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Liaison

UNDER ATTACK

Transport Canada, TC for short, is considering a series of regulation changes that could have considerable impact on our sport, some of it highly detrimental to its growth or even its survival:

- Lowering the ceiling of controlled airspace even more than it is now
- Requiring an Operation Certificate from all organizations that teach people to fly!
- Regulating the performance of a towplane and minimum requirements for towpilots.

In most cases, TC wants to go ahead with these changes for reasons that have nothing to do with our flying activities. These range from making Canadian regulations similar to FAA, to regulating other activities like banner towing or ultra light training activities. We just happen to get caught in the crossfire. By the time you read these lines, we will have contacted your club president and requesting him to direct his membership into some direct actions with TC, or your local MP. IF WE WANT TO SAVE OUR SPORT, IT IS TIME TO ACT NOW.

With the current government attempting to cut, at last, on expenses, Transport Canada is looking at transferring their responsibilities to other parties. This is in itself an opportunity to achieve a greater degree of self regulation. An age old French saying confirms that nobody is better served than by himself.

This way, we might avoid spending lots of energy on fighting regulations that are not pertinent to our sport. Ian Oldaker and his group did invest a considerable amount of their time to have the "5 takeoffs and landings in the last 6 months" rule amended. However, to achieve self–regulation we will have to show TC that we are capable to do so. This is in my estimation the challenge that lies ahead of us NOW.

On a more cheerful note, my work took me to Vancouver in mid–August. I was therefore able to schedule a weekend with the members of the Vancouver Soaring Association. I was very impressed by their location and the conditions prevailing at Hope with two consecutive days of wave, not to mention their splendid fleet of gliders — but above and beyond that are the quality and the friendliness of their welcome. Everyone went out of their way to make me feel part of the group. This weekend will remain in my memories as a highlight of my soaring days. Thank you all.

I hope to have some more opportunities in the future to travel through Canada for my company and wherever possible, I will attempt to meet all of you and better still fly with you. See you soon.

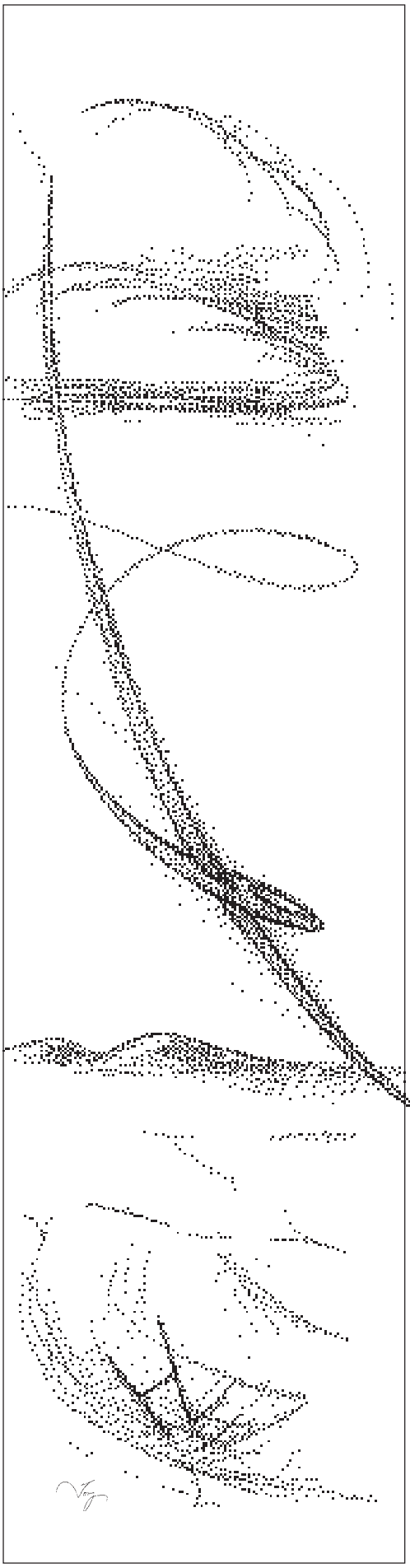
Je vais conclure cette rubrique sur la question de la langue. Ma première intervention a rapport au nouveau manuel de vol à voile élaboré par l'ACVV. Cette édition constitue un pas de géant comparé à ce qui existait avant. Hélas, il n'est disponible qu'en anglais. Le faire traduire à l'extérieur est à la fois complexe et dispendieux. Nous serions cependant intéressés à donner le travail à un vélivole contre une compensation à discuter avec le ou les intéressés.

Pour vous faciliter la tâche, je veux aussi vous informer que le secrétariat national a en stock la version française du manuel de météorologie publié par le fédéral. Le titre est "MÉTAVI".

J'ai eu aussi l'occasion de manger avec le président et l'instructeur chef du Club de Vol à Voile de Québec, Messieurs Hélie et Cousineau. Cela m'a permis de prendre connaissance de leurs activités et de discuter du support que l'association nationale peut leur apporter. Ce fut une réunion agréable et fructueuse quant à moi. Sachez que je suis toujours heureux de rencontrer l'exécutif des clubs et de voir ce que nous pouvons fair ensemble.

À bientôt

Pierre Pepin president



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

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Cover Have you got a favorite turnpoint? One of mine is the south dam on the Chain Lakes half way between Cowley and Cu Nim in the foothills of the Rockies. If you are there, it means the weather is great and you are surrounded by spectacular scenery. photo: Tony Burton

the Nationals and the Sports class

a modest proposal for improving both

Tony Burton

AT THE 1994 CONTEST AT SOSA I did a little lobbying (to no avail by the way), trying to convince a few pilots to fly Sports class to keep it going from its good start at Swift Current last year. I believe there is the potential to significantly improve the competitive environment at our Nationals. My off–the–cuff arguments at the contest did not win the day; perhaps the somewhat more reasoned thoughts here will convert some souls to my proposition.

I think two obstacles lie in the way of getting a solid competition going in this class: its name and its past history. First of all, the Sports class name has an image problem. It has the connotation of only being a fun, not–for–serious–pilots–with–proper–soaring–machines contest; sort of uncool for "real" Nationals competitors like you and me. It needs to be given a neutral name which describes simply what the class does, and "Handicapped class" is as good as any.

Secondly, the short history of this class has indeed seen many beginning contest pilots using it as an entry level to competition. In fact, adding a third class was a means of increasing participation in the Nationals because the current low number of competition pilots in Canada requires that all skill levels to be signed up for a contest to be financially sustainable. New competitors are being thrown into the water to learn to swim, and there are certainly safer and better ways to train. The first–time competitor really shouldn't be at a Nationals, for this pilot it is a bit intimidating, and certainly there is no additional competition being provided to test the pros.

The problem is beginning to be solved by more Provincial contests, more well organized cross–country weeks at clubs, a province–wide season "Ladder" competition in Ontario, and by new contests specifically directed to the novice such as the last two "Un–Nationals" run by eastern clubs. If this class is recognized for what it should be — a top competition between *people* rather than *equipment*, then it will grow in popularity and in the willingness of pilots to fly this class in our contests rather than stick to 15m or Standard. I therefore suggest that there is no overriding reason why our national competition requires the separation of the two FAI classes (the Open class now being quite moribund):

- the Canadian team is selected from the top names on the Canadian seeding list which is generated from the competitive results of pilots from *both* classes, and these pilots may choose in turn in what class they wish to fly in a Worlds. (Being named to the team and actually being able to afford the tab and accept is a separate problem.)

- given that task committees have recently been setting the same course for both classes on a given day, there is no reason why they shouldn't continue and the pilots all be scored together provided the relatively small performance difference between the ships is adjusted by their handicap factors.

- since racing skills are improved by strong competition (that's why many of our pilots compete in American contests occasionally), combining the classes into a handicapped class effectively doubles the pilots who are capable of beating you. Surely there is more competitive significance to being the winner of a 25 man contest rather than an 11 or 14 man field as occurred this year.

- a larger field largely eliminates the "funny" scores that now occur in every contest as a result of day devaluation factors applied to a short list of competitors.

What arguments might there be against the idea?

- *a pilot could move up to the Canadian team squad flying an older uncompetitive ship.* Great — the best pilots are *not* all rich and can afford top of the line ships. ⇨ **p19**

The SOARING ASSOCIATION OF CANADA

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

free flight is the official journal of SAC.

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

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

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

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

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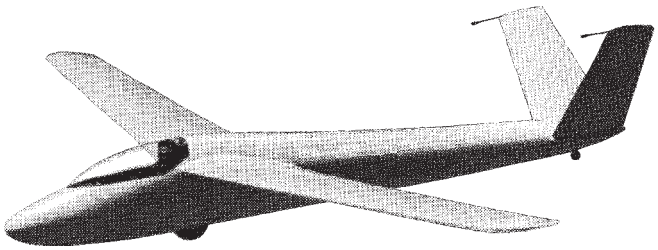
Filleting the Austria



George Graham
Bluenose Soaring

NO, THIS ISN'T AN ARTICLE about improving performance by reducing the fuselage wetted area. It is testimony that glider owners get the fidgets when the bleak mid–winter cometh, and is a humble admission that such fidgets sometimes result in real gains.

Even before Christmas I got the urge to reshape the wing leading edges of C–FPHH, an Austria SH–1 that Chris Purcell and I own. Talks about the project with seasoned veterans of the fettling game: Dick Vine, Peter Myers, and partner Chris, did not convince me to go away and wait until the madness passed. Instead, Mother Nature paid me what I didn't recognize as a great favour at the time, in the guise of a dread "Blue Northerner" that visited in early December, marooning the Austria behind a protecting barricade of ten foot snow drifts, and leaving me, well, mad.

The blizzards kept on coming, reducing my options to short and simple projects — but what? Peter Myers is a doer, willing to furnish more than moral support. In the midst of another winter storm (this one properly coming its allotted month, January), I dusted the snow off my mail box to find good information on profiling wings plus a copy of Peter Masak's admirable book on coaxing new performance out of gliders, *Performance Enhancements of Modern Sailplanes.* A first reading revealed a treasure box of fine tuning tricks; more important, it had a chapter called "Quick and Dirty Performance Gainers." Since winter was blitzing by, and since I am no craftsman, I settled down to serious study.

Like a whale emerging from the depths to spout water and take in air, I emerged from under this ocean of advice spouting, "Fillets, that's what I need to tame unruly air and improve performance." Fillets, I knew, represented about my limits when it came to fabricating things aviational, and the book said they were more in the advanced category of performance enhancers.

But first, speaking of unruly air, I decided to take Peter Masak's advice and do something about the conniving zephyrs that slip in under the Austria's canopy, as well as places unmentionable, only to shriek insults as they pour out the slots of the tail actuators. Yes, I would make air enter by the appointed ventilation door, have it cool my brow, and then sent it packing via some official exit.

I struggled through the snow and retrieved the tailcone. I first drilled two half inch holes in the end (the Austria's tailcone is a no–load fairing), as well as through its plywood stiffener. Later, with spring whispering enticing promises, I sealed the canopy edges, gear doors, and renewed the wing root seals.

Did this work? Well, the first flight produced — at pedal to the metal volume — the truest International A note (440 Hertz) than I've heard this side of a pipe organ. Turns out the tailcone holes were really pulling air, so much so that it couldn't get in the front vent fast enough. A redesign of the vent stopper calmed the music and revealed just a modicum of wind noise.

Now for those pesky fillets. Off I went to the experts. Both Masak's book and Peter Myers suggested tuft studies to determine the fillet's design. But hey, when I say quick and dirty, I mean quick and dirty.

Partner Chris allowed that studies on fillets say they work best when the fuselage curls away from the wing at angles substantially less than 90 degrees. Since most of the Austria's lower wing meets the wing at nearly right angles, this directed my musings to the upper wing/fuselage junction, more particularly to the aft 50% of the chord of the upper wing surface. Later, with the gliding season underway and the Austria on the flight line, Chris let a dangerous genie out of the bottle. Said he (roughly), "When it comes to fillets — if it looks about right, it probably works about right."

Now that's licence! I immediately accredited myself as an aircraft designer, ⇨ **p22**

Designing Genesis 1

How is a glider designed today? Armed with the latest CAD tools, renowned aerodynamicist John Roncz describes the complex process of designing a kit sailplane with the goal of Discus plus performance.

John Roncz

COMPETITION soaring is a relatively simple sport. You start the 300 mile triangular course whenever you are ready, and take any route you want to the finish line. The only catch is that sailplanes have no motors.

When Group Genesis Inc. of Marion, Ohio asked me to design Genesis 1, a glider that could win international competitions, my assistant, engineer Mark Mangelsdorf, and I knew our task would be tough.

Crucial to our effort was engineering software such as the following: Ashlar *Vellum*, Algor *Finite Element Analysis*, *AutoCAD*, Computervision's *Design View*, Microway's *NDP Fortran*, *Lotus 1–2–3*, Universal Technical Systems' *TK Solver*, *VSAERO*, and *Pizzaz Plus*. We used six computers: an IBM AT; two Compaq 386/20s, both with Weitek math cards and one also hosting a Microway i860 40 MHz Number Smasher board; a new Comtrade 486/66 speed demon; a Macintosh IIci; and a Macintosh Quadra 700.

How they fly Understanding the principles of glider operation was a critical first step. Standard class gliders have 15 metre wingspans and no camber changing devices to tune wing performance. They are solar powered. Gliders circle in thermals to gain altitude. The altitude is traded for distance as the glider cruises, while searching for the next thermal.

On days when thermals are weak, gliders spend 65% of their flight circling to gain altitude. On days when the thermals are booming, the gliders spend only 30% of the time thermaling. Warm air inside a thermal rises fastest at its centre. The further you get from the centre, the more slowly the air rises. The slower you can fly, the smaller your turning radius and the faster your glider will climb. To make it fly slower, I could give the design a bigger wing. But bigger wings are heavier, and extra weight makes the glider sink more while thermaling!

On the other hand, extra weight lets gliders fly faster for a given sink rate, so competition gliders have ballast tanks that can be filled with water to make them heavier. The problem: find the optimum tradeoff.

Modeling the competition A survey of contest results showed that the sailplane to beat was the Discus, so we started by modeling it. If our performance predictions matched the real world performance of this glider, then we could trust the computer to tell us how good our imaginary glider would be, using the same laws of physics.

