestowed upon us. We had an angel in the sky to guide us to the hidden treasure — not the most heavenly angel one has ever seen (and with a moustache to boot), but André Pepin from the Champlain club really came through for us. In his DG-600 he beckoned us several times in that first hour to join him above Marcy airfield. But we were very reluctant to head in that direction.

Now I must digress and explain the circumstances. This was Hicham's 4th season in soaring and his third wave camp; he has 300 hours. It was my third season (150 hours) and the first flying regularly over this mountainous terrain. We were not sure where exactly Marcy was, except that it was downwind of Lake Placid. We managed to stay stationary in the weak wave at about 40 knots. We were also monitoring 123.3 on the blower and knew of the chaos occurring on the ground: a takeoff attempt had been aborted; surviving through several rock 'n roll landings had caused the towpilot to question the wisdom of continuing; at one point the towpilot called in that he had engine trouble. Therefore gliding operations had temporarily ceased. Prior to our own departure we had seen gliders and power aircraft doing dipsy-doodles on takeoff and final approaches that resembled a fly-in at a drunken barnstormers' reunion. So in our minds, venturing about the windswept sky above rocky peaks and tree-laden summits was a task to be performed with great care, especially when one is downwind of home sweet home.

Now, back to our story.... Finally, after about the 5th or 6th call from André, we examined the map, verified the location of Marcy airfield and Hicham made the executive decision to go for it! (after all it was his flight). ⇨ **p16**

The elements of handicapping gliders

Part 3 Handicaps based on the pure MacCready model

Carl Herold

For the next few parts, I will be comparing the cross-country performance for seven gliders ranging in performance from the 1-26 through the Nimbus 3D. In Part 2, I challenged the reader to compare the cross-country speeds using the representative curves provided. We will generate an initial handicap for these seven gliders using a very simplistic MacCready soaring model with the following idealized assumptions outlined below.

Basic MacCready model handicap assumptions

- The start gate and finish gate altitudes are the same.
- This is a very long distance flight with no landouts.
- All flight airspeeds and altitudes are at sea level at standard temperature and pressure (59°F and at 29.92"Hg).
- All gliders are 100% efficient in finding, entering, climbing, and leaving thermals.
- All gliders climb at the same rate for climbs ranging from 100 to 800 ft/min.
- The best speed to fly and the achieved cross-country speeds are based on the MacCready model.
- The cross-country cruising speeds are constant and stay on the course line.
- The model assumes 100% thermal intercept probability.
- There is no sink or lift between thermals.
- There is no wind.
- The start and final glide speeds are the optimum inter-thermal speeds.
- The glider polars are generated as a closed form equation fitting published performance measurements.
- The single place glider flying weight is based on its maximum takeoff weight plus 265 pounds (accounting for pilot, batteries, parachute, oxygen system plus 15 pounds).
- The multiplace glider flying weight is based on its maximum takeoff weight plus 475 pounds (accounting for pilot, passenger, batteries, two parachutes, oxygen system, plus 25 pounds) .
- The "scratch" glider (handicap = 1.00) will be the Standard Cirrus.

The MacCready (speed-to-fly speed ring) model was developed by 1956 Open Class World Soaring Champion, Paul MacCready, as an aid to the pilot to fly at the best inter-thermal speed to the next thermal. It was based on the pilot's expected rate of climb to be achieved at the next thermal and, in addition, provided the pilot with the best additional speed to fly (via the speed ring attached to the variometer) in increased sinking conditions. We will now use this same MacCready model as we develop a simplistic sailplane handicap. Subsequent parts will add realizable complexity to this model which will progressively modify this basic handicap. These real world functions which will be investigated are:

- The impact of start gate speeds (eg, red line limitations) and gate altitudes and finish gate altitudes on the handicap.
- The impact of task distance on handicaps.
- The impact of glider weight changes on handicaps.
- The impact of wind on handicaps.
- The impact of height band on handicaps.
- The impact of contest site field elevation on handicaps.
- The impact of task types (O&R, POST, triangles) on handicaps.
- The impact of density altitude on handicaps.
- The impact of the different climb rates for each of the gliders due to wing loading and minimum sink differences on handicap.
- The impact due to wingspan changes and winglet additions on handicap.

By the time I have done all this, I will begin to explore what winning pilots in the past and currently are accomplishing in competitions compared to this series of idealized incremental developed models. We will learn that the highest performance Open Class racing gliders in the world are winning with thermalling percentages as low as 17% or better, even for long tasks. In addition, I notice the instrumentation (Total Energy compensation, wind measurement in real time, GPS flight recorders, thermal

marking, good True Airspeed corrections, and GPS interconnected glide computers) has made measurable performance gains with increased pilot confidence and decision making skill for all gliders incorporating them. Obviously the higher performance gliders with longer reach are able to achieve larger gains from this than the lower performance gliders.

Employing the list of assumptions above, I will now refer to the comparative curves for each of the seven gliders to be compared to the similar ones shown in Part 2. For each 100 ft/min rate of climb the optimum speed to cruise to the next thermal is shown in Figure 1. Each glider is shown with a different symbol with a glider name and the flying weight noted in pounds. Figure 2 shows the resulting achieved cross-country speeds as a function of rate of climb using these same reference curves for each of the gliders. Figure 3 shows the ratio of the achieved cross-country speed of each of the gliders for each rate of climb compared to the speed of the scratch glider. Thus, the Std Cirrus at 744 pounds will have a handicap 1.00 for all rates of climb. The cross-country speeds for all gliders climbing at 100 ft/min are ratioed. This produces a handicap for each of the gliders compared to the Std Cirrus for 100 ft/min, then 200 ft/min, etc.

You will note in Figure 3 that for high rates of climb the handicaps change very little for above 600 ft/min and for low rates of climb the handicaps begin to diverge for both the low and higher performance gliders. The glide of the very high performance gliders begins to dominate in weaker lift and the glide of the low performance glider begins to deteriorate due to its very low inter-thermal cruising speed.

Table 1 will be the interesting table to monitor as we proceed through the addition of the complicating factors listed above.

This table shows the percent of time the glider is assumed to be climbing during the cross-country flight for the model assumptions. This table shows the percent of total flight time the glider is thermaling. It is interesting to see that the actual time in each thermal is exactly the same for all the gliders at the same rates of climb. There is, however, a noticeable advantage for the higher wing loading and higher L/D (aspect ratio) gliders. For example, in very weak thermals (100 ft/min) the high performance gliders thermal only 57% of the time, while the lowest performance glider in this sample list (the 1-26) must thermal 70% of the time. The lower performance glider gets to lower altitude much sooner, thus have to endure more climbs per unit of distance than the more efficient (lower sink rate) gliders. Thus, the increasing difference in percent thermalling time.

As the lift increases to 800 ft/min for all gliders, the percent thermalling time diminishes to around 36% to 40% for all gliders. As they all fly faster inter-thermal speeds in stronger lift, the profile drag penalty begins to dominate as induced drag diminishes.

The next few chapters to be explored will show dramatic changes in the basic handicaps.

