free flight · vol libre

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Liaison

I was really impressed by last month's issue of *free flight*. The use of colour sure brightens things up. The cover was a reproduction of a mini-poster produced and published by SAC. Its purpose is to help you in your club's recruting efforts. This size of poster was developed by our friends from the Montreal Soaring Council. They found that the small size allowed them in many venues that would not allow a full size one. Therefore it stayed up longer. Also we wanted a piece that would allow clubs to customize their own message rapidly and at low cost. Thus it had to be acceptable to photocopiers. At a dime a piece it is a bargain. We are on standby to fill your order NOW.

Another project on the way is the rejuvenation of many of our publications. The SAC Logbook has been given a contemporary look and a more practical cover. The Student Progress Booklet has been updated to match the current training syllabus. Next in line will be the Air Instruction Notes. The current version still follows the old training manual. Then the instruction manual, SOAR, will receive an update for its second edition. The current version is already on its second printing.

The March 1998 issue of SOARING had a fairly significant Canadian content. A very substantial article by Tillman Steckner described a problem familiar to many of us — weak brakes. I plan to use the recipe on my Diamant. In its "Letters to the Editor", I found a note from SAC's Alberta zone director David McAsey. Our southern neighbours rarely submit articles to *free flight*.

For those who do not think that the lack of safety has a price, you will have taken notice of the significant increase of premiums for two-seaters. I hope and pray that every club in the country has cranked their safety program up a notch or two.

Have you said thank you recently? Every time we have the privilege to be airborne in our plastic bullets and have again the thrill of soaring, it is because many of our friends have volunteered their time and talent to make it possible for us to be airborne. So to you: the instructor, the towpilot, the bookkeeper, the person who orders avgas, who pays the property taxes, keeps the algae out of the pool — from all of us: students, and low and high time pilots, *THANK YOU*.

La migration des Outardes. Voici un groupe qui n'a pas froid aux yeux ... Après plus d'une décennie à Saint Esprit, précédé d'un assez longue période au nord de Saint Gabriel de Brandon, nos amis ont conclu une entente très créative avec les opérateurs de l'aéroport de Bromont qui leur ont construit, incroyable mais vrai, une piste en gazon ... En plus de cette relocalisation de plus de 150 kilomètres, ils viennent de se porter acquéreur d'un rutilant L-33 Solo. Bravo les gars et que les contreforts des Appalaches vous apportent un avenir prometteur.

Au moment de lire ceci, le cours d'instructeur, donné par notre ami Marc Lussier, du comité Formation et Sécurité, sera probablement de l'histoire ancienne. Le club de Québec sera l'hôte de cette formation car la majorité des candidats viennent de ce club. Nos amis de la vieille capitale ont un besoin d'instructeurs pour continuer la formation des nouveaux membres de 1997 et ceux qui se joindront à eux cette année. Denis Pépin et son équipe comptent rééditer en 98 leurs exploits de 97 au chapitre du recrutement. J'émets le vœu pieux que leur exemple stimule les autres clubs du Québec et du Canada tout entier. L'an dernier, Gatineau Gliding et le CVV Québec ont été nos étoiles.

On était un bon nombre de Québecois au "ridge" cette année. Peter, Alex et Bernie de MSC ainsi qu'André, Jean, Réjean de Champlain se sont joints à moi dans cette célébration annuelle chez Tom Knauff. Les conditions ont été sublimés, me permettant de faire un 300 km le vendredi, et un 500 kilomètre le samedi. N'étant pas un pilote de super talent, je dois donc conclure que les conditions ont fait plus que leur part et que tout pilote d'expérience moyenne peut faire l'expérience exaltante de ce type de vol. Alors, si cela vous intéresse, bloquez la dernière semaine complète d'avril 99.

Pierre Pepin president

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Le journal de l'Association Canadienne de Vol à Voile

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a facelift for *free flight*

Glider pilot's eyes are getting older by a year per year, so as well as having Jörg Stieber write about 'how to look' in this issue, I decided to change the layout and typeface of the magazine to both add a little additional style and to make the articles easier to read. The new font is Myriad and it's set slightly larger and with a little more spacing than the previous font. The article layout is now in two columns with a wide outside margin space in which to flow photos and other art-work. Let me know what you think of this change. editor

Cover

The East Kootenay Soaring Club's 2-33 soars in front of a towering cu high above Mt. Swansea near Invermere, BC.
photo: Renee Machat

Letters & Opinions

THE DOWNSIDE OF UPGRADING

Our president, who for years has been urging us to get more participants into the hobby, was pleased that one of the clubs he visited was getting a high performance glider (*free flight 2/98, p2*). If it's a two-seater, he shouldn't be impressed. Clubs that buy beautiful expensive two-seaters rather than less costly plain-lookers are diverting money from other uses that would be much more effective in increasing the popularity of flying gliders. Here are a few examples of other things that could be done:

Let's imagine a club intending to spend $70,000 for a glass two-seater. Instead, it could buy three old ones and have lots of money left over for additional maintenance costs. This would permit three times as many flights, would reduce the frustration of waiting around all day for a ride, and thus would appeal to the vast majority of potential participants in gliding who don't have a whole day to spend at the gliderport.

It's no secret that in the competition for a person's time, gliding doesn't rate. Reducing the time a person must spend would attract far more people to gliding than a gorgeous, high performance two-seater would.

Another alternative use for the money would be to invest it and use the proceeds to promote the hobby. Even today, a conservative investment yields around 5% annually. This would provide $3500 that could be used to lower the cost of gliding at the club.

It could also provide scholarships to students or others of limited finances. Or it could be used to reduce annual membership fees or glider rental or launch costs. In my club, with close to $500 for the combined annual club and Soaring Association of Canada (SAC) fee, we could provide seven free memberships — or 14 half price ones. We might even spend some money to find out what we can do to bring back many who hold a glider pilot licence but no longer fly.

Far more benefit to gliding would result from these actions, or combinations of them, than from a modern two-seater. I'm sure there are many other ideas among those who place high priority on increasing participation in gliding.

There are many who are active in gliding whose main motivation is not increasing its popularity. They will invent excuses (rationalization) for opposing anything that isn't glamorous. We haven't got the launch capacity. We haven't enough instructors. Greatly increased membership would place an unbearable load on the few who do most of the club work. It would be unsafe because it would increase traffic too much. We don't have the storage space, etc, etc.

Fancy club two-seaters are for people hooked on gliding, not for the market we don't have. Their main function is showing off to others, ego tripping. As Rudi Salter (*free flight 5/97, p5*) noted about the Australian gliding movement, the Canadian one is also "constantly preaching to and catering for the converted". It's unlikely that anyone ever rejected our hobby because they had a ride in an old Blanik or K13 or 2-33. But I'm sure that a lot of people failed to continue because they couldn't afford a whole day to get one or two rides ... or couldn't afford the cost.

It's hard to avoid the conclusion that upgrading is downgrading.

Len Gelfand, Gatineau Gliding Club

The SOARING ASSOCIATION of CANADA

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

free flight is the official journal of SAC.

Material published in *free flight* is contributed by individuals or clubs for the enjoyment of Canadian soaring enthusiasts. The accuracy of the material is the responsibility of the contributor. No payment is offered for submitted material. All individuals and clubs are invited to contribute articles, reports, club activities, and photos of soaring interest. An e-mail in any common word processing format is welcome (preferably as a text file), or send a fax. All material is subject to editing to the space requirements and the quality standards of the magazine.

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

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

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

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L'ASSOCIATION CANADIENNE DE VOL À VOILE

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

vol libre est le journal officiel de l'ACVV.

Les articles publiés dans vol libre proviennent d'individus ou de groupes de vélivoles bienveillants. Leur contenu n'engage que leurs auteurs. Aucune rémunération n'est versée pour ces articles. Tous sont invités à participer à la réalisation du magazine, soit par des reportages, des échanges d'idées, des nouvelles des clubs, des photos pertinentes, etc. L'idéal est de soumettre ces articles par courrier électronique, bien que d'autres moyens soient acceptés. Ils seront publiés selon l'espace disponible, leur intérêt et leur respect des normes de qualité du magazine.

Des photos en couleurs ou noir et blanc seront appréciées, mais s'il vous plaît, pas de négatifs ni de diapositives.

vol libre sert aussi de forum et on y publiera les lettres des lecteurs selon l'espace disponible. Leur contenu ne saurait engager la responsabilité du magazine, ni celle de l'Association. Toute personne qui désire faire des représentations sur un sujet précis auprès de l'ACVV devra s'adresser au directeur régional, dont le nom et l'adresse sont publiés dans le magazine.

Les articles de vol libre peuvent être reproduits librement, mais le nom du magazine et celui de l'auteur doivent être mentionnés.

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The art of flying is to throw yourself at the ground and miss. Douglas Adams

A "flight test" in ground effect

Mike Swendsen, "BH"

Saturday, May 16, Cu Nim Gliding Club. The day looked great, beautiful blue skies, the lift should be there, it was going to be a good day for flying. There was a cold front that seemed stalled just to the north and there were clouds forming all around the field. Cloud streets were forming all along the mountains west and even out into the prairies to the east. This was a day when you could go places!

This was the first flight of the year in my own glider, an HP-16. My partner had had the glider out for a week in Golden and had a lot of good flying. But I hadn't flown anything but the Blaniks for the last few weekends.

I rigged the ship and pushed it out on line. One plane was ahead of me and gave me time to do a final positive control check and settle my mind on the flight ahead. I was just going to fly and get used to the aircraft again. Everything looked good, the towplane was ready and off we went. Upon release, the lift was a little elusive to start with, but finally I found it and the day was on. I flew around the area, to High River, down to Longview and then over to the foothills, where I could climb over 8000 feet, then up to 10,000, and south towards Chain Lakes. Everything was going well, I had been up for over three hours and was getting comfortable again. I decided to test the glide back to the field and headed back. I heard some of the more experienced pilots radio that they were headed in also, and I decided to wait until they had landed before heading for the circuit.

I was high so I pulled on some flaps and started descending. I got to the IP at about 800 feet and proceeded downwind. I was in lift almost all the way while adding more flap and running just a little fast to keep my altitude down, turned base at 700 and flew a long base leg with enough flap on to keep descending, and at about 400 I turned final. I was still a little high and cranked on my flaps to full to get down on my aiming point.

That's when the unthinkable happened.

As I was putting the nose of the ship down and cranking on the flaps I heard a loud bang and the flap crank handle came off in my hand! By the time I realized what had happened my speed was over 90 mph and I was over the threshold of the runway, still high.

Since we have a 2800 foot runway and I had no idea of the status of my flaps, I decided that I would get down on the field and use my wheel brake to slow down. As I tried to push the nose of the aircraft down, the only thing that seemed to happen was that the tail lifted — I couldn't get down.

I was truly in ground effect and not losing much speed at all. As the end of the runway and its fence rapidly approached, I decided to land in the next field, and I hopped up over the fence and was preparing to settle down into that pasture. But I still couldn't get down. My speed was still fairly high and the far side of this field was rapidly approaching. At the boundary were two more barbed wire fences guarding a road and a telephone line. I had little choice but to stay in ground effect and go over the fence and under the wires.

Finally my speed had bled off enough to get my wheel on the ground and use the brake as I had originally planned.

I had gone over a mile and a quarter in ground effect! I had no idea that I would or could go that far. I don't know if the choice to land straight ahead was the best that I had, but it worked this time. Luckily I had almost two miles of landable field in front of me. If I had been landing in any other direction I couldn't have made that decision. I would have been forced to choose to go up and try another direction or try to sideslip to bleed of my speed and altitude. I radioed back to the field and let everyone who had seen me on the ground and in the air know that everything was fine, and I started to walk back to get help to retrieve my glider. This had been a memorable first outlanding! ⇨ **p20**

All you need to know about spins but were afraid to ask

Ian Oldaker
Chairman, Flight Training & Safety Committee

Spinning is the subject of much discussion among pilots. It is a challenge to do well and to be able to recover, pointing in a desired direction. It is an exciting maneuver to do, and it is enjoyed by many. The purpose of teaching it is to enable pilots to recognize the situations that lead to a spin, and to recover from it should they inadvertently start one. However, many pilots are afraid of not only the spin but of the stall as well! Surely this reduces their enjoyment of flying, and of course puts them at risk in any situation where an inadvertent stall could occur.

This apprehension about stalling and especially about spinning may be because there are some gliders, including two-seaters, that may drop a wing with little or no warning, particularly when the pilot is busy with thermalling. Under these conditions the speed is higher than in wings-level flight, the changes in airflow noise are not so obvious, and the controls remain effective up to the stall, after which the glider will not respond to the controls to "lift" the nose or to lift the dropping wing. Gliders such as the ASK-13, IS-28 and IS-29 Larks, the Blanik, the Puchacz and most modern high performance sailplanes will spin readily and can catch the pilot unaware! This may come from an inadequate understanding of the subject or may even be the result of an instructor being reluctant to teach spinning to the pilot in the first place. Students and even more experienced pilots may then not be in sufficient practice to react promptly and correctly to a situation involving a wing drop while thermaling, which can lead to the typical stall/spin situation.

Good, efficient flying of thermals demands that we fly close to the stall in well-controlled circles so anyone who is not relaxed about this will not make a good soaring pilot! We should not forget the final turn in the circuit pattern when the pilot's workload is high and distraction could get in the way of allowing the pilot to recognize an impending stall. In this case the pilot's response is usually to pull back further on the stick to try and raise the nose, making the situation even worse. Now the problem is that there is insufficient height to effect a recovery before hitting the ground. It is very important to be able to recognize the symptoms of the stall and particularly the situation when close to the ground. This will help to make pilots safe, and will allow them to heed the warnings that they need to prevent the stall in the first place.