Our first task was to recreate the published Discus polars — the variation of sink rate over its speed range and the chief determinant of glider performance. The key to creating the polar is to correctly predict the glider's drag over its full speed range. We started that determination with *TK Solver Plus*. With it you can specify values for every variable you know and the program will rearrange the equations, backsolve, and substitute on its own. It will also give the values of all the unknown variables that can be determined from the numbers you provided. We started by modifying my standard *TKS* airplane model to add models of thermal behaviour, and to get performance estimates for circling flight.

A glider is mostly wing To get the drag of the wing at different speeds, we take a list of points defining the shape of the wing airfoil and run it in computer programs that predict its performance, including lift, drag, and pitching moments. We obtained a drawing made from a real Discus wing and found that it differed from its theoretical shape. This drawing proved too large to be digitized all at once, so we drew a grid over it, and digitized it in pieces. But we've found that when you draw a perfect square and then digitize it, you don't get the right size. Worse, it is no longer a square! The easiest way to fix this is by using *AutoCAD's* BLOCK feature. It gives you the opportunity to correct the size and aspect ratio of a digitized drawing.

Now, we needed to convert the wing shape into a list of numerical coordinates. To do so, we exported the airfoil as a DXF file, imported the DXF file into *EasyCAD*, which turns it into an FCD file, then exported *EasyCAD's* FCD file to what it calls an EXF file. The process generates the points that the airfoil program needs to predict performance, starting with the pressure patterns around the wing section.

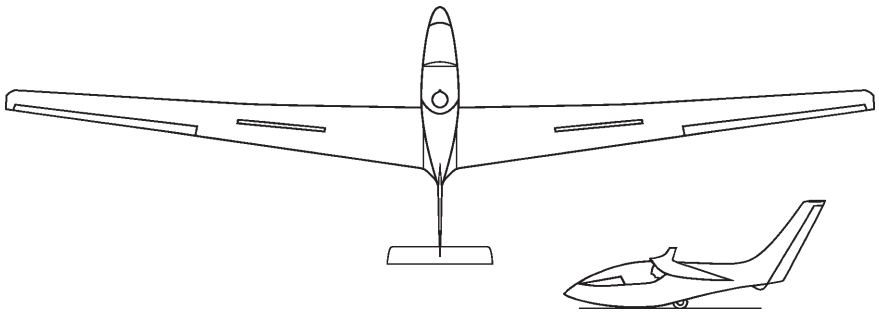
Calculating fuselage drag While wing drag changes substantially with speed, the drag of the fuselage and tail are less sensitive, coming mostly from their "wetted" or surface area. To get these values, we measured the height and width of the Discus from a published drawing at 15 stations along its length. Then using *Vellum*, we drew a front view of a typical body cross–section.

To create the sink polar, we made a list of speeds, and using the "List Solve" feature of *TK Solver,* calculated the sink rate at each of these speeds, creating another corresponding list of sink rates. We also entered our target, the published Discus sink rates at each speed, and used *TKS'* plot feature to draw the real world curve against our calculated one. Adjusting the induced drag moved the low speed side of the curve, while changing the body/tail drag shifted the high speed side. By trial and error, our *TKS* model soon matched the flight test values very well.

Racing on the computer Modeling the glider racing task proved to be a huge undertaking. We were worried that we might create a "point" design, a wonderful glider under one condition and terrible at all others. We needed to know what combination of ballast weight and cruise speed gave us the shortest time around the task as thermal strengths varied.

We decided to run the race using 11 different thermal strengths, from very weak to very strong. After the computer had found our best times around the course for all 11 thermal strengths, we plotted these times against thermal strengths, then took the area under the curve which would give us the total integrated time. The glider with the lowest integrated time would win. This approach gave us 11 thermal strengths X 25 speeds X 30 gross weights, or 8250 cases to calculate for one race.

Ready to design Now that we could model a glider's performance in the computer, it was time to design our own glider. It had to have a 15 metre wingspan, one seat, and consist of composites such as fibreglass or carbon. Modern gliders all have a tadpole shaped fuselage (in which the pilot semi–reclines) that tapers to a long, slender boom



with the tail at the back. The tadpole shape keeps the surface area to a minimum. Wing areas vary from 103 to 118 sq.ft.

With no motor, the glider totally depends on its wing efficiency. As we got deeper into the project, I was constantly amazed at how very tiny changes to wing airfoil shapes made dramatic differences in the race durations. This proved to be the chief design challenge.

Designers for years have tried to build flying wings because the fuselage and tail degrades performance. Conventional aircraft use uplift on the wing and downlift on the tail to produce stability. The wing must not only lift the glider, but also offset the negative lift made by the tail. While current sailplanes can have a glide ratio of 42:1, the wing by itself (removing the body and tail) on the final Genesis 1 can achieve a ratio of 49:1, or 17% more. But for a tailless airplane to work, the wing has to be stable and correct for disturbances without a tail.

Flying wing In an ideal flying wing design you would like the pilot inside the wing, and no tail. However, sailplane wings are too small to house anything bigger than a Chihuahua. We could, however, make the pod housing the pilot as small as possible. Since electronically augmented flight stability is not allowed in gliders, we also needed a vertical tail to make the airplane directionally stable.

By making the vertical tail tall and narrow, we could blend it into the body and still have it effective enough, without much of a lever arm. We also needed to control the speed of the glider (usually done with a movable surface on the tail). Our first design iteration used the trailing edge of the wing itself as the elevator.

Starting with an earlier airfoil design as a baseline, we began the tedious process of preparing data sets for *VSAERO*, our 3–D wind tunnel program. Using the wing area of the Discus, we created 27 complete 3–D wings with various combinations of taper and sweep. We wanted to find the wing shape that had the least amount of elevator movement required to control pitch, and also gave us the most lift at low speeds. We cross–plotted the results in Claris *ResoIve* on the Mac to see which worked best. The winner proved to be a double–tapered wing swept forward 10 degrees. But 10 degrees offered only a tiny improvement over 7.5 degrees, so we chose 7.5 because it would make the wing lighter.

Now, on our Macintosh Quadra, we began sketching a fuselage around our Air Force human male CAD model in *VeIlum*, a very intuitive program. Because it was small, the fuselage shape would change rapidly, therefore it was very important that these changes happen smoothly. The best way of ensuring this is to define the body mathematically. We use a program called *FLOFT* for creating these blended shapes. We usually create a rough drawing in *VeIlum*, and create the *FLOFT* model from that. For fine touches, we used the editor in *FLOFT*.

Not good enough Our project now had a preliminary body and wing. But the stable wing airfoil we started with wouldn't win the race. Without a high performance stable airfoil, we would have to abandon the flying wing with its smaller wetted area and low trim drag. It needed to have low drag at high speeds for cruising, low drag while thermaling, and high maximum lift to keep the glider's turning radius small. These constraints led to unstable wing airfoils on other gliders. Could it be done with a stable airfoil?

I wrote the software I use for designing airfoils in FORTRAN for the Weitek, using HALO graphics to drive the plots and the mouse. When I'm happy with a new shape, our i860 runs it through the monster programs to predict its performance at different speeds and its maximum lift. The predictions go into *TK Solver*, after being sorted in *Lotus 1–2–3*. Then, we ran the race and compared our glider against the Discus, against the Discus with our airfoils, and against our glider with different airfoils.

Once we saw what a great tool this was, we modified it so we could change the wing areas half a square foot at a time until we found the fastest race times for each candidate airfoil. Then we raced the best against each other. This gave us our winning airfoil and our wing area of 120.5 sq.ft.

The question of whether a stable and competitive wing section could be found was answered when airfoil #17 finally edged out the Discus, using that aircraft's body and tail. Our next step was to try to improve on airfoil 17. We continued redesigning until the 34th section beat the 17th. Much later, the 42nd beat the 34th. Finally, the 74th beat the 42nd. Nothing since has done better.

Joining wing and body The next job involved marrying the wing to the fuselage — one of the most difficult problems in aerodynamics. Improperly done, it ruins the performance of both. We used *VSAERO*, a program I wrote, and *1–2–3*, among other programs, to simplify the nightmare.

The first major crisis came when we added the water ballast. The glider weighs in at 500 lbs, but it can carry up to 400 lbs of water in the wings. Simply filling the wing with water made it so tail heavy that it would be uncontrollable. Because the wing sweeps forward and its tips remain higher than its centre, the water fills the wing from back to front. We played with creating tanks inside the wing, and needed to know where the centre of gravity of the water fell as the tanks were filled. By modifying the inboard wing slightly, and playing with the tank locations, we finally kept the cg within limits with any amount of water ballast.

For changing wing shapes, we used *Design View*, a wonderful Computervision ⇨ **p21**

John Roncz has designed airfoils for 36 aircraft, including *Voyager*, which flew around the world without refueling. Recently, Group Genesis Inc. handed him a major challenge: design a sailplane that could win a world Standard class glider championship. Roncz relished the opportunity, and *Design News* offered help by arranging for software companies to provide him some of the tools for the job.

He developed a totally new series of custom airfoils for the Genesis 1. There are four discrete airfoils in the swept forward wing, along with washout. The size and shape of the fuselage is tailored for minimum wetted area and internal volume, and smooth pressure contours along the surface.

In any design project, there are hundreds of engineering decisions that must be made. You can get the full story in a forthcoming CD. There, you'll find considerably more background and graphics than we could publish in this article. It will put you in the designer's seat beside Roncz. This CD–ROM is available for $US95 from *Design News,* reprint dept, Carol Bien, 1350 E Touhy Ave, Des Plaines, Illinois 60018, (708) 390-2235.

Avoiding showers

Watching how cu develop may help pilots get round a task in spite of showers.

Tom Bradbury
from *SAILPLANE & GLIDING*

IT IS DIFFICULT TO PREDICT showers accurately. Forecasters use terms like isolated, scattered or widespread but unless they mention the ominous phrase "merging to give longer period of rain" it is often worth setting out to see if the showers are avoidable. Watching how cu develop may help pilots to get round a task in spite of the showers and save a long muddy retrieve.

Conditions for showers
Most showers occur when cumulus clouds grow big enough to extend well above the freezing level. The theory is that when temperatures fall enough to produce a mixture of ice crystals and water droplets the reduction of vapour pressure over ice causes the ice crystals to grow at the expense of the water droplets. A temperature of –9°C is usually needed to produce a good shower. Once initiated the process seems to occur quite rapidly; the particles fall through the cloud, melt below the freezing level and produce a shower down below.

This is not the only process. Large droplets fall faster than small ones. This results in collisions which eventually produce raindrops. It takes longer to produce rain if ice crystals are lacking but showers do occur from some big cumuli whose tops do not reach the freezing level.

Prediction problems
In theory one should be able to predict the tops of cu by plotting an upwind sounding on a tephigram (see Figure 1), adding the dry adiabatic from the predicted surface temperature *Max T* and seeing where this line meets the dew point line. The meeting point gives the condensation level *CL*. From the condensation level one then draws a third line along a saturated adiabat until it crosses the original environment curve. The shaded area between these curves represents the energy available from release of latent heat. Cumulus clouds should extend up to the top of the shaded area (13,400 feet in this case) and their momentum will probably take some of them higher.

In practise the process is more complicated. In the first place one cannot always pick a truly representative temperature sounding, especially in a small country like Britain. Even if the sounding was valid at midnight it may be altered by large scale up and down motions in the atmosphere during the twelve hours before the flight.

Curvature of isobars Showers are most likely where the isobars have cyclonic curvature; the greater the curvature the higher the risk of showers. In contrast anticyclonic curvature tends to reduce the risk of showers. Figure 2 shows how a building ridge can stabilize the air due to subsidence. The upper part shows the fronts and isobars, the lower part is a cross section. The ridge effect lowers the cu tops and inhibits showers. A trough has the opposite effect; it raises cu tops and encourages showers. The figure shows a departing cold front on the right; there is a brief clearance behind it due to subsidence beneath the frontal surface. This front is followed by a trough in the isobars where much bigger cu tops are found. It is not until the trough has cleared that the ridge moves in and subsidence brings down the stable layer. The small cu near the ridge give the best soaring conditions.

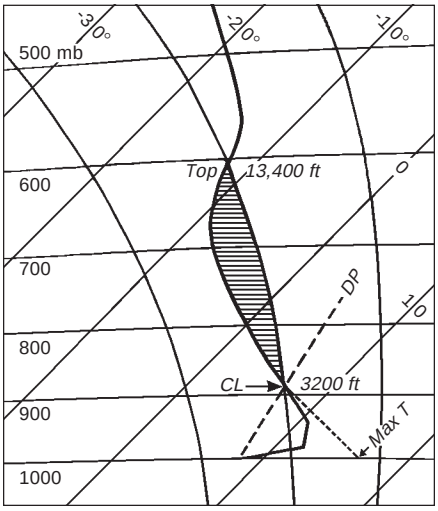


Figure 1 Tephigram showing how the base and tops of cu are predicted using dewpoint and maximum temperature. Shading shows the amount of energy available when condensation releases the latent heat.

Cold fronts are not always followed by a showery trough but if pressure is reluctant to rise when the front has passed it is often because a trough is following. Some analysts mark in a secondary cold front instead of a trough. Theorists may argue which is correct but in practise both troughs and secondary cold fronts bring similar conditions.

Dewpoint changes
Large scale up and down motions are not the only things which affect the size of cu. The amount of energy released depends both on the instability and the dewpoint. If the dewpoint rises it means that the air contains more moisture. Then the condensation level is lower, the energy released by condensation is increased and the cloud top extends higher. A drop in the dewpoint reverses the process; the condensation level rises, less energy is released when cu form and the cloud tops do not go so high.

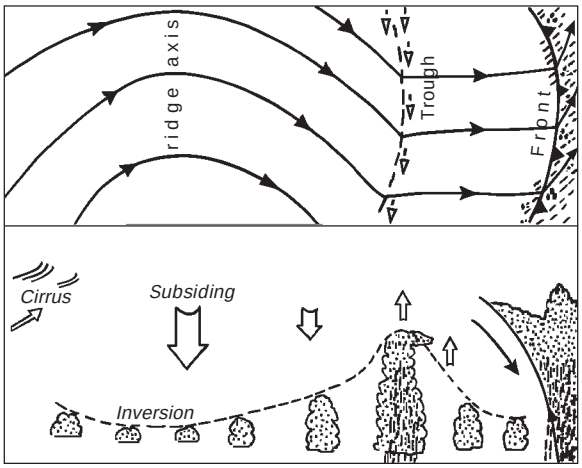


Figure 2 Post–frontal troughs enhance cu while subsidence in a building ridge can stabilize the air and so reduce cu tops.