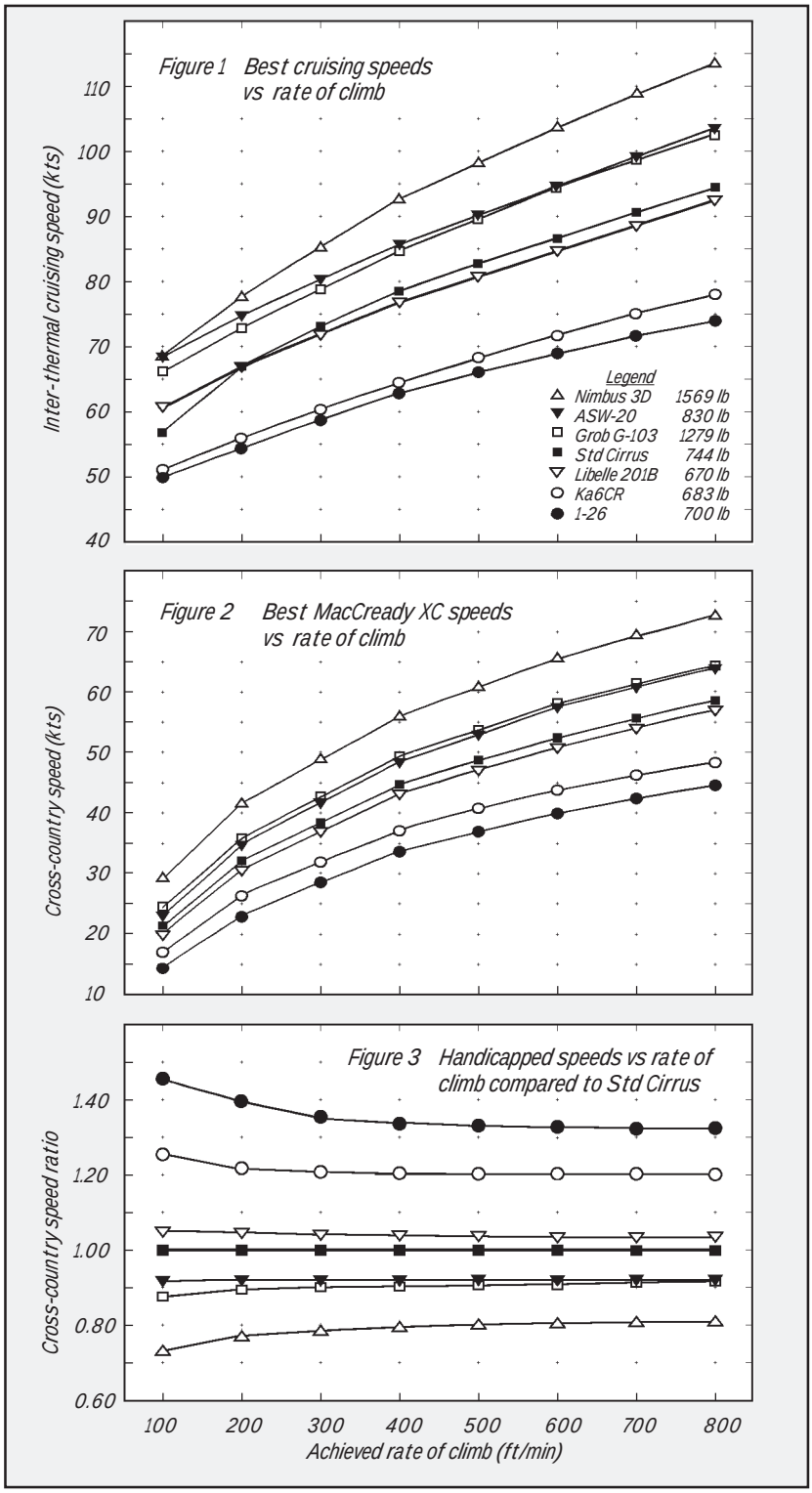
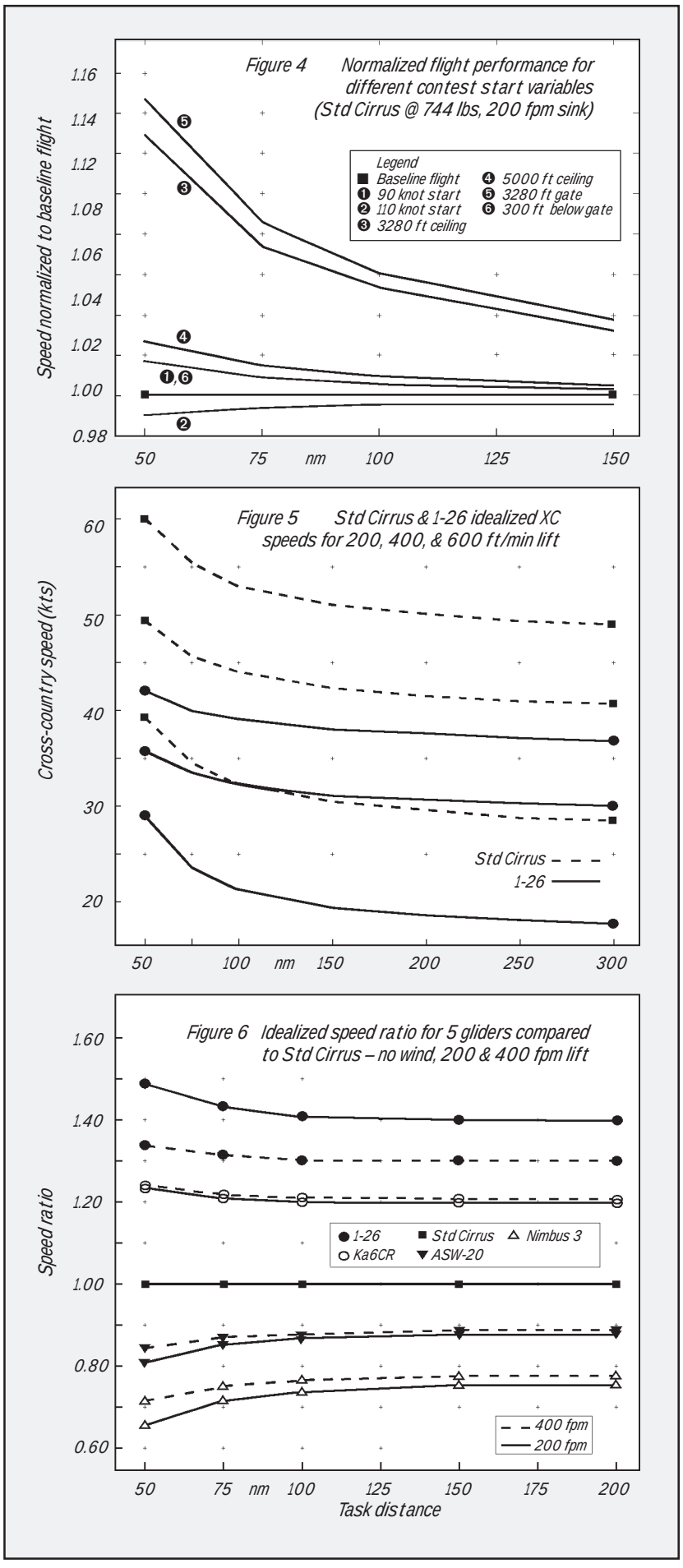


Table 1 Percentage of time thermalling

Glider @ flying weight (lbs)	*Average rate of climb – ft/min*							
	100	*200*	*300*	*400*	*500*	*600*	*700*	*800*
Nimbus 3D – 1569	57.2	46.5	43.1	39.6	38.3	36.9	36.5	36.1
ASW-20 C – 830	63.2	50.8	46.4	41.9	40.4	38.9	38.0	37.1
Grob G-103 – 1279	65.8	53.4	48.4	43.4	41.3	39.3	38.7	38.0
Std Cirrus – 744	62.6	52.0	47.8	43.6	41.5	39.5	38.8	38.1
Libelle H201B – 670	66.5	54.2	49.1	44.1	42.0	40.0	39.3	38.6
Ka-6CR – 683	66.7	52.7	47.5	42.4	40.7	39.1	38.5	37.8
1-26E – 700	70.6	57.7	52.4	47.0	44.7	42.3	41.1	39.8



Part 4 The impact of start gate height, start speeds, and task length on glider speed ratios.

Part 3 showed the speed ratio for six representative gliders against the Standard Cirrus at 744 pounds. This part will show a glider flying an idealized contest task on a no wind day. The probability of intercepting a thermal is 100% and all gliders finish. All speeds are at sea level at standard temperature and pressure (STP). This model and spread sheet produced the results shown in Figures 4 through 6 in this chapter.

The example shows the conditions for the Std Cirrus starting at 0.93 of its V_{ne} speed, flying under a 5000 foot agl start gate margin by 100 feet, pulling up to the MacCready cruise speed setting of 67 knots based on a string of perfect 200 ft/min thermals having a 7000 foot agl cloudbase. This model assumes the first thermal climb is to 6500 feet and the final glide altitude starts at 6500 feet. The final glide is flown at the MacCready inter-thermal speed to a finish altitude of 250 feet.

By varying the baseline parameters and plotting the results in Figure 4, the fractional impact on performance as a function of task length is identified. Examples of this impact are summarized below in diminishing order for task length of 100 nautical miles:

a. if the cloudbase is lowered from 7000 feet to 3280 feet, the task speed will be reduced by 6%.

b. lowering the gate from 5000 to 3280 feet will reduce the task speed by 5.5%.

c. increasing the margin passing under the gate from 100 feet to 300 feet or increasing the finish altitude from 250 feet to 500 feet will each reduce the task speed by 1% for a 100 nm task.

d. if the start gate speed is decreased from 102 kts to 90 kts the task speed will be reduced by 1%.

e. if the cloudbase is lowered from 7000 feet to 5000 feet, the task speed will be reduced by 1%.

f. if the start speed is increased to 110 kts, the task speed is increased by 0.5%.

One can selectively combine the above results to achieve a multiplicative (plus or minus) effect on overall task speed. Later parts will show (current) soaring techniques by which much higher speed performance gains are obtained by the more modern gliders and instrumentation, such as cruising along paths of delayed sink or on final glides along lines of lift. Later, I will also show the impact of density altitude on cross-country speed.

Figure 5 shows the comparison of the baseline Std Cirrus starting at 103.2 knots and a 1-26E starting at 93.6 knots. This figure shows idealized cross-country speeds as a function of task distance for the base-

line tasks of 200, 400, and 600 ft/min rate of climb, with a 100 foot gate margin under a 5000 foot gate, with a cloudbase of 7000 feet, and finish at 250 feet. This figure shows higher cross-country speeds for the shorter task distances. This is the result of the start gate energy (potential and kinetic) reducing the MacCready distance one has to fly to start the final glide. Note that for a 200 ft/min lift, this start gate energy adds 3% (to the MacCready task speed for the Std Cirrus at 450 nm and for the 1-26 at 335 nm. For a 150 nm task, the start gate energy boosts by 15% (Std Cirrus) and 7% (1-26) respectively to the MacCready speed for a 200 ft/min thermal.

The speed advantage increases for the higher performance glider on shorter distance tasks. The higher red line speed gliders also have a task speed advantage with higher speed starts, most especially at high density altitude sites (like Minden, NV).

Larger excursions will produce proportional speed reductions or gains. Adding time delays to the model assumptions, eg, taking extra time getting centred and leaving a thermal or turning wide around the turnpoints reduces your achieved cross-country speed. These are all calculable losses, and a fixed model component could be incorporated in an idealized performance model.

Figure 6 shows the speed ratios (or the speed advantage of the Std Cirrus over the compared glider) for the 200 ft/min and 400 ft/min climb conditions respectively. The curves are plotted for the speed ratios for the Std Cirrus, 1-26E, Ka6CR, ASW-20, and Nimbus 3D at the all-up weights previously given. These speed ratios are developed for each of the gliders by using the Std Cirrus as the reference glider. Its cross-country speed for a given climb rate is divided by the compared glider's speed for this climb at each calculated task distance. Thus, the Std Cirrus speed results in a constant ratio of 1.0 (compared to itself) for all task lengths for a climb rate. The lower performance gliders will have a speed ratio greater than 1.0 and the higher performance gliders will have a speed ratio of less than 1.0. If we could agree on the model, this could be the means of producing a first generation handicap. We still have a lot more factors and variables to compare and discuss.