It is self-evident that to fly confidently and safely we should all be experienced at spinning. Obviously it is undesirable for any pilot to be flying gliders with little spin experience, especially as there are many gliders that will spin. We all need to be able to recognize the situations that lead to stalls and spins, and to be able to react correctly and promptly to make a quick recovery. This article tries to remove any misunderstandings about the spin. If you are uneasy about the spin, you should seek the help of an instructor who is interested and competent in the subject. Go flying with him or her at the first chance to review stalls, incipient spins and of course full spins. Techniques to do stalls and spins are suggested here and are based on our SAC flying training manual, *SOAR and Learn to Fly Gliders*.

What is a stall?

A stall occurs when the normally smooth airflow over the wings breaks up, becomes very turbulent, and the flow becomes detached from the top of the wings. This occurs when the angle at which the airflow meets the wing exceeds 15 to 20 degrees. This causes a serious loss of lift and produces an increase in drag. The wing is stalled. The glider now loses height rapidly until the incident airflow again meets the wing at a smaller angle, so that the wing becomes unstalled and can again produce the required amount of lift. At the stall there is often a distinct nose-down pitching movement, due in part to the centre of the remaining lift of the wings moving aft, and from the lift from the tailplane. The tailplane doesn't stall because of the downwash effect from the main wings and its lower angle of incidence. The nose pitching down assists the glider to unstall the wings. Note that almost all sailplanes will become unstalled if they are permitted to "fly again" on their own, however the pilot must not try to prevent the nose from dropping by moving the stick further back.

The symptoms of the approach to a stall in straight flight or in a gentle turn are many and should be well remembered — the stick position is further back than normal, leading to:

- Low airspeed
- Absence of or reducing airflow noise
- Ineffectiveness of the controls
- Sloppy aileron control
- The stick will not raise the nose
- Nose may or may not be "higher" than normal
- Buffeting of the glider and/or controls.

At the stall the nose drops in spite of the pilot keeping the stick hard back, and one wing may drop first, again in spite of attempts to keep the wings level with the ailerons. There is a rapid loss of height and the airspeed will build up again. The recovery from the stall must be assisted by the pilot, however, because some gliders will continue to descend in a very nose down stall until the back pressure on the stick is reduced to allow the glider to fly again.

At low speeds the glider will be flying at a high angle of attack and the nose may or may not be higher than normal. For example with the dive brakes open there is extra drag and the attitude could be close to normal or indeed slightly nose down! During an approach in high winds the airspeed could drop suddenly because of rapid changes in the wind speed (because of the turbulence and strong wind gradient). Under these conditions the angle of attack is again high and, when the wind gradi-

ent or shear is encountered, an even higher angle of attack could occur, leading to a stall.

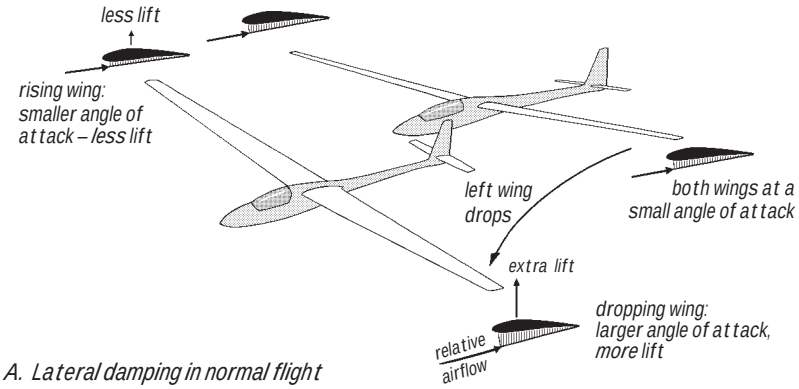
A high speed stall can occur in a steep turn or when pulling out of a dive. In these cases it is called an *accelerated* stall. At an angle of bank of 60° the 'g' load is twice normal for example, meaning that the wings have to develop twice the lift to maintain the glider in an accurate turn at this angle. The corresponding stall speed is increased over that for straight and level flight by a factor of $\sqrt{2}$. At the stall the turn cannot be tightened any more by further backward movements of the stick, and of course the nose can't be raised. To actually stall the glider under these conditions the angle of attack has to be increased as before; in fact, the elevator has to be moved fairly vigorously to achieve the stall. The symptoms are as above but now include the extra 'g' loads and only slight or no buffeting. The stick will be more fully toward the rearmost position and the pilot will definitely be pulling back on it. Note that the nose is not necessarily higher than normal. At the stall there may or may not be a definite buffet, the elevator is not effective in 'lifting' the nose any more, the nose will drop, and there will be a rapid loss of height. At the same time the inner or lower wing will tend to drop first and this is known as an incipient spin. Also note that the ailerons will not be effective in rolling the glider, the ailerons may 'flick' the stick suddenly to one side, and the feel will be different.

And what is a spin?

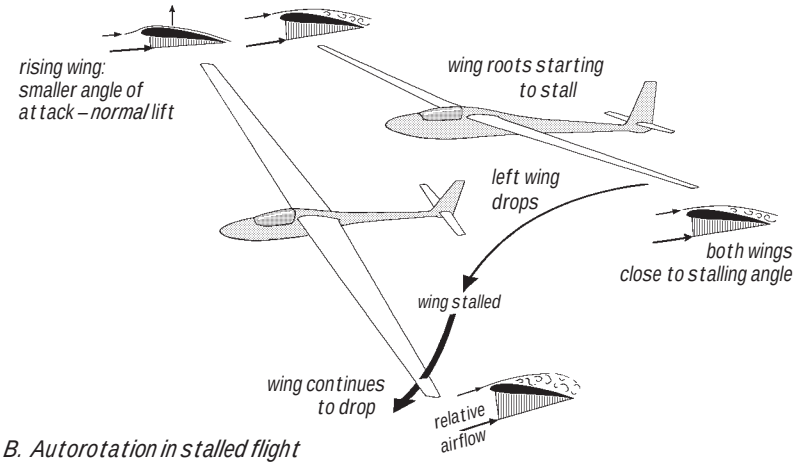
A spin is a condition of stalled flight during which the glider makes a spiraling descent, losing height rapidly. The glider rotates about the three axes simultaneously, so it rolls, yaws and pitches at the same time while descending. Sounds alarming doesn't it! However, once it is understood, the spin becomes an interesting and an enjoyable maneuver to practice. How do we understand a spin, and what is the relationship to the stall, why all the preliminaries about stalling? Read on!

An aircraft in normal flight resists any tendency for turbulence to disturb it. When one wing tends to roll downward, the angle of attack is thus increased and the wing develops more lift; at the same time the high wing produces less lift and therefore it tends to stop rising. This stabilizing effect is known as lateral damping and it is a very strong effect, particularly in gliders with long wings (see Figure A). It is present so long as the glider is rolling, and disappears as soon as the rolling ceases. The effect won't level the wings however, as it is a damping effect only. You can see this strong effect when you try to roll the glider; it will not roll rapidly due to the lateral damping effect of its wings.

Once stalled however, an aircraft becomes unstable, as the lateral damping effect is lost; if one wing starts to drop, it will tend to drop further. This is because the angle of attack (already more than the stall angle) is increased even further by the downward motion, the wing stalls more completely and it tends to drop even faster. Meanwhile the other wing which is rising has a smaller angle of attack, so it produces less drag and some lift. The net effect is to allow the glider to roll more toward the lower wing. The stalled glider is, therefore, laterally unstable and undamped. If one wing drops in a stall, the glider continues to roll. So long as the glider remains stalled, this roll is uncontrollable. This is known



A. Lateral damping in normal flight



B. Autorotation in stalled flight

illustration from *Understanding Gliding* by Derek Piggott

as autorotation and it is the cause of spinning (see Figure B). The autorotation combines now with the increased drag on the down-going wing and the reduced drag on the upper wing to produce a strong yawing motion toward the lower wing. At the same time the nose pitches down and the glider goes into a spin.

It is important to understand that a glider will only be able to enter a spin when it is fully stalled. Once unstalled, lateral damping will be regained and the glider will immediately stop rotating. The glider is again controllable. This means that if one wing starts to drop when the glider is approaching a stall, you should immediately lower the nose to reduce the angle of attack, and you will instantly regain lateral damping and hence control. Take this one step further to the incipient stage of the spin when the glider is beginning to autorotate and yaw, and the same recovery technique applies — unstall the wings by "lowering the nose", lateral damping will be regained, and the rolling stops immediately. Now the wings can be levelled and the glider returned to level flight normally. This is the accepted method of recovery from any stall including a wing drop at the stall, as well as to recover from an incipient spin. Remember, therefore, that the recovery from any stall is the same, and it involves unstalling the wings, bringing the wings level and returning the glider to a normal gliding angle.

The rudder is the primary control that is used to start the recovery from the full spin (this is fully explained later) and it can be used here effectively too. However, it must be used carefully and only when the wings are unstalled, otherwise the glider may well enter a spin in the other

direction! To assist the recovery from a wing-drop stall, use some opposite rudder, in the sense that you will use the secondary effect of the rudder to lift the down-going wing. Only use this effect when you are already also lowering the nose by relaxing the back pressure on the stick to unstall the wings. Hence the recommended recovery from the incipient spin and the wing-drop stall is to unstall the wings as quickly as possible and to use rudder only sufficiently to maintain good coordination. This recovery technique gives the smallest height loss.

General considerations

The position of the centre of gravity (CG) of the aircraft has an important effect on the spinning characteristics. Most gliders will refuse to spin with the CG at the forward limit and they will spin readily if the CG is close to the aft limit. Some gliders will spin quite differently with the CG at the aft limit, though all gliders with a certificate of airworthiness will recover from such a spin. In fact it is a requirement of the Joint Airworthiness Requirements (JAR-22) that they will recover readily when the pilot uses the "standard" recovery procedure. All modern gliders are type certified to these requirements.

If the centre of gravity is toward the aft limit, the glider will be reluctant to recover, and although the glider is designed to do so eventually, it can be alarming to the pilot not used to a rear CG position! With the CG close to the aft limit, a spin can be stopped by using the standard recovery sequence. The recovery may take longer than normal, however, and unusual forces may be needed to move the controls. The above dictates that you *must* know the location of the CG at all times, and that it is well inside the limits defined in the flight manual (pilot and ballast weights as defined on the cockpit placard). If it is likely to be close to the aft location, the glider will be sensitive in pitch even at normal speeds, so it is advisable to carry additional ballast. This is a very important consideration for lightweight pilots, who may at the same time be shorter than average. You will need to carefully consider your seating position to help keep the CG within the defined limits.

Typically, inadvertent spins can occur in two situations. The first is while thermalling when usually there is adequate height for recovery. The second is during the final turn onto the approach to a landing. No spare height exists here! The first arises because the pilot is trying to hold a turn at the normal low thermalling speed, is concentrating on climbing and allows the speed to fall close to or below the stall speed. A bit of turbulence can then stall the glider. The second case can be dangerous due to the low height; it can occur during a slow final turn when the pilot is otherwise preoccupied with getting onto the field. At such a time the pilot is perhaps trying to stretch the glide because the circuit itself was started too low. If you remember these two situations, you will be able to avoid them. This is the first line of defence, and is a case of prevention being better than the cure.

Recognizing the onset of a spin early is very necessary so that you can prevent a full spin developing. What we are aiming for is to take action early, automatically and instinctively. Knowing how the glider reacts at various stages of a spin will increase your confidence to be able to handle any situation. Better still — avoid the low and slow final turn!

Incipient spins and recovery

The incipient spin is so called because it has the potential to develop into a full spin. This can be avoided, as we have seen, if the glider is recovered quickly from this condition. As the glider is slowed down and stalls, one wing can stall first. This makes the glider roll toward the dropping wing. If the wings are not immediately unstalled, the glider will start to auto-rotate. Next the glider will start to yaw, the nose will go down sharply; this is called the incipient spin.

Before you start this exercise, make sure the location of the CG is within the cockpit placard limits, and climb to an adequate height. Then carry out a careful CALL check:

***C**ockpit*	No loose articles, straps tight, canopy locked and window closed.
***A**ltitude*	Must be sufficient to recover above specified minimum.
***L**ocation*	Not over the airfield, farm buildings or town.
***L**ookout*	Make sure no other aircraft are around by doing clearing S turns.

To try an incipient spin and recovery, first start a gentle turn and then slowly decrease speed. Notice that the attitude of the glider will appear to be normal, the slight "raising" of the nose to slow down will be almost imperceptible. The glider may not exhibit the prestall warnings that you learned in the stall exercise. As it slows, it will tend to increase its angle of bank. The decreasing speed and the shallow angle of bank that tends to increase, the quieter airflow noise and the gradual moving of the stick toward the back are the symptoms of the approach to a spin. Notice again that this is difficult to "see" as the glider's attitude appears quite normal. This is more of a problem close to the ground when the pilot's attention will likely be on trying to complete a final turn and is therefore not concentrating on the decreasing speed.