A fall in the dewpoint may be because a change of wind direction has brought drier air. The shelter provided by a range of mountains may also lower the dewpoint. Showers are apt to be heavier and more persistent over high ground. Much moisture is left behind on the hills so when the air moves on, the dewpoint is frequently lower on the lee side. The Scottish Highlands provide a good example of this effect but the Pennines and Welsh mountains also have a higher cloudbase and more broken cloud on the lee side.

Watching how cu develop BBC forecasters try to be helpful by qualifying showers as "isolated, scattered, frequent, widespread, etc." and sometimes end up with that most ominous phrase "merging to give longer periods of rain". This later phrase usually means a trough or approaching front will ruin the day over a large area but a prediction of "isolated showers" can mean a good soaring day and even "frequent showers" may allow reasonable whether for short cross–countries, especially to the lee of

mountains. If one is to make the most of a showery day it is worth watching how the clouds develop as the day goes on.

Cumuli usually start out as small and well separated individuals; before any showers develop the clouds often clump together and grow much deeper. Isolated cu suffer from erosion and evaporation at the edges but a clump of cumuli help each other by protecting the inner clouds from evaporation as they grow. Clouds joining together and turning dark grey at the base is often a sign of imminent shower development.

Wind shear

Evaporation is not the only problem faced by a growing cloud. Wind shear tends to disrupt the rising columns. The weaker the thermal the more the cloud will be distorted by wind shear. The base of these clouds may slope upwards. The cloud will lose its lift under it even though the top is still bubbling up. Where the base is level the lift is still active below cloud. Broader clouds are not troubled by wind shear; it is the narrow clouds which contain short lived thermals that suffer most from wind shear.

Showers often break out under a line of big cu; when they do the changes can be quite rapid. Figure 3 shows four stages. The clouds are labelled "a" to "f" in order of age. "a" and "b" never made it to the big league and dispersed when the bigger cu formed. "c" began to evaporate too soon. The cloud top became fuzzy showing it had ceased bubbling up and was degenerating. Turret "d" shot up far above the rest and soon produced a shower. The rain produced a downrush of air spreading out as a gust front. This boosted cell "e" which then took over from "d" as the dominating cell. Finally as "e" reached shower size the new cell "f" formed at the left hand end of the line.

Lines of cunim give many showers. On such days the cunim can produce conflicting gust fronts which may meet to set off yet another cunim. The situation is shown schematically in Figure 4. It is unlikely that such gust fronts would actually meet head on; more often they intersect at an angle. When this happens the new cunim grows rapidly outward above the intersection point to form a fresh shower line. This is a trap which probably catches more powered aircraft than gliders. Power pilots rely on their superior speed and power to find a way through a mass of cunim. They do not expect to find the clear lane they came in but has been blocked if they decide to turn round.

Going round the end of a cunim

On one flight a wide shower gave an area of heavy rain almost large enough for lightning. This cloud was at the southern end of a line of cunim. Lower bits apparently hanging down below the main base were actually updrafts feeding the cunim. These cloud tails were constantly altering as separate surges of fresh warm air were sucked into the shower cloud. It looked as if one could safely tuck in under one of the tails and make a quick climb to cloudbase before going on towards the little cumulus in the distance. On this occasion there was a safe exit from the storm area.

A rapidly extending anvil top can form from quite a small cunim. Such anvils are a nuisance when they cast a big shadow ahead of the shower cloud. The anvil is often so thick that it stops all convection under its shadow, though some active cu can remain in the shadow for a time depending on how unstable the airmass is.

Wake effect When a cunim travels downwind it often leaves a wake of dead or sinking air behind it. The typical structure of a cunim wake is shown in Figure 5. The cloud is moving from right to left. The upper diagram "A" shows a side view. The lower part "B" is a plan view. The old cunim with its overhanging anvil of cirrus is preceded by new cells growing rapidly on the downwind side. With luck one can make a rapid climb in the new cells and, if you remember which way to head, break out into the clear before flying gets too rough. Sometimes one can still climb even if part of the circle is made in the rattle of precipitation. The loud noise is a useful guide; it shows which way the sink lies and serves as a warning to get out before sink engulfs the whole circle.

The wake of a mobile cunim often kills the thermals for many miles, as is shown in the plan view "B". If the cloud motion consists of growth on one side and decay on the other there can be the dregs of showers falling from cloudless air several miles behind the main cloud. Sometimes these show up as unexpected bits of rainbow marking areas of even more sink.

Severe cunims One day a typical well developed thunderstorm moved westwards with the youngest cells on the sunny western side. One generally needs a theodolite or time lapse camera to see how fast a cu top is rising but these towers were going up so fast their ascent was detectable by eye. Centred and on the right were the mature cells under whose shadow the lightning flashed, and there was enough heavy rain to give local flooding soon afterwards. Bold pilots may venture under the leading edge of such storms but it is not safe. Clouds of this size can produce exceptionally strong lift which can suck you in, and you can encounter heavy rain, hail, or lightning which can compromise the aircraft and your ability to control it. ⇨ **p13**

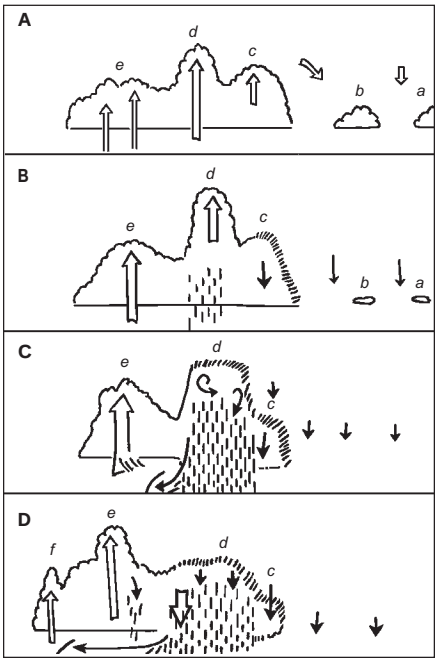


Figure 3 Evolution and collapse of a cu tower setting off new turrets. Small letters indicate the age of the clouds, "a" being the oldest.

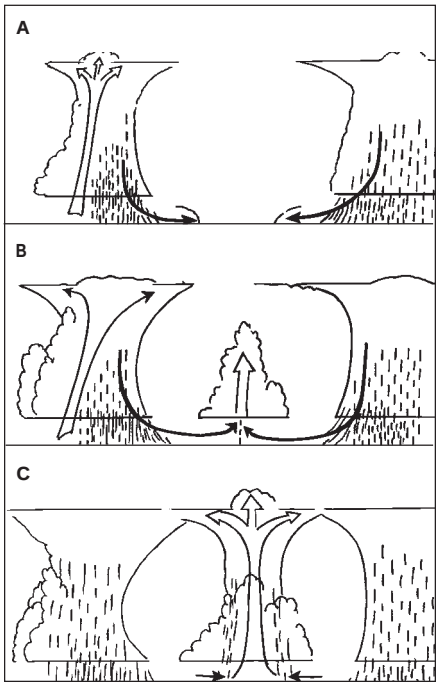


Figure 4 Outflow from two cunims colliding and setting off a new one.

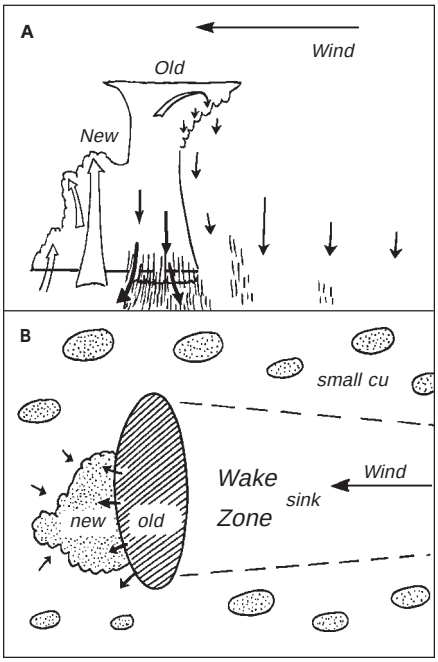


Figure 5 Region of sinking and dead air in the wake of a cunim. A is the side view and B is the plan view.

a Novice contest

Rick Officer
Gatineau Gliding Club

AS IN PREVIOUS YEARS, the contest was organized by Glenn Lockhard of the Gatineau Gliding Club. All clubs in eastern Canada were notified during the spring months. Sadly there appeared to be little interest either by the clubs or by the members themselves. Only one contestant appeared from MSC, Gilles Séguin. However, entries from the host club brought the total gliders to fourteen. The oldest bird was a 1–26, the newest an ASW–20.

After judiciously studying the weather patterns for the past several years, the first week of July was chosen. After a fair weekend, the weather turned as most contests go. Only one good contest day. Not to be outdone, the morning briefings were continued to provide much requested information on cross–country flying. These are our pilots of tomorrow's contests. Those who wonder how to generate enthusiasm for contests should get up from their armchairs and host a club style contest, provide information to the newer pilots, and teach them how to fly from one point to another.

Day 1
The day commenced with lectures on field selection, cross–country circuits over a strange field, and local field hazards.

The sun was shining and a Pilot Selected task was chosen. As the day didn't materialize, the times were shortened. After the sniffer stayed airborne for only 15 minutes, the task was shortened again. Finally the grid was launched into 4 knot thermals. The 1–26/two seat class was 1 hour, sports 1.5 hours and the glass was 2 hours. After excellent flying conditions, only three pilots landed out, all close to the airport. Wet surrounding terrain was blamed for local inconsistencies.

Day 2
Pilots woke up to local thunderstorms and a low ceiling. Frank Vaughan gave excellent lectures on cross–country flying techniques, how to fly thermals to their maximum when away from the airfield, and how to build/use final glide calculators. Reams of paper flowed, filled with figures for all manner of ship performances. As well, lectures on weather and tephigram formulation were provided by our local weatherman Ted Froehlich.

Day 3
The third day ran as usual. Low ceilings and winds from the north. Lectures dealt with topics such as multiple glider landings on a common runway (such as would occur at a Nationals) and strong crosswind landings. Pilots were given an overview of the Ladder Contest as outlined in a recent *free flight* article, and reminded to submit their flights for 1994.

A 1–26 and a 1–36 were taken to the flight line and all pilots were tasked to fly two spot landings, one in each ship. It turned out to be a novel experience to watch experienced pilots flying low performance ships and attempting low energy landings while following the new requirements for the Bronze badge. To make the flight more difficult — a swamp, fence, a slight tailwind, and a "wall" 450 feet from the IP were also included. Surprisingly, everyone did well.

Day 4
Overcast again. The pilots met at 0930 for lectures on final glide calculator use, cruise directors (one of the club ships has one), variometers and audios (all club ships), and other points such as compensation, gust filters, etc. Then the novice pilots were teamed up with the more experienced and towed out for final glides. Fields along the final glide path were examined for ease of landings, obstacles, etc and a debriefing was held after each flight.

Day 5
Overcast again. Just like the big contests. The day's lectures included medical facts from Beth McCollum, and weather forecasting, fronts, etc. from Ted Froehlich. As the ceiling was still low, the pilot teams went flying over local fields to examine them for landing. Several were chosen. The teams then drove to the respective fields and walked each. De–briefings were then held on the choices.

What was learned?
Using the new Bronze badge requirements improved the thrust of the contest from the point of view of certifying seven pilots for cross–country in club ships. Even the dinosaurs of the soaring community agreed that they all learned something. The contest was simple to organize, CHEAP, and available to every pilot in the club, not just those who were licensed or even solo. Activity increased around the club, and those with experience passed it on to those who would benefit. A major improvement for next year is that the local clubs will alternate the hosting of the event, which will reduce the workload and attract more entrants.

One thought on non–flying days at Nationals would be to use a club 1–26 and have the contestants fly low energy spot landings. Since a large number of our accidents occur during off–field circuits and landings, this type of exercise could be utilized to demonstrate landing distances and energy dissipation.

Gatineau had another first for the soaring community. An 18 hole golf club has been built at the corner of the property and opened July 1st. Our wind–up dinner was the first in their large dining room. The food was excellent and everyone won a prize. •

GGC FUN CONTEST – Scores

		Day 1	Day 2	Points
	Club Class			
1	Ted Froehlich	360	91	451
2	Lindsay Masters	324	49	373
3	Brewin/Officer	321	37	358
4	Bauer/McCollum	182	91	273
5	MacPherson/Lockhard	233	–	233
6	Graham Armour	–	97	97
	Sports Class			
1	Claude Leblanc	257	64	321
2	Duncan Marshall	220	94	314
3	Ulo Okapuu	313	94	307
	Glass Class			
1	Ian Grant	410	91	501
2	Frank Vaughan	382	91	473
3	Tom Milc	221	100	321
4	Stewart Baillie	278	–	278
5	Dan Cook	132	55	187
6	Gilles Séguin	54	–	54

Day 1 – cross country Day 2 – spot landings

Landing
in high wind conditions

Steve Nichols
from *SOARING*

THE FOLLOWING THOUGHTS WERE developed over the last ten years spent flying in Texas. The material originally appeared as a safety item in a club newsletter to share experiences that might prove helpful to a pilot new to soaring in this area. Suspecting that the conditions described are common to other soaring locations, it is offered here to the broader national readership.

Two factors must be considered when landings must be made into very strong winds. The first is that everything we do in the cockpit requires judgement. The second factor involves what we can refer to as "piloting" skills, the technical skills required to determine which controls we will employ and how we will use them. Since a judgement decision should always occur before pilotage is employed, I will address the judgement aspect of the landing first.

The recognition of specific weather patterns and events, particularly potentially threatening weather, is fundamental to our sport. These conditions will not sneak up on you. They are visible from a normally considerable distance and frequently telegraph their potential for violence.

Beating bad weather back to the airport requires that you recognize the potential for violent weather along gust fronts associated with a frontal passage — sea breeze fronts, and localized thunderstorms — which are common to many soaring locations. The visual recordings of this type of localized severe weather are available in soaring and general aviation literature, including some graphic shots that will curl your hair.