You will notice from studying these curves for 200 and 400 ft/min climbs that there is a task length dependency and a rate of climb dependency. With what criteria should we pick an idealized handicap? The speed ratios tend toward slow convergence with increased task distance and more rapidly diverge for weaker climb rates. Later in this series, actual contest trend data from 40 years ago to recent contest results around the USA and the world will provide insight on the impact on soaring location, geography, and weather conditions on selecting one handicap number for all gliders flying in weak and strong conditions. Can one pick an acceptable or fair fixed number for each glider? We will look at the impact of glider weight, wind, site elevation, task types, and changing contest rules.

Later I will make available the spread sheets, the mathematical models, the equations and the coefficients for producing the plots being shown for your own use. Much of this material has practical use for self-study on your personal soaring techniques as well as understanding some elements of handicapping. ❖

Not last!

from page 6

people (with drinks) standing around several thoughtfully supplied barbecues, by flashlight, discussing when to turn the steaks (which were excellent), or whether or not to add the house sauce (it was delicious). For the evening's entertainment our group was given the trick *barbecue fourchette* with the handle that would fall off at a *moment critique*. Warm hospitality and great conversation were served for dessert.

Day Two was scrubbed, but local flying continued, so I was treated to a ride in their souped up Cessna 150 towplanes. I am towed, and I'm impressed by the way these pilots can turn around so quickly through aggressive letdowns and downwind landings. I'll remember them the next time I fire up our 260 hp Pawnee at SOSA.

The high point of the day was a flight I took in a Blanik with, well, let's call him "Jean Smith" to protect his identity. There's a 1000 foot hill about 25 kilometres from the field that, given the strong winds, can be used to ridge soar. "Jean" gave me a great introduction to ridge soaring and, since we were too far away for final glide, an introduction to my first landout. I later found out that André, I mean "Jean" had been to the hill five times and made it back once. Out of habit, the towpilot pointed out to "Jean" a good field while outbound, and we were able to be towed out. (To be fair, only two of the three gliders with us made it back.) The other landout was a short-fuselaged homebuilt that easily fit onto the trailer sideways without derigging. My impression of these Champlain guys is that they land out so often that they have made preparations to make retrieval easier. At SOSA you get scolded and have to buy everyone a beer.

Dinner tonight was just as much fun, you still got to cook it yourself, but we knew in advance about the trick fork, so no burgers landed out during flipping. One of the revelations that came out over dinner was why there are so few females in the sport. We were enlightened by a woman pilot who had previously been an extremely accomplished skydiver. She said women's aversion to gliding had nothing to do with the risk involved, as evidenced by her past. One stumbling block is the heavy lifting involved in rigging and de-regging, but the real reason is that you're required to wear such a silly hat.

Day Three — my partner flew, and landed out. He was wearing what he called his "lucky T-shirt", but admitted that each time he has worn it flying, he has landed out. I think he should trade it to "Jean" for one of the excellent Champlain shirts. Everyone else went home, but I was having so much fun that I stayed and ate all that was left, and, quelle surprise, I didn't have to cook my dinner — Pierre Pepin did it for me. Thanks, Pierre. Then it got real dark and started to rain and they threw me out.

All the folks at Champlain were wonderful, and if you wish to visit, you'll find great hospitality, a swimming pool and a stray cat named Pistache that needs a home. My only question is, "Why are there so many sex shops in St. Hyacinthe, and why do they close so early on Saturday night?" ❖

designing a sailplane safety cockpit

All accidents involve the ground sooner or later, the pilot can be protected by an energy-absorbing "Formula 1" type cockpit

Tony Segal
from *Sailplane & Gliding*

Safety features may be built into new gliders with little or no effect on performance, but fitting some of these improvements into existing gliders is more difficult. Moreover, the incentive for the manufacturers to fit safety features in new gliders as standard has to be led by pilot demand.

Survivable loads on the pilot

The survivable load on a pilot depends on the direction of the impact, the acceleration, and the duration of the impact. A load in the direction of the pilot's spine (the z-axis) is the limiting case compared with the fore-and-aft case (the x-axis). The sideways impact (along the y-axis) is considered to be less significant.

During a z-axis impact there is a risk of severe spinal injury as well as injury to the internal organs; a vertical impact causes the heart, diaphragm and liver to move up and down as a single unit. If the heart tears away from its main connecting blood vessels, the pilot will die.

The effect of deceleration and duration of the impact are shown in the Eiband diagram (Figure 1) where deceleration in terms of g (g = 9.81 m/s/s) is shown with respect to the duration of that deceleration in seconds. It will be seen that the shorter the duration of the deceleration, the higher the value of sustainable deceleration the pilot can tolerate, and vice versa.

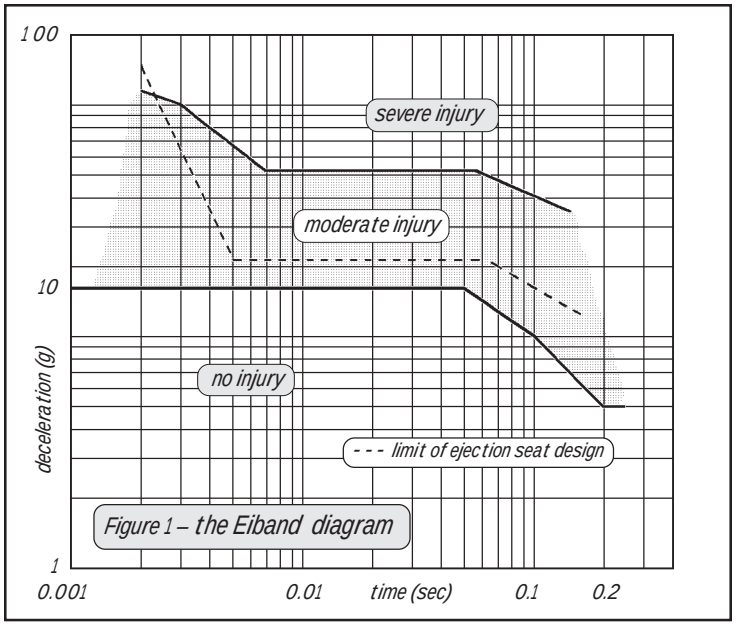


Figure 1 – the Eiband diagram

There are three areas shown: the bottom represents the area of voluntary human exposure, (ie, the amount of g to which we are voluntarily prepared to expose ourselves) after which we remain uninjured and undebilitated. The shaded middle area represents an area of moderate injury, such as slight injury to bones of the spine. This is the region to which the limits for military ejection seats are designed.

Lastly is the area of severe injury or death. One special region is shown at 0.2 seconds (5 Hz); this is the frequency at which the spine resonates and to which we have an especially low tolerance.

These limits apply to young, fit, seated, harnessed pilots. The limits are reduced for the elderly, for those with previous spinal injury, or for those in an unfavourable seating position. Yamada produced a table showing the reduction in the breaking load of lower spinal (lumbar) vertebrae with age, as follows:

Age	*Breaking load, kN (lbs)*
20–39	*7.14 (1605)*
40–59	*4.67 (1050)*
60–79	*3.01 (677)*

The aim of improved aircraft design is to ensure that a pilot is exposed to forces arising from only the bottom and middle areas of the Eiband diagram. Initially, design to minimize decelerations along the x-axis (the fore and aft direction) will be considered.

Impact in the fore & aft direction

Cockpit improvements are based on the concept of a strong survival cage around the pilot, with an energy absorbing structure in front. This is the method used in modern car manufacture. In 1991, I asked Frank Irving if he would calculate the effect on drag and hence performance of increasing both the length and depth of the glider fuselage by 0.5 metres. The decrease in maximum L/D was 5%. The decrease in L/D at 80 knots was 10%. Clearly this decrease in performance was not acceptable; I devised the aphorism, "better broken legs than dead".

The structure from the nose cone to the plane of the control column should collapse progressively on impact, with a consequential risk of injury to the legs. The cockpit structure aft of the control column should form a strong cage protecting the vital organs of the pilot's body. The external design of the glider would be unaffected, as would the length and fittings of the glider trailer.

In 1997, Prof. Loek Boermans, of Delft University in Holland, studied the effect on fuselage drag of extending the nose alone (the fuselage depth remaining unaltered). Prof. Boermans showed that the increased drag is insignificant when the depth of the fuselage is not altered.

This finding offers the opportunity of extending the energy absorbing nose of the glider without adverse effects on performance, and hence offering some protection to the pilot's legs.

Test of a new cockpit design
Martin Sperber, of TuV Rheinland, Cologne, carried out a significant test in January 1998. A glider cockpit was designed using Formula-1 racing car technology, the test impact being into a skip of earth. I was invited to observe the test.

Eight out of ten glider accidents in Germany occur on grass or bare soil. Allowing the glider to penetrate the soil would help to absorb the energy of the impact. This theory required the provision of a very stiff cockpit structure. A skip of "standard earth" was provided, the load-bearing power of its compacted soil being tested by an ingenious Russian instrument usually used to test airfield surfaces. The cockpit was built from a composite material consisting of carbon fibre and *Dyneema,* a polyethylene fibre.

