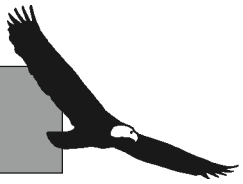
6/04
Dec/Jan

free flight • vol libre

Priorities

Phil Stade, SAC President



Although today there are beautiful lennies piled high to the south of my home, the 2004 soaring season is largely over in Canada. Remembering battles with gravity and the enjoyment of the victory cruise on the way to another goal is still an activity that comes easily.

I recall the struggle of a cloudless five hour flight and the satisfaction of landing at the Central Alberta Gliding Club in Innisfail. The image of flying on the face of a beautiful sunlit cloud and climbing up and over it in wave moves me to write "Cowley Fall Wave Camp" in bold letters on my 2005 calendar. Seeing the thrill of achievement on Gord Taciuk's face on his return from a flight in which he was preparing to land and climbed away to 28,000 feet encourages me to invite all of you to southern Alberta to take on your own soaring challenge.

2004 wasn't a banner year for soaring weather in Canada but we will look back on our personal successes and find lots of reasons to begin planning for 2005.

2005 - the 60th anniversary of SAC Anniversaries are traditionally a time for reflection, evaluation and dreaming. The condition of our sport today and what we want it to be in the future needs to be examined in the context of where we might have been without an organization such as SAC.

Would we be enjoying the relative freedom of the skies that we have today without the efforts of SAC representatives of the past? Would our ability to manage our operations be as free of government regulation without the diligence of glider pilots at the national level? Would we have a structure in place to which we can bring our soaring related concerns if it had not been for the work of the many SAC committee members that have given their time over the last 60 years? Would we have a variety of venues in which we can present our dreams for the future of soaring in Canada if pioneering pilots had not founded a group that sponsored this magazine, one of the first aviation related websites in Canada, and the online Roundtable?

The challenges continue. It is essential for our future enjoyment of this sport that Canadian soaring pilots have a voice that represents their unique interests and concerns in the areas of insurance, airspace, safety, training, aircraft maintenance, instruction, licensing, competition, marketing, records, and a host of others. Please consider volunteering to sit on one of the SAC committees or on the board of directors. Your input will be the structure future pilots build on.

Planning for tomorrow – and getting along! To no one's surprise, even a quick read of the club newsletters and soaring magazines produced during the past sixty years illustrates that mixing strong personalities, passionate pilots, financial concerns, and administrative necessity has often yielded varying opinions. It is unfortunate that sometimes this diversity has resulted in discontent and unproductive activity. On the other hand, mixing dreams and needs sometimes generates imaginative solutions such as the new program for disabled student pilots at York and the youth soaring initiative centred at SOSA. Congratulations to all involved.

As you begin your planning for 2005, keep in mind the lines from "High Flight"*: Oh, I have slipped the surly bonds of earth and danced the skies on laughter-silvered wings.* Determine now that you and your club will not only fly more next year but will ensure the joy of soaring is experienced by everyone that participates.

free flight · vol libre

6/04 – Dec/Jan

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

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Cover

Hooking up for a tow to the wave at the Cowley fall camp. Beautiful warm weather and 7 out of 10 days of wave. This large lennie is south of Cowley looking down towards Waterton National Park

photo: Kerry Stevenson

DEPARTMENTS

Changes to the FAI Sporting Code

Tony Burton, IGC Sporting Code committee

THE UPDATED SPORTING CODE for gliders (AL 5) has changes (marked by a bar at the side of affected text) which will affect your badge and record flights. Explanatory text in the Annex C pilot/OO guide has also been changed. (Go to SAC documents webpage.)

The cylinder observation zone This new OZ, an unlimited volume within 500 metres of a turnpoint, can only be used with a flight recorder. It is useful when a badge or record is being flown in conjunction with a competition task and by users of Cambridge FRs that cannot designate the FAI sector OZ. The disadvantage of this type of zone is that you must get close to the turnpoint, whereas there is no limit to the area within a sector OZ — the "beer can" could be full of water when you get there! The official length of each leg of the course must also be shortened by 500 metres each time a cylinder OZ boundary is crossed — this will eliminate some club badge "milk runs" I know of that are close to the minimum Gold and Diamond distances if this type of OZ is used.

Another trap to be wary of is that the minimum leg proportion (ex. 28%) of an FAI triangle is based on the *corrected* distance between waypoints, not the actual distance.

Three turnpoint distance Dropped in 1998, the re-introduction of this task to the distance records completes the set, so to speak, with distance types in each of the four predeclared and free definitions.

Flight recorders/declarations A pilot could always carry more than one barograph on board for backup on a badge or record flight. But, with the introduction of FRs and their stored electronic declarations, a lack of positive control was recognized on which one was submitted for a claim, and there was also some suspicion that a pilot could have different declarations on board and cherry-pick the one used depending on the flight outcome. Now, the flight files of all FRs on board must be submitted with a claim. If however, the flight requires a post-flight barograph calibration, only the FR that recorded the file used for the claim will require calibration.

The post-flight calibration period for IGC-approved electronic barographs and FRs has been extended to 2 months from 1 month.

If you've been reading *rec.aviation.soaring* recently, you will have seen a lot of comment on what constitutes the "last" declaration when more than one FR is carried, or a late paper declaration is made, and if it's still valid if made before the FR on board is powered up for the flight. Clearly this is an area where a misstep by the pilot or OO could result in an invalid claim. The Sporting Code committee will see if clarifying text can be added to Annex C for next year. In the meantime, you should carefully read your FR operating manual and be clear as to what time is stored when you make an electronic task declaration.

The above changes related to FRs is going to require OOs to be more conscious of their responsibilities about storage, sealing, and control of FRs and their flight files.

Records in any one flight

Parallelling the rule that only one type of speed record can be claimed from a flight, only one type of distance record has been added to that restriction. With the introduction of free (post-declared) distance records, almost all claims of free distance were being tacked onto a pre-declared course claim. This "two-for-the-price-of-one" situation, in the ⇨ p17

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 Canadian team pilots for 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). All material is subject to editing to the space requirements and the quality standards of the magazine.

Images may be sent as photo prints or as hi-resolution greyscale/colour .jpg or .tif files. Prints returned on request.

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 Zone Director.

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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 Canada au sein de la Fédération Aéronautique Internationale (FAI), laquelle est responsable des sports aériens à l'échelle mondiale et formée des aéroclubs 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, et la sélection des membres de l'équipe nationale aux compétitions mondiales.

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, des fichiers .jpg ou .tif haute définition et niveaux de gris peuvent servir d'illustrations. Les photos vous seront retournées sur demande.

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.

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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EDITOR
Tony Burton
Box 1916 Claresholm, AB T0L 0T0
tel & fax (403) 625-4563
e-mail: ***t-burton@telus.net***

Any service of Canada Post to above address. Courier service to:
335 - 50 Avenue West

COMMERCIAL ADVERTISING
SAC office (613) 829-0536
e-mail: ***sac@sac.ca***

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"That's not a Dagling"

I enjoyed the article on the late Shorty Boudreault and I too am proud to have known him. However, I must point out an error in the first photograph. I am certain that the glider illustrated is a Slingsby Falcon and not a Dagling.

There is a photograph on page 13 in Martin Simons' excellent book, *Slingsby Sailplanes*, which is taken from almost the same position, and comparison of the two photographs clearly confirms my identification.

I understand that this Falcon, (the only one exported), was the glider donated, in 1936, by the MacDonald Tobacco Co. to a Montreal club which had been formed by the previous McGill and Webster gliding clubs. It is known that in 1938 it was flown on the ridge at Bolton Glen (wherever that is!) for an hour by Jim(?) Simpson, after a bungey launch. I heard that it survived the war, but I have been unable to find out the end of its story.

Terry Beasley

New fund established

The Douglas E. Carson Memorial Fund has been established to recognize the great contribution Doug made to the establishment of the Bulkley Valley Soaring Club. It was Doug who provided the spark to create the club along with a handful of flying enthusiasts.

Doug was born on July 5, 1924 in Moosejaw, Saskatchewan. He attended the University of Saskatchewan, going on to become a professional photographer and a licensed private pilot. Later he moved to Ocean Falls on the BC coast and became an instrument control technician at the local pulp mill. With the purchase of a Luscombe float plane he and his family spent their spare time flying up and down the coast. In the early 70s Doug moved to Smithers, BC, where he flew as a commercial pilot.

In 1976 Doug proposed starting a soaring club but he was told that the local population base was insufficient to support one. Doug was determined to prove them wrong, and shortly thereafter he purchased a Blanik L13 and provided it to the club as a trainer.

Along with the generous support of another club member, the club was able to secure the use of a Super Cub towplane and a Pilatus B4 glider. At the peak of the club's activity it had about 25 members, with six students. Unfortunately, the club had to fold this year due to higher operating costs and a low membership. Doug passed away in 2000 after a lengthy illness and is sorely missed.

It is in great appreciation of Doug's efforts and determination that the BVSC, along with SAC, has established this memorial fund to assist others in the sport of soaring that Doug so loved.

The purpose of the Douglas E. Carson Memorial Fund, like the Pioneer Fund, is to provide an ongoing income stream to support the activities of the Association.

Leif Jorgensen

Aging pilot response

Let me say that I welcome the comments by Henry Wyatt of ESC on my recent article on the Ageing Pilot. I am delighted that we seem to be in agreement on most of the issues we have both recognized regarding the position of the ageing pilot.

I hope, like Dr. Randy Knipping, that we will all "make evidence-based life style changes, in order to become a 90 year old pilot". In fact last year I wrote an article on pilot health for *free flight*, in which I discussed this very issue. The purpose of my recent article in *free flight* was to create an awareness of the issues presented by an ageing pilot, for his own safety and enjoyment, and that of others. I don't want to create an atmosphere of paranoia or anxiety among pilots in this age group, or create a feeling of "Big Brother is Watching You".