In dry, dusty country dust clouds rolling along the ground ahead of the gust front are often seen, while along the Gulf Coast of Texas, such a sight will seldom be seen. In the Panhandle, rolling dust clouds appearing to be three to five hundred feet high, with rows of dust devils four deep out ahead of the roll cloud, are not uncommon. Sharply defined and deep virga cloud will frequently indicate potentially severe weather.

A primary judgement call should incorporate being able to beat the weather back to the airport, thus preventing having to land in unfavourable conditions. If it's not possible to get to the airport of choice ahead of deteriorating weather, the option to continue on to an alternate landing site, even if this is not an airport, should be considered. However, if flying locally in a club glider it is really the pilot's responsibility to get back before the weather deteriorates.

A few years ago, a storm front passed through Houston that was so violent it took the lives of eleven unsuspecting boaters on an area lake. From the air, I observed this mass of black nastiness as it was approaching the area of the local soaring operation while it was still some 20 miles distant. I immediately radioed ground operations to start closing down the operation. I returned to the field, promptly landed, started to put my ship away with the help of a ground crew and had just pulled off the first wing when a gust of wind from the north (a 180 degree shift in wind direction) slammed into us so hard that for a moment it was all we could do to control the wing and stay on our feet.

> Retreat in the face of overwhelming force is always a good judgement call.

Understand that the front was still miles away. The downwash preceding this type of weather may be as much as five miles ahead of the visible storm front, meaning you do not have as much time to get on the ground and secure your ship as you might think. Unfortunately, flight operations continued with the Blanik being launched just as the "gust" part of the front arrived. The Blanik managed to land back at the airport, but the towpilot scared himself enough in attempting to land that he then elected to outrun the front, and later landed safely 12 miles away where he sat out the storm — and half the night — tucked in behind a hangar. Smart move on his part. Retreat in the face of overwhelming force is always a good judgement call. However, I have also seen pilots penetrate severe storms in an attempt to get home. There's not enough money in the world to get me to follow along on that ride — arriving home in a casket has no personal appeal for me.

Clearly the best judgement scenario is the one that does not require you to land at the same time the storm is passing over the field. Unfortunately, in our desire to experience the "joy of soaring", we occasionally get out ahead of the mode calling for self–preservation.

Sea breeze fronts and small gust fronts can provide some of the more pleasant soaring that a glider pilot can hope to experience. Rest assured, however, when you elect to play along the face of these types of fronts, you are eventually going to underestimate the storm and have to land in very strong gusts.

Knowing this to be the case, keep in mind that weather that appears to be moving past the field may grow in your direction, and even if the wind direction would favour the front missing the field, you cannot safely assume that it will do so. Severe weather tends to spread out along the frontal boundary. Isolated showers can quickly grow together, and getting caught between them is more excitement than you want.

If you have missed the mark on your judgement call, or have been trapped by circumstances, you could face making a landing in a harsh and potentially damaging environment. You should always strive not to let circumstances get this far out of control, but if such a situation does develop there are several things you can do to improve the odds in your favour.

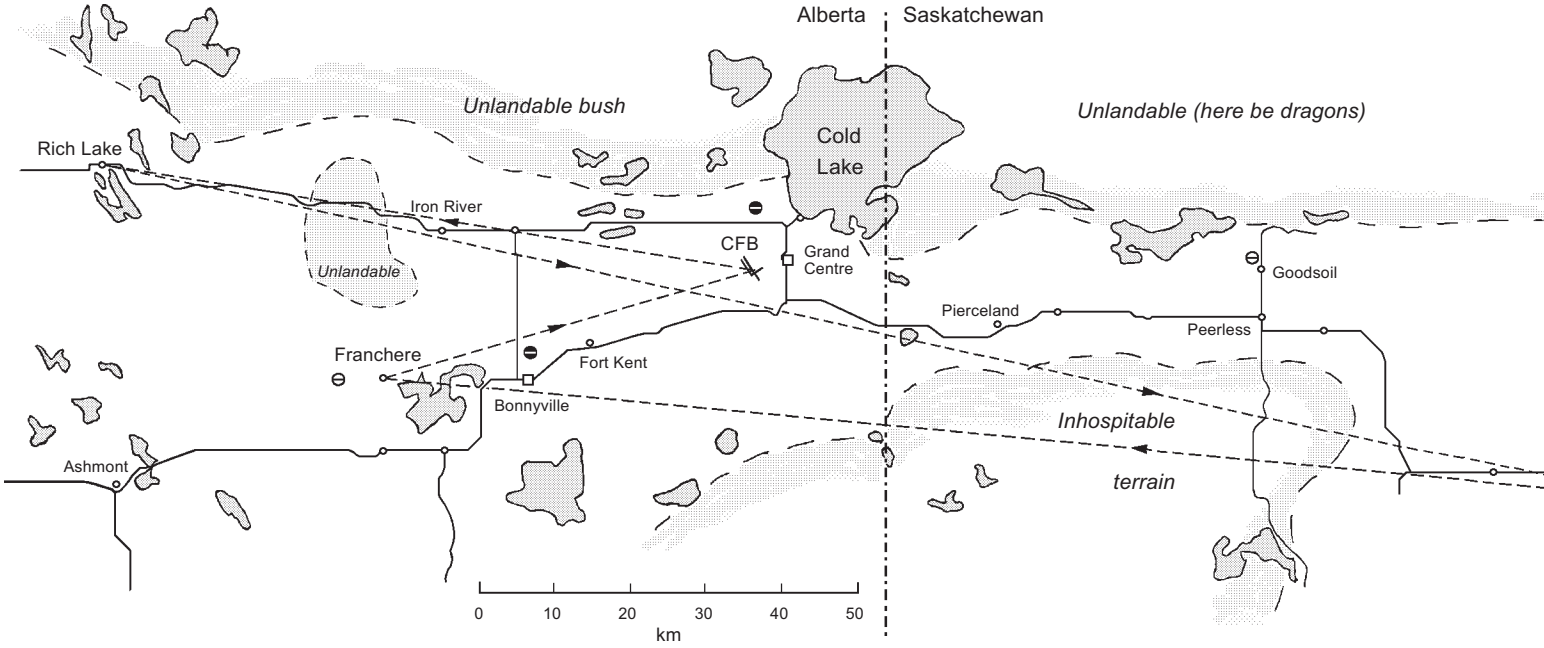
Every pilot knows the maxim about flying faster into a headwind, but just how fast is fast enough? Adding one–half of the estimated wind speed to the normal approach speed has been the standard procedure, and it should work well for you.

I have also found that the *"That Looks About Right"* (TLAR) technique works as an excellent backstop to the traditional technique once you have turned into the wind on final approach.

The TLAR concept can be used to gauge elevation relative to the intended landing spot, and the same concept regarding speed on the approach can be used. A pilot should have a feel for how fast the glider is covering ground and what look is normal in that regard. Push the nose over until the real estate slides by at the right pace, ⇨ **p15**

A perfect blue Diamond

517 km, 1 May 1994



Dave Mercer
Cold Lake

CLSC BEGAN FLYING THIS YEAR only weeks before my Diamond attempt was made. Up until the 30 April weekend, the weather had given much indication of yet another poor spring. This changed midweek about 26 April. Progressively stronger lift and higher cloudbases prior to the weekend made for some of the roughest flying I've done in the high–wingloaded F–18. When you can feel very rough turbulence in a fighter, you know it's strong!

The pessimistic side of me said the good lift would be gone by the weekend anyway, so there wouldn't be much point in being disappointed if or when the weather took a turn for the worse. We had checkouts to give on Saturday, and as the club's CFI, it would have been irresponsible to just hop in my RS–15 and disappear for the day.

Saturday came and went with the highest cloudbases I've ever seen in Cold Lake. The cloudbase topped out at 12,800 feet which is fortunate because legally we could not go higher without oxygen. Our high point on one of the checkrides was a little over 11,000 feet agl! I began having visions of 200 kilometre final glides from that altitude with the lift at 6–10 knots! The forecast for Sunday was identical. The Sunday morning preparation went relatively smoothly. The forecaster was still predicting a cloudbase of 9000 feet beginning about noon. Winds were to be from the west no stronger than 10–15 knots all the way up.

The declared route was from the CFB Cold Lake #1 Hangar tower to Rich Lake (intersection of Hwy 55 and the N/S road), to Meadow Lake (intersection of Hwy 55 and Hwy 4), to Franchere (intersection of the E/W and N/S road) and return. The total distance is 517 kilometres. Due to a fair amount of inhospitable terrain southeast of Cold Lake, the actual distance flown would have to be a bit further.

I chose to take an early launch, as a sniffer flight had not gone up. I released about 1130 in weak lift of one to two knots. Knowing lift was about, I immediately pressed west on course, simultaneously notching the barograph. But where were the clouds to follow? I figured it was still too early for them yet, from what the forecaster had predicted. I found as the day progressed the forecaster was incorrect in his prediction, as not a cloud in the sky appeared all day, not even a wisp of cirrus!

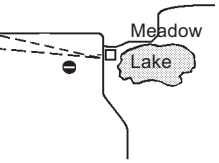
A few miles west of the base, I found a reasonable thermal of a few knots, and prudently chose to climb at this early portion of the flight rather than push on without knowing fully what the day had to offer. With one more of these weak thermals I was over Iron River with a small area of unlandable terrain ahead, except for one square cut out of the trees. I topped a broken thermal of 2 to 3 knots just short of the treeline and pressed on for Rich Lake, easily clearing the forested area, but at the sacrifice of a long period of weak sink.

After the extended glide of just under 30 kilometres with hardly even a hint of a thermal, I was becoming concerned. The terrain ahead (upwind) was laced with lakes. I was pondering whether the lakes were cooling the air sufficiently to suppress the lift when I stumbled into an odd thermal with apparently two cores. It was not a particularly strong thermal by western standards at 3 knots, but it was a little better than average up to this point, and besides, I was beginning to need it. I left the thermal as the lift began to fade and ran in and out of the turnpoint, located 50 kilometres north of Ashmont, hoping to hook up with the same thermal exiting Rich Lake.

It appeared my thermal had dissipated while I was gone, so I did not retrace my steps over the forested area towards the next turnpoint. Fortunately, I found another thermal 18 kilometres out of Rich Lake as I was heading south of the woods. It gave enough to be able to press back onto track over those same trees which had sucked up all my lift earlier. The sink wasn't as severe the second time.

The route back past the base was uneventful, averaging about 75 km/h. Cruising in a height band between 7000+ to 4000 agl, Pierceland passed lazily off my left side, allowing me to easily see the airfield a mile or so west of the town. Not far ahead, a small forest fire burned on the area near the group of reserves south of my track. The smoke did not appear to flatten on top, so I was not troubled by the chance of thermal suppression in the vicinity. One of the better thermals of the day in fact was a few miles north of the fire at 5 knots.

From the top of that last thermal, I could have pressed on directly to Meadow Lake, but it would have been over completely unlandable terrain and leave me uncomfortably low emerging on the far side. Taking the slightly longer route around made for less anguish on an enjoyable flight so far.



Dashing into the second turnpoint was fun as minutes prior to the photo two 5 knot thermals presented themselves, allowing me to really do some racing for the first time that day.

Facing westward into the wind again that forest fire seemed so incredibly far away for some reason. It dawned on me I was a shade over half way, passing 300 kilometres in the Meadow Lake area. I still had many hours left in the day, but I think I was getting tired at this point. The sun had been directly on me all day, as there were no clouds to dolphin into the shade under, and it was past lunch time and I wanted my nap.

The lift became scrappy as my intuition warned me it might. I hobbled along in semi–survival mode towards Peerless away from the forest, knowing an airfield was at nearby Goodsoil should things go downhill. Nearing Peerless I was in full–fledged survival mode in sink for what seemed like forever down to a shade under 2000 feet. After spending the last three hours over 4000 agl, this was uncomfortable. The first useable thermal in 35 kilometres graced me with its presence at just the right moment: a weak and broken one knot at first (survival!) but it improved to a smooth 3 knots or so after grinding away for about 10 minutes of not really gaining much. I climbed it for all it was worth!

Once high again, progress was easy, bumping off the two knotters, and occasionally taking a turn or two in the above average. The high point in the flight was just prior to passing Cold Lake for the second time at 7300 feet agl. From that height I could see Bonnyville and knew I could quickly glide there. I was feeling excited now because I knew I would only need another thermal and a half to make it. The time was 1730, I had gone about 420 kilometres so far with the average speed now down slightly to 70 km/h.

Strangely, the air went rather smooth towards Bonnyville. I clipped the odd bump here and there, but nothing substantial. Overhead the Bonnyville airport with plenty of altitude, I went on a search pattern over the scrapyard and the most likely looking fields. Passing over an electrical power station, and feeling like a landing was soon to be inevitable, I snapped a picture hoping I could make up some distance elsewhere.

The last turnpoint is on the northwest shore of Moose Lake, with not an abundance of fields and apparent thermal producers inbound to it. I wanted to climb short of the turnpoint and then stretch my glide with the knowledge I could make it to Fort Kent at least on the way home, or maybe even Ardmore for perhaps a shade over 500 kilometres. Finding that last thermal a few miles west of Bonnyville took 20 minutes of scratching and sweating, and climbing took much longer! In all I wasted nearly an hour scrambling for what I thought would be enough altitude.

I was elated that I could make the turnpoint. Even more so, when cruising past Bonnyville homebound (or Fort Kent bound really) I fumbled my way into a steady 3 knots! The final 20 kilometres home were spent at 100 knots, finally touching down at 1930 for a not so speedy 65 km/h average speed.

This flight completed my three Diamonds. The first was 7–8 years ago in the RS–15 at the Gatineau Gliding Club and the second in the Cowley wave in a 1–26. *(Dave has now earned Diamond Badge #83.)* •

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avoiding showers

continued from 9

Landing near showers
One cannot always get enough height to glide to the next thermal. Pilots have followed a course through the wake zone of the cunim and met excessive sink. Even if one is clear of the wake, the spread of a big anvil cloud carried ahead of the cunim by strong upper winds may cast such a wide area of shadow that the small cu you hoped to reach die out before you get to them.