The cockpit was built in a Glasflügel Hornet mold, although the final construction was, of course, entirely different from that of the standard glider (Figure 2). Two upper spars passed from the nose cone, along the cockpit sills, to the rear wing-mounting bulkhead. Two lower spars passed from the plane of the control column back to form the support for the seat, then to the front wing-mounting bulkhead. In front of the control column was a strong crossbeam and a bulkhead. There were bulkheads in front of and behind the undercarriage area, supporting the wing fore and aft cross tubes. This region had a strong roof, forming a box behind the pilot to prevent the wings folding forward and crushing him. A ring structure lies between these two bulkheads supporting the structure to the rear of the cockpit which also acted as a roll bar. The longitudinal midline joint of the fuselage had considerable overlap and was very strong.

The crushable nose cone was attached to the front of the cockpit, separated from the pilot's space by a bulkhead. The aerotow hook had to be attached to the main cockpit structure rather than the nose cone as tests showed that the hook would interfere with the energy absorption.

A pilot manikin was not used, but the mass of the pilot's feet and thighs were simulated by sandbags. It was considered that the mounting points for the seat harness were so strong that testing wasn't needed. An accelerometer was fitted at the CG behind the cockpit. The wings, rear fuselage, and pilot loads were simulated by metal bolted to the wing mounting area.

The test simulated a fully loaded glider weighing 525 kilograms of 15-18 metre wingspan hitting compacted earth at 45° at 70 km/h (45 mi/hr), a considerably greater velocity than that specified for car impact testing.

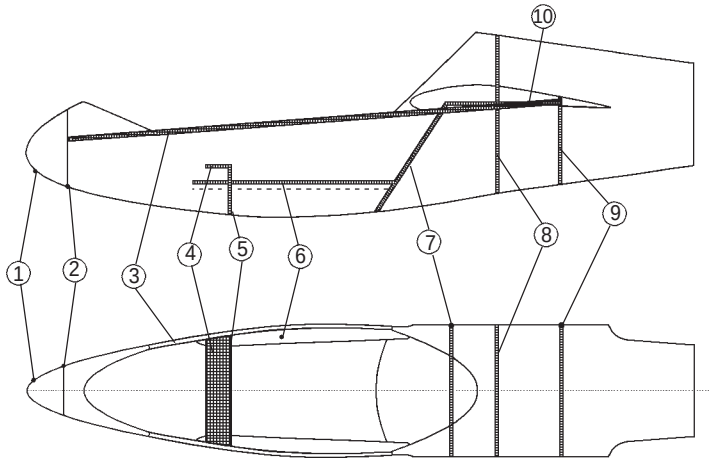
The accelerometer trace showed an ideal trapezoidal pulse shape, with an easily survivable 18 g maximum deceleration. The distance from the front of the nose cone to the forward bulkhead was 0.3 m. The nose penetrated 0.9 m into the earth, in line with the longitudinal axis of the glider. The cockpit structure was intact following the test, excepting for slight delamination, but without displacement of either cockpit sill. The forward bulkhead had failed, but this was known to be weak before the test; it is to be strengthened. Earth entered through the open cockpit (no canopy was fitted) and the broken forward bulkhead.

The test was considered to have been highly successful, but more tests need to be carried out with a longer nose and the glider impacting onto a hard surface. The rollover structure needs to be tested as the stiffness of the cockpit results in a greater risk of rollover. Finally, the canopy has to remain in place and not be broken by the earth and stones thrown up during the impact. This might require that the canopy transparency be made of stretched acrylic, polycarbonate, or a laminated material.

More on avoiding injury in a fore-and-aft impact
The pilot should be prevented from 'submarining' down and forward under his seat harness, which can be achieved by the use of a five or six point harness. Alternatively, Martin Sperber has devised a method using a steeply raked seat pan and a suitably positioned lapstrap (avoiding the use of crotch straps) for which the lap strap passes from the pilot's hip down to the anchorage point at an angle between 0-20° from the vertical.

A head restraint should be provided. The OSTIV Airworthiness Standards give detailed requirements for head restraints: each head restraint must not be less than 250 mm wide; it must be faced with energy absorbing material; it must be able to withstand an ultimate load of 3 kiloNewtons (kN); and it should not foul the parachute

Figure 2 – Reinforced cockpit design



1 Nose cone
2 Forward bulkhead
3 Upper spars
4 Cross beam
5 Bulkhead
6 Lower spars/seat pan support
7 Front wing mounting bulkhead
8 Roll bar
9 Rear wing mounting bulkhead
10 Top of undercarriage box

during an emergency exit. Where possible, head restraints should be mounted integrally with seat backs.

To protect the pilot in emergency landings, moveable parts such as batteries should be restrained to withstand 20 g. There should be no sharp edges in the cockpit, such as those often found on the lower edges of instrument panels, or sharp fittings such as switches or catches.

Impact in the direction of the pilot's spine

Undercarriage design
Gerhard Waibel observed that, under severe perpendicular impact, an undercarriage first collapses then comes to a sudden halt, imposing a considerable load on the pilot's spine. He has designed an undercarriage that, rather than reaching the end of its travel with a jolt, collapses progressively from there on, thus avoiding sudden loading on the pilot (Figure 3). The resulting distorted undercarriage tubes are easily replaced.

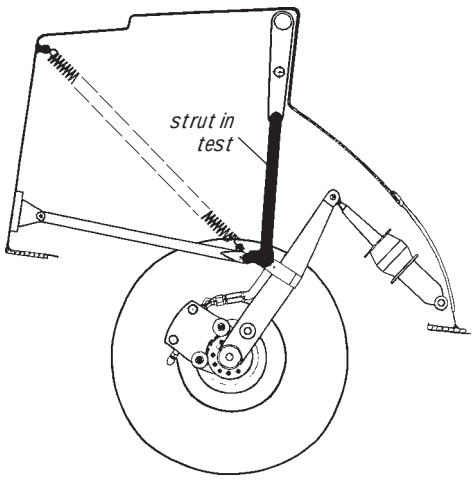


Figure 3 – Waibel's collapsing undercarriage design
Source: Technical Soaring, Vol 15, #4, p105

As mentioned before, the spine is susceptable to resonance at 5 Hz (five cycles per second) at which frequency its strength is greatly reduced. Vibration at 5 Hz should therefore be avoided in the design of the undercarriage and the wings of the glider.

Seat pan design
In modern gliders, the pilot is semi-reclining rather than sitting vertically in the cockpit. Impacts directly along the axis of the spine must also be taken into consideration. Studies at TH Aachen by Prof. Wolf Roger, and at TuV Rheinland by Martin Sperber, have both shown that aluminum honeycomb material placed under the seat pan makes maximum use of the limited crush distance available between the seat pan and the undersurface of the fuselage. The load should be applied as far as possible along the axis of the honeycomb to prevent it buckling prematurely.

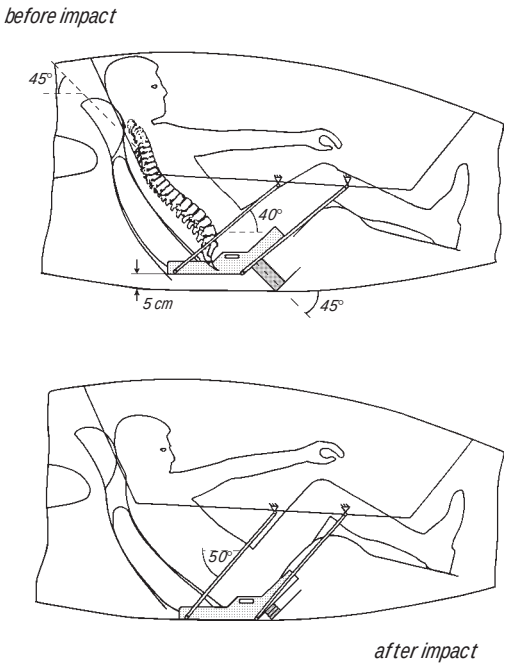


Figure 4 – Collapsible honeycomb under the seat pan
Source: Technical Soaring, Vol 19, #2, p52

Martin Sperber has designed a seat pan suspended from the cockpit wall by four swinging arms (Figure 4). The resulting movement of the seat pan means that the seat will be correctly aligned. The honeycomb material can be easily replaced after an accident.

An energy absorbing cushion may be used on the seat pan, in conjunction with the aluminum honeycomb. The cushion will absorb the effects of minor impacts and heavy landings, leaving the aluminum honeycomb unaffected and in reserve to deal with serious accidents.

A test using *Dynafoam* (called *Sunmate* in the USA) was carried out at DERA, Farnborough in 1994. The impact was at 17 g with an impact velocity of 9.4 m/s (21 mi/hr). Using 1" thick *Dynafoam* at room temperature, the following resultant forces were obtained:

manikin	*no cushion kN (lbs)*	*1" Dynafoam kN (lbs)*
Light female	*5.558 (1250)*	*4.619 (1038)*
Medium male	*7.198 (1618)*	*5.985 (1346)*
Heavy male	*8.993 (2022)*	*7.520 (1691)*

Use of a 1" energy-absorbing seat cushion reduced the load on the pilot by about 17% throughout the range of pilot weights. In addition, if the seat back structure and parachute pack fully support the spine, risk of injury will be further reduced. A lumbar support pad, to maintain the shape of the curve of the spine, will increase the compression loading strength of the spine by 80%!

There have been great advances in the study of crashworthiness, but unless pilots insist on them being incorporated into their new gliders, avoidable injury and death in gliding accidents will continue. *(See p19 for additional safety comment.)* ❖

Towplane engine cooling

Doug Carman
Chief Towpilot, York Soaring

A few seasons ago, we were discussing the problem of cylinders cracking on our 180 hp O-360 Lycoming engines. Our fleet of three was averaging about 8-10 failures per season, and this was obviously costing the club a lot of money.