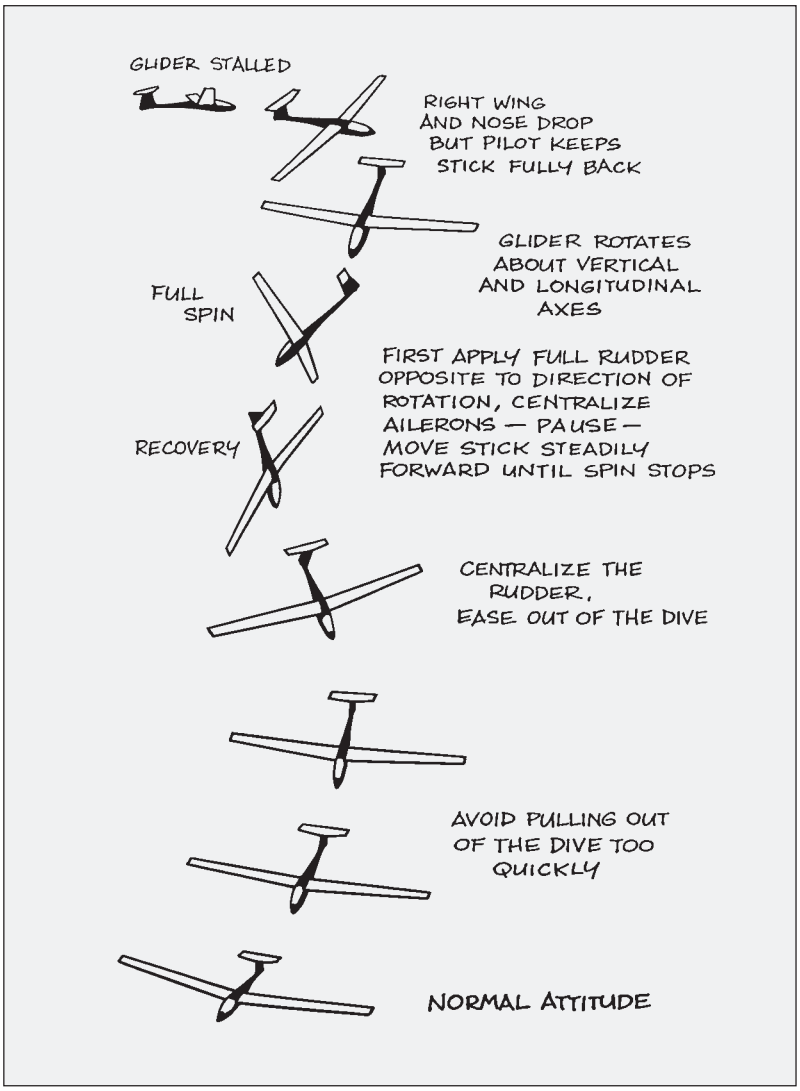
Recovery from the incipient spin

At the stall, the lower wing will go down more rapidly and of course the glider will roll more quickly; the glider will begin to autorotate. At the same time there may be sufficient extra drag on the lower wing to start the yaw toward that wing. A full spin will develop from this unless recovery is started immediately. To recover from this wing drop, or incipient spin, quickly lower the nose to reduce the angle of attack and unstall the wings. Having unstalled the wings, lateral damping returns and autorotation stops immediately because the lift is restored and the glider will now begin to pick up speed. Having increased speed sufficiently, return to level flight using the stick and rudder normally. Again notice this is the same basic recovery technique as for a wing drop at a normal, wings level stall.

Don't attempt to raise the down-going wing with ailerons only, you will only increase the angle of attack of that end of the wing, which may well deepen the stall, and the wing will drop faster. This is a very natural thing to do of course, and may well happen with an inadvertent stall and incipient spin, when you will not be expecting the glider to stall in the first place! If no recovery

actions are taken and the stick is held back in an attempt to "keep the nose up", the maneuver will likely develop into a full spin. Most sailplanes will spin for only a turn or two and then become unstalled. The speed will increase quickly, following which the pilot may find him or herself in a spiral dive in which the speed and 'g' load build rapidly. The recovery here is to relax the pressure on the stick to unload the wings and to return to level flight normally.

Notice that the incipient spin is not a specific point in the entry to a spin, but is the sequence of the wing drop, the developing autorotation and the ensuing yaw toward the lower wing. This all occurs before the glider develops a full spin. The incipient spin can be stopped at any point using the above technique; recovering as early as possible to lose a minimum of height is the name of the game. Remember — the worst point to start a spin is during the final turn before landing, so learn to recognize the situation that can be produced from a slow and shallow turn, low down. From now on avoid making low and slow final turns whenever you fly. Remember you have no spare height!



Full spin and recovery

General

Before any spin maneuvers are to be practiced, check that the CG is in the right range, and is if possible reasonably ahead of the rear limit. If ballast is to be carried make sure it is correctly fastened and that it cannot come loose in flight. Proper parachutes should be worn (yes, suitable ones *are* available for Blaniks). Turbulence at the time of the flight may preclude full spin training, so consider this as well.

If your club does not have a glider that can spin readily (some two-seaters are indeed reluctant to spin), the club will likely use a higher performance glider for full spin training. Use the time well and ask for extra flights to cover the spin if at first you feel uncomfortable with your recoveries. To become a fully competent pilot, it is important to become proficient at spin recognition and recovery; extra time spent now is well worth it.

It is recommended that you start a spin no lower than 3000 feet above ground to allow sufficient altitude for adequate height after recovery. Go through the CALL check thoroughly before the exercise, and repeat the check if doing several entries and recoveries in a row. Practice to recover on a known heading; this will give you an added challenge, besides spinning is an enjoyable exercise when done well. Enjoy!

Full spin recovery

An inadvertent spin is most likely to develop from a slow turn and not from straight and level flight. So start a slow and shallow-banked turn. This will allow a full spin to develop in most two-seaters and will reproduce the spin that can occur from the too-slow final turn. This turn, incidentally, can often be badly coordinated as the pilot may be using too much rudder in an attempt to tighten the turn. If the glider is flying slowly at the same time a spin can rapidly develop as the wing drop is "helped" in this situation by the wind gradient. Remember the lower wing is in the slower moving airflow over the ground, hence it will be flying more slowly than the upper wing. The glider will be difficult to unbank without stalling the lower wing even more. We do not practice this maneuver close to the ground for obvious reasons, so cannot demonstrate this effect. However, remember the effects of the wind gradient as they can catch the unwary.

To try a full spin, first climb to a sufficient height, go through the CALL check and start a gentle turn of no more than about 15° angle of bank, then gradually reduce speed. The glider's attitude will "look" normal but as the speed reduces further, you will probably have to prevent it from overbanking. The situation that we are trying to simulate is the skidding turn as the pilot tries to tighten the very low, final turn because the glider is low to the ground and the pilot is reluctant to bank more. Instead he or she applies more rudder briskly to tighten the turn, so simulate this! This reproduces the over-ruddered final turn mentioned above.

As autorotation starts and the glider yaws toward the lower wing, hold the controls where they are, the stick most likely to one side and back (to keep the nose up!) and the rudder to the other side. As already mentioned, in some gliders this will not be needed, as they will spin with the rudder and ailerons more in the centre but with the stick fully back. Next on the agenda is a full spin! Note that the classic stall warnings are not present, the nose will not be above the horizon at the stall and the speed may be somewhat above the 1g stall speed. A mistake is sometimes made in which the nose of the glider is pulled up sharply to make the glider stall more convincingly. This will result in a sharp nose drop and recovery, most likely into a spiral dive with the speed increasing rapidly.

As you become more familiar with how the glider performs at the entry to a spin, you can explore the spin behaviour some more. For example try a coordinated slow turn at minimum speed and then pull the nose up to stall the glider. See what happens! Another variation is to try this from a well-banked turn; you will find it is not possible to over-rudder such a turn! These variations are explored at instructor courses and are often described as "eye-openers"!

Recovery from the spin starts almost as soon as either control is moved from the extreme position. It is imperative, however, that you learn the standard recovery technique. To recover from the full spin:

- First apply full rudder, opposite to the direction of rotation in the spin, and centralize the ailerons, then pause, though this can and should be very brief,
- Move the stick steadily forward until rotation stops,
- Centralize the rudder, and ease out of the dive.

Why do we use the rudder first? This is the most effective control to recover from a spin because it stops the yawing motion. How, you may say? The yawing and rotating of the glider about a vertical axis give a steep, nose down angle for slow rotating speeds and a flatter angle for faster speeds. Imagine the mass of the pilot and glider ahead of the centre of rotation as a single mass. It is like a weight on a string that is being swung round in a horizontal plane. The 'centrifugal' force will increase as the rate of rotation increases. This will have the effect of raising the nose of the glider. Similarly the weight of the glider aft of the centre of rotation acts also to pull the glider into a flatter angle. Immediately the glider stops rotating, there is no centrifugal force effect, and the glider will pitch nose down, sometimes quite sharply. Many pilots feel they pitch so far forward that they are facing almost vertically down at this point in the recovery! This further assists the wings to becoming unstalled, even without relaxing the back pressure on the stick! Other reasons to apply the rudder first are that on some gliders the rudder can become blanketed by the elevator when in a spin, and this is made worse with the elevator down (stick forward). Some V-tail gliders might also be unable to produce full rudder authority when the stick is fully forward, so it becomes necessary to apply full rudder first in the recovery sequence, followed by moving the stick forward.

In most cases the glider will start to come out of the spin when the first action is taken, that is to apply rudder against the spin and to centralize the ailerons. In some gliders you will have to reach the third step of moving the stick steadily forward before the glider responds. In some gliders such as the 2-32 the stick can be forced back during the spin and it can take an extra effort to move it forward at the start of the recovery sequence. In others the rudder is forced against the stop during the spin, so applying the rudder fully in the opposite direction can require a larger than normal force. Hence it is important to make definite movements during a spin recovery on all the controls to overcome these larger forces. Beware that you may be fooled into thinking that you have moved the controls enough by merely applying normal forces.

As a new glider pilot, practice incipient and full spins often. Start with the early solo machines in the club before progressing to the higher performance sailplanes. These can have awkward spin characteristics, such as oscillatory motions, so it is essential that you master the basic recovery sequence first before trying the newer gliders. Becoming competent at recognizing incipient spins and recovering from them will protect you from the inadvertent low down, spin entry. By unstalling the wings immediately that you recognize the developing incipient spin, you will recover with little loss of height and you will be able to continue the turn safely. Practice full spins too. They are fun to do and the more you do them the easier it will be to handle the higher performance sailplanes when you move up to them.

We should briefly recall the differences between a spiral dive and a spin; they might appear similar due to the descending, diving nature of both. There are distinct differences between the two, however. A spin is recognized by the rapid rotation and the low airspeed. It is typically 1-1/4 times the normal stall speed and it remains fairly steady. The rate of rotation and descent rate remain steady also. The 'g' load is constant at about 1-1/4 to 2g. The loss of height is about 300 feet per revolution, but can be much greater. A spiral dive on the other hand is recognized by the rapidly increasing airspeed, increasing 'g' load and the steep nose-down attitude.

In the spin and the spiral dive recovery, and also the recovery from a loop, the glider is pointing steeply nose down and the speed is increasing very rapidly. Take care not to allow the speed to get too high and use the airbrakes if necessary to increase drag. Also, to limit the 'g' load on the structure, avoid pulling out of the dive too quickly.

Spins develop from any number of situations such as thermalling too slowly, from flying the circuit pattern too slowly under turbulent conditions, from a poorly planned circuit pattern and poor speed control and from attempts to stretch the glide into a field. These are the 'usual' situations. Less usual include the wave-off from tow when the glider's brakes have been inadvertently left open, or even when the pilots have deliberately let go low down to simulate a rope brake, but have then failed to maintain adequate speed. When low down, these situations are critical as there is insufficient height to recover unless immediate and correct recovery actions are taken. Finally, beware the high ground speed when making the downwind landing after the rope or cable break!

Winch launching has its hazards too and, in this case, trying to continue a launch at too slow a speed can lead to trouble. Another situation that produced several accidents worldwide in the past was failure to allow the speed to recover sufficiently following a cable break and push-over. The speed typically can reduce to well below the 1g stall speed in the push-over, yet the glider is fully controllable because it is not stalled in the classic sense since the loads are much less than 1g. In the attempted turn (when the horizon heaves into view) to return to the launch point, the pilot pulls hard on the stick to tighten the turn and maybe applies a bootfull of rudder too... do an extra careful CALL check and try it at a good height with an instructor who knows how to simulate the winch launch, cable break and attempted 180 degree turn. It can be another eye-opener but it can be fun too! ❖

Collision avoidance

Jörg Stieber, SOSA

Many of the world's best pilots (like Helmut Reichmann) have lost their lives in mid-airs. There were mid-airs in both the Worlds I attended in 1989 and 1991, one of them fatal. Only a miracle prevented the loss of life as a result of a mid-air during the Canadian Nationals last year. Keeping a vigilant lookout is the only defence against a mid-air collision. We have to learn *how* to look and *where* to look.

Seeing is a very complex process and it is primarily done by the brain — the eye has only a supporting function — it is the lens not the film. The brain:

- filters
- recognizes shapes
- makes up for colour weakness in peripheral vision
- controls eye movement reflexes

Since the brain plays such a prominent role, *seeing can be learned.*

Field of vision

Our eyes give us a tremendous panoramic field of vision of approximately 210 degrees. Try the following: look straight ahead, stretch out your arms to the side, bending them back a bit and move your fingers. You should still be able to see your fingers moving. This proves that your peripheral vision extends well past 90 degrees from the centre line. However, only a cone of approximately 60 degrees centred ahead is covered by both eyes. Within this area we can direct our eyes to any point to focus on. The area on which the eyes have the best ability to focus is as narrow as the beam of a flashlight (1 mm^2 of retina is mapped to 10,000 mm^2 of brain surface). Receptors for colour vision are concentrated here (limited night vision capability). In other words, if we want to see something clearly, we have to look at it directly.

In the periphery, the retina has mostly light/dark receptors in much lower density. Peripheral vision is excellent for detecting motion, but is fuzzy, very weak in colour, and the outer periphery is covered by only one eye.