It is often difficult to tell the surface wind direction when committed to landing out. Showers produce their own circulation which can be very different from the general flow of wind. A developing cumulonimbus may appear to come up against the wind. This is partly because some clouds have a gradual inflow extending many miles ahead of them. The flow aloft may be westerly but at low levels a light easterly wind can occur ahead of the storm. Then, when the downpour is near, the arrival of a gust front spreading out ahead of the cunim can reverse the wind direction in a few seconds. The strongest winds generally blow outwards from the storm.

The squall is increased if there is a big temperature contrast between the hot sultry air ahead of the storm and the cold downburst and outflow brought by the storm. Hence thundery squalls are usually more severe in summer and wind speeds may suddenly increase from almost calm to 60 knots. Parked gliders have been blown over because the previously light winds gave a false sense of security. Even in the colder months many showers pull down faster moving air from aloft to boost the surface winds. There may not be much change in direction but the speed can easily rise by 20–30 knots when the gust front arrives.

On average the development of showers lags an hour or two behind the daily rise of temperature. One expects most showers to fall between early afternoon and sunset but the time can vary a lot.

The early morning showers
Sometime after a cold front has gone through overnight the day starts bright and clear but cunim and showers develop almost as soon as the sun has come up. Such exceptionally early showers are often due to a post frontal trough. There is a fair chance that this breakfast time downpour will be the only showery spell. The succeeding ridge will make the air subside and damp out any further showers. This is not an infallible rule but works quite often.

The slow starter
This is an awkward situation because cu are slow to grow. One is lulled into a sense of false security and sets off under a good looking sky. Then, just after rounding the furthest TP, the cu tops break through a small stable layer and quite suddenly start to grow into cunim. The day may need the maximum amount of heating to break the final inversion so nothing happens until 3 or 4 pm. The delay stores up a lot of heat energy at low levels and once the cunim starts it is apt to grow explosively.

Sea breeze fronts
Sea breeze fronts sometimes produce strong convergence. Often this simply sets off a line of much better clouds but occasionally the convergence lifts the stable layer several thousand feet and then showers break out along it. When this happens the sea breeze usually comes to a halt. On rare occasions when two sea breeze fronts meet the cloud builds high enough to give a thunderstorm. This has been observed over East Anglia but a meeting of sea breeze fronts seems more common over a long narrow peninsula such as Cornwall and Devon or Pembrokeshire. When the wind blows along such a peninsula the convection is enhanced for a long distance downstream. •

GOLDEN TALES

1

14 FLIGHTS IN HEAVEN

Mike Glatiotis, Cu Nim

SPRING SPRUNG THIS YEAR with the great promise that only a set of non-club wings can offer. Half of a Mini–Nimbus, 'Jolly Miller', was mine, and the sky's the limit. A distinct lack of employment for mineral exploration geologists (me), a distinct demand for petroleum geologists (my partner, Jos Jonkers), and an understanding working wife set the scenario for a fine year of flying.

After testing my wings around Black Diamond through one of the best spring seasons since I started flying, I was ready to venture into the mountains and see first hand what all the old Cu Nim hands had been talking about. Previously, most of the soaring that has occurred in the Rocky Mountain Trench, along and just west of the mountains, has been the result of various sporadic club flying camps run out of the Invermere part of the valley. Past experience of hang gliding out of Golden, coupled with my recent introduction to Uwe Kleinhempel and Aaron Archibald of the Rocky Mountain Soaring Centre, convinced me to drag the trailer out to Golden to test the air there. Uwe and Aaron have introduced sailplane soaring into the Columbia Valley on a regular basis, and besides offering us the opportunity to fly, RMSC has been encouraging new participants, and has licensed and is training a good number of new pilots. In this day of dwindling numbers, their efforts are to be applauded.

The hang gliding and parasailing communities have long recognized Golden as a world class soaring site and hold national championships there. This July saw two new paragliding world records set, and if a paraglider can do it, then a sailplane should easily be able to smoke some new records.

But I digress. My first few forays into this new mountainous and apparently hostile terrain were far from easy. I was puckered up even before I released at what seemed just above the trees on the slopes. A glance at the vario settled me down, and was followed by an introduction to ridge running and rock polishing which are definitely not available on the prairies. My biggest adjustment to flying in the mountains was flying close to terra firma and adjusting to the sparcity of landable fields, with lakes and the Columbia River initially looking like great alternatives. After soaring about locally, though, it quickly became apparent that consistant soaring conditions along the cliffs and ridges more than make up for the lack of flat fields. Ridge tops of 7500 to 9500 feet with a valley bottom at 2500 mean plenty of time to see the suitable hay fields and airstrips which dot the valley floor.

Spectacular mountain and glacier scenery await exploration, all accessible within a final glide of the runway. But this flying is still not for the faint of heart. Serious dangers exist for those who venture away from the main valley when conditions are not predictable. Good judgement and plenty of reserve height are always required. Local flying provides plenty of thrills on the 'poor days' with ridge soaring, rock polishing, and peak climbing all within easy reach of the airfield. Given enough flights to get comfortable, there are endless valleys to explore as you venture further out. One June day, Jolly Miller saw almost nine hours of soaring in two flights, and there were more soarable hours available!

How about enjoying glassy evening valley lift and landing at 10 pm? Westerly flows can give spectacular looking wave whose potential has not yet been fully explored. Cloudbases 13,000 to15,000 feet open up the country from the Columbia Icefields to the Shushwap, south into Montana, and as far as the flatlands to the east.

Significant flights this year include three cross mountain traverses. Dick Mamini visted Cowley by flying south from Golden towards Elko then east over the Crowsnest Pass, and Mike Cook came across the rocks from Golden to Black Diamond on a tour of the ski hills at Lake Louise, Sunshine, and Nakiska. Lastly, Mike Thompson and Joe Gegenbauer crossed the Rogers Pass on an outstanding flight from Salmon Arm to Golden during the BC Soaring Safari. A new cross–country pilot, Willi Terpin, completed five great flights as well as his Gold climb, all in a Phoebus B that he was going to sell earlier this spring. (It is gone now, so Willi should be completing some formidable tasks in a new ship next year.)

There are unsoarable days, but the valley lends itself well to other activities — hiking, fishing, whitewater rafting, canoeing and mountain biking are unparalleled. Radium and Fairmont Hot Springs and the Columbia Valley lakes are not far away, and provide tempting incentives for the retrieve crews. Top it off with friendly people and a town that has not adopted the plastic gouge–a–tourist attitude yet, and a great flying vacation is guaranteed. Needless to say, I have been captured by Golden, and the fine soaring made available by Uwe and Aaron have opened the scope for our sport in one of the most spectacular regions of North America.

Right now we have the skies to ourselves, but don't worry, sharing the thermals only serves to enhance the whole experience, and I look forward to meeting more soaring pilots next season, in the mountains. •

2

A SEASON TO REMEMBER

Willi Terpin, Vancouver

THE 1994 SOARING SEASON STARTED when I found a copy of Helmut Reichmann's *"Cross Country Soaring"* under the Christmas tree. After reading it for a few days, I even got used to the strange looks from my wife as I went to bed with my soaring book and a pocket calculator, occasionally mumbling "now that makes sense!" My previous idea of cross–country soaring was to get high and stay high. All that changed radically as I started to practise in Ephrata, WA. I landed out three weekends in a row and my Phoebus, "Love (or Lima) Whiskey" soon became known as "Landout Willie".

By June I had learned when to push and when to back off and I found myself spending a lot more time soaring the Cascade mountains. Flying only on weekends just was not enough so I planned to spend my vacation at a location where I could soar every day.

I phoned Rocky Mountain Soaring Centre and talked to Uwe, the same pilot who two and a half years ago introduced my son and me to the joys of silent flight with the VSA at Hope. I was told I could get a tow anytime from dawn to dusk, seven days a week. If I did just come for a day or two, I could rent one of his two Blaniks, a Ka6 or a Pilatus.

I felt confident in flying from Ephrata to my home in Castlegar and have my wife follow me with station wagon and trailer. A rainstorm put confident–me into a muddy field just south of the Canadian border. Well, no big deal. Then Vera informed me she would spend the summer with her parents in Austria. I spent the following day cleaning mud out of the gearwell, tailcone, from under the seat and drove the five hours to Golden.

The soaring was even better than I expected. Flights up to 15,000 feet in thermals and long, easy cross–country flights became almost routine. The scenery of the Rockies, the Purcells and the Selkirks was breathtaking. I camped out at the airport and got to know a few sailplane pilots from Calgary flying for Gold and Diamond badges.

Badges? Someone jokingly suggested that since I did not have any at all, I might as well try for Diamond distance and work my way down. So I borrowed a barograph and declared a 500.

I almost succeeded on my first try. I left Golden at 1500 and photographed my turnpoint at Elko at 1730. Flying low and fast in strong ridge lift, I reached a point north of Edgewater. About 75 kilometres short of home, all ridge lift stopped and rather than landing out in a field, I turned back for the grass strip at Radium. As I flew down the middle of the Columbia Valley, I found myself in zero sink or weak lift. The

evening "wonder winds", as the local hang and paraglider pilots call them, allowed me to fly all the way back south to Invermere, where VSA was holding their annual summer soaring camp. I received a warm welcome, borrowed a sleeping bag and stayed the night. The next day I got an aerotow back to Golden behind the L–19.

On my second 500 attempt I got away early, had an excellent flight but a cold front with 40 mph headwinds parallel to the ridge forced me to land in a hayfield at Spillimacheen, just 40 kilometres short of Golden. The valley was made for the sport as there are a lot of fields to land in.

Undaunted, I left for Elko a third time and met Trevor in his ASW–20 down that way. For a brief time we flew together. He showed me the location of his cabin on one of the small lakes and told me he had just flown his 500 out of Invermere. I photographed my turnpoint and arrived back at Golden 6 hours, 40 minutes later and called it a day.

The Columbia Valley may be our best kept soaring secret. Let's not keep it that way! •

Landing in high winds

continued from 11

and do not be surprised if the indicated airspeed is higher than what you thought would be adequate.

I once had a chance to watch a pilot shoot an approach in the club's Twin Lark just before the arrival of a gust front. It was windy when he shot the approach, but not as gusty as it would get when the storm arrived. He set up his approach so the speed over the ground looked normal, when in fact his indicated airspeed was 70 knots. He glanced at the instrument, realized how fast he was, thought about slowing down a little, but then watched the glider's movement over the ground and decided that 70 was just fine.

Unfortunately, flying fast into the headwind has a very dramatic effect on your glide slope. (A brick with short wings, flapping very fast comes to mind.) So what is the proper thing to do when the sink rate gets higher than your comfort level? Close the spoilers some, right? Keep in mind that a sailplane wing is designed for producing high amounts of lift at slow speeds. Flying into a strong headwind can result in a relative wind moving across the wing at speeds of 80 to 100 knots. The extra relative wind moving across the wing, coupled with reduced spoiler usage, will affect the glider during your attempt to flare out. Consider also how sensitive the controls are going to be with all this extra air flowing across the control surfaces.

The combination of the faster reaction time of the controls and the turbulence will make it difficult to hold the desired line of flight. It will be easy to overcontrol the ship, particularly where changes in pitch are concerned. As you flare out and put a neutral angle of attack on the wing, the glider may rise. At our club, we teach a "two–point" touchdown, with main and tailwheel contacting the ground at the same time, in order to provide the shortest possible rollout in an off–field landing. The two–point touchdown may still work if the wind component is not too high, but you will have to let the extra speed dissipate before the glider will touch down by itself. This means flying close to the ground, in wind shear, while allowing the aircraft to slow down. In a strong crosswind, the glider will drift off the centre line while you are waiting for it to land, assuming you kicked out the crab angle as you flared out. By the time the glider touches down, you may find yourself very close to a fence or other obstruction on the downwind side.

For these reasons, I generally prefer to fly the glider on, touching down on the main gear in a neutral pitch attitude, and then adding slightly more forward stick pressure after I feel the main gear is the ground. This pins the glider in place and helps to prevent your being launched back into space at a slow speed with potentially ineffective or insufficient control of the glider. As soon as the main wheel contacts the ground — smoothly and gently — go to full spoilers if you have not already done so.

Going back to the Twin Lark's landing, touchdown was at a level flight attitude. As the pilot began to lower the tail, the rest of the gust front arrived with at least an additional 10 miles an hour gust. The additional wind component, coupled with the now positive angle of attack on the wing, caused the glider to fly again. The glider reached an altitude of four feet at a very slow speed, spoilers were immediately closed, and a second landing was made safely. Always be sure that you are through flying before you put the tail down.

If you are flying a ship with flaps, going to negative flaps after the ship is on the ground will kill the lift on the wing, but I would only do so if the spoilers will stay out while you're changing the flap setting.

A second benefit of going to a negative flap setting is that with most gliders it will tend to put the tail on the ground, which can be very helpful in a crosswind situation. In a strong crosswind, full downwind rudder may not be sufficient to prevent the glider from turning into the wind and running off the runway. Putting the tail down with full up elevator will help control this problem.

The decision to land on the main gear or in a two–point stance will depend on the ship you're flying and the degree of severity in the weather. You should practise different techniques in the gliders that you commonly fly to determine what will likely work best. Your ability to play with the flaps will depend on the ship. In the Twin Lark, you might want your co–pilot to run the flaps to negative while you keep the spoilers open.

My personal experience with gliders that use flaps as their only means of glide control leads me to feel that landing a "flaps only" ship in this type of weather could prove to be more difficult than in a glider with spoilers. In addition to adding more speed, I feel you must add additional altitude to the approach. You will want to use less flap than normal throughout the entire approach, adding the flap at a later point in the pattern than normal. My experience has been that the lesser flap setting will not be a problem as the glide angle will naturally steepen into the headwind.

Knowing my own preferences when flying a flap–only ship, I would carefully consider the judgement side of the weather scenario outlined here and give myself more clearance from the gust front, making sure I would not have to land in the kind of conditions we are talking about.

The truth is that you can't land in strong winds and gust conditions without being at risk. With the right amount of skill you may pull it off, but keep in mind that weather can be unpredictable in ways that no amount of skill can overcome. If you stay ahead of the weather you have the option of avoiding that risk entirely. •

training & safety

TESTING DAILY INSPECTORS

Gary Sunderland
from *Australian Gliding*

Note: In Australia, a person is required to pass a nationally set exam in order to legally sign off a sailplane DI. The Gliding Federation of Australia is responsible for sailplane airworthiness, not the government.