Our Technical Director devised a computer logging system with an accurate thermocouple temperature probe, designed to be carried in flight to actually log the cylinder head temperature over the entire towing circuit. We decided to restrict our tests to one towplane towing only Schweizer 2-33 gliders with two persons on board in order to keep the variables to a minimum. Our tests were conducted under fairly typical soaring weather with ground temperature about 20°C. The aircraft was our PA-18 Super Cub, with about half fuel, towing with one notch of flaps at 55 mi/hr. Both of us were on board, one flying, and one doing the computer logging.

Several circuits were done, then we shut down to look at the data so far. Our standard descent procedure was to reduce power to 2100 rpm at 100 mi/hr and continue that until the turn to base. Our standard descent procedure was definitely exceeding Lycoming's limitation of 50°C/min cooling rate, but what was even more surprising was that reducing our airspeed to 60 mi/hr made almost no difference at all! We thought that the reduction in cooling would make a significant difference, but apparently not.

We spent some time studying the research paper done by a McMaster University student, and we saw that his results were similar to ours in some ways, and that he spent considerable effort to study and quantify the cooling effects on the cylinders. We also saw that he missed a couple of significant items. One was that he was unaware, as all power pilots are, that propeller rpm varies widely with airspeed, given a fixed throttle setting. Second, when he noted a sudden drop in cylinder head temperature at the turn to base, he didn't correlate this with the fact that throttle was cut from 2100 rpm to idle. We had also noted in our flight tests that there was rapid cylinder heating during startup, warm-up, and takeoff. We also took note of normal flying procedure for light aircraft, which was to go into cruise power after a climb.

So now we sat with what amounted to a mystery. Neither we nor the McMaster grad seemed to have all the answers, but we knew there was something missing from our scenario. The rapid heating profiles gave us the clue, and then it came to us — combustion! We were all so focussed on cooling, that we had missed the item that got it hot in the first place. It was the changes in the amount of combustion in the cylinder that was causing the sharp rises and falls of temperature! Sure, the airflow played a role, and leaky baffles, hot air and low airspeeds contributed to higher overall cylinder head temperatures, but did not appreciably affect the rate of temperature change. We had seen that 100 mi/hr and 60 mi/hr made little difference in the rate of cooling, and now we knew why: the throttle setting was the same or very close. Therefore the amount of combustion and hence the amount of heat produced was about the same. From that it followed that if we wanted to reduce the cooling rate, we needed to increase the throttle setting.

Back to our Super Cub we went, this time realizing that we'd have to start the cooling at 2350 rpm or higher to avoid the red arc from 2150-2350. So maintaining 100 mi/hr throughout, we tried so many seconds at 2350 and so many at 2150, and checked our results. After we had changed to 20 seconds at 2350 and another 20 seconds at 2150, we succeeded in staying in the envelope at last! Looking at the curve we realized that we could quickly reduce power from that point on, so we tried 100 rpm every 10 seconds and that still stayed in below 50°C per minute. Now we realized, that to take advantage of this, we would have to modify our circuit. We discovered that during the first 20 seconds we rose 200-300 feet, and only got down to about 1800 feet after the 10 seconds at 2050 rpm, so we started the circuit at 1800 feet, and it got us to turn-to-base at about 800 feet and 1500 rpm. Not only were we where we wanted, with the cylinders gently cooled, but it took no more time to descend overall than our old procedure.

Having noted the rapid temperature rises, we also changed our startup and takeoff procedures a little. We insist on 2 minutes warmup before taxi, and minimum 5 minutes before takeoff. We also stress slow throttle advancement during takeoff power application, which is better for the engines mechanically as well as thermally.

In addition, our AME did some research into replacement cylinders and discovered that new cylinders were only about 30% more than rebuilt, and had an expected life span of 50% more than rebuilt. Then he discovered that a complete assembly including piston and rings was actually cheaper than the lone cylinder. In the end we opted for the complete new assembly, and it cost only a few hundred dollars more than the rebuilt one. This has probably had an impact on our statistics this year — only one cracked cylinder as of November 1.

Now after about three seasons towing with the new procedure, we have reduced our cylinder failures to an average of 3-4 per year instead of 8-10, and we tow at the same rate, using the same amount of gas. Now we don't suggest you adopt the procedure exactly as ours unless you have the same equipment and can handle the modified circuit altitudes, but we hope you can benefit from our experience in some way. ❖

Catchin' the express from page 7

I simply asked, "Are you sure you know what the h#$@% you're doing?" He was certain he did. Along the way, the variometer needle decided to take a dive. This was not a pleasing sight at 5000 agl, 14 kilometres downwind with a 40 knot breeze to fight in order to make it home. I was on my tenth Hail Mary when we reached Marcy and as we arrived, André deftly guided us into the wave as there were no lennies for support.

At that moment we didn't realize that our Twin Astir had just boarded the Big Kahuna Express — direct and non-stop. It carried us effortlessly upon its silken crest at an average of 3 knots. Whiteface Mountain to the north started to shrink, and the ski runs on its southeast face were the only features that distinguished it from the rest of the bumps below us. The large span of Lake Champlain to the east could easily be seen now as well as the shores of Vermont on the other side. The oxygen masks were donned. Our excitement grew even as the temperature started to drop sharply.

After more than half an hour of continuously ascending, we finally nudged the other glass ceiling at 18,000 feet! However, this ceiling was not a natural phenomenon but rather the brainchild of the FAA that required the airspace above for the heavies.

Naively, we assumed that the party was over and dutifully decided to surf out of the Big Kahuna Express, although it showed no signs of subsiding; we probably could have cracked 20,000 feet. Later we learned from Bernie Palfreeman, our resident cross-country and Lake Placid guru, that a call to Boston may have given us the clearance above 18,000. However, our portable handset had died after reaching Marcy anyway.

Nevertheless, feeling like Zeus and Jupiter, we commenced to conquer the rest of the sky above the Adirondacks. Our first destination was Whiteface Mountain. Dashing towards it at 80 knots, we discovered to our amazement that we were still riding the Express according to the variometer that continued to register a positive reading for almost the entire jaunt to Whiteface and we arrived over its peak at about 17,600 feet.

The temperature was becoming an issue now; the seal on the canopies of our twenty year old Grob left a lot to be desired during sustained flight at high speed in sub-zero conditions. We had no gloves or heavy jackets, as the temperature on the ground was a comfortable 14°C when we left. I felt more sympathy for my partner in the front, as he had to deal with the cold air blasting out of the nose hook and onto his feet. The ambient temperature was probably -15°C at altitude. The Greek and Roman Gods probably never had to deal with these conditions!

However, we were far from surrendering to the cold. Next destination: Saranac Airport — right into the teeth of the 50 knot wind. Flying at an average of 80 knots we made slow progress. Unfortunately our rookie instincts took over at about 9000 feet when we had already traveled three-fourths of the distance, about 18 kilometres from the Lake Placid Airport. We looked back and decided to turn around. We made it back in about six minutes with 5500 feet to spare in an obviously roaring tailwind. We can only take consolation in the instructional value of our own mistakes, especially the brutally stupid ones. Having no choice now but to hang around and simmer in our own humility, we had some fun flying through rotor. Unfazed by the turbulent conditions, Hicham carved out an excellent circuit and we landed uneventfully 3-1/2 hours after takeoff.

The most striking feature from our lofty perspective was the feeling that all points on the ground were close and easily accessible. It was an incredible feeling to gaze down at the earth while taking every life-sustaining breath through a mask. I must assume that this sort of journey is indeed rare and one I may not experience again for a long time, if ever. Thank you André for taking the time to help out a couple of rookies. We shall continue to aspire to reach the heights of Zeus and Jupiter again. ❖

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(613) 523-2581, fax (613) 523-9322
e-mail: mgmzaqua@cmw.ca

Delivery position for the fabulous ASW-27 available April 1999

SAC Video Library

Ted Froelich
2552 Cleroux Crescent
Gloucester, ON K1W 1B5
(613) 824-6503
102375.1616@compuserve.com

Video tapes are available to clubs and members from the SAC library. To rent a tape for three weeks or so will cost you $5 for shiping and the return postage. Send cheque to Ted Froelich at the address above.

Copies can be ordered at $3 per tape + $5 for shipping + 10¢/min of video duration ($11 for average feature of 30 minutes). Specify if you want each video on a separate tape at SP (max resolution), or save money and have as many as will fit on one tape at SP, SLP, or LP speeds (8 hours maximum).

Professional videos

P1 ***Running on Empty*** *(USA)* 22 min
The world's best soaring pilots compete in Arizona. Narrated by Cliff Robertson.

P2 ***Free flight*** *(UK)*
Derek Piggott risks his neck flying a reproduction of the world's first glider. Hans-Werner Grosse tells the designer how he likes his latest ASW. The joys and frustrations of soaring in the UK.

P3 ***Pure flight*** *(UK)* 30 min
Cliff Robertson tells power pilots about soaring in Vermont and Colorado.

P4 ***Soaring*** *(USA)* 20 min
A history of soaring, concluding with the Region 5 contest in 1988.

P5 ***Soaring in harmony with the wind*** *(USA)* 13.5 min
Excellent ridge soaring shots from Stowe.

P6 ***Delta Fox*** *(France)*
Silent (music only) dream flight over Alps.