Henry himself has referred on several occasions in his response to "the risks ... because of our changing physical and mental functions with age". I cannot speak for the FT&S committee, but I would be very surprised if their intention isn't the same as Henry's and mine, ie. that pilots young and old will make the necessary life style changes to maximize the possibility of becoming a 90 year old pilot.

We certainly do not hope that "older pilots will quietly melt away". I know — I've been soaring for 40 years. I am an older pilot.

Dr. Peter Perry, SAC medical committee

Recording the possibilities

Dave Mercer, Cold lake

Kerry Stevenson

COWLEY HAS TREATED ME VERY WELL over the years. From Diamond climbs from off the end of the runway at 700 agl on my first solo flight in Cowley (in a 1-26 no less!), to 34,000 in a borrowed yellow RS-15 that we all know as Echo-Echo, to what may be the first record ever flown in Canada over 100 mph in my Genesis 2. I really don't think that a huge amount of skill was involved in any of the above flights, just the ability to recognize opportunities when they arose mixed with generous sprinklings of the stuff called Cowley Magic.

6 October 2004 – FAI 100 km triangle

History Two years prior I had made numerous attempts at the same task. I made the triangle as flat as was legal, fiddling with the placement of the triangle to spend the longest leg in the secondary and just deal with the sink getting to the westernmost tip-of-the-triangle turnpoint. I placed the triangle really 'square' to the Livingstone Range, if you know what I mean, with the longest leg parallel to and situated smack in the middle of the Range.

On one of the days back in 2002, the longest leg was spectacular! I had a strong northerly component wind, and so as I flew southbound on that leg my groundspeed was insane, reaching a peak of 342 km/h! Unfortunately my task planning wasn't great and the sink out of the secondary killed any chance of smashing Open class records. The best I could do was a Club class record of 115 km/h; not bad, but far from Cowley's magical potential. It all boiled down to poor choices in task planning.

I spent a month after the 2002 Fall Camp thinking how to improve the speed. I was stuck in the paradigm of squaring the task to the Range and bombing down the long leg at Ludicrous Speed, but one day I had an epiphany. By tilting the whole triangle so at least two legs had only proximity to a wave, I could spend an overall greater percentage of elapsed time in lift. The percentage of distance spent in lift meant nothing.

Present day Fast forward to 6 October 2004, mostly a clear day with the upper winds perpendicular, if not slightly north of perpendicular to the Livingstone Range at roughly 45-80 km/h depending on altitude. The plan was to start high just south of the Livingstone Range, at my southernmost turnpoint at 21,000 feet, use the primary northbound and then depart the wave to reach the first turnpoint that was located west of the range. After the first turn, the plan was to beeline quickly downwind to the second turnpoint and then take the shortest route to reconnect with the primary for the climb back to finish height and fly southbound while climbing to the finish.

The first attempt of the day did not go particularly well, as too much altitude was lost in heavy sink penetrating westward to the first turnpoint, making the reconnection with the primary after the second turn difficult. Too much time was wasted in weak lift and the attempt was abandoned on the last leg.

Plan B went into effect since the wave was working at higher altitudes much more reliably. A climb was made to 28,000 feet and the start was made at 27,000 feet. All went well to the first and second turnpoints, and after the second turnpoint the primary was reached with ease. A quick climb back to 24,000 feet was made for the finish. The elapsed time for 101.2 km was 43 minutes flat giving 141.5 km/h. What was remarkable was that the lift was never all that strong. My average climb rate was not much more than 500 ft/min.

I figure that this task, when flown correctly in average Cowley wave, can be flown often in about 37 minutes, or 164 km/h; not too far from Dale Kramer's 168 km/h citizen's record set on The Ridge in the USA. To go 169.1 km/h to beat that record would take 35:54 minutes — quite doable in Cowley on a strong day where the lift is 2000 ft/min down low.

I must say I feel a little out of place and humbled to join the list of those who have held this record, as the list is a who's who of Canadian soaring. No matter the speed, it's a real honour to join the list of names in Ursula's *Book of the Best*.

7 October 2004 – SAC 100 km speed-to-goal

History In 2002 I also had planned an attempt at the SAC 100 km speed-to-goal task — essentially a downwind dash. The day I actually flew the task, the winds were well off-axis from the north, yet stupidly I chose to fly northeast to land in Vulcan, ostensibly to stay in wave from the range north of Cowley. The flight was still a Club class record, but only because the record was fairly slow to begin with! In the coulda-shoulda-woulda category, had I gone southbound that day, the average would have been about 170 km/h knowing what I know now.

Present day 7 October was mostly a clear day with the upper winds off-axis to the north of the Livingstone Range by 20 degrees or so, making it a tempting day to try the 100 km speed-to-goal flight southbound — like I shoulda done two years prior. The plan was to start just north of the Oldman River Gap at 12,000 feet, dart to the primary and fly southbound while climbing, depart CYA201(S) at 18,000 feet, use speed management to make the finish at 9000 feet, then fly the 15 kilometres to Cardston airport and land. It was a simple plan, and the execution went almost exactly as planned.

The start gate was hit on the south side of the gate as per strategy, but not at top speed, perhaps at only 100 knots IAS or so. I had been pushed too far southeast by the strong wind and expended considerable energy getting back into position to hit the narrow gate. I had given consideration to the large turn radii at high true airspeeds, but I mistook the magnitude of effect the wind's crosswind component had.

On reaching the primary, I flew at minimum sink speed to help maximize the climb rate. My speed over the ground was in the order of 85 km/h during this phase. The wave was not particularly strong with mostly 4–5 knots climb. It became clear I would not reach FL180 before reaching the Victor airway, so I contacted Edmonton Centre and received clearance across the airway. I was able to climb well south of Centre Peak, and when the lift spiked to 7 knots, I took one (unnecessary) weave to top up the height, then made my way directly to the finish. I made sure I had plenty of altitude to spare should there be an extended area of sink like I had in 2002 going to Vulcan. I had roughly 4000 feet excess with 65 kilometres to go when I left the primary pretty much on the plan at about 18,000.

The rest of the flight was merely a matter of the odd wiggle downwind to shift from one wave iteration to another, and I never had any strong extended sink to deal with. The last 50 kilometres were flown near red line with ground speeds in excess of 300 km/h. After the finish, I waffled around Cardston in weak thermal lift till the trailer arrived, then landed on the paved strip.

With a stronger wave with the same northerly component, a six-minute climb from 12,000 to 18,000 to exit the block southbound is entirely within reach in Cowley, making the task flyable in 30 minutes or less. Even those without a calculator can figure out that this should exceed 200 km/h, besting Rolf Siebert's 184 km/h citizen record set in Ely, NV.

Lessons After playing with the numbers for a while, I realized that seconds *really* count over such short distances when the speeds start getting high. For the FAI triangle, one minute saved from 43 minutes is worth 3.3 km/h, but two minutes saved is worth 6.9 km/h (it's non-linear, naturally). For the speed-to-goal, a minute saved from 36:20 is worth 4.7 km/h and two minutes is 9.7 km/h. Some lessons that I learned to save seconds were:

• Logger interval. Set to one second. My actual elapsed time was 42:56 on the triangle and 36:16 on the dash, but I lost four seconds on both tasks in what I could claim since I had the logger set to 4-second interval.

• Turn rate/radius. As true airspeed climbs so does the turn radius, and conversely turn rates plunge. In fact, a good rule of thumb is to take the TAS in knots and divide by 100 to get the radius in nautical miles, so at 25,000 feet or so, moving at 140 knots TAS, a gentle turn's radius is roughly a mile and a half (3 km) and the rate somewhere around 5°/sec (versus a normal thermalling turn radius of 125 metres at a 12°/sec rate). A level, constant speed high "g" turn to keep it tight is an energy waster.

The point is that if you are slightly off-line going into a turnpoint or a start gate, it's going to take a huge turn and a lot of "g" to fix the problem. A smarter way to enter a turnpoint is about 100-150 metres left (or right depending on which way you're going around the triangle) of the bisecting line going into the turn, pull back about a mile back to hit the turn at minimum speed with your nose high in the sky, then do a 70-90 degree bank slicing turn towards the next turn aiming to hit the target airspeed on rollout (in fighter jock talk: a high yo-yo). The start of the turn can be abeam or slightly ahead of the actual turnpoint fix and the radius of the turn should give a few fixes within the turnpoint sector. I figure I lost 40 seconds in the turnpoint sectors by going in too fast and too deep, or slightly off-line.

• Climb rate. An obvious one, but since my average was only 500 ft/min, I had to spend about 20 minutes of the triangle's 43 minute total in the climb, and fly overall slower. For the speed-to-goal, I spent 15 minutes climbing of 36 task minutes. The speed-to-goal's time to climb can easily be cut in half. Imagine the time saved by 1000 ft/min climb! My guess is a conservative 5 minutes could be chopped off by "normal" Cowley climb rates.

Speaking of Cowley Magic, I just got back into radio controlled sailplanes after 25 years away from the hobby. The morning I packed up and left Cowley, the winds were southerly and light for my first hi-start launch, and I did a few spot landing practices in fairly dead air. On my fifth and sixth launches, the winds were up to 20 knots and right perpendicular to the Livingstone Range.

The winds were right for wave, but as of yet, none of the full size birds had flown due to the awful looking sky. I pulled back the hi-start only about 75 feet because I wanted to do more spot landings, but up she went, digging hard and maxing out the launch regardless. It was clear immediately I was in some rotor/wave (secondary) and in no time at all I was struggling to see the model. I cycled back into the down-side of the rotor a few times to get it back into view, only to penetrate back upwind into the up-side to climb again.

After 20 minutes doing this, I asked my timer/observer Kerry Stevenson to jump in his car and measure 1 km down the airfield for the distance leg of a model "badge" leg, but as all this was happening the wavelength shifted upwind marginally and suddenly I was trapped in heavy down air, going from a speck to circuit height in about three minutes, landing after just over 28 minutes.