If our eyes provide clear vision only in a cone as narrow as a flashlight beam, why do we feel we can see a clear picture of our entire surroundings? Obviously there is more to seeing than meets the eye, and that is the work of the visual computer in the brain. Our eyes are in constant, seemingly erratic movement. Eye movement is directed by the brain on a subconscious level. What seems to be erratic movement is in reality a highly efficient way to pick out the important information to build a complete picture of our surroundings. The brain filters the dazzling stream of information supplied by the eyes and only uses what is important. It recognizes familiar shapes in a split second, it even stores colour information and adds it to the peripheral vision. Most important for pilots, the brain reacts to movement in the periphery by directing the eyes towards it. Let's try the test again: stretch your arms, but this time move your fingers only on one hand. You should feel a reflex to look towards the moving fingers.

The brain also allows us to gauge distance. Stereoscopic vision is only effective up to 100 metres and is not relevant for airspace observation. For distant objects the brain uses the apparent size of the object to estimate the distance.

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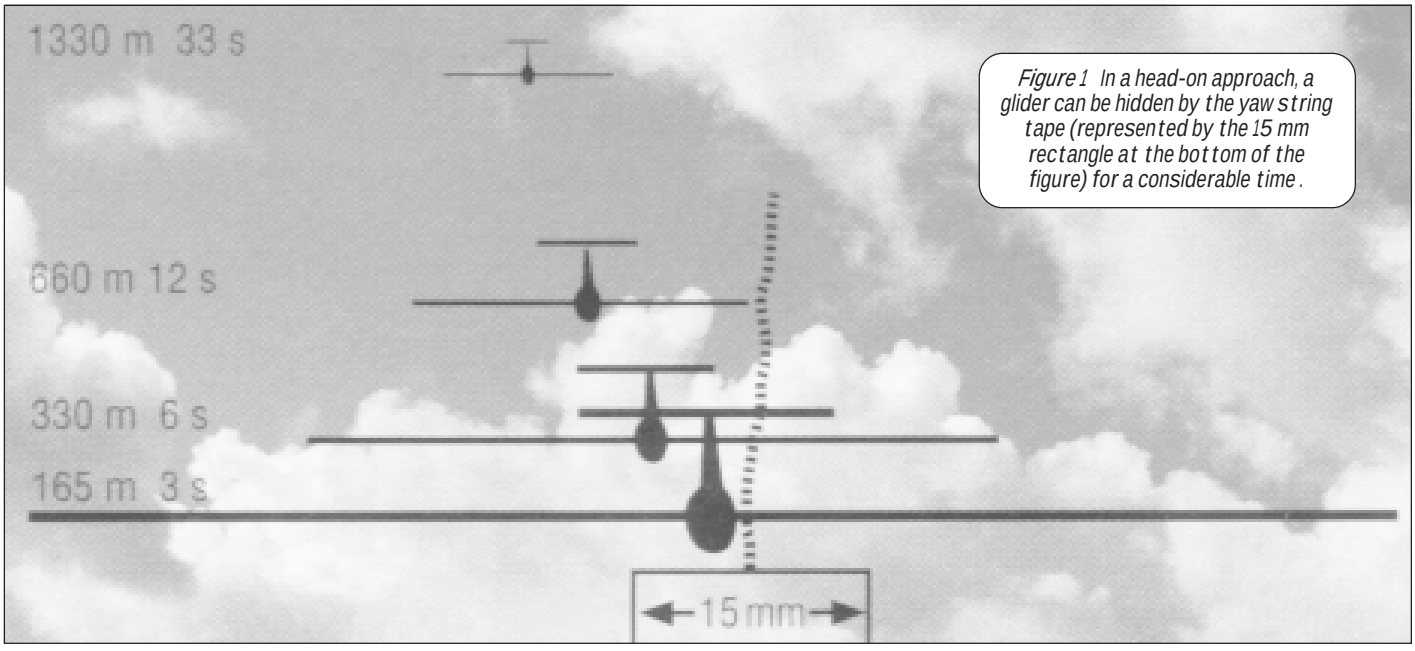


Figure 1 In a head-on approach, a glider can be hidden by the yaw string tape (represented by the 15 mm rectangle at the bottom of the figure) for a considerable time.

This can lead to interesting effects if the size of an object with known shape is much different than expected (ie. kid's balloon vs. hot air balloon; model airplane vs. real airplane; model airfield vs. real airfield). Since airplanes come in many sizes, significant misjudgement can result.

Dangerous situations and warning time

It's important to know that if you are in straight flight on collision course with another plane, also flying straight and level, its image will not move on your canopy — it will just slowly grow at first, then explode (Figure 2). As there is no relative movement it will be difficult for your motion-sensitive peripheral vision to pick it up. A clean canopy and frequent eye movement are important.

Head-on
Modern glass ships are very difficult to see when they approach head-on. I have experienced it time and again that I knew and expected a glider head-on (out of turnpoints and on the ridge), but could not spot it until it was uncomfortably close. This isn't surprising if you look at the numbers — assume you fly at a modest 55 knots and another glider is approaching you head-on at the same speed. The other glider can still hide behind the tape holding your yaw string 33 seconds before impact (or passing). Even six seconds before impact the fuselage can still be covered by the tape (Figure 1).

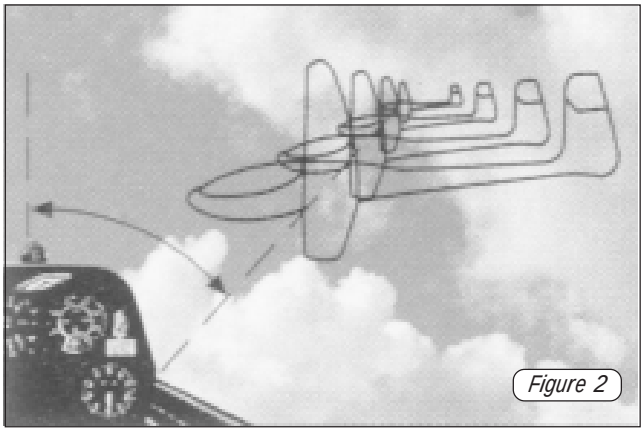
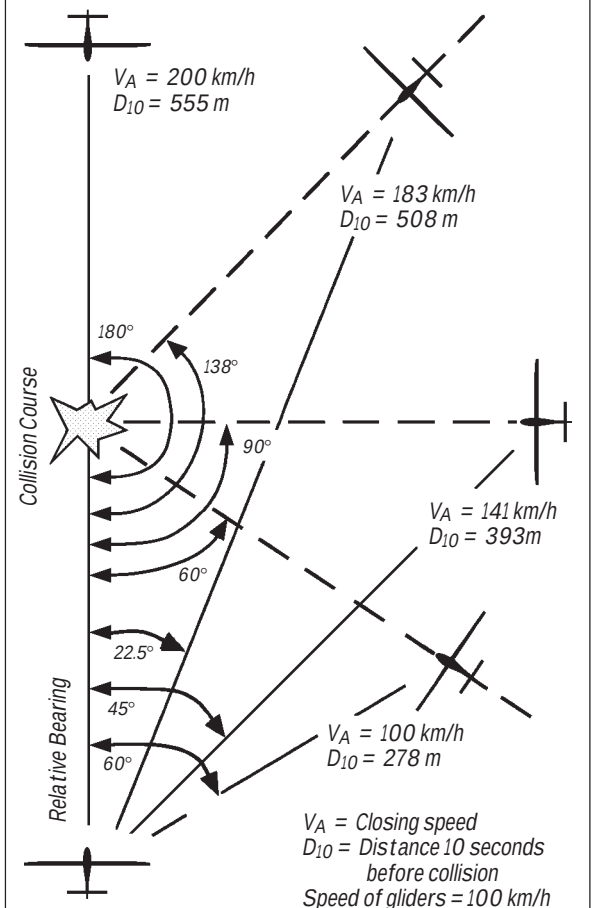


Figure 2

Converging
In practice, the probability of two gliders being on a converging track is much higher than head-on situations, for example, two gliders going for the same thermal. What makes some of these situations so dangerous is the combination of unexpectedly high closing speeds and peripheral position. Figure 3 shows four different collision scenarios with convergence angles from 180 degrees (head-on) to 60 degrees. In all cases the speed is 100 km/h (54 knots). The angle at the bottom of the diagram is the relative bearing at which the pilots see each other (at a 90 degrees convergence angle the pilots will see each other at 45 degrees from the centre line).

The most dangerous case is the one where the tracks intersect at an angle of 60 degrees. From the perspective of both pilots the other glider appears stationary at an angle of 60 degrees (2 or 10 o'clock) — far out in the field of peripheral vision. What makes this situation so dangerous is the unexpectedly high closing speed. Although both gliders fly only at 100 km/h, they are also closing on each other at 100 km/h, or over 100 ft/second, just as if they were flying head-on into a brick wall! With more acute convergence angles, closing speeds decrease significantly.

Figure 3 – Collision scenarios



Thermals
Since thermals are the high traffic areas in gliding, most mid-airs happen there. The most serious conflicts occur when entering, but sometimes also when leaving.

Figure 4 shows gliders A and B entering the same thermal from roughly opposite directions and 1200 feet offset. Both contact the thermal in position 1 and both turn right. It's unlikely for pilot A to see glider B in this position. In position 2, pilot A will see B only with good lookout and luck — 7.5 seconds to impact and only four seconds to position 3 where a collision is inevitable. Even in position 3, pilot A can see glider B only if he looks hard right. In all likelihood pilot A will never know what hit him, even though, according to the rules of the air, the collision was technically his fault.

Figure 5 shows the case of two gliders (A and B) diverging with a lateral separation of 1000 feet and contacting the same thermal with opposite turns. At the start of the turn (position 1), with 15 seconds remaining to impact, it is nearly impossible for the pilots to see each other. With good lookout they will see each other in position 2

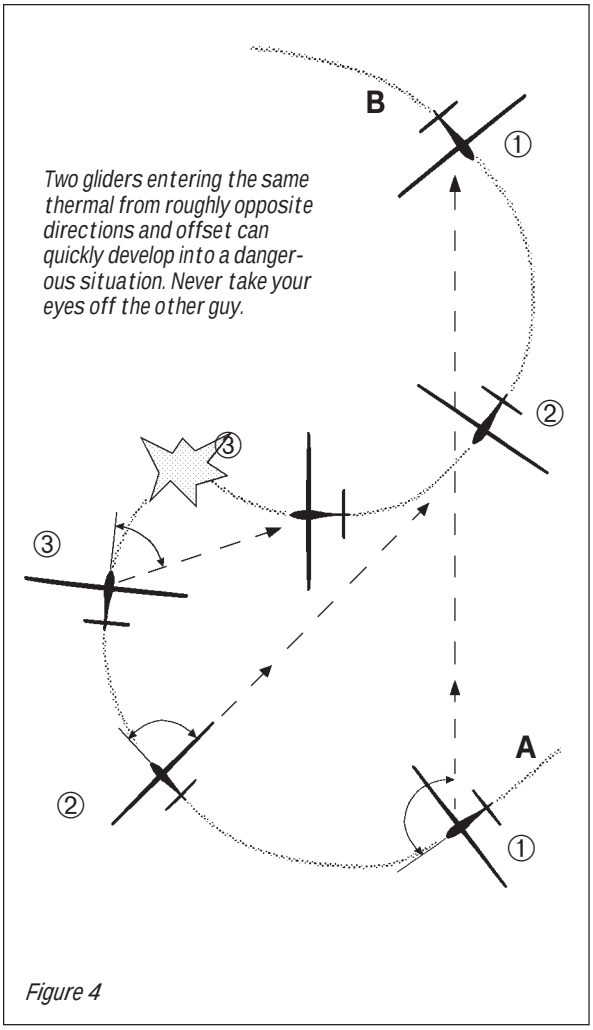


Figure 4

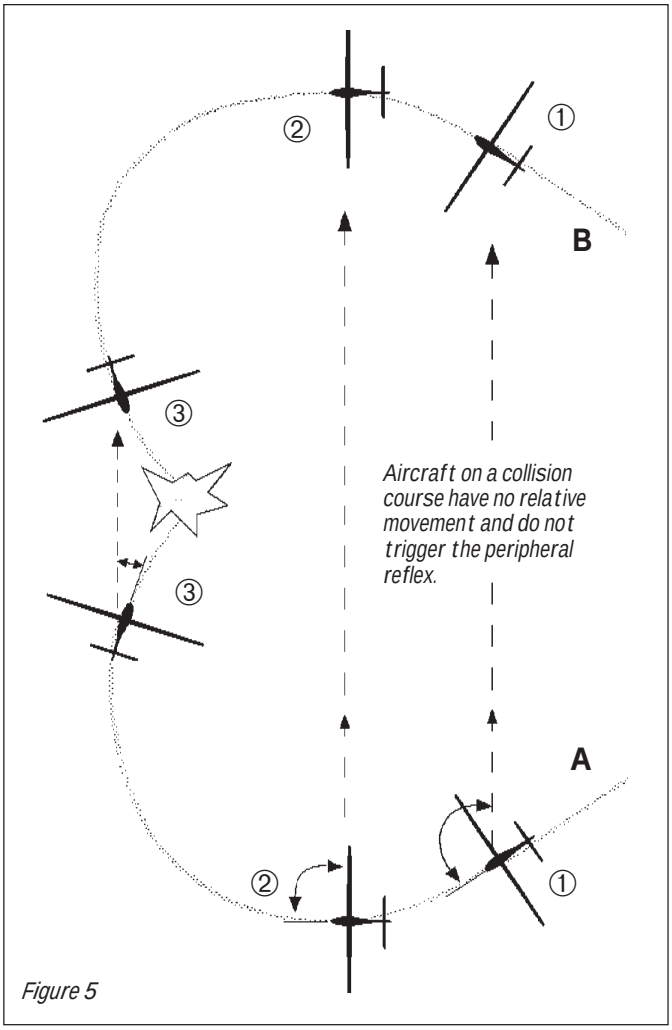


Figure 5

with 11.5 seconds to impact and 8 seconds to position 3 where a collision is inevitable.