P7 ***Riding the Mountain Wave*** 27 min
The 1982 Thanksgiving Cowley wave camp. (by CBC Edmonton)

P8 The wild south: two very well done films about soaring in New Zealand.
1. ***Wind Born*** 55 min
A young lady learns to fly gliders and then goes on a wild trip across the Southern Alps.
2. ***Champions of the Wave*** 52 min
World championship is won by a New Zealander because of his knowledge of the wave.

P9 ***Soaring in France***
Collection of 20 professional and amateur short films from 4 to 35 minutes including the French team at the '88 championships in Finland and '89 in Austria.

P10 ***25ème Championnat du Monde*** 30 min
1997 World championships in France
Nick Bonnière getting ready for France
6 min, (CBC documentary).

P11 ***Segelflugschule Wasserkuppe*** 1992

Canadian club videos

C1 ***SAC 50th anniversary*** *(eng & fr)* 15 min

C2 **GGC and Pendleton's 50th anniversary**
Tiger Moth gathering (there were 90 of them at Pendleton once), giving rides and tows. Glider rides, aerobatics, speeches.

C3 **Base Borden Soaring Group**
Winch soaring, well filmed and edited.

C4 ***Chasing Phantoms****, Hope BC* 5 min
A professionally done filmed slide presentation with musical background, and some breathtaking aerobatics (3 min).

C5 ***Winnipeg Gliding Club*** 29 min
A short but well done essay on late spring soaring as shown on TV, some interesting amateur shots at the field, a TV news report on a fatal mid-air at that field.

C6 ***1982 Nationals at SOSA*** 27 min
High quality documentary by Molson's.

C7 Bluenose Gliding Club 90 min
a. ***The Harris Hill Soaring Museum***
b. ***The quiet challenge***
c. ***A motorglider visit from Florida***
d. ***Sailors of the sky***

C8 **1989 Flying Week at Bluenose**
A documentary of a year's activities at Stanley, and a day's visit to St. Raymond, QC.

C9 From the Alberta Soaring Council:
a. ***Interview with Tony and Ursula*** 32 min
TV interview answering many layman's questions about soaring in general and is very useful in introducing the public to soaring.

b. ***Building the AV-36*** 11 min
Constructing the Fauvel AV-36 flying wing gliders by the "Tenardee" club members in Calgary in the early '50s.

c. ***Alberta soaring in the 50s*** 26 min
The flying activities in Southern Alberta that led to the discovery of the wave at Cowley. Ursula edited this material from old home movies by A.W. (Bill) Riddell, one of the AV-36 builders, who does an informative "voice-over".

C10 ***SOSA in Brantford in the early 60s***.

C11 ***Soaring at GGC in the early 70s***.

Educational videos

E1 ***To be a Pilot*** *(TC)* 21 min
Overconfident student prangs the club's Cessna 150 in a crosswind landing but is given a second chance.

E2 ***The Wrong Stuff*** *(TC)* 51 min
For too complacent airline pilots.

E3 Ian Oldaker et al (SAC) 7h 45 min
Eight very interesting lectures presented at a towpilots' and instructors' seminar.

a. ***Dangers on tow***
b. ***Airspace use*** – Kathy Fletcher, TC
c. ***Stall prevention on final***
d. ***How to join gliders in a thermal***
e. ***Stress overload***
f. ***Dehydration*** – Dr. Hanson, TC
g. ***Post-solo training***
i. ***The important first flying lesson***

E4 ***Collision Avoidance in gliders*** *(SAC)*
How to prevent accidents when entering a gaggle.

E5 ***Why Airplanes Crash*** *(NOVA)*

E6 ***Better Communication for Better Safety*** (TC) 26 min

E7 ***Safety by Stress Management*** *(TC)* 40 min

E8 ***Accidents and Pilot Planning*** *(SAC)* 24 min

E9 ***When in Doubt*** *(TC)*
All about ice on the wings.

E10 ***Bon Voyage, but ...*** *(External Affairs)*
Travel tips for Canadians abroad.

E11 ***Speed to Fly***
by Karl Striedieck from a X-C series

Other lectures from the same series are:
Navigation and Map Preparation,
Thermals and Thermalling,
Soaring Physiology,
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Landing Out,
Soaring Weather.
They can be ordered on request or directly from "Airscapes",
(864) 574-4857, fax (864) 574-1886
airscapes@teleplex.net
www.teleplex.net/airscape

Oran Nicks

A sad message has reached me through the Internet: Oran Nicks was killed in an off-field landing in his PW-5.

Oran's contributions to world gliding have been of extreme value, and I would like to single out his role in the development of the World Class in particular. As a highly placed and trusted man in NASA and respected university professor Oran took enthusiastically part in all phases of the development of the World Class, from the definition of the class, the design competition and all the way through the long and complex selection process, even the test flying in Oerlinghausen. One of my special memories from this event is Oran happily flying in the PW-5 whereas I was in the same thermal with one of the other designs.

Oran's status and background gave prestige and distinction to whatever he undertook. As a long time member of OSTIV's Sailplane Development Panel and a member of the World Class Steering Committee from the start, he was able to convince many doubters about the project, which was deemed by many to failure from the outset. That the World Class is now a healthy project is due not the least to Oran, and it is doubly sad that he should be killed in the little glider that he loved so much.

We thank Oran for his contributions to the cause of gliding, and for all the good memories!

Tor Johannessen
president IGC

– Pilot Survey – Rental and use of GPS flight recorders at Canadian Nationals

Canadian Advanced Soaring is pursuing the manufacture of flight data recorders for use in contests, the intent being that CAS would rent these recorders for $5-10 per day during contests to pilots who do not own one.

These recorders would require the person renting it to have a GPS unit capable of NMEA output that the recorder would read. This would allow the National Contest rules to be amended to make data recorders mandatory for start/turnpoint/finish control. Depending on the results of this survey, it will have to be decided whether the rules should be amended for the '99 season, and for what classes, ie, just the FAI classes or should the Sports class be included as well.

The questions to be answered are:

1 How many pilots currently own a hand-held GPS capable of NMEA output?
2 How many pilots would be willing to pay $5-10 per day to rent a recorder for a contest? (Remember, film costs ~$4 per day.)
3 Who supports the mandatory use of data recorders for the '99 season and in what classes?
4 If it were possible to buy one of these data recorders for under $250, how many pilots would buy one?

All responses may be directed to:
Dave Springford,
669 Milford Drive, Kingston, ON K7M 6J1
(613) 634-2056, *springfo@mail.rmc.ca*

From Alvaro – a real story

This came in from Alvaro de Bourbon, a noted sailplane pilot from Monaco via a friend in England:

We all heard unusual gliding stories, but I guess you never heard of the following one:

A bit of background — last year at the World Championships in St. Auban, I became friendly with Gonzalo Echeverry, a Colombian crewing for Ron Tabbery of the US team.

Gonzalo is a software engineer and glider pilot in Austin, Texas. He sent me an e-mail to arrange a meeting; we finally couldn't meet, but today we spoke on the phone and, among other things, he told me that he took part in the first Colombian National Gliding Championships.

The championships were held at a military airbase in Cali, with a fleet of four IS28 Larks (two military ones), a Janus CM, and other gliders.

What was unusual were the outlandings — Gonzalo matter-of-factly told me how, due to the "unstable local situation", whenever a pilot landed out (apparently quite often), a Black Hawk attack helicopter with 10-12 fully armed troops would reach him within minutes to ensure a peaceful retrieval.

Now, I can think of at least one instance in my outlandings where such a help might have been handy — that time when an irate farmer wanted to impound my glider for the three or four kartoffels [potatoes] that were prematurely harvested by my glider.

I must go outlanding in Colombia and see it with my own eyes ...

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Safety Comment

Age dramatically reduces the strength of your back

A recent accident in Edmonton in which the two pilots suffered back injuries, and the article on the safety cockpit in this issue, are reminders to us all to look to our seating. The article shows that, as we age, the ability of the spine to successfully absorb the shocks of a heavy landing is dramatically reduced. From the 20-39 year age group to the 60-79 age group, the injury-free force on the spine reduces from 7.14 kiloNewtons (1605 lbs) to 3.01 kN (677 lb). If we estimate the weight supported by the spine to be about 100 lbs, then the deceleration required to damage the spine becomes 16 g for the younger group and only 6.8 g for the older pilots. This is not difficult to reach! Food for thought, eh?

Anyone who has ridden on a snowmobile can attest to the discomfort of repeated bumps. In a glider the hard ride of unsprung wheels and the vertical posture of the pilot(s) can be damaging, and the more we fly the more the damage accumulates. The article highlights the value of using energy-absorbing seat cushions. Many of us can recall a heavy landing and the pain suffered by the pilot. We can also remember the long-term effects of many instructional landings on hard runways! These injuries can be reduced or avoided by using better cushioning materials.

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Confor energy-absorbing foam is readily available in Canada, and all clubs and private owners are urged to obtain this material for the club two-seaters and their own sailplanes. A one inch thickness is the minimum to give protection. This material is very comfortable, and on long flights is surprisingly supportive because it spreads the pilot's weight effectively over a larger area than a standard compressible soft foam cushion (I can say this as we have *Confor* foam in the syndicate Puchacz!). In fact "standard" cushions amplify the shock of a landing by compressing readily, resulting in the pilot being hit hard by the rebounding glider. Such cushions should be banned from the club and private gliders ... so why not embark on a hunt for them now? Cushions of energy-absorbing foam are cheap compared to injuries, hence they are well worth the cost. *(public service announcement – contact Ulli Werneburg below for details on the grades and cost of Confor foam. ed)*

It has long been established that maintaining the proper curvature of the spine is vitally important if we wish to avoid back problems as we sit. A second and very effective way to reduce back injuries is to support the spine more effectively. A lumbar support pad made of stiff energy-absorbing foam should be about 25 mm thick (1 inch) and 100 mm (4 inches) high. The width should extend across the back. Placed between the back and the parachute or rear cushion, or when instructing kept in place under the shirt, it will help maintain the correct curvature of the spine. Sewn into a simple bag, it can be held in place with *Velcro*.