Following an *Australian Gliding* report on procedures for Daily Inspector training, it may be in order to give some background to our GFA Daily Inspector test. This test is unique as far as I am aware. Other aviation organizations, in this and other countries, train and rate individuals for Daily Inspections, but only the GFA conducts an actual physical test using an aircraft. The test procedure was developed under the leadership of Alan Patching during an early national Gliding School, at which Reg Pollard and I were the demonstrators.

After a series of lectures and demonstrations we decided to check how the message was getting through, by making the students inspect a glider which we knew to be unairworthy. The results were surprising. We discovered that, despite the actual level of theoretical training and knowledge, students were "missing" obvious and glaring defects. Some did not have a sense of the hardware or priorities. For example they were overly concerned with minor internal features, and would not pick up the rigging connections as being out of safety.

People with a background of experience with machinery, such as tradesmen and farmers usually performed better than office workers. Even when we sent them back to the same aircraft with advice on what to look for, some individuals could not "see" that something was wrong. Only after the problem was explained once more did we obtain a response.

Then we started deliberately "bugging" aircraft with typical defects and retesting the failures. These students showed a rapid improvement in their speed and ability to spot defects. After two or three exercises they were able to perform near to the same level as the most capable students.

We therefore decided to introduce DI tests into the airworthiness system and this continues to this day. Incidentally I do not completely agree with the need to conduct a test on each class of structure, ie. wood, metal or composites. You certainly need to demonstrate how to inspect each variety of glider, and show the pupil what to look for. However the "test" is all about pupils learning and showing that they can appreciate what is before them.

Safety is involved because we are introducing defects into an aircraft, which has to be made airworthy again under a system of inspection. Also we need to ensure that the test is fair and representative. The inspector is the sort of person who will have experience in the defects which may be present in the type of glider being used.

Before setting up an aircraft the inspector will check it to see what defects are already present. This is usually worthwhile in most instances! We want a total of ten or twelve representative defects in the glider. Some testers are inclined to be excessive, with twenty or more. This takes up too much time and can lead to adverse feeling of failure in the person being tested. The test should take about twenty minutes, plus ten minutes to record the defects. Say a half hour total, which is about the usual time expended in a normal daily inspection.

For those conducting DI tests, I recommend that at least one or two fairly obvious major rigging connections should be out of safety, ie. take the safety pin right out of the main pin and put it in your pocket. This will be less obvious than undoing the safety pin and leaving it in that condition. These type of defects may appear glaringly obvious but it is surprising how many people fail to see them. This also gives you a starting point. If they miss these then they have failed the test. You certainly could not let such people conduct DI's in your club.

After "rigging", the next most important class of defects is "damage". You can hardly bash a hole in the glider, but what you can do is to tape a note under the tailboom, such as "report me", representing a dent or hole which could occur in service. Make the pupil look under the glider as well as on top. Foreign objects are potentially lethal devices which are commonly found on inspection. I have removed a screwdriver from a divebrake box and numerous coins and metal pens from cockpits.

Try to fit in a few minor defects, which may not prevent it from being flown, but may result in service difficulties. For example, removing the cap from the mainwheel tube will permit dirt to enter the valve and promote an eventual failure. (I suggest you stick to airframe defects and leave the instruments and systems alone. Trouble shooting these can be time consuming and inconclusive.) As you are incorporating each defect you *MUST* record it on a list which you keep. The persons being tested then will make up their own lists which, hopefully, will be something like the examiner's.

It's usually worthwhile trying to get three or four people to do the test on the one occasion. They are warned not to talk to anyone about the test, and not to rectify any defects they find, but just record them. The examiner should supervise each person, and help with testing instruments and holding wing tips as requested. A "pass" should include all the mandatory safety items, plus a majority of any secondary defects.

After all the tests are completed the aircraft must be returned to its previous condition. The examiner should work from his list and rectify and record each defect in turn. After this is completed an independent inspector or instructor must follow up and check that each defect has been removed.

We learned the necessity for this the hard way. At an early national Gliding School, I had "bugged" a glider with a number of defects, but forgot to reset the offset rudder pedals. The owner was rather peeved when he discovered these, and understandably so. He was not so much concerned by the rudder pedals but by the thought that there might be something else which I had forgotten.

Finally, after all this and before the subject aircraft is flown, it has to be given a normal and careful DI. Not only as the normal requirement, but all the people pushing and prodding the innards of the glider will usually do some inadvertent disarrangement to its usual order and condition.

DI tests are a lot of extra work and concern, but, like spin testing, I believe they are worth all the effort involved, in that they ensure a certain minimum level of competence is being achieved in practise.

It would be instructive and perhaps enlightening for club CFIs or safety officers here in Canada to see what would happen if their pilots were turned loose on a club trainer which had been set up with a number of recorded "faults" to discover on a DI. ed.

CHANGES TO FT&S COMMITTEE

I regret having to report that Mike Apps has stepped down from the committee after several fruitful years as thinker, advisor, and course director. Mike's contributions have been numerous and included his enthusiasm to many who attended his instructor courses and cross–country clinics over the years. In particular he will be remembered as the pilot who introduced us to the idea that we can teach pilot decision–making (some of us call it "judgement") in a simple but structured way, independent of our personality!

His use of "SOAR" as the four step memory jog will surely rate as one of the simplest yet most inspired ideas we have seen in soaring lore. We thank him for this, and wish him all the best in future soaring, and success in his possible business move to Europe shortly.

Terry Southwood, from the Cu Nim club, joins the committee, and we welcome an-

other western pilot with his vision (CAVU?) and experience to share our important work.

Terry assisted me at the eastern instructors course this summer at Hawkesbury, and helped Paul Moggach at the western course at Chipman — so he was thrown into the deep end straight off. That he survived to become the course director for future western courses is testament to western fortitude. Welcome aboard Terry!

Ian Oldaker

ALERT ON GROB G–103

Rudder pulleys, G–103 Twin II, 1107 hrs

On a daily inspection, all 5 nylon rudder cable pulleys (PN 102C3–2016) installed on the front rudder pedal adjustment assembly were found cracked. The cracks radiate from the cavity where the bearing is pressed in. The replacement pulleys supplied by Grob are now metal, but to our knowledge, there is no Technical Note specifying this change.

The rudder cables from the front pedals are routed over these pulleys to provide a means of adjusting the pedals fore and aft. The failure of one of these pulleys could disable the front rudder pedals and result in a loss of rudder control from the front seat. Control from the rear cockpit is unaffected as push–pull rods are used.

Paul Fortier, Rideau Valley Soaring

ACCIDENTS & INCIDENTS

3 Jun Cu Nim, Ka6CR, FKJO. Glider ballooned after flare and landed hard. Wind shift a factor. No damage.

20 Jul Champlain, IS29D2, GARS, Wing dropped on launch and glider groundlooped. Minor wrinkles on wing skins, no injuries.

6 Aug Winnipeg, IS29D2, GBEQ. Release jammed (chain link used in Tost mechanism). No damage.

18 Aug York, PA-11-modified, GHFV. Stall with spin entry right after takeoff with glider. Towplane a write–off. Pilot uninjured. Glider OK. (no SAC claim)

20 Aug Cu Nim, PIK20–B, GXWD. Landing in strong crosswind, glider rolled off runway and wing struck hay bale. Fuselage broken behind wing and wing roots/spars have pin shear damage.

10 Sep York, 2–32, FRRP. Midair on short final and close to ground. Vertical stabilizer struck wing of other glider. Minor damage, no injuries.

10 Sep York, Cherokee. Midair on short final, pilot did not see traffic, left wing struck by fin of other glider. Moderate wing damage, no injury to pilot.

accident report

PUCHACZ SPOILERS OPEN

Flight Training & Safety Committee investigation into the circumstances under which a Puchacz sailplane was damaged and the pilot injured.

Date	Sunday, June 26, 1994
Time	1600 hours
Glider	Puchacz
Passenger	? (This is the actual entry in the flight sheet!)
Towplane	Citabria

The purpose of this investigation is fact finding rather than fault finding, but if faults are revealed they will probably be of use.

It is necessary to find the answers to four questions:

1 What happened?
2 How did it happen?
3 Why did it happen?
4 What can we do to prevent it from happening again?

What happened? The glider was being towed by the tow aircraft. Shortly after takeoff the towpilot found difficulty in reaching the required airspeed and rate of climb. He saw in his rear view mirror that the dive brakes of the glider were deployed and he tried to signal this to the glider pilot by wagging his rudder. This movement was minimal due to aircraft being close to stall. The glider pilot decided to release and made a heavy landing in a field of clover.

The impact of the landing caused the glider pilot to suffer a cracked vertebra. The glider performed a partial ground loop, the left spoiler hit the crop (apparently two or three times) and was damaged. The total amount of damage will not be ascertained until the spoiler box is opened for examination prior to repair.

The pilot left the glider and, when the towpilot overflew the site, was seen to be lying on the ground. He was removed to Orangeville Hospital.

How did it happen? The dive brakes of the glider deployed just prior to takeoff or shortly after, since the ground run was longer than normal. The glider pilot either was unaware that this had happened or he didn't have time to correct the problem.

The wing runner stated that she watched the progress of the takeoff along the runway and the dive brakes were not deployed at that time. At this stage we do not have a statement from the glider pilot.

Why did it happen? The cause of this accident was the unintentional deployment of the dive brakes. The glider pilot's failure to close them and his decision to release and land out were contributory factors. It must be suspected that the pre–launch procedure was not thoroughly performed.

This procedure states that the brakes be closed *and locked.* Unless there was a previously unreported malfunction of the locking mechanism, it would appear that the glider pilot failed to lock the dive brakes.

Can we prevent it from happening again?

- *Pre–launch procedures*

These must be fully and carefully carried out before each launch. It's not good enough to say that it was okay the last time I flew this ship a couple of hours ago. Nor should pre–launch procedures be hurried because another glider has entered the circuit.

- *Communications*

We have not yet installed a radio in the Puchacz, but we must do this before we fly it again. All other ships and the towplane are radio–equipped. The towpilot should wear a headset with microphone and he and the glider pilot should be in communication before takeoff and during tow. This should become part of the pre–launch procedure and towing practise. A press–to–talk switch mounted on the control stick would be desirable, since a pilot is vulnerable when operating aircraft close to stall. To reach up to the side for a microphone would be an unwanted distraction at a critical time.

- *Suggestions from towpilot*

Wing runner before waving takeoff should call out to the glider pilot, "Check spoilers in and locked" with a similar response from the pilot.

The switching on of the rotating beacon by the towpilot could also be a communication to the glider pilot that spoilers are deployed. Towpilots should always ensure that mirrors are properly positioned so that they can clearly see the glider. High density foam cushions should be installed in all gliders as recommended by the Safety Board.

- *Suggestions from wing runner*

Keep left hand on spoiler bar so pilot is aware of the status of the spoilers during tow.

This report and suggestions arising from it will be discussed at our mid–season meeting which is to be held shortly.

Everyone should remember that in all cases Transport Canada must be called before aircraft is removed from an accident site.

Ken Brewin
FT&SC

club news

OFFICIAL OBSERVER RENEWAL

It is time once more for the list of OOs in Canada to be updated. Remember that OOs are dropped from my register every three years unless I receive notice from club CFIs or club Senior OOs that their OOs are still active and current.

Club Senior OOs or CFIs should send me a list of their current OOs as soon as possible so that my register is up to date for the next season. Please note my new address and phone on page 22.

Walter Weir,
FAI Badge Chairman

WINNIPEG GLIDING CLUB

Our club operation saw a dramatic turn for the better this season compared to the previous two years. Continued floods and heavy rains throughout the summer of 92–93 left our flight stats down and our membership wondering if gliding is really worth the bother. Well this year has, thanks to aggressive and creative marketing both with promotion and a restructuring of our glider rental plan, left us with a 30% increase in total flights overall. The club executive recognized that many members did not get their monies worth in 92 and 93 and chopped the regular membership rates in half, thereby enticing all members to return for one more shot in 94 — the only catch being that they were a fully paid member in 93. We also changed the glider rental rates to a one time fee for unlimited glider time payable at the beginning of the year. For $120 any member could fly the glider of their choice (providing they were checked out) with no extra charges levied. Of course the usual tow fee applied.

The result of all this was an instant increase in flight numbers and several members received checkouts on our two–seat Lark and ASW–15 (now turned into a Grob 102). Our treasurer could not be happier. Combine this with a return to more normal maintenance costs on our towplanes and our club is looking forward to a bright future.

In early August we sold our ASW–15 and purchased a locally owned Grob Astir CS, which was an instant hit with all who flew it. The aircraft has more upright seating, is capable of fitting pilots on the larger size and has a higher gear stance allowing easier off–field landings. Jim Oke, our president, is busy developing a fleet replacement plan which will review our operational requirements for the next several years. The intent is to determine if there is a suitable replacement for the venerable 2–33s. If anyone has experience with other trainers, either for or against, please let Jim know your thoughts.

We have also been busy with other non–flying activities around the field. There have been the usual social gatherings and BBQ and several members have been enjoying the atmosphere at the campground on Saturday evenings. Often I think that the after flying events are more entertaining than the actual flying, and nothing could be better than sitting around a bonfire with friends telling stories of the thermal that got away.

On the July long weekend to commemorate Canada Day, we invited all members to bring some fireworks. We ended up with over 75 items to fire off, and the display as viewed from the clubhouse deck was truly awesome. The party that night lasted well into the early morning and everyone agreed it was the best time had in a long while.

Many members took holidays this summer to include the Cowley flying week. The club Lark was trailered out and provided many opportunities for some excellent soaring on the rocks, something us flatlanders are not used to. A few private sailplanes also made the trip, making this year's Cowley camp a very enjoyable and rewarding experience, ensuring that we will be back next year. Due to a previous commitment to an airshow, the Lark was removed prior to the end of the camp and driven back home.

The airshow (the first for the area in several years) included Manfred Radius and his "ultimate" aerobatic routine with his Salto sailplane. The club was well represented with three gliders on display and the standard information packages available. We supplied the towplane for Manfred and were pleased to be working with such a professional. Minutes prior to his release over the showline, he gave a good plug for WGC, mentioning where we are, who to contact, intro rides, prices and so on. As a result our phone lines were busy for several days after and we saw many interested people show up at Starbuck to have a ride (but sorry that we cannot do a low level, inverted ribbon cut)! Many thanks to Manfred for a superb performance.