Collisions between gliders established in a thermal occur at low relative speed and often without serious consequences. Fortunately, peripheral vision works really well in thermals.

How can we prepare ourselves?

Lookout techniques
Use the horizon as anchor to sweep back and forth in a 120 degree arc. This is the zone with the highest probability for conflict. However, do not focus on singular points on the horizon (trees, towers, hills). Planes below the horizon are much harder to spot than above. Try to use and train your peripheral vision. Be very alert if you spot a plane with no apparent relative movement, do not take your eyes of it until you are satisfied there is no danger of collision.

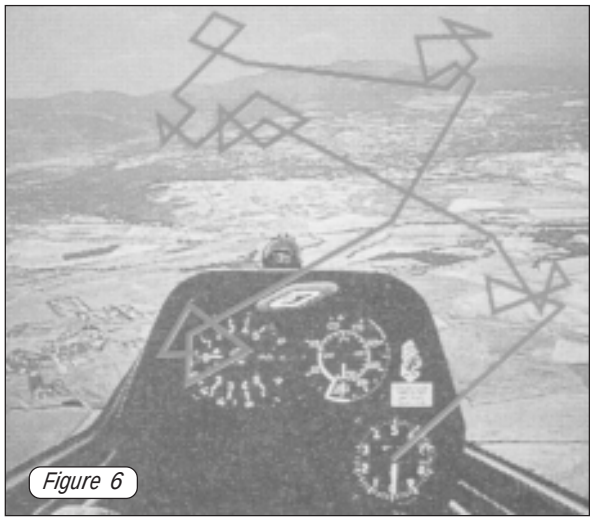
Figure 6 shows the eye movement of a beginner pilot: from the altimeter his scan hangs up at the airfield to the right of the cockpit, from there up and to the left, hangs up below the horizon (possibly another aircraft), from there up to the horizon, hangs up at a cloud, narrow sweep to the right, hangs up again, then down to hang up at the vario. Figure 7 shows the eye movement of an experienced soaring pilot: his scan starting at the altimeter includes all important terrain features (airfield), weather (cu), sweeps the horizon symmetrically to the center line and covers all instruments in one fluid motion without getting stuck at any single detail.

Shape recognition
One of the brain's functions is to filter the dazzling stream of information provided by the eyes. From childhood on you have been trained to recognize the shapes of letters and words. As a consequence, you can read a word within a split second. We have to teach our brains to pick out and recognize airplanes and their direction of flight just as quickly.

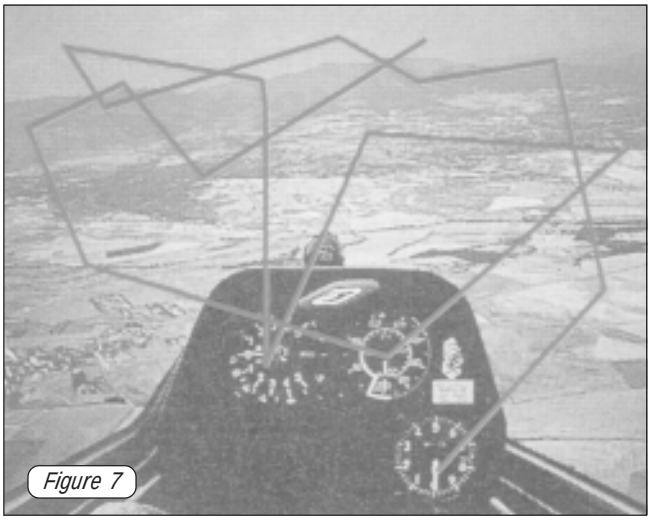
In Figure 8, cover the two bottom gliders and look at the glider on top. Is it flying away or towards you? Now uncover the other two gliders. This little exercise shows how easily it is to draw the wrong conclusions. Your life could depend on getting it right in a split second.

If you are instructing, ask routinely and often during every flight (also while on tow) how many airplanes your student sees. Point out the ones he doesn't see. This should also be a routine exercise during spring check flights — just to make sure the old eyes didn't get dim over the winter.

One technique used in Germany is for the instructor to constantly point out other planes in direction and reference to the horizon (2 o'clock high, 9 o'clock low) and the student to spot them and acknowledge. Later when



The scanning eye movement of a beginner pilot
Narrow sweep angle, spends too much time focusing on airfield (to right of instrument panel), village, clouds.

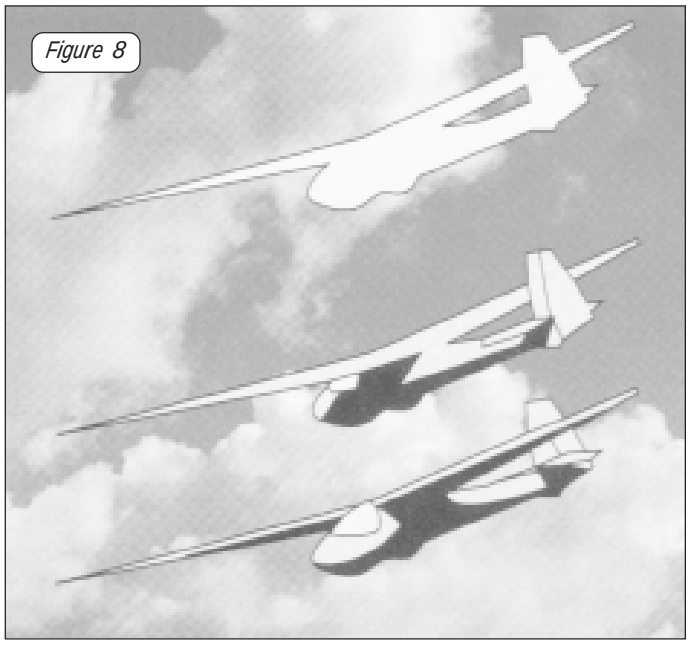


Scanning eye movement of an experienced pilot
Wide sweeps along the horizon while keeping an eye on airfield location and all instruments.

the student is more experienced in spotting planes he will point them out routinely to the instructor. Once the student is proficient in spotting, have him identify the direction of flight of aircraft he is spotting (direction, climbing, descending).

Anticipation
It is much easier to spot targets when you can anticipate where they are going to be. Practice to anticipate the movements of airplanes and to draw conclusions as to whether or not a conflict situation could develop:

- Where will the tow, just lifting off, be in a minute?
- The towplane just released, where will it go?
- When heading for a thermal with gliders in it, which ones are more likely to be a problem, above or below the horizon?
- Reverse your situation – you are in the thermal, and you see other gliders are heading for it.



Look at the top glider. Is it coming towards you or is it flying away? If you only see a silhouette, your brain does not have enough information to determine that. In such a case your brain tends to make things up and can mislead you. Always assume the other pilot is flying towards you unless you are absolutely sure he is not. Don't let your mind play tricks on you.

Gaggle experience
For the untrained it is impossible to assess and anticipate the complex relative movements of gliders in a thermal. Post-solo students should get a good dose of experience in flying close to other gliders (a dual exercise), joining thermals, etc. This will allow the student to get a feel for the relative movements of gliders and to learn to recognize situations that are potentially dangerous.

Other factors

Head gear
It is important to wear a hat that does not obscure the field of vision. Wearing a baseball cap is like painting the top third of the canopy black.

Sunglasses
Our eyes cannot focus in the UV spectrum. When selecting sunglasses make sure you get good UV filter characteristics. On a bright day distant objects appear much clearer when the UV portion of the light is filtered out. As a side benefit, the same effect will allow you to see thermals better (haze domes and forming cu).

Brain fitness
Since the brain is so central to vision and recognition you should make sure it is running in high gear. The following factors degrade brain performance:

Lack of oxygen (hypoxia)
Dehydration
Alcohol, drugs (hangovers)
Lack of sleep

Although there is no absolute protection against mid-air collisions, practicing good lookout techniques, knowing how to look and where to look and recognizing potentially dangerous situations will help us to reduce the risk. Soaring is a visual experience. Being at a high level of alertness not only increases the intensity of the experience, it also makes it a safer one. ❖

A season-ending flight

Even a poor day out on course is better than sitting on the ground

Dave Hennigar, Winnipeg Gliding Club

It's 2 am and I have just had a road retrieve of 280 kilometres. Tired? Yes, but still feeling pretty chipper — it had been a good flight on a long day. After a month in Benalla, Australia, it's time to get home to family and the doubtful joys of winter.

Benalla is a two hour drive east of Melbourne and the home of the Gliding Club of Victoria (site of the 1987 World Gliding Championships). The club is fairly large with good facilities. Club members run things on the weekends and the permanent staff operate during the week. Usually there are a number of overseas members and visitors around in the summer flying season — new faces and new stories weekly.

It takes a while to get in sync with the local time. The first part of my stay consisted of hut cleaning and odd jobs around the club. Ozzie beer tastes very good after repairing a vent fan on a metal roof at 38°C. After completing annual checks and some local flying, the good weather was due — early December. The aircraft for my last two weeks is rather nice: a Nimbus 3T equipped with a good flight director and integrated GPS (translation — 25.5 m wingspan with retractable sustainer engine).

The weather has been fairly good but not outstanding, pleasant flying but thermals starting too late for long flights. Friday should be a great day, the airmass has been getting more unstable — maybe we can get away early.

The Victoria State contest is being held at GCV as well as regular operations. The met briefings are busier than usual. John Williamson (club GM) uses the early morning temp trace flight data as well as official forecasts to provide a soaring forecast for the area. Local knowledge and a lot of experience make John's forecasts generally quite accurate, always optimistic unless heavy rain is falling.

Friday morning starts early, noisy birds in the rafters and a bright sun through the window don't let you sleep in. Might as well get started, lots of time for a leisurely breakfast and to prepare Bravo Victor. Considering the anticipated conditions today, water ballast is added to get max. all up weight — 1650 lbs. Aircraft all cleaned up, batteries installed and checked, tentative flightplan in computer and daily inspection completed. Back to the hut and prepare lunch; sandwiches, musli bars, unsweetened juice, fruit and ice water plus emergency water (food = energy and ability for me). Off on the venerable pushbike again for a little gossip before briefing.

The forecast looks good, an early start with light upper winds and thermal strength 6 to 8 knots later in the day. The only problem is a weak system moving in from the west, possible scattered thunderstorms west of Benalla late in the day. Time to get Bravo Victor out on the field and let the comps pilots sort out their tasks for the day.

On the way out to the runway we see high cloud to the west, the system must be moving faster than expected. There is student training going on so we will be able to get reports on thermal activity. The temperature is getting up toward the value of the "trigger" temperature, time to get ready. Final check, last data in computer, strapped in, food and water stowed and all clear except for the wingtip dolly.

At high weights, Bravo Victor needs about 3 knots of lift to climb away without too much hard work or the risk of having to drop water ballast. We are at trigger temperature but still nothing over 2 knots lift. On the next training flight, 2.5–3 knots is reported. Hook up the Pawnee and away we go — well, struggle away at least. Off tow at 1800 feet agl over the local thermal factory at the race track, thermals small and only 2 to 3 knots — hard work. After struggling up to 3000, let's have a look around now that there is some breathing room. There is a wedge tail hawk over the sewage lagoon, move over and it's great — 4 to 5 knots — and climbing is a lot easier. The upper cloud is almost overhead and a band of middle cloud has formed and leads off northeasterly just about on track — time to go.

There is weak lift under the cloud and an airspeed of 70 to 75 knots can be maintained without thermalling. The flight plan is northeast to The Rock, northwest to West Wylong, and south back to Benalla. The cloudstreet peters out near the Murray River but there is good looking cu as far as you can see. Cruise along at 70 to 90 knots and take a good thermal occasionally to get back up near the cloud base. At The Rock the conditions aren't quite as good, it looks better towards the northwest. Back in strong lift, it is time for some lunch. There is a lot of chatter from the comps pilots about completing the task; I'm glad I got out when I did. That trough must really be moving, with luck it may be possible to get home behind it.

The averager shows 7 to 9 knots and the cruise speed has increased, 90 to 110 knots — lovely. The GPS is rolling off the klicks at a good rate, a quick mental check gives a ground speed of over 140 km/h, really? Try a six minute check and Bravo Victor is doing almost 150. Follow the GPS, update the map position and smile! Approaching West Wylong the cu looks a little sparse so let's get some height. A few turns in a 10 knot thermal and Bravo Victor heads for the turnpoint, still in good lift in clear air.

⇨ **p20**

training & safety

GLIDER PILOT REVIEW TEST

The following 30 questions is a review of operating procedures at a typical gliding club and the Air Regulations. It can be used as part of pre-season check flights or a self-test review. Thanks to Larry Morrow of the Winnipeg Gliding Club.

1 List ALL the documents that are required to be on board an aircraft during flight.

2 List the pre-takeoff checks.

3 List the post-release check.

4 List the pre-landing check.

5 List the check used prior to stall and spins.

6 Describe the "STOP" signal used during glider launch.

7 What must the glider pilot do when the towplane waves its wings?

8 What does it mean when the towplane yaws back and forth?

9 During the tow you let the glider get above the towplane to the point where you cannot see the towplane. What are your actions?

10 What are your actions when your release fails to work and you have no radio?

11 Describe the actions to recover from a full spin (as described in the SOAR manual).

12 Describe the actions to recover from a spiral dive.

13 When two aircraft are on converging headings at approximately the same altitude, the aircraft that has the other on what side shall yield the right of way?