I strongly believe the model could easily have climbed to over 10,000 feet in a matter of five minutes in the secondary. I have no idea what the world record for R/C sailplanes is, but Cowley is a good reliable location for low level wave off the secondary and tertiary. Those suitably equipped with long-range reception and visibility could set a new standard for the world to aspire to down there. ❖

Some accidents *in 2004*

Dan Cook, SAC Safety Officer

ACCIDENTS CAN BE A SOURCE of invaluable information, the analysis of which can contribute to a reduction in the number and severity of accidents down the line. This is why SAC has an accident reporting system and why the Flight Training & Safety committee spends a considerable amount of time and effort examining accidents. Its intent is not to be critical, but rather to draw some good out of misfortunate events, which hopefully will help individual pilots and clubs reduce the risk of having future mishaps. Of course, we recognize that analyzing the decisions underlying an accident, with the benefits of hindsight and considerably more time, is a much less daunting task than taking decisions in the first place.

Among the lessons to be learned is that relatively minor adjustments in checkout procedures, flightline management, and/or communications among pilots can materially assist in risk reduction.

The following represents 7 of the 17 accidents SAC is aware of. Note that the "lessons learned" represent our analysis of the facts; others may not draw the same conclusions or may have a different perspective based on other information.

Events

Major damage The towpilot taxied the towplane (a tail dragger) back to the apron following 2.5 hours of towing. The aircraft turned quickly in the grass parking area and the wingtip struck a nearby tree. Damage included several ribs, spars, frame, and wing support and attachment areas. Noted were possible human factors of complacency and overconfidence.

Lessons learned It is necessary to exercise extreme caution when taxiing towplanes in confined areas. Shutting the aircraft down and moving it by hand are often called for. If obstacles cannot be eliminated, the restriction of apron areas by visual boundaries such as painted lines or other means should be considered.

Major damage During a dual training flight, the glider (a Puchacz) was put into a sideslip on a high final approach (450 feet agl) and full dive brakes were utilized to increase the rate of descent. The canopy opened and was destroyed and inflicted some damage to the wing while remaining attached to the glider at the hinge points. The instructor successfully landed the glider.

Lessons learned Similar incidents have occurred with this type of aircraft before. The FT&S committee contacted OSTIV Training and Safety Panel members and one of the test pilots of this type, and a design problem was not found. One contact however, with experience of similar problems, said that investigations suggested the canopy locks were not fully over-centre when closed, hence could easily be knocked open. The latching mechanism components can become loose/worn, and sideslips with full dive brakes may cause wake vibrations that rattle the canopy. This situation is not limited to this glider type, and side opening canopies on other two-place gliders are susceptible to large side loads in slips. If a glider is equipped with powerful dive brakes, the FT&S committee recommendation is to avoid sideslips with the air brakes fully open. If slips are necessary, attempt to do so in a direction that the cross flow of air will not force open the canopy. Careful preflight inspection of canopy latching mechanisms before each flight continues to be paramount.

Substantial damage During his first flight in a newly acquired glider (an HP-18), the pilot experienced control difficulties with the initial launch on aerotow. The pilot released, started to select flaps down, and was attempting to lower the nose but the glider rolled to one side and struck the ground. The glider was substantially damaged but the pilot was unhurt. Noted factors were pilot lack of currency and familiarity with glider type, CG towhook location, rear CG location in this aircraft, and club checkout procedures.

Lessons learned Transition checkouts, especially to modified homebuilts may present special risks. Pilot currency and club method of transitioning pilots to new types are critical mitigation factors. This process must be thorough. Aircraft with aft CG location are pitch sensitive, they lack a straightening effect of the pull of the tow rope in the initial takeoff roll, and are prone to kiting and getting high on the towplane (a dangerous situation).

Fatal During a passenger flight, a Blanik L13 was released off tow 250 feet higher than normal after the towpilot reminded the glider pilot/instructor that they had reached release height. Later, observers noted the glider was low (about 300 feet agl) and they assumed the pilot was preparing to land downwind and taxi up to the launch point. However, inexplicably the glider was turned away from the field. It appeared to enter a spin, and then spiralled towards the ground until the front passenger (a power pilot) apparently raised the nose before impact. The instructor was fatally injured and the passenger suffered broken legs. Possible human factors

included the rear altimeter apparently miss-set for the airport elevation. The accident occurred very early in the gliding season and the pilot had only a few flights in the glider (new to the club) that season.

Lessons learned It is easy to misread an instrument, especially when flying a new aircraft type and after a winter season of gliding inactivity. Currency in all flight maneuvers/emergencies is critical to a thorough spring checkout. The FT&S recommends that all items in the glider pilot test standards be reviewed annually.

Fatal During the early stages of a winch launch the glider was observed climbing rapidly, then rolling and impacting the ground. The pilot was fatally injured.

Lesson learned The BGA gliding website posted an article on winch launching stating that the target climb speed must be 150% of the 1g stall speed before rotating into full climb attitude (for a 34 knot stall speed you would need 51 knots).

Write-off The pilot of a Schweizer 1-34 flew a normal (ie. low wind) circuit to land, and selected full dive brakes on final approach and an approach speed of 60 mph. Surface winds were reported gusting from 16-22 mph and upper winds were observed much stronger. The pilot experienced heavy sink and loss of airspeed (40 mph) on final and reduced dive brakes to 1/2 to extend the glide. The glider continued to undershoot on the final approach until it struck the ground. The pilot was not able to recover from the dive and appeared to make no attempt to flare. The pilot wasn't critically injured. Human factors include low experience on type and in gliders in general.

Lessons learned Strong winds, lower performance gliders, and lack of experience and familiarity on type do not go together well. Use of dive brakes before establishing that the glider is in an overshoot situation often leads to problems. If glide slope and airspeed cannot be maintained, the dive brakes must be closed completely until an overshoot situation at the proper airspeed can be re-established. Then only enough dive brakes should be used to prevent the overshoot. In addition, this pilot appears to also have been caught off guard by the classic effect of a wind gradient. The approach speed selected for these conditions was on the low side and was not maintained. It is possible that the pilot thought he was stalling (high rate of sink) and continued to push the stick forward until impact.

Club analysis of training factors in the accident report did not include the techniques taught to the pilot in pre-licence training. The new SAC curriculum has identified recognition of an overshoot and establishment of an overshoot condition as pilot skills that must be emphasized in training. Then the brakes should only be opened after an overshoot condition has been recognized. Also the analysis did not indicate the club procedures to control type checkouts, or requirements for low-time pilots attempting early flights in difficult conditions.

Write-off In calm conditions, a student in a Blanik L13 completed the circuit and arrived too high on final. The instructor took over control and performed a side-slip with what was thought to be the dive brakes, but was in fact the flaps. The instructor did not recognize the different forces on the handle and the abnormally low rate of descent. Approaching the round out, the instructor could not put the glider on the ground before the end of the runway. He closed the flaps, thinking they were the air brakes. He attempted a right climbing turn in order to land in the opposite direction in the adjacent field of corn. The right wing tip touched the ground during the turn and the glider rolled on its nose and then on its left wing. Human factors include the poor ergonomic design of handles in this type of glider and the instructor's lack of experience.

Lessons learned This situation over confusion with flap and dive brake handles in Blanik L13s continues to trap both students and instructors. The technique of confirming visually that the correct handle has been selected by looking at the dive brakes for correct operation was not done in this situation as the instructor was distracted by the urgency of the situation.

Training gliders with powerful dive brakes should not need to be slipped to reduce height in an emergency. Certainly, slipping techniques should be taught but dive brakes are more effective. Human factors have proven that students will make mistakes and, in urgent situations, pilots can fall victim to tunnel vision and lose sight of other options. We must continuously be re-evaluating the situation and our decisions. We must guard against students putting themselves in a situation where extraordinary action must be taken. One way to condition oneself against tunnel vision is to expect that what can go wrong will go wrong and to practise and/or visualize as many different options you might have for each key point of the circuit. For example, write down a decision matrix for variables in the circuit at various decision points (high/low/too close/too far).

Some clubs have changed the feel of the grip with some success but this has not eliminated the problem completely due to the proximity of the handles. This problem, though common in Blanik L13s, is not unique to them. Visual confirmation of dive brake position every time the handle is moved for remains the best safeguard. Remember, if the result in aircraft performance is not as expected, reconfirm visually again and consider other options (the SOAR technique).

Conclusion

The "lessons learned" here are not all-encompassing or exclusive. There may be several you can think about that haven't been identified. The SAC Roundtable has a safety subject area where you can add your own thoughts that could help other pilots. Many have commented on the Roundtable that they feel the SAC curriculum is too long. Lessons learned and comparison with other OSTIV countries have been used to analyze how some of our basic training exercises could be improved. Our goal is to improve our resistance to some of these accidents. The new curriculum only adds a few more flights to the average and mainly consists of an increased number of exercises in a specific order to improve the quality of instruction. Our training is now similar to the training conducted in countries with lower accident rates. The results may take many years to achieve because many pilots have not had the benefits of these exercises and many clubs continue not to use them because they prefer to stay with current methods. ❖

Winch launch to 15,000 feet

Hillar Kurlents, MSC

I SIT STRAPPED INTO THE FRONT SEAT of a Blanik L13. Two people are connecting the Y-harness to the twin CG cable attach points on each side of the rear cockpit. They pull on the Y-cable harness covered with green garden hose, and walk back to check the automatic release, a good precaution in case I don't pull the release at the top of the launch. I am, after all a foreigner, an unknown quantity and they don't want to lose their glider.