Alternately, Tony Burton describes below a simple and effective lumbar support that you can carve out of a piece of insulation board, customized to your back shape and seat.

In 1993 we thought the correct curvature of the spine with such a pad increased the strength of the spine by 60%. I see from this latest article that this is now 80% — well worth the effort! For best effect a pilot should avoid leaning forward when landing.

As the article infers, insist on proper back support to avoid avoidable injuries!

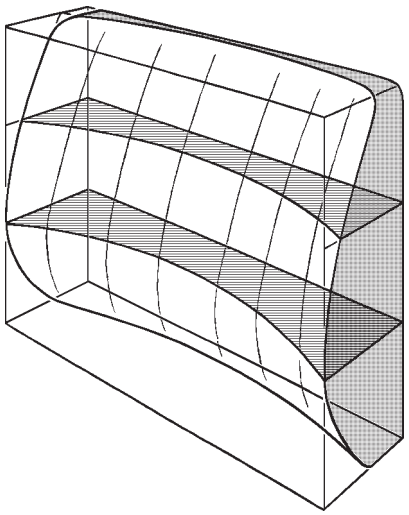
Ian Oldaker
Chairman, Flight Training & Safety committee

A lumbar support that works

If the seat/chute combination in the sailplane you usually fly gives poor lower back support, sitting can become very uncomfortable in a short time. Hard landings and crashes in gliders are also notorious for producing injuries arising from poor alignment of the spine. Pieces of rolled up foam, and other soft material is often used to alleviate this back support problem, but it is an unsatisfactory solution because such material is not firm under load and never stays in the right place.

My experience was that without additional back support for the RS-15 seat geometry, a flight became terrible after a couple of hours. Other gliders may have similar problems with varying degrees of discomfort (my personal opinion is that 1-26 and 2-33 seats should be illegal!).

You can custom build a firm, simple lumbar support for yourself from a piece of "blue board" Styrofoam insulation. The diagram shows its general size and shape (somewhat exaggerated in thickness). Starting with a 10"x12" piece of 2" board, carve the saddle-shaped surface into it using a long bladed knife such as a bread knife. Note that the thickest part is about a third up from the bottom. Experiment a bit with the support in place while you are seated in the glider and trim until it feels right. If the seat pan is curved the back side of the support will also have to be shaped.



When you wear a chute, the support must be placed between it and your back, and it must be as low as possible when you are seated.

When the fit is correct, you won't even notice it after a while (telling you it's doing its job perfectly), though at first it may feel odd. Once the shape is right for you, strap it with a few windings of duct tape to protect the fragile corners and fit it into a cover made from an old towel or other similar cloth to keep the support clean and absorb sweat.

A more ambitious project is to use the support as a mold for a fibreglass model once it has conformed itself to you and the seat back after some use.

Tony Burton

SAC news

Flight Permit – Exhibition Category

The type certification of gliders by Transport Canada has long been considered too costly and unnecessary by many of our members. This was especially true in the case of older designs that were no longer in production and the manufacturer was not willing to pay for the certification costs. Since it was not possible to get a Flight Authority (C of A) for a non type certified glider, this in fact made uneconomical the importation of used gliders which had not already been type certified.

SAC's concerns in this regard have been put forward with TC within the context of the recreational aviation initiative. Our position is that Canada should have an equivalent to the Experimental category in the USA.

Progress has been made. It is now possible to get a flight authority (Flight Permit) for a non-certified aircraft in the new Exhibition category. This category is not limited to aeroplanes. The first glider, a Janus CM, has already been licensed in the category and a second is undergoing the process. There are restrictions to the use of the aircraft in this category which are stipulated at the time of the issue of the Flight Permit, but these restrictions do not preclude normal flying activities such as proficiency flying, participation in competitions, record attempts, etc.

If you have found that one-of-a-kind glider that you absolutely must have and the only thing holding you back is the certification issue, this new category may be just right for you.

Decertification of aircraft/gliders

Transport Canada will be announcing in the next few months the introduction of a *Special C of A – Owner Maintained* classification. A list of aeroplanes/gliders eligible for this Special C of A will be published at that time. It is anticipated that 80% of the gliders in Canada will be eligible at the outset and others may be added later.

Owners will have to apply for transfer to the new classification, and once transferred, it may be difficult to go back to the previous status. This could be construed by some as a "one way trip" to a lower level of airworthiness and it could affect the market value of such gliders.

The Special C of A – Owner Maintained will allow the owner to sign for the maintenance and inspections on his glider. The requirements for maintenance, inspections and log keeping remain the same. Airworthiness Directives will still be distributed to the owner of record, but the compliance with the AD will not be mandatory unless expressly specified for this class of aircraft.

The Special C of A will be issued for recreational purposes only, the aircraft will be placarded, *"This aircraft does not comply with internationally recognized airworthiness standards"* near the entrance and the Data Plate altered by adding an "X" after the model number and after the serial number.

Owners contemplating this change should carefully weigh the pros and cons of this new classification against their capability/willingness to do their own maintenance.

Paul Fortier
Chairman, Technical Committee

SAC membership meter – 15 Nov

Club	Membership 90-97 avg	1998 total	% avg
ASTRA	5	11	220
Air Sailing	28	21	75
Alberni	13	13	100
Base Borden	16	11	69
Beaver Valley	12	15	125
Bluenose	37	31	84
Bonnechere	10	7	70
Bulkley Valley	11	1	9
Central Alberta	10	12	120
Champlain	56	83	148
Cold Lake	25	20	80
COSA	42	29	69
Cu Nim	62	55	89
East Kootenay	10	23	230
Edmonton	65	59	91
Erin	32	33	103
Gatineau	88	90	102
Grande Prairie	9	11	122
Guelph	29	23	79
London	42	35	83
Mont Valin	4	3	75
Montréal	102	91	89
Outardes	28	21	75
Pemberton	10	12	120
Prince Albert	10	13	130
Québec	39	57	146
Regina	32	32	100
Rideau Gliding	15	11	73
Rideau Valley	36	30	83
Saskatoon	14	17	121
Silverstar	8	11	138
SOSA	128	158	123
Swan Valley	6	7	117
Toronto	19	19	100
Vancouver	96	79	82
Westman	4	2	50
Wheatbelt	6	1	17
Windsor	10	1	10
Winnipeg	68	59	87
York	87	90	103
Non–club	13	22	169
totals	*1337*	*1319*	*99*

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(403) 281-0589 (B&F)
mprsoar@agt.net

World Contest vacant

The Pioneer Trust fund a key to our future success

John Broomhall

Volunteers are the driving force behind SAC. The purpose of the Pioneer Trust fund is to help sustain that force by giving SAC a firm financial foundation. By donating to the fund, you are supporting an organization that has a long and distinguished record of accomplishment as well as sending an encouraging signal to SAC volunteers that their efforts are being recognized, and you will be making a permanent contribution to soaring. The principal is retained forever, as are at least 50% of the investment earnings. Donations are eligible for a tax receipt, considerably reducing the cost (see *free flight* 6/97).

SAC would like to thank the following members who have generously donated $6735 this year (as of mid-November). Won't you join them? It will make a difference.

John Bender
Simon Berzekri
Roland Biber
Nick Bonnière
John Broomhall
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Ronald Cattaruzza
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Gilles-André Séguin
Dave Springford
Larry Springford
John Stibrany
Al Sunley
Wolfgang Thiele
Alex Upchurch
Ron Walker
Bryan Weber
Walter Weir
Donald Wood

Report on a Recreational Aircraft Seminar

In mid-November a two-day seminar and workshop was put on by Transport Canada at Barrie airport, Ontario for instructors of ultralights, hot air balloons, hang gliders, powered parachutes and gliders.

The agenda included sessions on how to become a better instructor, how to navigate the TC maze (licensing, aircraft registration, etc), how to market your sport better, the CARs, airspace, how to manage your business better, and sessions on looking after your Rotax engine and glider (the latter one was not done because the speaker from the USA didn't arrive). TC personnel from Ottawa, Hamilton, Edmonton, Calgary, and Winnipeg gave the presentations and led the working sessions.

Out of the 32 recreational pilots present there were 11 gliding instructors, representing five clubs and the Air Cadets. Of particular interest were brief sessions on how to be a better instructor that included discussion of human factors and how pilots make errors. We reviewed how to prepare lesson plans and how to demonstrate a skill. The sessions on navigating the TC maze, the CARs and airspace were lengthy but we had a chance to let TC personnel know where our difficulties and concerns lie (mainly administration).

It was very interesting to see where and how we fit in relative to other aviation sports. We were surprised to learn that the other sports know very little about soaring, in fact we spent a lot of the time talking to them and learning about their problems and strengths too. TC intends to run these seminars across the country during the next few months, this seminar having served as the pilot.

Ian Oldaker and **Tom Coulson**
Flight Training & Safety committee

Coming Events

SAC Annual General Meeting
27 Feb, Edmonton, AB. All details are available through the SAC webpage. Contact: John Broomhall (403) 438-3268, <*john@cips.ca*>

1999 Invermere Soaring Camp
22-30 May East Kootenay Soaring Club and the Alberta Soaring Council are happy to revive the annual Mountain Soaring Camp at the Invermere Airport. The event will be run and attended by experienced Rockies soaring pilots who are available to coach mountain soaring techniques and micrometeorology, give check rides, and promote a safe transition to flying at this exceptional site.