14 While you are on tow, a large slack develops in the towrope. How do you remove the slack without breaking the rope.

15 Len Ticular has purchased a state of the art Cloudbuster Mark 2 with the carbon fibre instrument panel. Before his first flight Len decides to check the weight and balance. Len weighs 65 kg with his parachute and sits at a moment arm of +475 mm from the datum point (475 mm in front of the wing leading edge). The empty weight of the glider is 255 kg and the empty moment arm is –672 mm (672 mm behind the leading edge). The cg limits of the glider are –250 mm to –425 mm and the maximum gross weight is 500 kg. Will the glider be within the weight and cg limits? Please show your calculations.

16 The manufacturer of the Cloudbuster Mark 2 has made provision for 12 kg of ballast with a moment arm of 475 mm ahead of the datum point. With the ballast in place will the cg be within limits? Please show your calculations.

17 You have just landed after a two hour soaring flight. Before towing the glider back to the flightline you double-check to make sure the canopy is _____ and _____.

18 In what direction does the wind blow around an area of high pressure in the northern hemisphere?

19 If you stand with your back to the wind, where is the low pressure area be found?

20 The following sequence of clouds is observed at an airport: cirrus, cirrostratus, altostratus, and nimbostratus. What type of front would you expect to pass?

21 What approximate direction would you expect the wind to be from at this time?

22 Before departing on a cross-country the weather briefing indicates a low pressure area moving into the province. Later in the day you would expect your altimeter to have what kind of error if you have not reset it with a current altimeter setting? Why?

23 You are soaring in the wave at Cowley. The altimeter has just passed through 30,000 feet. The pilot's handbook for the glider states that the stall speed is 39 knots without water ballast and on previous flights you have practiced stalls and confirmed this. At 25,000 feet the stall speed of the glider will be:
a) greater than 39 knots IAS
b) 39 knots IAS
c) less than 39 knots IAS

24 The CARs state that an aircraft may not be operated between _____ feet and _____ feet for more than 30 minutes or at all above _____ feet unless oxygen is readily available for each crew member.

25 Name two of the five hazardous attitudes that may affect a pilot's judgement.

26 Give an example of one of the attitudes above.

27 You are soaring west of Carman on an exceptionally good soaring day. The altimeter passes through 13,000 feet and you still keep climbing. There is no oxygen system on board the glider. You reason that the rules were made for long flights by powered aircraft and do not apply to you. What hazardous attitude does this illustrate?

28 On the flight referred to in question 24, the pilot's handbook for the glider also states that the Never Exceed Speed (V_{ne}) for the glider is 135 knots. At 25,000 feet the V_{ne} of the glider will be:
a) greater than 135 kts IAS
b) 135 kts IAS
c) less than 135 kts IAS

29 Estimate the indicated airspeed for V_{ne} of the glider in question 28 at 25,000 feet.

30 When resetting the altimeter setting on the subscale of the altimeter, what effect will increasing the altimeter setting have on the altitude that the altimeter indicates?

ANSWERS TO PILOT REVIEW TEST

1 Certificate of Airworthiness, Certificate of Registration, Radio Operators Certificate, Radio Station Licence, Operators Manual, Weight & Balance documents, Journey Log, Insurance documents, Visual Intercept Orders, Pilots Licence and LVC.

2 Controls, Instruments, Straps,
Trim and Ballast, Release, Spoilers, Canopy, Wind, All Clear.

3 Rope, Trim, Location

4 Radio, Straps, Wind, Water and Wheel, Airspeed, Flaps, Traffic, Spoilers.

5 Cabin, Altitude, Location, Lookout.

6 The signaller will hold both arms straight up over his or her head and yell "STOP".

7 RELEASE !!

8 Check that your spoilers are closed and locked.

9 RELEASE !!

10 Fly to the *left* hand side of the towplane and wave the glider's wings vigorously. *(free flight 2/98 p14)*

11 First apply full rudder opposite to the direction of the spin, and centralize the ailerons. Pause. Move the stick steadily forward until the spinning stops. Centralize the rudder and ease out of the dive. *(Soar and Learn to Fly Gliders, p131)*

12 Start to level the wings with coordinated use of the controls; at the same time, reduce the back pressure on the stick to reduce the 'g' loading on the aircraft, and then ease out of the dive. *(Soar and Learn to Fly Gliders, p131)*

13 The aircraft that has the other on its right shall give way.

14 The basic technique is to yaw the glider away from the loop in the rope. This will create extra drag and help to remove the slack. If the slack comes out when there is a large speed difference between the two aircraft, the energy required to pull the glider straight may prevent the rope from breaking. Spoilers may also be used to increase the drag and remove the slack. See page 97 of the SOAR manual for a more detailed explanation.

15 Weight & balance calculation
+475 datum –250 –425 –672

	moment	mom-arm	wt
pilot	+30,875	+475 mm	65 kg
glider	–171,360	–672 mm	255 kg
total	–140,485	*–439 mm*	320 kg

The cg is behind the rear limit of –425 mm.

16 Addition of nose ballast

ballast	+5,700	+475 mm	12 kg
new total	–134,785	*+406 mm*	332 kg

The cg is now within the allowable limits.

17 Before towing the glider back to the flighline you double check to make sure the canopy is closed and locked.

18 In the northern hemisphere the wind will circulate clockwise around an area of high pressure.

19 In the northern hemisphere the wind circulates counterclockwise around an area of low pressure. If you stand with your back to the wind, the low pressure area will be on your left side.

20 A warm front.

21 The south.

22 The altimeter would indicate too high. For example if the altimeter were set to an airfield elevation of 800 feet with an altimeter setting of 29.92 and the pressure changed to 29.82, on the ground the air pressure would be reduced and the instrument would interpret this by showing a higher altitude. For each 0.1 inches of mercury difference the altimeter will be in error by 100 feet. Therefore the altimeter in the example will indicate 100 feet too high. Remember the saying "From high to low – lookout below". *(From the Ground Up, p39)*

23 The indicated stall speed of the aircraft is always the same.

24 The CARs state that an aircraft may not be operated between 10,000 feet and 13,000 feet for more than 30 minutes or at all above 13,000 feet unless oxygen is readily available for each crew member.

25 The five hazardous attitudes are anti-authority, impulsivity, invulnerability, macho and resignation.

26 The regular glider you rent has been grounded for maintenance. You have been scheduled to fly another glider and you discover that it is a model you have never flown before. The weather is really good and the new paint job on the glider convinces you that it must be in top condition. Since the line-up at the flightline is getting longer you decide to just jump in and go before getting a briefing on the new glider or doing a DI. This is an example of impulsivity.

27 Anti-authority.

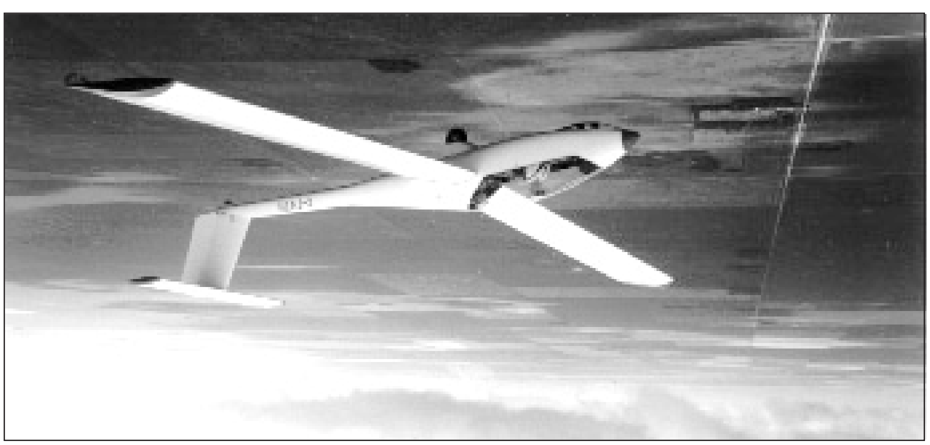
28 In question 24 the indicated stall speed remains the same but the actual stall speed increases with altitude. The V_{ne} for a glider is a true airspeed. As altitude increases the indicated speed for V_{ne} will decrease.

29 To calculate TAS from IAS the pilot must take into account air density and temperature. An easy rule of thumb however is to add 2% to the IAS for each 1000 feet above sea level. For example, if the glider is at 8000 feet asl, add 2% x 8 = 16% to the IAS. For an IAS of 80 knots we will have 80 + (16% x 80) = 80 + 12.8 = approx 93 knots.

For a TAS of 135 kts we know that
135 kts = IAS + [(25 * 2)% * IAS]
135 kts = IAS + [50% * IAS] = 1.5 * IAS

Therefore IAS = 135 / 1.5 kts = approx 90 kts

30 The altimeter will indicate a higher altitude. For example if the glider is sitting on the ground at 800 feet asl with the atmospheric pressure at 29.92 inches HG and the pressure set properly, the altimeter will show 800 feet. If the subscale is now moved to 30.02 inches HG the real pressure of 29.92 will cause the instrument to read 100 feet too high.



hangar flying

A more comfortable parachute for long flights

If you have ever made a long trip in a car equipped with an adjustable lumbar support you know how nice it is to be able to easily vary the seat in order to change the seat feel and position. I personally like the feel of air bladders as they adjust to the shape of your back. This is most important in tight fitting fully reclined seats like in a Corvette or sailplane or other great piece of glass.

I recently had cause to replace the air bladders in the seat cushion of my *GQ Security 250* pilot emergency parachute. After examining all the alternatives, I replaced both the original latex air bladders in the seat with the latex bladders as used in a blood pressure measuring cuff. Based on visual and tactile inspection they are identical with the original bladders and are the same size and have two tubes in the same location.

I blocked one tube and connected the other to act as a common equalizer with the second bladder and connected the second line to the pump/valve. I used a connection insert inside the tube and glued the joint with cyanoacrylate glue *(Crazy Glue).* These bladders are also available with a single tube, but I would caution readers that the tubes do not all have the same inside diameter. Make sure to use two bladders with the same size tubes. These bladders are available in several sizes but the most common is the standard adult size 12 x 23 cm. The trade names include *AMG*, *Baum*, and *Labtron* and are available from medical suppliers who sell blood pressure measuring cuffs. Replacement bladders cost $10–15 and the pump/valve about $10.

Replacing the seat bladders required cutting and restitching the seat of the chute. That was a small matter for the rigger and was performed at the same time as the chute was fully inspected, tested for acid, and repacked. I am sure that this could also be done as a retrofit with little extra work but would depend on the chute seat design. I investigated placing a Velcro access flap on the seat side but my rigger convinced me that adding it would require an extensive rework of the seat and a stitched access area would be better. Access would only be required if the bladder failed and in that case cutting and restitching was a better alternative.

I decided if a little was good, more would be better, so I added another bladder to provide support and comfort in the lumbar area. The original pack design provided a back pad that was the full size of the pack back and held in place with perimeter Velcro. I sewed a bag to hold and protect the bladder, equipping the bag with hook Velcro to attach it to the matching plush Velcro strips that I sewed under the padded back. I sewed the plush Velcro strips 10 cm apart the full height of the inside of the back flap to allow the location of the lumbar bladder bag to be adjustable for best fit. I used the same size bladder for the lumbar as the seat in order to keep things simple and cheap and to allow switching parts if needed and to ensure that replacements will be common and easy to get. It is my experience that parts that are cheap and easy to get seldom fail in service.

The most common air pumps are rubber bulbs with a turn type valve that can be opened to drain air. There are also pump/valve units that have a push button to drain air which I believe is a better system and is easier to use with one hand, but these systems are much harder to find. I used separate pumps for the seat and lumbar so I would have more control over adjustment, but they could be interconnected for a simple single pump system. This was a simple inexpensive addition that has paid great comfort dividends.

R Wilson-Smith

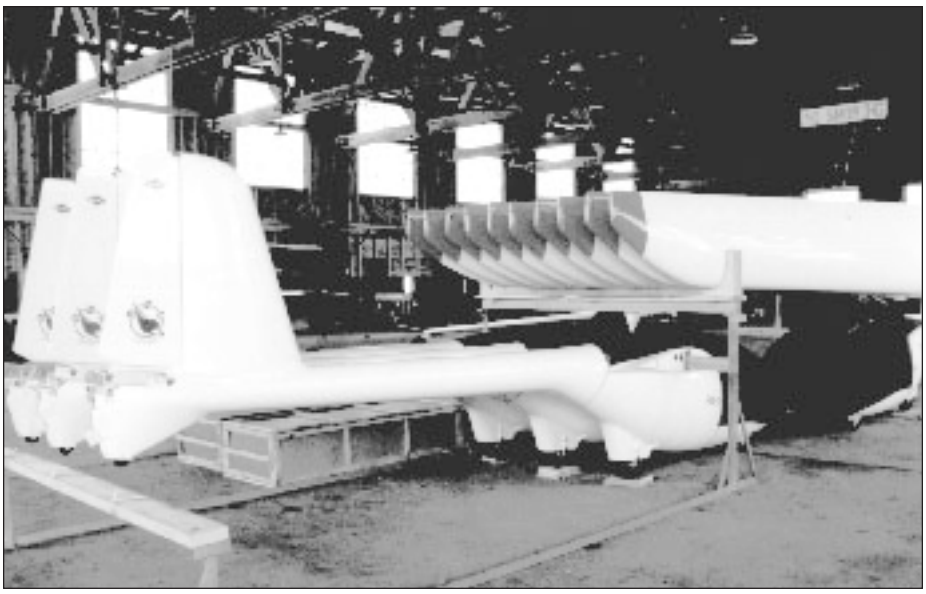
For an alternate dirt cheap, simple, yet effective and comfortable lumbar support, read in free flight 5/92 how to form your own custom carved pad out of a block of 2" blueboard foam insulation. It works like a charm. editor

A Canadian World class event

As the result of a gleam in the eye last year, sextuplets were delivered successfully in Stanley, Nova Scotia, on 21st March 1998. All the little ones appear to have mischievous characteristics. The occasion set a Canadian record. Never before have six new sailplanes arrived in one shipment. Six PW5 Smyk appeared, closely packed in a forty foot overseas shipping container on the back of a truck that trundled in from the Halifax port. Freeing them required a large group of volunteers who oohed and aahed as each bit was carried out and laid lovingly around the hangar floor. Then the shipping jigs were dismantled, carried into the hangar and reassembled so that the six ships would have a place to stay during inspections and while awaiting the arrival of distant adopting parents.