The winch cable snakes ahead and disappears over a slight rise in the distance. The winch is somewhere far away and not visible. Someone looks at me and signals that all is ready. Nervously, I give a thumbs up and the wing tip is picked up, the hand-held radio crackles and the cable tightens. We are rolling and lift-off occurs almost immediately. By allowing the stick to remain in neutral, the climb quickly steepens to what appears almost vertical. I make small corrections with ailerons to keep the wings level. The altimeter is spinning as if in a jet fighter with the afterburner on. Far below, I see the winch with the long cable curving down to it.

Soon the climb is starting to level off. In trying to get a few more feet out of the launch I pull back on the stick. This puts extra load on the wings and when the automatic release activates, the glider shoots upward, freed from the cable load. The altimeter settles down and indicates 14,600, well short of the target of 15,000 feet. I start circling in the thermal triggered by the launch and soon pass the 15,000 foot target ....

If this sounds like a pure fantasy, the story has a logical explanation. It all started many years ago with a business trip to La Paz, Bolivia. The international airport is located at a field elevation of about 13,200 feet above sea level. This is so high the normal jet cabin pressure of 8000 feet has to be *decompressed* before the door can be opened. One might also expect the airport to be located in the mountains but this is in fact not so. Rather, it is located on the "Alto Plano", a fairly flat treeless plain stretching over a hundred continuous miles between two mountain ranges.

La Paz, the largest city in Bolivia, is located some thousand feet lower, in an enormous gully eroded from the Alto Plano. It typically takes a couple of days to acclimatize to this altitude, usually accompanied by persistent headaches. Many people never do and have to be evacuated to lower altitudes.

Having been in La Paz before, I made arrangements prior to this trip to meet with people from a local gliding club in order to have a flight or two.

Thus, a week or so later, after again having gone through the painful acclimatization, I met on a Sunday morning with members of "Club de Planeadores Ayar Uchu" and we proceeded to their field at Laja, a short distance from the International Airport. All flights, including gliders, must file a flight plan anywhere in Bolivia. The club had an unofficial agreement with the ATC which allowed them to phone in an estimated number of flights in the morning and then fine-tuning the numbers at the end of the day, all flights being "local".

On the drive to the field the instructor, who was one of several ex-patriot Germans forming the backbone of the club, gave me a thorough briefing of their operations along with bits of history. In the beginning, when the club started operations, they were offered a "good deal" to acquire what was considered a powerful towplane. However, it had a normally aspirated engine and the first attempt at towing nearly ended in disaster. After a long takeoff run, the plane and glider barely managed to get airborne, never leaving the ground effect. The result was a circuit at "10 metres", with very shallow turns and the glider releasing "on final". Now the club uses a powerful winch, operated by a native in traditional clothes and wearing a colorful knitted Inca cap.

It was early June and, being slightly south of the equator, theoretically their winter. The thermals were moderately strong and we quickly climbed to 18,200 feet, still far below the cloud base. There was no oxygen installed in the glider, and while I felt fine, having now spent over a week at these altitudes, the instructor pointed out that the club had a rule not to exceed 18,000 feet without oxygen. We used the plentiful thermals to maintain this altitude.

I had secretly hoped to soar with an Andean condor and mentioned this to the instructor. He said that this would be an extremely rare occurrence and expressed surprise and doubt when I told him that I had seen two of them only a couple of days ago. I proceeded to tell him how I had come to see the condors:

We were a small team of three Canadians trying to sell a country-wide air navigation system to Bolivia. Extreme conditions, ranging from tropical rain forest to high altitudes, dictated special design conditions. I volunteered to inspect one of the proposed locations, an NDB site at 18,600 feet. The Civil Aviation Department assigned a truck with a driver and a technician for the day trip. About halfway there, as we slowly climbed up the rocky precipice and just as we emerged from the top of a cloud bank, two very surprised condors dove from a ledge less than a couple of hundred feet away. They

glided in loose formation toward the windward rock face and disappeared in the overcast (can they fly IFR?), all without as much as a single flap of the wings. Most memorable was their enormous wing span, each wing the length of a man and the high aspect ratio which made their wings appear very narrow and very different from other birds. It was a rare sight even for the locals in the truck. To my regret I never saw any condors again.

Later, I was taken aback when the attendant at the NDB site casually retrieved his soft boiled eggs using his fingers in the boiling water which at that altitude was well below the 100°C we are used to at sea level.

Actually, I was not totally naive about the effects of oxygen starvation and its limits on the human body. Several years earlier I had undergone high altitude training for civilians at CFB Trenton. I remember volunteering to remove the oxygen mask at about 29,500 feet in the chamber. After all, several persons had succeeded in climbing Everest at 29,028 feet without supplemental oxygen so what could happen to me, sitting comfortably inside the pressure chamber? Besides, I planned to pressurize my lungs using chest muscles in order to increase oxygen absorption in the blood.

Well, guess what, I lasted less than five minutes and had no symptoms whatsoever before passing out. When I came to, I remembered my surprise to find the mask back on and set at 100% oxygen, thanks to the safety instructor. There was absolutely no recollection of any warning before passing out! A good object lesson when flying in wave. Make sure the oxygen is in fact flowing.

Nevertheless, I wanted to experiment more. During subsequent navigation equipment flight testing in the company's DC-3, I designated myself (since flight test came under me) to go without oxygen for periods of more than 30 minutes. This was actually relatively safe since there were several others present, all on oxygen. By experimentation I established my personal tolerance; up to 14,000 feet I suffered no obvious ill effects but at 16,000 feet, after about a half hour, I ended up with a bad headache. Now, on each trip to La Paz the same type of headache returned and lasted overnight. After this initial period of acclimatization most functions return to more or less normal but with significantly reduced physical capacity. Walking uphill was a real chore.

So, back in the Blanik, holding at around 18,000 feet, I took time to admire the view. To the north the landscape is dominated by Lake Titicaca. It stretches almost 200 kilometres into the distance and, at an elevation of 12,500 feet, is sufficiently low to support the growth of a few trees along its shores. The vista reminded one of a dazzling blue eye in the otherwise drab brown landscape. The region around the lake was one of the early seats of the Inca civilization and is rich in pre-Columbian history.

To the east towers the snow-covered peak of Illimani at an elevation of 21,200 feet. It has perhaps the world's highest ski resort. A portable oxygen system goes along with the tow ticket. The downhill run ends abruptly with only a warning sign and a red ribbon to direct skiers to turn away from the ever-increasing steepness of the glacier leading to a thousand feet of free fall!

Across the altoplano, 200 kilometres to the west is the Cordillera de los Andes with the peak Nevado Sajama reaching 21,464 feet above sea level. This range continues south for another 4500 kilometres, ending at Cape Horn, the tip of Tierra del Fuego.

All flights must end and soon we were on final for the landing. The ground was zipping by at a great rate and I reminded myself of the substantial density altitude effect. Later I computed the true air speed for 55 knots indicated to be 71 knots true. This brings to mind all kinds of possibilities — consider flying a speed triangle at an indicated average of 65 knots at 23,000 feet. This equates to 98 knots true, a good start towards a record.

Later, I visited the control tower at La Paz and talked with the controllers about the complexities of operating the world's highest airport. Aside from "simple" problems such as high voltage arcing in transmitters, the altitude affects almost everything. The fire engines and pumps do not meet the ICAO performance standards, and the runway, despite its 13,000 foot length, has no room for stopping at the takeoff speeds dictated by the altitude. The time-to-rotation of a typical jet taking off at La Paz is one minute and five seconds compared to about 25 seconds at sea level. This pretty well uses up the entire runway. A dirt overrun is available but it probably would wipe out the landing gear making survivability highly questionable. The takeoff speed is also the critical speed for most aircraft tires with no guarantee that they won't fly apart.

A few days later with the visit over and this information in the back of my mind, I climbed on board the old DC-8 at 1 am (the cooler air helps by increasing the air density). True to form, the engines would not start. The captain explained over the PA that the fuel regulator was not calibrated for starting at this altitude but this would be easily corrected by blasting compressed air into the regulator compartment while turning the turbine. Indeed it worked and soon we were on our way. As predicted, 65 seconds after brake release the runway end-markers flashed by a few feet below and we were airborne in the nick of time. The cabin pressure was then increased to 8000 feet accompanied by an approving murmur from the passengers. Life was returning to normal. ❖

the birth of the Air Cadet gliding program

created the Alberta Soaring Council

Kerry Bissell, ESC

THE GLIDER FAMILIARIZATION PROGRAM that was conducted at Cooking Lake, Alberta by the Edmonton Soaring Club in 1965 proved to be the starting point for the adoption of gliding as a major component of the training program by the Air Cadet League of Canada. The success of this venture by the Edmonton Soaring Club under the leadership of its president, Gordon Prest, and with enthusiastic participation of many of its members has been recorded by others.

This program was initially promoted by,
- *S/L Al Sinclair,* Senior Air Cadet Training Officer at Training Command HQ;
- *F/L Jim Nelson,* Cadet Liaison Officer for Alberta, and
- *F/L Eric Anonsen,* Cadet Liaison Officer for Saskatchewan.

These officers had excellent support from the provincial committees in Alberta and Saskatchewan and with a successful program of summer camp glider familiarization flights completed, the groundwork was laid for expanding the glider activities for the 1966 camp to be held at RCAF Station Penhold.

The Alberta Air Cadet League, with the slogan, "Let's put the Air into Air Cadets", established a planning committee whose objective would be to expand the summer camp glider familiarization flying and to offer scholarship glider pilot training. There were few qualified glider pilot instructors or glider pilots qualified to carry passengers in the ranks of the Air Cadet League; therefore it fell on support from the gliding clubs to provide both equipment and personnel to the program. To facilitate arrangements between the Alberta Air Cadet League and the gliding clubs, the Alberta Soaring Council (ASC) was formed in 1966 with representatives from the Cu Nim Gliding Club, the Red Deer Soaring Association, and the Edmonton Soaring Club.