East Kootenay Soaring also offers glider rentals and check rides. Camping available at the airfield, and the lake is very inviting! Soak your weary soaring bones in the hotsprings. Don't be shy, come fly. Questions?, call the event coordinators: Mike Glatiotis, Cu Nim, (403) 282-6121 <*mglatiot@cadvision*>; Don Miller, East Kootenay Soaring Club, (250) 342-3201 or, Matt Kazakoff, (250) 342-3006 <*kaz@rockies.net*>.

Canadian National Soaring Contest
June-July, AVV Champlain, Saint Dominique, QC. Dates and further info available by the next issue. Contact: André Pepin (450) 923-3631, <*champlain@videotron.ca*>

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The following badge legs were recorded in the Canadian Soaring Register during the period 3 September to 5 November.

GOLD BADGE

283	John deJong	York

SILVER BADGE

898	Barry Usprech	London
899	Pierre Pepin	Champlain
900	Andrea Kuciak	SOSA
901	Tim Daniel	Vancouver
902	Volker Budziak	n/a
903	Peter Chanachowicz	SOSA
904	Gerard Savey	Outardes
905	Lorraine Gower	SOSA
906	Fred Gray	SOSA
907	Richard Sawyer	York

DIAMOND DISTANCE (500 km flight)

Dave Springford	SOSA	502.1 km	ASW-20	Rockton, ON

DIAMOND GOAL (300 km goal flight)

John deJong	York	305.7 km	HP-14	Arthur East, ON
Dave Springford	SOSA	502.1 km	ASW-20	Rockton, ON

GOLD DISTANCE (300 km flight)

John deJong	York	305.7 km	HP-14	Arthur East, ON
Dan Bush	SOSA	303.1 km	Hornet	Rockton, ON
Dave Springford	SOSA	502.1 km	ASW-20	Rockton, ON

SILVER DISTANCE (50 km flight)

Andrea Kuciak	SOSA	62.2 km	Astir CS77	Rockton, ON
Volker Budziak	n/a	55.5 km	1-26	Hobbs, NM
Peter Chanachowicz	SOSA	64.0 km	1-26	Rockton, ON
Gerard Savey	Outardes	50.4 km	LS-4A	Lk Keepit, Australia
Alain Berinstain	Gatineau	59.8 km	1-36	Pendleton, ON
Lorraine Gower	SOSA	62.2 km	1-26	Rockton, ON
Fred Gray	SOSA	62.2 km	Ka6CR	Rockton, ON
Richard Sawyer	York	62.2 km	Skylark 3D	Arthur East, ON

SILVER/GOLD DURATION (5 hour flight)

Dick Wolff	London	5:14 h	1-34	Embro, ON
Roger Harris	Guelph	5:18 h	1-26	Elmira, ON
Adrien Burtenshaw	Toronto	5:11 h	Bergfalke	Conn, ON
Andrea Kuciak	SOSA	5:20 h	Hornet	Rockton, ON
Michael Viechweg	York	5:15 h	1-26	Arthur East, ON
Tim Daniel	Vancouver	5:30 h	Astir CS77	Invermere, BC
Gerard Savey	Outardes	5:08 h	Astir 77	Bordertown, Australia
Fred Gray	SOSA	5:10 h	Ka6CR	Rockton, ON
Richard Sawyer	York	5:14 h	Skylark 3D	Arthur East, ON

SILVER ALTITUDE (1000 m gain)

Barry Usprech	London	1190 m	Blanik L-23	Embro, ON
Roger Harris	Guelph	1560 m	1-26	Elmira, ON
Pierre Pepin	Champlain	2240 m	Diamant	Julian, PA
Dennis Mountford	Prince Albert	1750 m	K-7	Birch Hills, SK
David Russell	Prince Albert	1150 m	K-7	Birch Hills, SK
Michael Viechweg	York	1450 m	1-26	Arthur East, ON
Gerard Savey	Outardes	2570 m	Std Cirrus	Bordertown, Australia
Keith Andrews	Prince Albert	1920 m	K-7	Birch Hills, SK
Philip Hinton	SOSA	1820 m	1-26	Rockton, ON
Fred Gray	SOSA	1410 m	1-26	Rockton, ON
Walter Clark	Montreal	1220 m	1-26	Hawkesbury, ON
Richard Sawyer	York	1310 m	Skylark 3D	Arthur East, ON

C BADGE (1 hour flight)

2592	Dick Wolff	London	5:14 h	1-34	Embro, ON
2593	Bryan Weber	Winnipeg	2:17 h	L-Spatz	Starbuck, MB
2594	Ross Taylor	Prince Albert	1:32 h	K-7	Birch Hills, SK
2595	David Russell	Prince Albert	1:17 h	K-7	Birch Hills, SK
2596	Michael Viechweg	York	5:15 h	1-26	Arthur East, ON
2597	Volker Budziak	n/a	1:30 h	1-26	Hobbs, NM
2598	Paul Warman	Borden	1:10 h	2-33	Borden, ON
2599	Gerard Savey	Outardes	5:08 h	Astir 77	Bordertown, Australia
2600	Keith Andrews	Prince Albert	1:04 h	K-7	Birch Hills, SK
2601	Philip Hinton	SOSA	1:54 h	1-26	Rockton, ON
2602	Fred Gray	SOSA	5:10 h	Ka6CR	Rockton, ON
2603	Walter Clark	Montreal	3:09 h	1-26	Hawkesbury, ON

It's been a good summer for soaring in the east. Ten Silver badges to report in this issue — more than we had all last year. Richard Sawyer did his three Silver legs in one flight with his Skylark 3 on August 1st.

Another "head's up" on the new Club category records – sorry, John

There's been a thundering silence on applying for these records! I think it's because they are new and pilots planning badge flights haven't given the possibility a thought. Let's name a name to give an example of what has been missed. John deJong, above, in completing his Gold distance flight but not being prepped on the additional OOing details required, missed claiming 4(!) records — 3 TP and free O&R distance, and triangle distance and 300 km speed if the course had been an FAI triangle. This initial claiming bonanza won't last long so — OOs and CFIs — get up to speed on this and help your Club category pilots become famous. Tony

SAC SUPPLIES FOR CERTIFICATES AND BADGES

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3	SAC BRONZE badge pin *(available from your club)*	(12 for $55)	$ 6.00
4	FAI 'C' badge, cloth, 3" dia.		$ 6.00
5	FAI SILVER badge, cloth 3" dia.		$12.00
6	FAI GOLD badge, cloth 3" dia.		$12.00
7	FAI 'C' badge, silver plate pin		$ 5.00
8	FAI SILVER badge, pin		$45.00
9	FAI GOLD badge, gold plate pin		$45.00
	Items 7–12 ordered through FAI awards chairman – see Committees list		
	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 (personal record of badge achievements)		$10.00
	Processing fee for each FAI application form submitted		**$15.00**
13	FAI badge application *(download from SAC website forms page)*		n/c
14	Official Observer application *(download from SAC website forms page)*		n/c
15	SAC Flight Trophies application *(download from SAC website forms page)*		n/c
16	FAI Records application *(download from SAC website forms page)*		n/c
17	Flight Declaration *(download from SAC website forms page)*		n/c
18	**Badge & Record Flying**, ed. 7 *(download from SAC website forms page)*		n/c

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

ARTICLES ACVV POUR CERTIFICATS ET INSIGNES

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Insigne FAI 'B', plaqué argent
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Insigne FAI ARGENT, écusson en tissu, 3" dia.
Insigne FAI OR, écusson en tissu, 3" dia.
Insigne FAI 'C', plaqué argent
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Les articles 7–12 sont disponibles au président des prix de la FAI
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Trading Post

Personal ads are a free service to SAC members (please give me the name of your club). $10 per insertion for nonmembers. **Send ad to editor**, not the national office, Box 1916, Claresholm, AB T0L 0T0
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Ad will run 3 times unless you renew. Please tell me if your item has been sold sooner. Maximum ad length is 6 lines and subject to some editing as necessary.

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L-Spatz, CF-UJZ, 1966, recent fabric and overhaul, basic instruments, radio, Varicalc, open trailer. $6000. Winnipeg Gliding Club (204) 837-8128 or <*info@wgc.mb.ca*>

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1-23, #16, 1951, 2400h, beautifully refinished, all instruments, trailer. Asking $11,000. Matt (250) 342-3006 or <*kaz@rockies.net*>

1-26A, #23, 1050h, beautiful condition, new fabric on wings, tail and fuselage recently recovered, total refinish in 1996. Excellent enclosed trailer. Asking $9500. Would consider delivering for expenses. Harold Eley, (306) 584-5712, Wilbur Eley, (306) 255-2859, or <*eeley@cableregina.com*>

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SZD-55, instruments, LX4000 GPS + LX20 FR, radio, trailer. New April 1997. $70,000 ($65,000 without GPS and FR) Andy Gough (905) 639-5939, e-mail: <*gough_andy@hotmail.com*>

miscellaneous

Instructors wanted Aéro Club des Outardes needs qualified instructors and towpilots for the 1999 season – min. 200 hours. *Aéro Club des Outardes à besoin d'instructeurs et pilotes remorqueur qualifiés pour la saison 1999 – min. 200 heures.* Gerry (450) 621-4891; Daniel (450) 628-5116.

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Radio trade – a panel mounted radio for an ICOM IC-A2 handheld. Mike Cook (250) 427-5471

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