Finally our club has seen several new glider licences issued and a few others nearing the end of their flight training. For all involved it has been a very rewarding summer and we are looking forward to an early start again next season. Many pilots have been thrilled with their first taste of actual soaring conditions and we have seen a marked increase in the number of B and C badges issued. We even had a Silver C duration completed in late August, something you normally see only in the early spring. We are well on our way to a full and complete recovery from the previous disaster of a season in 93.

Mike Maskell

ONTARIO SOARING ASSN

Fall Planning Meeting – 12 November

This year you, the soaring pilots of Ontario, received some $14,200 in government funding to help support soaring in Ontario. Your funding actually increased despite cuts in other programs. Maybe you were lucky — maybe it's the coming provincial election? Maybe your participation at the planning sessions last fall and winter had something to do with it? Maybe you can increase your funding again next year.

Projects that OSA helped fund this year were: the Nationals $3700, the Provincials $1500, the Eastern instructors course $3000, and cross–country clinics $3000. Now it's your turn to help decide which projects should be receiving grant money next year. We start this process at our annual fall planning meeting which will be held at 10 am at the Delta Meadowvale Inn in Mississauga.

Here is your chance to discuss that special project so dear to your heart with like–minded individuals in one of several informal break–out sessions. Ideas coming from these sessions will form the core of the grant submission for the 1995 season. Look for a more complete agenda on your club's bulletin board, or call me at (416) 920-0484. Please help develop soaring in Ontario.

OSA president, **Ken Withrow**

The OSA has been having a quiet and moderately successful year so far. With a complete change of executive there was a certain amount of catching up to attend to but this seems to be mostly behind us now.

As we wrapped up last year's finances with the Ontario Ministry of Culture, Tourism & Recreation, we had to repay some funding from them which had not been used up, either because the funded project had not proceeded or was incomplete. At the same time, with the Ontario government's current emphasis on budget restraint it was suggested that we could expect less support this year than in the past. Accordingly, we were pleasantly surprised to learn in the last few days that our grants for this year are in fact slightly more than last year's.

One reason we attribute this to is that we were able to show the Ministry that the amounts spent by our members and member clubs for such things as national and provincial competition participation greatly exceeded the grant for these activities, whereas in the past only the funds which passed directly through OSA's books were reported to the Ministry. As a result, we have asked all the Ontario clubs to provide us with information on expenditures which relate to our funding categories, even though that expense is not made directly by or through OSA. We believe that, armed with this information, we can present a better case for funding next year.

We inaugurated our Provincial Ladder competition this year, and we are looking forward to seeing how well it works, and what if any improvements will have to be incorporated for future years. If this works as expected, we should see more cross–country activity than in the past.

For the second year now we have had to drop the Beginners Cross–Country Clinic, as no one met the new prerequisite to participating in the clinic, which is a Bronze badge plus three consecutive successful observed spot landings. We ran an Advanced clinic in conjunction with an invitational cross–country competition held at the Air Sailing Club on the Labour Day weekend in which 11 pilots participated. The weather cooperated with three exceptional days — thermals were up to 10 knots on Saturday! Instruction on various aspects of cross–country flying was given and included a session on Kurt Meyer's new GPS system in his Discus. All in all a very successful weekend, with several outlandings, no incidents or accidents, and close to 300 kilometre flights by several pilots. I believe the average distances flown exceeded the figures for both the National and Ontario contests.

OSA Secretary Treasurer, **Doug Eaton**

TORONTO SOARING

We were pleased to be able to host the 1994 Ontario Provincials from 29 July to 1 August, and I believe that all present enjoyed a very satisfactory weekend. Contest weather support was provided using some of the latest high–tech personal computer and modem to get the latest forecast charts and satellite images each morning from the AES computer bulletin board system. Towplane soundings were performed daily using the new "CuSonde" digital data logging aircraft psychrometer which automatically records data while in flight. The system was provided by club member Stephen Foster, a graduate of the U of T Institute for Aerospace Studies and now the president of Aventech Research which manufactures airborne atmospheric sensing systems. After each flight the recorder was connected to the PC to generate a thermal forecast. Forecast data were printed directly onto overhead transparencies for the briefing.

DAY 1 began overcast. Skies were expected to clear by late morning as a high slowly moved into the region with light winds aloft. The sounding predicted towering cu with bases at 3900 feet, locally heavy cloud cover and only a slight chance of showers. Conditions improved as expected resulting in a good contest day.

DAY 2 was marked by winds reaching 13 knots at 3000 feet with cloudbase still respectable at just slightly less than 4000 feet.

DAY 3 was assaulted with even stronger forecast winds aloft, now reaching 16–20 knots at 3000 feet and a cold front approaching from the northwest. Conditions were expected to degenerate rapidly but despite this the sounding still indicated favourable stability conditions for good cumulus development starting between 1000 and 1030. As sniffer, Walter Weir reported good lift to over 3000 feet so a short task was called. After the grid was launched, many pilots complained of the strong wind conditions, so the day was scrubbed.

Ten contestants entered. In first place was Walter Weir from COSA (ASW–20, 2000 points), second was Roy Thompson from SOSA (LS4, 1545 points), and third was Marian Nowak from our club (Ka6CR, 1516 points). On the social side we were pleased to welcome the pilots and crews to share the comfortable facilities of our new club room. Our fully equipped kitchen provided breakfasts and dinners, plus lunchtime sandwiches and beverages. After–flying activities included an adequate supply of refreshments for all to enjoy.

Ken Ferguson

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the Sports class

continued from 4

Perhaps we have missed a few who would have done well for Canada in past Worlds. In any case, team pilots have always had trouble finding the money to compete and ships to rent in a Worlds, and the new ships are, if anything, easier to transition to and fly than the older ones.

• *handicapping doesn't work and nobody really trusts that the values are accurate.* It's true that handicapping is open to argument and presumes flight under a set of soaring conditions that aren't there during the contest. It doesn't work when applied to a large range of sailplane performance — no matter how accurate the handicap is for a 1–26, on a windy day it will be on the ground while the Discus has already checked out three thermals. Handicaps *do* work acceptably well over a narrow range of values on reasonable soaring days, and today most Standard and 15m ships have handicaps within less than 8% of each other.

On weak soaring days, sailplane performance differences are far less important and pilot ability to just stay airborne is paramount; in this case handicap values tend to penalize the scores of hot ships, so a narrower set of values must be applied. One way to do this would be to adjust handicaps to a narrower range of values according to the average speed at which a task is completed.

The point I wish to stress here is that handicapping can be used within a narrow range of ship performance with a probable error *a lot less* than the range of soaring errors any pilot will make on any day. Further study is required but the problem is not so serious as to make suspect a Nationals winner.

• *from a recognition point of view, we cut the number of contest "winners" in half.* It is a pity that gliding has had a "if you are not first, you get nothing" national award process. With the number of tasks the pilots compete in, one more day often changes the winner. If Nationals were flown in one Handicapped class the current trophies for Open, 15m, and Standard winners could instead be awarded to first, second, and third place to increase the current level of peer recognition.

• *if there was only one class, tasks would be watered down.* It is important that appropriate task setting is *not* compromised in a handicapped class under the current scoring formulas — tasks should be matched to the skills of the top half of the field flying a 1.0 handicapped sailplane. Although a few lower performance ships may be present, they should not affect the task setting. If some such accommodation were contemplated, then the rules would have to be changed to use the "scratch" distance PST tasks used in US Sports class competition for example (a pilot's minimum distance to fly is the scratch distance set for the day times the sailplane handicap).

In conclusion, there's always some resistance to change, but that shouldn't mask the fact that the system is in need of change anyway, given the current rather sickly state of our competitive environment in Canada. A single handicapped class would improve competition and more effectively select our best pilots. Perhaps the germ of acceptance in scoring the skills of a large field of *pilots* rather than two smaller groups of *equipment* lies in the competitive exhilaration one feels on getting a higher score on a task than say, Jörg Stieber — you would never say to yourself, "I beat an LS6 today" — you do say, "I beat Jörg!" •

SAC affairs

THE SAC "MEMBERSHIP METER"

Club (by Zone)	Membership (15 Sep) '90-'93 avg	'94 to date	%
Bluenose	42	38	90
Champlain/Appal.	54	50	93
Mont Valin	5	5	100
Montreal/Ariadne	103	97	94
Quebec	39	28	72
Outardes	27	30	111
Air Sailing	33	28	85
Base Borden	16	12	75
Beaver Valley	11	7	64
Bonnechere	10	6	60
COSA/Kawartha	50	30	60
Erin	29	35	121
Gatineau	88	85	97
Guelph	31	32	103
London	47	38	81
Rideau	20	12	60
Rideau Valley	44	32	73
SOSA	120	96	80
Toronto	18	20	111
Windsor	12	9	75
York	93	79	85
Gravelbourg	6	6	100
Prince Albert	7	10	143
Regina	35	28	80
Saskatoon	12	14	117
Swan Valley	6	6	100
Westman	6	7	117
Winnipeg	71	63	89
Cold Lake	28	38	136
Cu Nim	63	59	94
Edmonton	73	49	67
Grande Prairie	7	7	100
Alberni Valley	11	15	136
ASTRA	0	2	–
Bulkley Valley	16	8	50
Vancouver	104	99	95
Individual	8	8	100
Totals	**1345**	**1188**	**88**

TC REG CHANGES PROPOSED

SAC has received (at very short notice) from the Canadian Aviation Regulation Advisory Committee, for our perusal, certain changes in licensing that will affect all our clubs. They plan to meet 27–28 October, 1994 in Ottawa; all branches of aviation are invited to submit their presentation. Two subjects that will affect us are operating certificate requirements and towplane pilot experience requirements.

• *Operating Certificate* In conversation with a Transport Canada inspector of flight training schools in Ottawa, he informed me that TC was having trouble controlling standards with many ultra and micro light training schools. It was TC's intention, by issuing an operating certificate to all training schools that it could be removed at any time if schools didn't meet their approval. I believe that all the soaring clubs in Canada have operated quite well for the last 50 years without TC's interference, but will be dragged into the certification process unless we suggest a better way. One suggestion already received is that this operating certificate be issued to SAC and let SAC, through its Board, control standards which is basically what we do anyway.

• *Towplane Pilot Experience*
TC has added time and experience requirements for towpilots. Clubs might like to add or subtract comments about this subject.

The Board will meet 30 Sept, 1–2 Oct in Oakville, Ontario to discuss this as it is imperative that SAC make a presentation to Transport Canada. It is more than likely a presentation will be put together by FT&S and discussed and approved by the Board. A copy of any presentation will go to clubs before 27 October. TC meetings are open to the public and are an open forum; anyone can attend and express their opinions.

Ken Brewin, on behalf of SAC Board and the Flight Training & Safety committee

Coming Events

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

3-5 Mar 95 **SAC Fiftieth Anniversary AGM**, Ottawa, hosted by Gatineau Gliding Club. Contact: Beth McCollum (613) 692-2227. Any workshop ideas or suggestions will be passed to Glenn Lockhard.

18-29 June **'95 National Gliding Championships**, Pendleton, ON hosted by Gatineau Gliding Club, more info later.

16-25 Jul 95 **International Vintage Sailplane Meet**, Elmira, NY, USA. For info contact National Soaring Museum, Elmira, (607) 734-3128.

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Genesis 1

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program that works under Windows. With it, we could draw a wing, give it a formula that determines the centre of lift, tell it that the tip had to be 1/3 the width of the root, etc. and watch as the program figured out a geometry that worked! *Design View* can do stress analysis, given the right formulas, to determine how thick a part needs to be to handle the loads.

Optimizing the design With the geometry settled, we went back to the 3–D analysis, moving the wing up and down on the body, looking for the lowest drag. We also tried many elevator positions. It is now mounted at the top of the vertical tail, where it has more leverage and is smaller than when it was part of the wing.

Because lift decreases along the wing as you approach the tip, we modified our wing airfoil GEN74S to have lower drag, while producing the lower lift found near the wingtips, and to accommodate the ailerons that make an airplane turn. This raised the question of where 74S was to stop and its tip version should start. I divided the wing into 16 strips from the body out to the tip, producing 16 airfoils from our wing spreadsheet.

VSAERO showed us how much lift the wing was making at each strip. The i860 helped us find the drag of the corresponding airfoil at the centre of each strip. Then we created a spreadsheet to integrate the total wing drag strip by strip. I moved the airfoils around along the wing, and added a new higher lift version of 74S three feet out from the fuselage when I saw it would help, and repeated this six times. Eventually, we improved the wing's performance an additional 19%. The final design showed a significant advantage over the Discus.

With molds under construction, structural design began. After two people in one week had recommended ALGOR for finite element analysis, we decided to give it a try. ALGOR's program is a general design, analysis, and optimization environment which includes vibration, heat transfer, dynamic analysis, and 3–D modeling. ALGOR has many modules which support the FEA processors, making the program much easier to use. We used four of them: SuperDraw, SuperView, SuperSurf, and the Composite Stress processor. ALGOR's technical support has been superb.

Analyzing the model To put the wing shape in the computer, we used SuperDraw and SuperSurf. The wing consists of an I–beam spar and the skins. ALGOR makes drawing these easier by allowing us to combine separate models. We modeled the wing skin with SuperSurf to create accurate 3–D surfaces. Many programs do 3–D CAD, but cannot do true surfaces, and finding the intersection of the body and wing requires true surface modeling, for example. SuperSurf gets the curves that define the surfaces from SuperDraw, or you can import a drawing from another CAD system using the IGES file transfer convention.

We transferred the 3–D *Vellum* drawings of the wing from the Mac to an IBM disk, then imported it straight into SuperSurf. Ten mouse clicks later ALGOR had created the surfaces that represented the wing skin. Another ten mouse clicks "meshed" the surface with SuperSurf's automatic meshing option. Meshing the surface divides it into the many finite elements required.

We had to rebuild the model many times, but ALGOR made it easier. In the final model, the wing consists of many spanwise stations. The loads and the thickness of the spars reduce toward the wingtips. The final model of the skin is divided into 14 groups and 28 colours. With the geometry of the wing defined, the next step was to tell the program what materials we selected for the wing. We did this in the Composite Decoder, listing material properties by group number. Once again, ALGOR made it easier by featuring a library. Once the material is in the library, you can set up each layer with just its name and fibre orientation.