Gordon Prest was the ASC's first president. In a report on the glider program at Penhold Summer Camp 1966, prepared by Graeme Proudfoot and Gordon Prest, authorized by D.H. Arnett, chairman of the provincial committee of the Air Cadet League, the stated objectives of the Alberta Soaring Council were as follows:

- to promote Air Cadet flying in the form of familiarization flight;
- to promote Air Cadet flying in the form of glider scholarships to "Wings" or licence standards;
- to liaise with the soaring clubs at Edmonton, Red Deer and Calgary concerning Air Cadet glider flying,
- to provide necessary training and instruction to cadet standards.

Scholarship glider flying training began at the Penhold summer camp in 1966. The selection of qualified pilots and the procurement of suitable two place training gliders from the resources of the Alberta clubs was undertaken by the Soaring Council. This program was judged to be a success and plans were made to expand activities in the following year.

Gordon Prest and Kerry Bissell, president of the Alberta Soaring Council in 1967, were named to the planning committee by the Alberta provincial committee of the Air Cadet League. Gliding activities during the summer camp were divided, with the familiarization flying taking place at Penhold and the scholarship flying at nearby Innisfail airport. The Red Deer Soaring Association undertook the project of organizing the equipment and personnel to carry out the scholarship program under direction of its president, Dirk Zutter. Some details of this program are worth recording here.

The scholarships were awarded by the provincial committees in Saskatchewan, British Columbia and Alberta. The candidates included:

cadet	*squadron*		*province*
Matheson	#722	Birchills	Sask
Gropp	#703	Regina	Sask
Dyer	# 43	North Battleford	Sask
Magnus	#664	Cold Lake	Sask
Hanson	#702	Saskatoon	Sask
Newman	#570	Edmonton	Alberta
Tobias*	#604	Calgary	Alberta
Green	#553	St. Albert	Alberta
Elgin*	#522	Berwin	Alberta
Bruce*	#538	Buffalo (Calgary)	Alberta
Hall	#583	Haney	BC
Johnson	#513	New Westminster	BC
S/L Wood*		Vancouver	BC
S/L Belaney*		Vancouver	BC

* these Cadets/Officers held Private Pilot licences.

Dirk Zutter, CFI for this program, was assisted by Daniel Lizotte, CFI from the Quebec soaring club and by Bob Short, a member of the Red Deer club, who acted as tow-pilot. Incidentally, Bob Short is believed to be the first Air Cadet in Canada to have earned both a Private Pilot Licence and a Glider Pilot Licence under scholarship while in the Air Cadets. These three provided the ground school and the flying instruction which ensured the successful examinations to Glider Pilot Licence status for most of the cadets on this course.

The flying training was conducted at the Innisfail Airport, some ten miles distant from the Station Penhold. Transportation to the field along with box lunches enabled the group to take best advantage of the good weather and to occupy classroom facilities at Penhold for the ground school portion of the training when weather was not so good. The training program was judged to be

very successful and lent added impetus for the league to expand its efforts towards incorporating gliding in the training syllabus.

The very great commitment by the Alberta gliding clubs to the support of the Air Cadet League in establishing the gliding program proved to be a detriment to the growth of the private clubs. Participation by club instructors in the familiarization program and the leasing of club gliders during the holiday seasons put a damper on expansion of club memberships. The ASC sought to gain some relief from this situation in presenting a proposal to the Alberta provincial committee.

In general terms it was proposed that the League purchase additional gliders making it self-sufficient in their need for gliders during summer camp. The ASC would undertake to lease gliders from the League, to sublet them to Alberta clubs in the spring and the fall and to offer scholarship training to Air Cadets. This proposal was not well received. By now the League had developed a sufficient cadre of qualified pilots and instructors within its ranks to carry out its own programs.

Most of those in the gliding fraternity are aware that Air Cadets and the private clubs have gone their separate ways since 1967. Sporadic attempts have been made to undertake scholarship cadet training (ie. the Edmonton Soaring Club trained cadets from Mundare, 1993) but these attempts seemed to meet resistance within the League.

There have been suggestions that military support may be withdrawn or reduced for some cadet programs. Also, there is political support for the concept of privatization. Given these conditions, the opportunity presents itself for renewed discussions between the ASC and the Alberta provincial committee of the Air Cadet League of Canada leading to renewed participation by the gliding clubs in the Air Cadet training programs. The training syllabus developed by the Air Cadet League closely parallels that of the Soaring Association of Canada and no difficulties should arise in having clubs adopt the League's syllabus for cadet training purposes. Hopefully, joint discussion would lead to actions beneficial to both the League and to the Alberta Soaring Council. ❖

This history was written by Kerry Bissell in 1995. Since then both SAC and the Alberta Soaring Council have offered incentives to Air Cadets to join gliding clubs for ongoing soaring training but have not undertaken to run any cadet flight training program. SAC offers free membership to Cadets. ASC subsidizes $100 of any cadet's club membership, matches any gliding scholarship awarded to top cadet glider pilots for soaring training at an ASC club, and rebates to all youth members of ASC clubs 25% of their training launch costs.

seeing the stall

Larry Morrow, Winnipeg GC

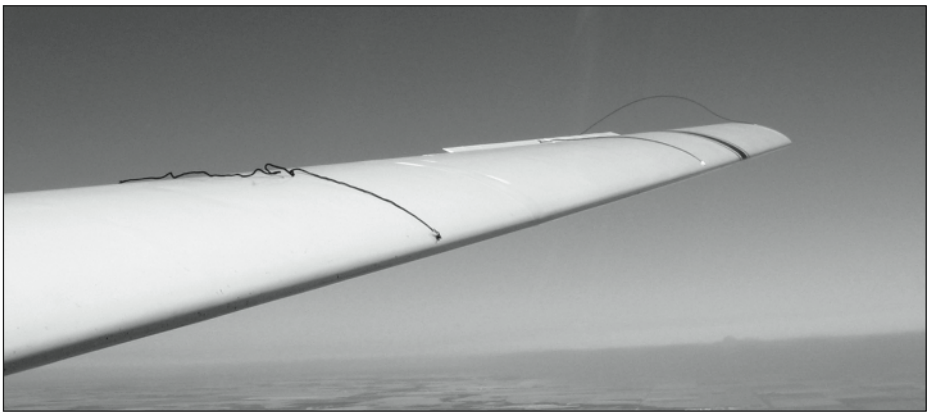
THE SAC SOARING INSTRUCTION MANUAL gives the purpose of stall training as the recognition of stalls and recovery from stalls. The mid-wing design of the Krosno glider allows for some enhancement of this training as it allows both occupants a good view of most of the top surface of the wing.

By taping yarn to the top surface, it is possible to show students the turbulent air flow that results when the stalling angle of attack is reached. There are several lessons in stalling behaviour that we can observe:

- the student can observe the turbulent air flow when the critical angle of attack is reached.
- the student can observe the air flow become smooth again when the angle of attack is decreased. A small forward movement of the control column will be sufficient to re-attach the airflow from a gentle stall. This lesson also shows that it is not necessary to move the nose of the glider into a steep nose down attitude in order to recover from a gentle stall.
- the student is able to observe the airflow begin to detach at the wing root and progress outwards as the angle of attack is slowly increased during a "mushy" stall.
- A related lesson can be demonstrated by putting a piece of yarn on the wingtip and observing the intensity of the wingtip vortex at different angles of attack.

Taping two or three pieces of dark coloured yarn about two feet long near the leading edge will give a good view of the airflow over the wing. See the photo below. PVC tape will not leave a residue if it is removed at the end of the day.

The use of the yarn is intended only for the instructor demonstration stage of the stall lessons. During the first flight(s) teaching stalls the student can observe the wing while the instructor demonstrates the stalls. ❖



Psychological factors affecting checklist use

Asaf Degani and **Earl Wiener**
from the *ICAO Journal*
and reprinted from *free flight 5/91*

To perceive something is to be conscious of it and to pay attention to it. Perception is a dynamic process. It changes constantly depending on the physical stimuli and on the way in which the brain blends incoming information with information already stored in memory. So, the mere existence of a physical stimulus obtained by a receptor (eg. the eyes) is not an absolute predictor of what the pilot will perceive and act upon while performing a task or checking a list, for example.

When a certain task is performed repetitively in the same way, operators become experienced with the task. In a sense, they actually create a "mental model" of the task. With experience, the shape of the model becomes more rigid, resulting in faster information processing, the ability to divide attention and, consequently, a reduction in workload. In return, however, this model may adjust or sometimes even override the perception of physical stimuli coming from the receptors and create a bias in the brain (causing one to see what one is accustomed to seeing).

Many of the pilots interviewed by the authors stated that at one time or another they had seen a checklist item in the improper status, yet they perceived it as being in the correct status and replied accordingly. The flap handle, for example, could be positioned at the zero-degree slot (physical stimulus), but the pilot may nevertheless perceive that the handle is on the five-degree position, and call out "flaps — five" because he expects the handle to be there. This incorrect reply is based on numerous similar checks in which the flap handle always was in the proper setting during this stage in the checklist. Often, this phenomenon is coupled with unfavourable psychological and physical conditions such as time pressure, high workload, fatigue, and noise. Nevertheless, the result is a human failure.

Most automobile drivers have had the experience of driving along a familiar route and suddenly realizing that they have travelled some distance without being aware of it. The driver ceases consciously to process information for a significant length of time. As a previous human factors study determined:

> "the highly practised skill of driving can be controlled by the output of the brain's pattern analyzing mechanisms without conscious perception."

There was almost a consensus among the pilots interviewed that at many times checklist procedures become an automatic routine (or "sing-song," as some called it). The pilot would "run" the checklist, but the reply would be done from memory, and not based on the actual state of the item. The authors believe this is controlled by the output of the brain's pattern analyzing mechanism, and that the check procedure is done without conscious perception.