PZL-Swidnik adherence to ISO 9000 quality standards throughout their production and packing processes ensured safe arrival in pristine condition.

Dan Dawson and I trailered the first ship to Springbank Airport in Calgary for JC Hauchecorne and Kevin Caldwell, over eleven



Six closely packed PW-5s as loaded in their container rest in the Bluenose hangar.

peaceful and very enjoyable days out and return. Allan Spurgeon, buyer of the second machine destined for an Invermere operating base, was there for the unveiling assembly. All were excited and pleased. With the C of R and C of A work done, the ship was ready to fly but it will mutter quietly in JC's hangar until their trailer is completed — that's an incentive to finish the work!

Next Jim and Donna Kayer arrived from Bramalea, Ontario, in mid-April with a well designed and well constructed, completely aluminium, stressed skin trailer from Azimuth in Connecticut. After adding tie down fittings, the load was mounted and they were away. By mid-May the other three ships were picked up by Ian Oldaker/Tony Firmin, David MacKenzie and Brian Henderson.

Dan Dawson tries the Smyk on for size.

All in all, there are seven World Class PW5 Smyk sailplanes flying in Canada this year — one in Halifax, three in the Toronto area, one in Winnipeg and two in the Rocky Mountains. It has been a quick and great start for the new FAI class in Canada.

Charles Yeates, Bluenose Soaring

> Safety is not the absence of danger, it is the absence of ignorance.

Australian soaring and hang gliding federations consider merger

The process has reached a stage where a determination to proceed or otherwise towards amalgamation is deemed essential. The main purpose would be to create a joint organization which, by its sheer size, would have greater impact in negotiations with authorities and could achieve considerable economies of scale in administration.

The GFA annual general meeting gave approval to allow the negotiators to continue discussions. It is interesting to note that this push towards the amalgamation of soaring organizations is gathering force in Europe. The ability of like-minded enthusiasts being able to move freely between all soaring disciplines having paid a common fee is seen to have great potential for diversity and growth.

from *Australian Gliding*

Calgary airspace finalized

Mid-May meetings with users of Calgary airspace have set the TCA boundaries of the Calgary airport. It changed in only minor ways from the interim structure, and places Cu Nim under a 8000 foot asl (4200 foot agl) ceiling between 20 and 30 nm where it jumps to 10,000 feet. Cu Nim is at the 24 nm mark SSW of the airport. Arguments that it should then be possible to have 9000 feet at 25 nm failed to convince NavCanada, who cited other considerations such the difficulties in climb-out for some heavies like the DC-10.

One concession that was made for the club was to change the current 4 nm radius alert area around the club to a somewhat larger rectangle extending from 21 nm out to the 30 nm ring. When the alert area has its normal 8000 foot ceiling, the change has no effect operationally, but when the area can be raised to 9 or 10,000 it allows much friendlier access south to the "outside" for cross-country flights.

The new expanded TCA restricts the ability of pilots in cross-country course selection — primarily to the commonly visited eastern points. For example, a flight straight east now entails staying under 8000 for 45 kilometres (flying south, one is out in 10 kilometres). Flights northwards now require significant diversion and extended flight under 8000.

Elevator control not connected

After assembling my Standard Cirrus I had a disturbing experience with my glider, and it should be shared with all Cirrus owners and all glider pilots in general.

I had rigged and moved the glider to the take-off area when I called for some assistance to do a 'positive' that I always do. When we got to the elevator, we discovered that the push-pull rod was not connected, even though the tailplane was on and locked. In the past, I could never lock the all-flying tailplane in place unless the push-pull rod was engaged. The lesson I learned from this is don't ever take anything for granted, and never forget a positive control test.

Hans Berg, Windsor

Coming Events

Eastern Instructors Course 21-27 June, Gatineau Gliding Club. Registration forms are available from the SAC office, or from your club CFI. $150 includes course materials. Campground at club, with cooking facilities, showers, and pool. There is also a B & B nearby.

Canadian Nationals, July 5-16, Brandon, MB. For info, see *ff2/98* or SAC Nationals web page.

Cowley Summer Camp 26 Jul - 4 Aug, Come to Canada's biggest soaring holiday. Tony Burton (403) 625-4563, *free-flt@agt.net*

Ontario & Québec combined Provincials 4-7 Sept, AVV Champlain, Saint Dominique, QC.

a season-ending flight from page 15

Southbound and still pounding along. Half an hour later the comps pilots are readable again, they are having trouble getting home. There is some high cloud and haze ahead, might have to use the turbo today (smile muscles not working as hard).

In the haze the lift quickly disappears — time for plan B. There is sunshine well to the west through a gap in the cloud cover. Execute a short retreat into weak lift, dump the water ballast and start up the turbo, try an end run. Bravo Victor was climbing slowly and progress was slow. The track was fairly close to the airport at Narrandara so I broadcast my position and intentions. No reply. A fairly large cb appeared through the haze in the southwest, and very shortly a heavy rain shower was moving across my escape route (smile muscles definitely not in use). Time to give it up; there is a good airport not far away.

Broadcast change in plan and still no reply. Landing toward a thunderstorm is a good plan, the cb wasn't that close but it could still dump cold air and cause strong gusts. With lots of altitude, the turbo retracted and the straps tightened up, let's have a look over the airport. The wind is light southwesterly and down the gravel runway nearest the terminal, nothing moving on the ground. Great, let's get on the ground and tie down. Nicely into the downwind leg Bravo Victor gets clobbered with moderate turbulence. The Nimbus has many good qualities but rapid response to control inputs is not one of them. After a couple of minutes wrestling, Bravo Victor consents to being S–turned off the end of the runway. Things settle down shortly, I land and roll on the grass at the taxiway, and with a lot of heaving, the Nimbus is clear but just.

There is no one around, tie down the aircraft and call in. Finally get through to Ann Goodley at the club with my landing report and arrange to get Johnny Walker (retrieve crew, not booze). Eventually I locate the field manager and he invites me to use the terminal and have a coffee. Four hours and several rain showers later Johnny arrives. The rain is over and we should get the airplane in the box before dark. Not to be, a bolt has worked itself loose, preventing the removal of the tailplane. With the help of the field manager's hacksaw blade, we remove the offending bolt. Bravo Victor is derigged by moonlight and a Mag light. The field manager came over and added car lights. Finally got everything in the trailer, searched the area for tools, and we are ready to go. Thanks and good by to the field manager. Three hours later we pull into the club and head for bed. All the contest aircraft also landed out, but a lot closer to home.

Every year it is pleasant to have a good flight and get re-enthused. The last flying day is cutting it a bit fine and there was more than enough aggravation, but it was still a good flight. Barring a major disaster, I hope to be back this year and enjoy more good flying. ❖

... off-field landing from page 5

I wondered how much I have depended on the hardware for glide path control; in all of my flights and landings, I have always used either flaps or spoilers. This was my first landing without them. Maybe some thought should be given to learning how to land without glide control hardware. I know I have been thinking about it! ❖

Comment from a spectator

As one of the pilots who had just landed and was waiting beside my glider half way down the runway, I was amazed to see Mike zoom by at a good rate of knots with no flap on. At four or five feet off the deck he kept going and going like the Energizer Bunny, floated over the downwind fence, then got smaller and smaller as he soared away down the far pasture and vanished from sight over a midfield hump while I and everyone else watching the scene unfold were expecting disaster at every moment.

Mike was lucky. The active runway was the only one with 1/2 mile wide clear fields ahead, so he wasn't forced to do a high energy ground loop to stop, and he still had energy to clear two more fences a mile after the normal touchdown point. An article on ground effect in free flight 3/90, gives a reduction in induced drag of 29% for a 15m ship at 10 feet agl and 48% at 5 feet!

Mike was unlucky. The weld failed just when he had excess energy to dispose of but little extra time or height to consider an alternate course of action. I don't know what I would do below 400 feet with the nose well below the horizon and a flap crank free in my hand. At that point he was mostly along for the ride, but he did the most important thing right — faced with the emergency, he flew the airplane!

Mike is a piano tuner by trade, and I think he now has a deal to keep the harp of his guardian angel in concert tone.

Tony Burton

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IGC REPORTS

The following report on 1997 activities of the International Gliding Commission was omitted from the last issue due to a lack of space.

1997annual meeting

Hal Werneburg, Canadian delegate

The past year at IGC proved again to be a year filled with many issues relevant to gliding activities in Canada. I was fortunate to be able to attend the annual IGC meeting through the generous financial support from the Alberta Soaring Council, my employer and last but certainly not least, SAC. At the meeting I made a presentation outlining the airspace usage problems which threaten us in Canada. As a result of intense discussions I am happy to report that IGC formed an airspace working group headed by Fransois Van Haff, the current president of the European Gliding Union (EGU). The EGU is a body which has been dealing exclusively with aviation regulatory matters as they apply to gliding for many years and has a vast amount of experience dealing with bureaucrats and administrators. The SAC Airspace committee was advised to establish contact with Fransois and to my knowledge a fruitful exchange of information is taking place.

Besides regulatory matters, sporting issues (the main mandate of the IGC) also consumed a fair amount of time and energy of the delegates. I am pleased to report that after having proposed Tony Burton as being willing to be part of a working group tasked with rewriting and simplifying the Sporting Code, he has graciously accepted this daunting challenge. Thanks from all, Tony!

The Sporting Code has seen a number of revisions again which became effective on 1 Oct 1997. The details have been published in *free flight* and are of course also contained in the latest issue of the Code which is available from the FAI in printed and electronic form. Many manhours are being spent by dedicated individuals on matters relating to GNNS ("GPS"). Unfortunately, it appears at this time that the end is not in sight yet; the technology is still evolving and new ways of using GNNS information are constantly appearing. Security of data logging for competition and record flights is the main area of concern.

The IGC was actively involved with the first World Air Games (WAG) held this past summer in Turkey. The gliding part of the WAG consisted of the 1st World Class Glider competitions flown exclusively with PW-5 gliders. The competitions seem to have been a success and I am sure it will be repeated in future years.

Perhaps a few words are in order regarding the relationship between FAI/IGC/SAC. FAI, as the world governing body for all aerosports, has under its umbrella a number of commissions, the IGC being responsible for gliding matters. Other commissions are involved with ballooning, model aircraft, parachuting, hang gliding, etc. Canada, through our official representative, the Aero Club of Canada (ACC), is a member in the FAI and pays dues, albeit reluctantly, directly to the FAI.

The level of their dues have been a concern for all ACC aerosport member associations in Canada for some time. If reductions in Canada's FAI fees are to be gained, it is important that SAC exert pressure on the FAI through Canada's official representative — namely the ACC and its delegate on the board of the FAI. The IGC's mandate is mainly to regulate sporting matters and except for some administrative assistance from the FAI office is totally self-sufficient. Expenses of IGC officials are held to an absolute minimum and in fact most travel and meeting expenses of the volunteers(!) are self-financed. The IGC receives some income from contest sanctioning fees, aircraft evaluation reports requested by manufacturers, and the like. None of the FAI fees charged to member countries and their sporting associations find their way back to the commissions such as IGC.

In summary, IGC fulfills a valuable function in promoting, protecting and regulating our sporting activities on a world wide basis. Lowering FAI fees can only be accomplished through lobbying of the ACC; SAC and the IGC has no influence over the FAI fee structure. ❖

Hal's comment on the 1998 meeting

Over 2-1/2 days in March of this year, reports from delegates and working groups were received and proposals for the future of gliding were discussed and voted on. These discussions, although sometimes quite animated, led to consensus in a number of areas.

A new handicapped competition class, "Club Class" was created with the first world contest to be held as a separate contest in Australia in the year 2001.

It was re-affirmed that gliding competitions are essentially meant to measure performances between individual pilots and, with this in mind, steps were taken to reduce the number of pilots from each country so that in the future only one pilot per country per competition class will be able to compete (thereby eliminating the present practice of team flying). This process will be completed by the year 2007. It is also planned to add both the "Club Class" and the "World Class" (PW-5) to the World Gliding Championship event by the year 2003.

A "World Junior Gliding Championship", formerly "European", will take place in Terlet, Netherlands in June/July of 1999. Subsidies will likely be available to overseas pilots.

Preparations are well underway for the contest at Bayreuth, Germany (Bavaria Glide 1998 and the WGC in 2000). It was noted that pilots flying in these contests must carry a valid visa allowing entry into the Czech Republic since the contest area might include parts of this country.

A major rule change was approved for badge and record flights which will allow the measurement of the maximum allowed altitude difference (1000 metres) between start and finish of a speed flight from the actual altitude of the glider at start and finish. Previously these altitudes were always related to ground elevations.

Several countries are bidding for the 2001 World Air Games including Austria, Turkey, Spain and Poland.

Working groups are active in various areas such as GNSS, airspace and the Sporting Code. The latter's mandate has been expanded to not only produce a simplification of the rule book but also a complete rewrite of the rules. Our Tony Burton is active in this group and his contributions are valuable and welcome. The Airspace group is wrestling with severe problems in European airspace allocations, quite similar to what we are starting to experience in Canada. This increasing restriction of operating room is quite worrisome and the chairman of this working group is encouraging anyone with experience in airspace regulatory matters to share their knowledge with others to the benefit of all. Please contact me if you would like to be involved in this.