The program also lets you to impose a twisting load (moment) on the structure, to model things like ailerons deflected for turning the airplane. We calculated these moments in a spreadsheet, and effectively deflected the ailerons up and down in different load cases, to see how the wing structure bent.

ALGOR provides SuperView, which has many ways to observe the models and loads, including hidden line removal, light shading, and cut views. This lets the designer find any glaring mistakes, such as putting the pressures on the inside instead of the outside of the wing or the fibre directions being off 90 degrees. Finally, we had a meshed model. An hour and a half later, the stress processor was done. It produced several files and over 35 Mbytes of data. SuperView read the results, plotting the wing in both its deflected and undeflected shape. It also displayed multi–coloured pictures of the stresses in each element.

Program analyses said the wing should pass its structural test easily, and predicted less than one degree of twist at the wingtip. The only way to know for sure about a composite structure is to build it and break it. As a test, we changed the fibre orientation in the skins to one that I knew wouldn't work. ALGOR said the wing broke. That gave me more confidence in its answers.

Sometime soon, our glider will take to the air. The computer says we have a clear winner. Deep down inside, I think so too. •

✞ Klaus Holighaus

The Alps has claimed another victim. Klaus Holighaus, 54, perhaps Germany's most famous glider pilot, crashed near Rheinwaldhorn east of Aquija (Tessin) 10 August. There was sadness and confusion among soaring pilots worldwide when the news of Holighaus' fatal accident became known.

He had launched around noon from Samedan near St. Moritz and was attempting a long triangular flight to Lago Maggiore, then return via St. Gotthard. His last radio call came at 1830 over the Nufenen Pass. He said that he would not fly the planned course due to storms, and would return to Samedan. The weather deteriorated with cloud and rain, and there were no further transmissions. When Holighaus hadn't arrived late that evening, a search began. Eight military helicopters, and search and rescue pilots from Germany and Italy took part in the action. There were difficult weather conditions and the search had to be interrupted several times. The wreckage was found at the top of a high (2500m) ridge two days later. An autopsy did not reveal any medical cause for the accident.

The very successful pilot and designer of sailplanes from Kirchheim/Teck collected numerous titles and world records in his soaring career. He was three times European champion, six times German champion, and flew sixteen world records, some of which were multiplace records with one of his two sons, Tilo (26). Holighaus was a very experienced glider pilot who was able to master all kinds of weather. He was one of the best in the world. As sailplane designer Holighaus became especially well known worldwide with his Nimbus 4.

Holighaus studied at the Darmstadt Technical University which in the last 75 years always gave new impulse to aircraft development. A student in mechanical engineering and member of the Darmstadt Akaflieg, he was involved in the development of several sailplanes, among them the D36 which was the first of the modern high performance designs. (The design team included Holighaus, Fries, Waibel and Lemke, who today almost define the whole German sailplane manufacturing industry.) He became owner of Schempp–Hirth Sailplanes, and many of his designs: the Cirrus, Discus, Ventus and the Nimbus attained world fame. He gave new dimension to the sport with his "Super Orchids" (so called by European pilots), high performance long wingspan super–sailplanes.

Holighaus' passion for soaring was shared by his wife Brigitte who was for many years one of the best of Germany's women pilots, and his son Tilo who belongs to the best of the younger generation. His wife and sons have become the company managers, promising to lead Schempp–Hirth in Klaus' spirit.

compiled from German newspaper articles, Internet email, and a press release.

FAI badges

Walter Weir
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The following Badges and Badge legs were recorded in the Canadian Soaring Register during the period 28 June to 4 September 1994.

DIAMOND BADGE

83	David Mercer	Cold Lake

GOLD BADGE

268	Colin Campin	Vancouver

SILVER BADGE

847	Colin Campin	Vancouver
848	Ian Chaun	Vancouver

DIAMOND DISTANCE

Norman MacSween	Vancouver	503.4 km	DG–400	Invermere, BC
David Mercer	Cold Lake	517.5 km	RS–15	Cold Lake, AB

GOLD DISTANCE

Colin Campin	Vancouver	303.3 km	Grob Astir	Invermere, BC

SILVER DISTANCE

Colin Campin	Vancouver	55.2 km	Grob Astir	Invermere, BC
Ian Chaun	Vancouver	52.6 km	Grob 102	Hope, BC

SILVER ALTITUDE

Cameron Maclean	Erin	1100 m	1–26E	Grand Valley, ON

SILVER DURATION

Peter Vados	SOSA	5:39 h	1–26	Rockton, ON
Patrick Gamble	London	5:01 h	1–23G	Embro, ON

C BADGE

2425	Dirk Schmekel	Montreal	1:54 h	Astir CS	Hawkesbury, ON
2426	Donald Kuehn	COSA	1:28 h	2–33	Omemee, ON
2427	Matt Chislett	Winnipeg	1:44 h	2–33	Starbuck, MB
2428	Lindsay Masters	Gatineau	2:25 h	1–26	Pendleton, ON
2429	Jim Trevisan	Rideau Valley	1:40 h	1–26	Kars, ON
2430	Patrick Gamble	London	5:01 h	1–23G	Embro, ON
2431	Scott Russell	Cu Nim	1:03 h	Blanik L–13	Black Diamond, AB
2432	Cameron Maclean	Erin	1:04	1–26E	Grand Valley, ON

Charles Holst of Rideau Valley Soaring reports that he flew a Silver distance flight of 62 km in France on June 16. The claim was registered with and approved by the BGA.

Filleting the Austria

continued from page 5

and ran off to find a sheet of aluminum and a pair of tin snips. Later, down in the basement, I sculpted my Mark 1 design, aiming it to start just aft of the spar and spread out to about seven inches wide at the trailing edge. I allowed for a generous curl–back from the trailing edge, following that well–known Texan adage, "If some's good, more's better." The fillets looked like a man's tie cut up the middle from tip to knot.

Now for those bends. The bend, intended to smooth the fuselage to the wing, sent me seeking that perfect bending form (okay, okay, so I used the nearest jack post). Getting the aluminum sheet to bend two ways at once was another matter. Here I remembered the advice of old hand and charter Bluenose member, Dan Morrison, whom I once had the good fortune of watching "spoon" metal into a compound curve. Unfortunately, Dan succumbed to cancer over ten years ago, but his comments remained to guide me and allowed me to hammer out a passable job, or to phrase it as Dan often did about his own work, "That will look okay to a man running by with a bear after him."

Duct tape, or five–hundred–mph tape as it is called when used by flyers, fixed the fillets to the Austria and I was ready to try these epaulets. Now fettlers all dream of reporting magical transformations resulting from minimal work, and amazingly, the Austria was truly transformed.

Let's talk first about the pre–fillet days. We winch launch at Stanley, and on the wire, with its nose up in the air 50 degrees courtesy of a gear–mounted Tost hook (SHK mod), the Austria felt like it was balanced on the tip of a needle, giving this venerable pilot a vulnerable feeling. Off the wire, even with the new ventilation system, the air noise was above that of a modern glass slipper. Any speed less than 47 knots caused a light tail buffet, which got more noticeable as the speed decayed. When circling in rough thermals, speeds under 47 knots could result in a wing drop. Even in a good thermal, the achieved rate of climb seemed below that of a good pilot in another glider. Any roughness in interthermal air made the ship wander. The Austria defined the term "all flying tail" for me (it means you fly them all the time).

The rough air of the margins of a thermal vigorously rattled the tail surfaces. I remember a pilot who likened thermals to bars — some were good, some nasty, all were fun. If such is so, then the bouncers of the thermal bars that I visited all tossed me out as if I had ordered one updraft beyond my cash resources, while the bouncer of the next thermal shook me by the heels until enough change rolled out to let me in.

Okay, now grab a draft and humour me whilst I do a little après–soar, après–fettle bragging. With the fillets in place, the Austria motored up the launch with a solidarity I had not felt since I flew a Skylark 4. Off the wire, the sound level reminded me of the Astir 102. The Austria is still by no means silent, but the noise was a soft whisper of its old rambunctious self.

The first buffeting quiver now appears at 43 knots, instead of 47 knots. The minimum sink speed seems to be reduced to 45 knots from about 49 before. I cannot in all fairness report any appreciable difference in the stall speed (around 35–37 knots), partly because of the fluttery nature of the ASI in the stall speed range (our ASI needs a new centering spring, and seems to overread about five knots in the 40–55 knot range). At any rate, fillets are only fillets, not lifting surfaces.

C–FPHH feels simply buoyant in the climb now. I finally got the fillets ready in August, but August hazed over, so I've only flown for a few soaring days with fillets affixed. In Nova Scotia, soaring days are so different one from another that subjective reports are fairly treated with scepticism. I didn't get to compare climb rates with other gliders often enough, as cloudstreets let me vanish off into distant regions exploring my "new" machine. But the Austria feels as if it wants to reach for the sky, whereas before it had to be coaxed into playing the climbing game. Dashing down the cloudstreets, the Austria displays a never–before–beheld stability. It lets me take out a map, unfold it, refold, lose my place, find my reading glasses, peer about to finally find where I was going, and take a drink, all without dropping a wing, a nose, or five hundred feet. Just as important, the thermals now treat me with the kind of respect afforded the rich and famous. They waft me up in cushiony comfort; they bid me adieu down carpeted stairs.

No doubt my enthusiasm makes any statement suspicious, but PHH seems to glide further at high speed now, at least I can do long glides at 75–90 knots with what seems to be less loss of altitude. One thing is sure — it flies fast with a lot less fuss and rattle.

As I bowed the wings in the late afternoon sun one Saturday, lining up final for runway 27, the presumptuous thought struck me that these amazingly simple fillets made the Austria the sailplane its designers hoped it would be. Talking over the change, Chris Purcell suggested that the air in the wing/fuselage junction area must have been turbulent at all speeds. The fillets smoothed the air, improving the performance just as Peter Masak promised. Chris noted that the fillets must deliver smoother air to the tail surfaces, not only making the Austria more stable, but also quieting the air noise at the tail/fuselage junction.

Winter now flies base leg. If any of you ponder transforming your magic carpet, get yourself a copy of Peter Masak's book. If any Austria owner wants to talk fillets, I'm at (902) 678–9857. •

Trading Post

SINGLE SEAT

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

1–23 Std, CF–ZBR, 1951 ser#16. Full overhaul, new paint, regular and sport canopies, encl trailer. Call Don Sutherland at (604) 325-5016 and leave a message.

Tern, 1971 wood homebuilt, 30:1 performance, comes with encl metal trailer, chute, and radio. $5000 or best offer. Chris Gadsby (403) 283-2411.

Monerai, C–FEUQ, vg cond, basic instruments, audio vario, netto, panel mount TR–720 radio, encl steel trailer. $7200. Struan Vaughan (403) 362-5837.

Monerai, C–GJUT, excellent condition, low hours, basic instruments with audio vario, encl metal trailer, wing stands. $5700 obo. Chute available. David Ellis (705) 687-2365 (H), 645-5272 (W).

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

HP–14, 450 h, good condition, one piece canopy, filled wings, TE vario, new Imron, chute, wood trailer. $US10,000. Keith Pritchard (519) 570-9437.

Zugvogel IIIB, 17m, almost 40/1, good condition, radio, instruments, barograph, trailer. Helmut Wieland (613) 548-7564 (H), 541-6606 (W).

SH–1 Austria, refurbished in '91, trailer, chute, wing & tail covers, final glide calc. Bob Kurzwernhart, (519) 658-6334.

RS–15, C–GPHZ, 500 h, Schreder trailer, chute, O_2, basic instruments with audio vario. Excellent cond, Diamond distance performer. $15,500. Dave Mercer (403) 639-2610.

KW–45, CF–SNZ, 500h, homebuilt glass fuselage with Open Cirrus wings, tinted canopy, radio, O_2, Ilec vario system, encl alum trailer. $17,000. Fred Wollrad (403) 479-2886 or Harold (403) 474-0139.

ASW–15, C–FKGB, 960h, Ball & PZL varios, constant flow O_2 system, fuse & tail refinished in '91, ballast bags (not installed), Schleicher soft top trailer. Asking $US15,800 with partway delivery possible. Kelly Allardyce (204) 661-0887 (H), 987-6390 (W).

Jantar Std 2, C–GMSG, 780 h, good cond, never damaged, all ADs. Schuemann & Ball varios, radio, O_2, chute, metal encl trailer. $US21,000 obo. Will deliver in western NA. Fred Guest (403) 289-8820 or Al Poldaas (403) 271-8929 (H), 287-0144 (W).

PIK–20EII, C–FIGW, in excellent condition, 465h, engine 135h, Varicalc vario/computer, Becker radio, Bohli, Security 150, one person rigging system, factory trailer, mainwheel dolly, expensive spares. $US42,000. Len Gelfand (613) 749-5101.

Nimbus II, C-GAJM, 860 h. Excellent cond, super performer, loves to be taken X–country. Factory trailer, full panel incl radio, 2 varios, Cambridge computer, mylar seals, wing and fuselage covers. Going abroad and must sell. $35,000 Mike Apps (403) 436-9003 (H), 435-7305 (W).

MISCELLANEOUS

For sale, unused odd–sized 4.95" x 3.5" **glider tire** (fits Skylark 4), static conducting, 6 ply, cost me £27. **Peravia barograph**, excellent condition, the ultimate in barograph design – no ink, no smoke, punches holes in waxed paper every 4 seconds. Max Harris, (519) 842-7481. Make me an offer.

Wanted – your Jantar 2 or ASW–19. Call Tracy Wark (416) 492-7299 or 565-1930.

Wanted – trailer for L-13. Call Julien at (604) 435-4239 (H), 432-5352 (W).

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

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Wanted – wing or wings for Grob Astir CS. Call Lee at (905) 840-2932 (H), evenings only.

Wanted – Grob single, Std Cirrus, ASW–19. Must be in excellent cond; trailer, instruments, chute don't matter. Cash waiting. Richard Longhurst (416) 391-3100 ext 250, fax (416) 391-2748.

New gliding school opening – Planning for spring '95 at First Nations Air Service Tyendinaga (Mohawk) airport, Deseronto, ON. We are looking for an L–13 or 2–33, and 1–26 or 1–34, preferably with trailers. Please call Michael Skubicky, 1-800-263-4220 or (613) 396-3100, fax (613) 396-3761.

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

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

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

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