Reversion to older habits is another common phenomenon in aviation, and its extreme usually occurs following a pilot's transition from one aircraft to another. This can also affect checklist performance. An example is evident in the 1987 crash of a Jetstream 31 following an aborted takeoff; the flight crew did not advance the RPM levers to 100 percent as called for by the operating procedure and checklist. The captain and first officer had a limited amount of time on the aircraft (47 and 15 hours, respectively), but both had considerable experience in a Beech 99. The operation procedure and checklist of the BE99 require that the RPM levers be set to takeoff position *before* taxiing. The Jetstream 31 procedure requires that the same levers be set *just prior* to takeoff. Therefore, the item was the last on the before-takeoff checklist. The National Transportation Safety Board concluded that under urgency and stress imposed by the controller, the pilots may have reverted back to recent habit patterns and began the takeoff believing that the RPM levers already had been properly positioned.

Another psychological factor affecting checklist performance is the relationship between the speed of performing the checklist and the accuracy of the check. Laboratory research has revealed a very definable relationship between response time and error rate. Therefore, if the pilot scans the appropriate panel(s) rapidly because of time pressure, the accuracy of his perception will suffer and the probability of error will increase.

The relationship between a task and its expected outcome is another factor that affects checklist use. Without the crew witnessing its apparent effectiveness, the redundant function of the checklist can sometimes lead to a decline in the perception of the task's importance. This is somewhat analogous to the use of seatbelts in a car: although most experienced drivers are aware of the consequences of not wearing a seatbelt, the individual's personal experience about the likelihood of an injury while not wearing a seatbelt is relatively low. The same applies to checklist use.

In summary, the combined effect of expectations, experience, and the pattern analyzing mechanism is a double-edged sword. On one hand, this ability makes the user flexible and faster in responding to multiple conditions. On the other hand, it can lead the operator to make a disastrous mistake just because part of the information which was collected quickly or without sufficient attention appeared to match the expected condition.

Research on this study began with a focus on checklist typography and design. The research goals changed however, as the authors interviewed airline pilots, observed cockpit procedures from the jumpseat, and studied incident and accident reports. They began to realize that pilots' misuse (or non-use) of the normal checklist could be attributed mainly to other factors as outlined above. For example, they found that "company culture" (read club safety attitudes) is an important influence on pilot attitudes towards checklist use.

This study tells glider pilots to use a checklist, to take time completing it, and to do more than look at a control and say "open" but to also physically test its movement and observe that, for example, the spoiler is indeed out — because if we hurry, our eyes and brains will tell us barefaced lies. Tony

SAC news

SAC membership 2004

Club	10 yr avg.	2004 total	% avg
ASTRA	11	13	118
Alberni	16	12	76
Air Sailing	18	14	79
Bluenose	26	13	51
Bonnechere	7.9	6	76
Central Alberta	11	13	114
Champlain	59	39	66
Cold Lake	14	5	36
COSA	28	11	40
Cu Nim	60	56	93
Edmonton	54	54	100
Erin	28	13	46
Gatineau	88	70	80
Grande Prairie	9.4	6	64
Great Lakes	17	27	155
Guelph	27	28	106
London	34	40	118
Montréal	96	81	84
Mont Valin	3.0	4	125
Outardes	28	31	112
Pemberton	9.2	5	54
Prince Albert	15	17	113
Québec	49	47	97
Regina	24	18	76
Rideau Valley	31	36	118
Rockies	22	36	164
Saskatoon	19	22	119
Silver Star	11	10	89
SOSA	158	152	96
Toronto	19	16	85
Vancouver	83	79	95
Winnipeg	62	56	90
York	97	90	93
Non-club	23	22	96
Air Cadet League	10	5	48
totals	*1267.5*	*1147*	*90.5*
membership in 2003		*1232*	

FAI/IGC "Gliding Weeks 2005" a contribution to the FAI Centenary

The International Gliding Commission (IGC) recently announced the manner in which they will contribute to the celebrations of the FAI 100th anniversary in 2005.

In 2005, the year of FAI's Centenary celebration (see *http://www.fai.org/centenary/*), the IGC will ask all glider pilots around the world to track their kilometres flown during a specific two week period in each hemisphere. Pilots will be invited to submit their flights via a link on the <*http://www.fai.org/gliding/*> IGC website. This link will be provided in January. All flights will be tracked with the support of the <*http://www2.onlinecontest.org/olcphp/olc-i.php?olc=olc-i*> On Line Contest (OLC), the highly successful world on-line gliding competition. The total number of kilometres flown in honour of the FAI Centenary will be tallied and reported in October 2005, at the official celebration of the FAI Centenary in Paris, France.

The northern hemisphere period for submission of flights will be 25 June to 10 July, 2005.

FAI Centenary diplomas will be awarded to the pilots from each hemisphere who have made the longest flight in any of the FAI classes of gliders, Open, 18 Metre, 15 Metre, Standard, Club, Ultralight, and World Class.

For further information, please contact IGC First Vice-President Eric Mozer at <*emozer@deltamold.com*> or consult the IGC website, where additional info will be published soon.

Signature of Holder.

SOARING ASSOCIATION OF CANADA
SILVER AND GOLD BADGE
CERTIFICATES

This is to certify that:
Ovila BOUDREAULT

Holder of F.A.I. Certificate
No. 1

Has qualified for Silver Badge and is entered in The National Register as No. 1 Silver Badge.

Signed G.B. Baranowski
For S.A.C.

Date Aug. 1, 1948

Qualified for Gold Badge and is entered in The National Register as No.
Gold Badge.

Signed
For S.A.C.

Date

A historic FAI Gliding Certificate

Above are scans of the inside pages of Shorty Boudreault's gliding certificate, the first issued in Canada with the recognition of Canada's first Silver badge.

Good advice to motorglider pilots

If you aren't already a member of the Auxiliary-powered Sailplane Association, consider joining the organization for the great level of support it provides. Visit them at <*www.motorglider.org*>. At the very least, take a look at some of the on-line back issues of the ASA bulletin.

If you haven't read my, *A Guide to Self-launching Sailplane Operation (3rd Edition)*, I strongly urge you do so (the second best text is the 2nd edition of the guide!). It's free, and it's on the ASA site under "On-line Publications". If you hurry, you can be the 935th person to download it!

Eric Greenwell

FAI badges

Walter Weir

3 Sumac Court, Burketon, RR2, Blackstock, ON L0B 1B0
(905) 263-4374, *<waltweir@ca.inter.net>*

The following badge legs were recorded in the Canadian Soaring Register during the period 12 September to 8 November 2004.

SILVER BADGE

983	Kyle Nordman	SOSA
984	Jan Mensink	Vancouver

***DIAMOND ALTITUDE** (5000 m gain)*

Gordon Taciuk	Cu Nim	7040 m	Jantar	Cowley, AB

***GOLD ALTITUDE** (3000 m gain)*

Gordon Taciuk	Cu Nim	7040 m	Jantar	Cowley, AB
David Clair	Vancouver	3090 m	Jantar	Hope, BC

***SILVER DISTANCE** (50 km flight)*

Kyle Nordman	SOSA	69.9 km	Astir CS77	Albertus, Il
Jan Mensink	Vancouver	60.0 km	Astir CS77	Valemount, BC

***SILVER ALTITUDE** (1000 m gain)*

Kyle Nordman	SOSA	1850 m	Astir CS77	Albertus, Il
Michael Lam	Vancouver	2770 m	L33 Solo	Hope, BC
Gordon Taciuk	Cu Nim	7040 m	Jantar	Cowley, AB

***SILVER DURATION** (5 hour flight)*

Kyle Nordman	SOSA	5:52 h	Astir CS77	Albertus, Il
Pascal Hayet	Quebec	5:45 h	Blanik	St-Raymond, QC
John Mulder	Central Alberta	5:11 h	Jantar	Innisfail, AB
Gordon Taciuk	Cu Nim	5:03 h	Jantar	Cowley, AB

***C BADGE** (1 hour flight)*

2791	Kyle Nordman	SOSA	5:52 h	Astir CS77	Albertus, Il
2792	Steven Jansen	Vancouver	1:16 h	Blanik L23	Hope, BC
2793	Donald Plewes	SOSA	1:23 h	Blanik L13	Rockton, ON
2794	John Mulder	Central Alberta	5:11 h	Jantar	Innisfail, AB
2795	Gordon Taciuk	Cu Nim	5:03 h	Jantar	Cowley, AB
2796	Alain Laprade	Montreal	1:03 h	Blanik L33	Hawkesbury, ON

SAC records

Roger Hildesheim

49 Maitland Street, Box 1351, Richmond, ON K0A 2Z0
(613) 838-4470, *<lucile@istar.ca>*

The following record claims have been approved:

Pilot	**David Mercer**
Date/Place	6 October 2004, Cowley, AB
Record type	100 km Speed triangle, Open & Club, Territorial
FAI Category	3.1.4h
Sailplane Type	Genesis 2, C-GBKK
Speed	141.5 km/h (133.0 km/h Club)
Task	GPS turnpoints
Previous Record	Open: 131.1 km/h, 1989, Kevin Bennett
	Club: 115.6 km/h, 2002, David Mercer

Pilot	**David Mercer**
Date/Place	7 October 2004, Cowley, AB
Record type	100 km Speed to goal , Open & Club, Territorial
FAI Category	SAC
Sailplane Type	Genesis 2, C-GBKK
Speed	167.0 km/h (156.9 km/h Club)
Task	GPS turnpoints
Previous Record	Open: 136.1 km/h, 2004, Tim Wood
	Club: 119.8 km/h, 2004, Tim Wood

Pilot	**Tony Burton**
Record type	Free triangle , Open & Club (previously unclaimed)
Distance	433.4 km Open, 515.7 km Club
Other data	see free flight 4/04 for Triangle distance flight

Note: The forms for record claims have been updated to reflect recent changes to the FAI Sporting Code and to reflect unique Canadian record classes such as Club and SAC classes. These updated forms are on the SAC website.