I was again approached by the chairman of the World Contest working group (Ake Petterson) with the idea of eventually holding a World Gliding Contest in Canada. Ake was assured that after we have overcome some of our current problems (memberships, airspace, etc), Canada would be interested in exploring this idea further. I believe that we could manage to hold a contest in our country and that it would be of major benefit to our sport.

Elections were held and the following persons were elected to office:
Tor Johannessen (Norway), President IGC
Dick Bradley (South Africa), first Vice President
Bruno Gantenbrink (Germany), VP
Erich Mozer (USA), VP
Ake Petterson (Sweden), VP
Tapio Savolainen (Finland), VP
Brian Spreckley (UK), VP

Official minutes of the meeting will be published shortly and these will be available on the FAI/IGC website, which is accessible through the SAC website <*www.sac.ca*> ❖

FAI badges

Walter Weir

3 Sumac Court Burketon, RR2, Blackstock, ON L0B 1B0
(905) 263-4374 email *waltweir@inforamp.net*

The following badge legs were recorded in the Canadian Soaring Register during the period 15 December – 25 April.

DIAMOND GOAL (300 km)

	Tom Coulson	SOSA	305.3 km	Mosquito	Rockton, ON

GOLD DISTANCE (300 km)

	Tom Coulson	SOSA	305.3 km	Mosquito	Rockton, ON

C BADGE (1 hour flight)

2578	Louis Cloutier	Quebec	1:17 h	Grob 102	St. Raymond, QC
2579	Chris Dutson	York	1:21 h	2-33	Arthur East, ON

NEW BADGE CLAIM APPLICATION FORM AND CLAIMS USING THE EW GPS LOGGER

Tony has updated the badge claim application form to include, among other important things, GPS logger claims. The form has been posted on the SAC documents web page which can be accessed directly at *www.sac.ca/page12.htm*

I expect all 1998 claims to be submitted on this new form.

The EW "unsecure" barograph/logger has now been approved for badges by the FAI when combined with several specified GPS units. Since this logger does not have the ability to store a declaration, the pilot will be required to write out his declaration, including all items listed on the SAC form designed for photos, and give it to his OO before takeoff. By the way, the flight declaration form designed for photos is also on the SAC documents page.

I have a new Cambridge flight recorder. Working with the software, I have come to realize that GPS badge leg applications should be made with a disk rather than a printout. With the Cambridge, for instance, it is possible to make a declaration at any time during the flight. The time of the declaration is recorded so you can tell that it was made after takeoff but you have to be careful to check the times. It is not flagged in any way. I don't think the average OO can be expected to be an expert on the particular software being used. I need to develop a library of evaluation instructions for each type.

SAC has a new e-mail address – *sac@sac.ca*

Sporting Committee news

EXTENSIVE REVISIONS TO SAILPLANE HANDICAP LIST

The 1998 SAC sailplane handicap list has now been posted on the SAC documents page. These handicaps are of interest to pilots completing SAC trophy flights, new Club class record flights, flying in Sports class contests, or posting Ontario or Alberta soaring ladder flights.

For the most part, SAC uses the sailplane handicaps developed by Carl Herold in the USA, who for years has been busy with this ongoing project. The 1998 list has been extensively recalculated by him based on new sailplane data, updated weight information, additional contest results, and several other factors. As a result, almost every glider on the list has had its handicap changed — in some cases significantly.

Whether or not your glider has the "correct" handicap is, naturally, the subject of eternal argument over a beer. Carl is planning to write a series of papers on exactly what goes into determining these values, and the best of the articles will appear in *free flight*.

Tony Burton, SAC Sporting Committee

Experience is that marvellous thing that enables you to recognize a mistake when you make it again.

SAC SUPPLIES FOR CERTIFICATES AND BADGES

1	FAI 'A' badge, silver plate pin		$ 6.00
2	FAI 'B' badge, silver plate pin		$ 6.00
3	SAC BRONZE badge pin *(available from your club)*	(12 for $55)	$ 6.00
4	FAI 'C' badge, cloth, 3" dia.		$ 6.00
5	FAI SILVER badge, cloth 3" dia.		$12.00
6	FAI GOLD badge, cloth 3" dia.		$12.00
7	FAI 'C' badge, silver plate pin		$ 5.00
8	FAI SILVER badge, pin		$45.00
9	FAI GOLD badge, gold plate pin		$45.00
	Items 4–12 ordered through FAI awards chairman		
	Items 10, 11 not stocked – external purchase approval given		
10	FAI GOLD badge 10k or 14k pin		
11	FAI DIAMOND badge, 10k or 14k pin and diamonds		
12	FAI Gliding Certificate (personal record of badge achievements)		$10.00
	Processing fee for each FAI application form submitted		**$15.00**
13	FAI badge application *(download from SAC website forms page)*		n/c
14	Official Observer application *(download from SAC website forms page)*		n/c
15	SAC Flight Trophies application *(download from SAC website forms page)*		n/c
16	FAI Records application *(download from SAC website forms page)*		n/c
17	Flight Declaration *(download from SAC website forms page)*		n/c
18	**Badge & Record Flying**, ed. 7 *(download from SAC website forms page)*		n/c

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

ARTICLES ACVV POUR CERTIFICATS ET INSIGNES

Insigne FAI 'A', plaqué argent	
Insigne FAI 'B', plaqué argent	
Insigne ACVV BRONZE *(disponible au club)*	
Insigne FAI 'C', écusson en tissu, 3" dia.	
Insigne FAI ARGENT, écusson en tissu, 3" dia.	
Insigne FAI OR, écusson en tissu, 3" dia.	
Insigne FAI 'C', plaqué argent	
Insigne FAI ARGENT	
Insigne FAI OR, plaqué or	
Les articles 4–12 sont disponibles au président des prix de la FAI	
Les articles 10, 11 ne sont pas en stock – permis d'achat externe	
Insigne FAI OR, 10k ou 14k	
Insigne FAI DIAMAND, 10k ou 14k et diamands	
Certificat FAI de vol à voile (receuil des insignes)	
Frais de services pour chaque formulaire de demande soumis	
Formulaire de demande pour insignes	
Formulaire de demande pour observateur officiel	
Formulaire de demande pour trophées de vol de l'ACCV	
Formulaire de demande pour records FAI	
Formulaire de déclaration de vol par feuille	
Vol pour certificats et insignes, éd.7 (anglais)	

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

Trading Post

Personal ads are a free service to SAC members (please give me the name of your club). $10 per insertion for nonmembers. **Send ad to editor**, not the national office, Box 1916, Claresholm, AB T0L 0T0
tel/fax (403) 625-4563, *free-flt@agt.net*

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

single seat

SAC travel insurance. Don't fly in the USA without proper medical insurance. Many travel health insurance policies don't cover injuries sustained while gliding. If you want SAC travel insurance, contact "Health Advantage" at 1-800-216-3588 and mention SAC. There are no forms to fill out.

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

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

Ka6CR, CG-CJB, #6608, 1967, 1200+h, annualled. In good to very good condition, new instruments, factory trailer. Slimpack chute. Michael Steckner, (440) 473-9365, *mks@gwis.com*

Skylark 4, fully equipped with trailer, hangared at GGC. Andrew Robinson (613) 226-7616 (H), (613) 723-2299 (W), (613) 237-4152 (F), *andrewr@hookup.net*

Dart 17/R, C-FOAK, easy to rig/derig, basic instruments, trailer (needs repairs), chute, O2. $9000 minus AD. Call Sylvain "Bingo" Larue at (709) 896-4499 or (902) 765-6865 after 1 July or *bingo@cancom.net*

Pilatus B4, C-GXTA, 398h, very good condition, the last and strongest version of this fully aerobatic metal glider. Includes metal enclosed trailer, O2 and chute. Goal and distance Diamond ship (see *free flight* 3/97). $21,500 obo. Paul Scott, (403) 455-7297, e-mail: *scottp@gpu.srv.ualberta.ca*

K-8, C-FROP, basic instruments, encl metal trailer. Asking $7000. Eric Durance (519) 969-7889 or Kurt Moser (519) 472-8876.

Monerai, CG-IHZ, extended wings, excellent cond, elec vario, encl trailer. $5150. Tom Stoer (705) 721-5539.

Jantar Std 2, C-GGEA, 747 h, excellent condition. Aluminum encl trailer, Rico, g-meter, EdoAir radio and chute. Asking $26,500. Réjean Dallaire, (514) 449-6333 (W), (514) 635-3470 (H).

PIK-mod, PIK wings, homebuilt fuselage, licensed as experimental K5 motorglider, flown all Diamonds, 40:1, tinted canopy, Mylar seals, O2, chute, new headset, encl metal trailer. See photo in ff 2/95. Asking $20,000. Mike Cook (250) 427-5471/2598.

RS-15, a fun aircraft with impressive performance, 2-5 hrs common. Nice condition with Imron finish. Cambridge vario, Mk 4 director, O2, radio, Schreder trailer. $14,500. Bryce Stout (905) 822-1814 ph/fax.

HP-18, C–GTRV, completed in '94 with initial flights only. Selling as I'm out of the country most summers. All drawings, special tooling, spares. All new instruments: CPT50 & CAV50 netto varios with speed ring, ATR 720 radio, new thin pack chute, etc. Maurice Engler (403) 246-6611.

Std Cirrus, CF–DFN, "Jolly Miller", 1650h, tinted canopy, bombproof trailer, excl flying cond, Ball elec vario & audio, PZL mech vario, Genave 320 radio, Plantronics mike, O2, T&B, chute. $26,000. Call Mike Glatiotis (403) 282-6121, *mglatiot@cadvision.com*

DG202/17C, 1981 carbon model, 2700h (ship has been meticulously cared for and is in excellent cond). Excellent gel coat, Becker radio/mic, ILEC computer/vario, GPS, Winter mech back-up vario, Hamilton compass, O2, water. $50,000. Based in Ephrata, WA. Harry Peters (604) 856-5456, *petersh@uniserve.com*

PIK20Bc, C–GXWD, carbon fibre, 820h, very good condition, new paint, Ball 400 c/w netto & cruise, Edoaire 720 radio, chute, O2, gear warning. Call Lee Coates at (403) 242-3056 or Denis Bergeron at (403) 526-4560.

DG600, 1050h, 17m tips and 15m winglets. Becker radio, Westerboer computer, Bohli compass, wing wheel, covers, Cobra trailer. US$52,000. André Pepin, (514) 923-3631 or *prpepin@videotron.ca*

SZD-55-1, C–FZQE, company demo, fully instrumented with the latest or with basic instruments, ready to fly. "Crown" clamshell trailer avail.
SZD-5J-1, C–GBYT, "Junior" new club single, instruments to suit. Trailer available. Ed Hollestelle (519) 461-1464 ph/fx, *solairecanada@compuserve.com*

two seat

K-7, C-FWRX, needs overhaul, encl trailer. $2500, negotiable. Eric Durance (519) 969-7889 or Kurt Moser (519) 472-8876.

Lark IS28B2, C-GVLI, 1500 h, basic instruments, Cambridge vario & repeater, Alpha 100 radio, g-meters, professionally built open trailer. Priced to move at $17,000. Winnipeg Gliding Club (204) 837-8128 or *info@wgc.mb.ca*

All my life, I always wanted to be a pilot. Yesterday I saw a glider, and now I see that I should have been more specific.

miscellaneous

Two winches, single drum with 3500 ft of cable, V-8 powered, very low time on both engines, on single axle frames with trailer hitches, excellent economical launch vehicles. Eric Durance (519) 969-7889, Kurt Moser (eves) (519) 472-8876.

Barograph, Replogle – $350.
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Contact André Pepin, *prpepin@videotron.ca* or (514) 923-3631.

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Save 50%, call Gilles at (514) 377-5737

ILEC SB-7 variometer, 2 **SB-7** varios, good condition, working order, with manuals, no flask needed, asking $US500 each. One 57mm **averager readout for SB-7**, $US150. Kevin Clifton, (306) 978-1832, e-mail *kev@envistatech.com*

Barograph, Replogle. Asking $250.
Parachute, Security 150. Asking $300.
Call Kurt Moser, (519) 472-8876

1-man rigger, a brand-new never used "Wing Thing". Selling as I never had the need for it that I originally anticipated. $295. Paul Nelson, (519) 821-0153.

magazines

SOARING — the monthly journal of the Soaring Society of America. Subscriptions US$43 second class. Credit cards accepted. Box E, Hobbs, NM 88241-7504. e-mail: *74521.116@compuserve.com* (505) 392-1177 fax (505) 392-8154.

SAILPLANE & GLIDING — the only authoritative British magazine devoted entirely to gliding. Bimonthly. £17.50 per year. BGA, Kimberley House, Vaughan Way, Leicester, LE1 4SG, UK. e-mail: *Bgahq@aol.com* fax 0116 2515939,

AUSTRALIAN GLIDING — bimonthly journal of the Gliding Federation of Australia. $A40.50 surface mail – airmail $A55. Payable on an Australian bank, Bankcard, Visa, Mastercard. Box 1650, GPO, Adelaide, South Australia 5001. fax (03) 9379-5519. *AdminOfficer@gfa.org.au*

suppliers

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

XU Aviation Chris Eaves. Glider repair in all materials. ph (519) 452-7999, fax (519) 452-0075, e-mail *xu-aviation@sympatico.ca*

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VariCalc, versatile pressure transducer and microprocessor based vario and final glide calculator, Canadian designed and produced. Skytronics (613) 820-3751 or (613) 596-1024.

LD-200 variometer, hi-performance pressure transducer based varios with audio. No bottle required. Peter Masak, 47 Sheffield Lane, West Chester, PA 19380 (610)-738-9792 *masak@ix.netcom.com*

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