As of October 2004, the Sporting Code allows only one distance record type along with one speed record (if it occurs) to be claimed from a given flight. Please keep this in mind when submitting your new claims. (See article on page 4 for more.)

FAI BADGE SUPPLIES

Order through FAI badges chairman – Walter Weir
3 Sumac Court, Burketon, RR2, Blackstock, ON L0B 1B0
Note: items 4 and 5 not stocked – external purchase approval is given

1	FAI 'C' badge, silver plate pin	$ 6.00
2	FAI SILVER badge, pin	$45.00
3	FAI GOLD badge, gold plate pin	$50.00
4	FAI GOLD badge, 10k or 14k pin	
5	FAI DIAMOND badge, 10k or 14k pin and diamonds	
6	FAI Gliding Certificate **10 for $39.00 to clubs**	$10.00
	Processing fee for each FAI application form submitted	**$15.00**
36	FAI 'C' badge, cloth, 3" dia.	$6.00
37	FAI SILVER badge, cloth 3" dia.	$12.00
38	FAI GOLD badge, cloth 3" dia.	$12.00

Order these through the SAC office

33	FAI 'A' badge, silver plate pin *(available from your club)*	$ 3.00
34	FAI 'B' badge, silver plate pin *(available from your club)*	$ 3.00
35	SAC BRONZE badge pin *(available from your club)*	$ 3.00

Please enclose payment with order; price includes postage.
GST not required. Ontario residents, add 8% sales tax.

SAC forms *(downloadable from SAC web site forms page)*
FAI badge application, Official Observer application, Flight trophies, FAI Records application, Flight Declaration form

ARTICLES FAI POUR INSIGNES

Disponibles au président des prix de la FAI – Walter Weir
3 Sumac Court, Burketon, RR2, Blackstock, ON L0B 1B0
Les articles 4 et 5 ne sont pas en stock – permis d'achat externe

1	Insigne FAI 'C', plaqué argent
2	Insigne FAI d'ARGENT
3	Insigne FAI d'OR, plaqué d'or
4	Insigne FAI d'OR, 10c ou 14c
5	Insigne FAI DIAMANT, 10c ou 14c et diamants
6	Certificat FAI de vol à voile (receuil des insignes)
	Frais de services pour chaque formulaire de demande soumis
36	InsigneFAI 'C', écusson en tissu, 3" dia.
37	Insigne FAI ARGENT, écusson en tissu, 3" dia.
38	Insigne FAI OR, écusson en tissu, 3" dia.

Disponibles au bureau de l'ACVV

33	Insigne FAI 'A', plaqué d'argent *(disponible au club)*
34	Insigne FAI 'B', plaqué d'argent *(disponible au club)*
35	Insigne ACVV badge de BRONZE *(disponible au club)*

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%.

Formulaires ACVV
Formulaire de demande pour insignes FAI, Observateur Officiel, trophées, records FAI, formulaire de déclaration de vol

Announcing the SAC "Looking for Heros" records contest

BECOME A HERO. Become a legend. Become enshrined in Canadian soaring culture. Make a fortune (well, not really!)

To celebrate the addition of the new FAI soaring record type, 3 Turnpoint Distance, I would like to announce a mini-contest to populate the new type in the Canadian records table and have some fun at the same time.

Here's how it works:

- Everyone is encouraged to make as many attempts as they would like (or they and their families/crew can stand) on the record until 31 August, 2005.
- Pilots then have thirty days (until 30 September 2005) to formally submit their best attempt.
- The record type will have citizen and territorial sections in the following categories:
  - Female (let's go ladies)
  - Club (everyone gets handicapped)
  - Multi (take along a friend)
  - Open (anything goes)
- The longest flight in each category that meets the Sporting Code requirements will become the first official Canadian record for the 3 turnpoint distance.

The fine print:

- Pilots should notify me via e-mail of their successful attempts and I will post these weekly on the SAC Roundtable throughout the summer.
- Formal submission of paperwork is only required after 31 August 2005 for a pilot's best flight in any category.
- All flights for formal submission must be in accordance with the requirements and standards of proof for records as defined in the Sporting Code.

I will also be giving a presentation on the ins and outs of record flying in Canada and discuss this contest in more detail at the Canadian Advanced Soaring Winter Clinic in early 2005 (date tba).

Many thanks to Walter Weir for proposing this idea (rather than the alternative of setting a minimum distance) and to Jörg Stieber and Tony Burton for their support. I look forward to receiving your notifications and looking at your flights in the coming months. Let the fun begin!

Cheers, **Roger**

Sporting Code ...

from page 4

view of the Sporting committee, ran counter to the philosophy of what any record should be: that it should be rare and stand out from other flights as the best performance of its type in the world.

Note that it is still possible to claim more than one record from one flight if:

- the record type is different (a speed and a distance),
- if you are a woman (both general and feminine categories — a bit of IGC reverse discrimination here), or
- you are not flying an Open class glider (ex. a flight with a 15m class glider might also exceed an Open class record).

New record increments

Given the high position and timing accuracy of FRs, the incremental distance or speed to claim a new record has been narrowed to 1 km and 1 km/h from the previous 10 km and 2 km/h.

Barograph calibration procedures

The Annex C appendix on recommended procedures for flight recorder and mechanical barograph pressure calibration has been completely rewritten. Official Observers or pilots should pass a copy of this appendix to their calibration lab for inclusion in their company procedures manual the next time you give them your FR/barograph.

Record/badge forms

The IGC forms now reflect the Code changes and the Canadian record forms have been adjusted and posted on the SAC website.

IGC Sporting Code committee members:

Ross Macintyre, chairman (UK)
Tony Burton (Canada)
Tor Johannessen (Norway)
Axel Reich (Germany)
Judy Ruprecht (USA)

Directors & Officers

President/Alberta
Philip Stade
Box 13
Black Diamond, AB T0L 0H0
(403) 933-4968 (H)
(403) 933-6190 (B)
pnbstade@platinum.ca

Ontario
Doug Scott
115-2301 Lake Shore Blvd W
Etobicoke, ON M8V 1A7
(416) 255-9449 (H)
dougmscott@hotmail.com

Eastern
vacant

Prairie / Vice President
John Toles
45 Churchill Court
Saskatoon, SK S7K 3W9
(306) 652-7909 (H)
j.toles@shaw.ca

Pacific
Kevin Bennett
52 Arbour Estates Landing NW
Calgary, AB T3G 3Z9
(403) 209-2611 (H)
kev_tri@telus.net

Exec Director & Treas
Jim McCollum
6507 Bunker Road
Manotick, ON K4M 1B3
(613) 692-2227 (H), 829-0536 (B)
sac@sac.ca

Finance
members: Phil Stade
Richard Longhurst
Jim McCollum

Flight Training & Safety
Ian Oldaker
"Willow Spinney"
RR1, Limehouse, ON L0P 1H0
(905) 873-6081 (H)
oldaker@aztec-net.com
members:
Dan Cook cookdaniel@adelphia.net
Tom Coulson tcoulson@istar.ca
Gabriel Duford gabriel@zeroknowledge.com
Bryan Florence florence_bryan@emc.com
Joe Gegenbauer gegb@home.com

Free Flight
Tony Burton, Box 1916
Claresholm, AB T0L 0T0
(403) 625-4563 (H&F) t-burton@telus.net

Historian
vacant

Insurance
Richard Longhurst
23 Lesmill Road, Suite 100
Toronto, ON M3B 3P6
(416) 385-9293 (H), 385-9298 (cell)
rlonghurst@look.ca
member: Keith Hay keith.hay@attglobal.net

Medical
Dr. Peter Perry
27 Bird Court, Cambridge, ON N1T 1V6
(519) 623-1092 (H&F), 740-6547 (B)
member: Dr. WL Delaney

Membership/Marketing
John Brennan john_brennan@sympatico.ca
Charles Petersen cfpeter@total.net

Sporting
Jörg Stieber
508 Fairview St. New Hamburg, ON N3A 1M7
(519) 662-3218 (H), 662-4000 (B)
joerg@odg.com, joerg_stieber@hotmail.com
members:
Colin Bantin ccbantin@sympatico.ca
Walter Weir waltweir@ca.inter.net
contest letters: Al Schreiter alschre@ican.net

Committees

Air Cadets
Dave Hennigar
404 Moray Street
Winnipeg, MB R3J 3A5
(204) 837-1585
dhengr@mb.sympatico.ca

Airspace
Ian Grant
2954 Otterson Drive
Ottawa, ON K1V 8Z7
(613) 737-9407 (H), 995-2031 (B)
granti@igs.net
members: Roger Harris
Scott McMaster

FAI Awards
Walter Weir
3 Sumac Court, Burketon
RR 2, Blackstock, ON L0B 1B0
(905) 263-4374 (H)
waltweir@ca.inter.net

FAI Records
Roger Hildesheim
Box 1351, Richmond ON K0A 2Z0
(613) 838-4470
lucile@istar.ca

Technical
Paul Fortier
RR2, Mountain, ON K0E 1S0
(613) 989-1634 (H)
paulfortier*1*@juno.com
members:
Chris Eaves xu-aviation@sympatico.ca
Herb Lach
Glenn Lockhard glockhard@aol.com

Trophy Claims
Phil Stade
see President data

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

Website
Tony Burton t-burton@telus.net
Bob Lepp boblepp@aci.on.ca
Martin Vanstone mvanstone@ltinc.net

Youth Issues
Oksana Chukyo
55 Farfield Avenue
Etobicoke, ON M8W 1R6

Trading Post

Personal ads are a free service to SAC members (give me name of your club). $10 per insertion for non-members. **Send ad to editor**. Ad will run 3 times unless you renew. Tell me if your item has been sold sooner. Subject to some editing for length (usually 6 lines max).

single seat

1-26A, CF-ZDQ, #70, 2260h. Metal wings. Framing check and recovered 1998. New paint 2002. Basic inst, open trailer. $10,000 firm. At London SS. Chuck McGee, <*cmcgee@quadro.net*> (519) 283-6260.

BG12B, CF-UKB, 774h, 1967, basic instruments plus T&B, 2 elec varios (one with audio), O2, chute, encl. metal trailer. Construction plans available. A good performer and capable XC ship. Always hangared or in trailer. Asking $7000 but open to offers. Derek Kirby (905) 458-0819, <*dkirbyc614@rogers.com*>.

L-Spatz 55, C-GBBI, 15 metre, L/D 29 at 39 kts, min sink 1.3 kts, empty 165 kg, loaded 265 kg (very light, a real floater). Basic insts. No trailer (the ASW-20 trailer could be borrowed for transport). At Atlantic Canada Aviation Museum, Halifax. History and photo at < *http://acam.ednet.ns.ca/cgbbi.htm*>. Needs 100+ hr work to be airworthy. Fabric looks good but may need recovering. Make offer. Peter Myers, (613) 531-9364, <*petermyers@cogeco.ca*>

Std Jantar, C-FLZS, 1205h,1976. All ADs done. Basic instruments, ATR 760 chan radio & boom mike, LX4000 computer, metal trailer. $28,500 obo. For info see <*www.hunkeler-online.com*>.

LS1-C, #54, 1970, 2088h. Good cond; gelcoat needs redoing. Responsive, excel L/D value for those who want to DYI. Annual in 2000, all ADs done. Basic inst, mech. vario, electric vario with audio, radio. Metal trailer, overhauled and painted with Imron in 2000, with wingstand, tail dolly, and solar-powered fan. At Montreal Soaring Council. $13,000 obo. Contact: (514) 240-8642 or <*pkom@videotron.ca*>.

ASW-15, C-GKDS, 1040h. Std. instruments + TE vario with audio, CofA till Oct. 2004. Semi-aerobatic glider, always hangared, never damaged. $18,000 obo. Includes factory trailer and misc. items. Call Ted Beyke (416) 244-8855, <*tedbeyke@excite.com*>.

HP-14T, C-FAXH, 1480h, glider & trailer in good condition. Trailer very stable when towing. New MicroAir 760 with boom mike, ILEC SB8, ELT, O2, new winglet-fences. Low maintenance A/C giving good bang for your dollar. E-mail me for current photos. Asking $19,300. <*spencer.robinson@sympatico.ca*> (416) 620-1218.

HP-18, 253h, 1986, stand. instruments incl GPS, hand held radio, baro, L-100 vario. Centre stick controls, one piece canopy, tow bar and wing dolly, encl trailer. All in excellent cond. Asking $15,500. Cal Gillett, (519) 425-1679, <*cpg342@oxford.net*>.

Std Cirrus, C-GEOD, 1800h. Refinished. Microair radio, elec and mech vario on good TE probe, connections and mounting for Volkslogger and PDA, O2, wing wheel, tow-out bar, trailer nice to tow. Easy flying, great thermalling glider for the low price of $25,000 obo. Many photos by e-mail on request. Al Hoar, (403) 288-7205, <*gwen.al@shaw.ca*>.

H301 Libelle, 1/2 share, $12,500. Located at York Soaring. Tracy Wark, details contact Gino Cavicchioli, <*gino@ginocavicchioli.com*> (905) 549-2638.

Glasflugel 304CZ, 230h, NDH, always hangared, 15m winglets & 17.4m tips, Roger release, Cambridge L-Nav, vario & GPSNAV Model 20, Sage SV vario, ATR 57 radio, Compaq Aero PDA, tow-out gear, one-man rig. Cobra trailer, solar vent, stabilizer jacks, swing-down supports, centre rail loading ramp. In Ottawa. $US59,500. Contact: <*rwalker@devon.com*>.

Grob Astir Club IIIb, C-GTMX, #5570, 197h. Last flown July 1997. Fixed gear version. Basic insts, Ball vario and audio, Dittel 16 channel radio. Wing spigot AD done, one other req'd. At Gananoque, ON on open trailer (designed to have lift top cover, but not built), pulls very well. $26,000 obo. Glider data at <*www.sailplanedirectory.com/PlaneDetails.cfm?planeID=22*>, Peter Myers <*petermyers@cogeco.ca*>.

ASW-20, 1981, 2100h, ELT, Varicalc GPS/computer/recorder, Dittel 720 ch radio, Security 150 chute, 1989 Cobra trailer, tow-out gear. Nick Bonnière, <*bonnfutt@magma.ca*>.

ASW-20, was C-GBDJ; #20033, 190h. Last flown '86. damaged - good project to register as homebuilt. Complete factory drawings for ASW-20 and long winged ASW-20L included. At Stanley, NS on open trailer (designed to have lift top cover, but not built). Pulls very well. ASW-20 data at <*http://www.sailplanedirectory.comPlaneDetails.cfm?planeID=27*>. Reasonable offer for package. Peter Myers, (613) 531-9364, <*petermyers@cogeco.ca*>.

two-place

Ka7, C-FHFN, #441, 950h, old style canopy (blown canopy available). In storage since 1989, no trailer. Data at <*http://www.sailplanedirectory.com/PlaneDetails.cfm?planeID=182*> Factory drawings. Open to reasonable offer. Peter Myers (613) 531-9364, <*petermyers@cogeco.ca*>.

Lark IS28-B2, C-GVLI. #67, 1800h, basic inst, Cambridge vario & repeater, Varicalc computer, Alpha-100 radio, g-meters, professional open trailer. 20 year inspection/o'haul in '99 at 1585h. $US18,500 obo. Matt Chislett, (204) 254-3767. More info at: <*www.autobahn.mb.ca/~mbc/Lark%20advert.htm*>.

misc

Wanted Serviceable bailout bottles. Karin Michel, (403) 645-3490, <*kevin.karin@shaw.ca*>.

Air Cadets seek 2-33s The Air Cadet League of Canada is looking to buy 2-33s to supplement their current fleet. They need complete flyable or repairable gliders as well as certifiable wings. Also interested in Scout and L-19 towplanes. Contact: Jerry Elias at <*j-jelias@rogers.com*> (519) 634-9913.

American Eaglet motorglider kit. About 80 to 90% of the materials in the kit found and collected. 50% plus constructed, vgood work. Included is new motor, drive system, folding propeller blades, fibreglass fuselage pod skins, moulded canopy, some of the high strength wing skin covers, wing struts, etc. Free with a suitable donation to the Canadian Cancer Society in original owner's name and an acceptable solution to how the kit will be used. Peter Myers, (613) 531-9364, <*petermyers@cogeco.ca*>

Masks, 2, military O2, plus one mask helmet.
Bailout bottle. Fred Wollrad (780) 479-2886.

Ilec SN10 flight computer with remote control and **Volkslogger** for $4000. SN10 coupled to the Volkslogger provides an IGC-approved FR system, as well as moving map display, full nav info, wind and final glide calculators, vario, averagers and speed to fly. Dave Springford, <*springfo@allstream.net*>.

magazines

SOARING — the monthly journal of the Soaring Society of America. Subscriptions, US$43 price includes postage. Credit cards accepted. Box 2100, Hobbs, NM 88241-2100. <*info@ssa.org*>. (505) 392-1177, fax (505) 392-8154.

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Canadian Soaring Supplies Borgelt instruments and soaring software. Svein Hubinette, 343 - 150 rue Berlioz, Verdun, QC, H3E 1K3, (514) 765-9951 <*svein@videotron.ca*>.

Swidnik Sailplanes Today's technology, polyurethane finished, instrumented, type approved PW6U and PW5 from CM Yeates & Associates. Avionic trailers with fittings also available. Phone/fax (902) 443-0094. E-mail <*yeatesc@ns.sympatico.ca*>, or see <*www3.ns.sympatico.ca/yeatesc/world.htm*>.

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Flying High Parachute sales, repairs, repacking, and custom containers. Al MacDonald (403) 687-2225 <*www.flyinghigh.net*>.

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Ontario Zone

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LONDON SOARING SOCIETY
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info (416) 250-6871
www.YorkSoaring.com
walterc@sympatico.ca

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Alberta Zone

ALBERTA SOARING COUNCIL
Tony Burton (403) 625-4563
t-burton@telus.net
Clubs/Cowley info: www.soaring.ab.ca

COLD LAKE SOARING CLUB
CFB Cold Lake, AB
Randy Blackwell (780) 594-2171
club phone (780) 812-SOAR
caeser@telusplanet.net
www.clsc.homestead.com

CENTRAL ALBERTA GLIDING CLUB
Innisfail A/P, AB
Brian Davies (403) 318-4577 H
ve6ckc@ccinet.ab.ca

CU NIM GLIDING CLUB
Black Diamond, AB
Al Hoar (403) 288-7205 H
club phone (403) 938-2796
www.soaring.ab.ca/free-flt/cunim

EDMONTON SOARING CLUB
N of Chipman, AB
John Broomhall (780) 438-3268
www.edmontonsoaringclub.com

GRANDE PRAIRIE SOARING SOCIETY
Beaverlodge A/P, AB
Terry Hatfield (780) 356-3870
www.soaring.ab.ca/free-flt/gpss/home

Pacific Zone

ASTRA
Harry Peters (604) 856-5456
petersh@uniserve.com

CANADIAN ROCKIES SOARING CLUB
Invermere A/P, BC
Evelyne Craig (250) 342-9602
evcrinvh@rockies.net
www.canadianrockiessoaring.com

PEMBERTON SOARING
Pemberton A/P, BC
Rudy Rozsypalek (604) 894-5727
www.mountain-inter.net/soaring/

SILVER STAR SOARING ASSN
Vernon A/P, BC
Mike Erwin (250) 549-1397
www.silverstarsoaring.org/

VANCOUVER SOARING ASSN
Hope A/P, BC
David Clair (604) 739-4265 H
club phone: (604) 869-7211
www.vsa.ca