



free flight

Issue 1/80

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Soaring Association of Canada
L'Association Canadienne de
Vol a Voile,
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Cover: The SIGMA experimental sailplane in flight.
See David Marsden's report on page 18.

President's Notes

The two months since my last report have brought the miscellany of items recorded below to the forefront. Many were discussed at the last SAC Directors' Meeting and are reported in more detail elsewhere in this issue.

Federal Government Support and Funding

Unfortunately, at the time of this writing, I cannot yet report a reversal in the Federal Government's position regarding its desire to remove all support and funding to the SAC. Considerable appeals activity has occurred in this area but, so far, without achieving a favourable conclusion. A key meeting will occur in early November with the Minister of State, Fitness and Amateur Sport, in early November at which time the Sports Federation of Canada will present a general brief requesting renewed support for several sport governing bodies, including the SAC, and the SAC will present the individual brief which was forwarded to all clubs in early October for distribution to members.

The Board of Directors has prepared a contingency plan for the future of the SAC to be presented for acceptance at the Annual General Meeting in the event that the SAC appeal is unsuccessful.

Free Flight

The Board of Directors has been acutely aware of the long interval which has existed recently between the deadline for material for an issue of Free Flight and the appearance of that issue on your doorstep. Several factors have contributed to this state of affairs and, to overcome them, the Board has approved the complete production and mailing of Free Flight in future from Winnipeg, the hometown of the Editor. The Board was unanimous in its opinion that the more timely communications which would thereby result would be well worth the additional expense incurred.

Services to Members

The SAC Instruction Manuals are being translated into French by the National Sport and Recreation Centre and should be available in time for the 1980 flying season.

Walter Piercy has been labouring mightily and effectively for some months on the SAC Operating Procedures Handbook. This hand-

book will clearly identify the services provided and the terms of reference of the various committees and of the Board of Directors of the SAC. It will provide an invaluable guide for club use on many aspects of the SAC not previously documented and collected in such a convenient form. A preliminary issue should be available at the Annual General Meeting.

The SAC is also preparing a brochure on gliding, in colour and with photographs, which will be available at cost to clubs for their use in promotion of the sport.

A Western Instructor's School was held in July 1979 at Vernon, B.C., hosted by the North Okanagan Soaring Club and led by Ian Oldaker. Ten instructors were enrolled and, as was its counterpart held earlier in the East, the course was very successful.

Committee News

Tony Burton has resigned after two years of providing excellent service in the time consuming task of being the FAI Awards Chairman. He processed literally hundreds of members' FAI Awards claims and produced the SAC Rules and Procedures Handbook for FAI Awards and Records Claims to help ensure the proper submission of claims. Our thanks are extended for a job well done. Dave Belchamber has agreed to take over the task from Tony, and his address appears elsewhere in this issue.

While on the subject of resignations, 'Chem' Le Cheminant has resigned as the SAC Historian, leaving in the SAC's hands a wealth of information reaching back to the earliest days of gliding in Canada. I am sure that the membership will want to join me in thanking you, Chem, for your very significant contribution to gliding in Canada, which extends from before the time you were a Founding Father of our Association in 1945. The SAC requires a new Historian to take over from Chem.

A new committee, the Membership Committee, has been formed under the chairmanship of Charles Keith. Charles brings to the position much relevant experience gained from his professional duties and will be particularly helpful in ensuring that each club can benefit from the experience of others in the SAC and in helping establish fund raising programmes and growth for our sport. Volunteers to serve on his committee and inputs to its deliberations are solicited.

Annual General Meeting

The format of the Annual General meeting, to be held this year in Ottawa on 15-16 March 1980, has been changed somewhat to encourage more organized discussion with the delegates and other attendees outside the formal business part of the meeting. Panel discussions will be held on the SAC Insurance Scheme, Safety, Funding and Fee Structure, Club Organization and Technical Aspects on both days of the meeting. I look forward to seeing many of you there. The Annual General meeting is occurring at a time when the SAC stands at an important decision point for its future development. The Board of Directors would like to share the decision making process with as many of you as possible.

Letters

Dear Mr. Perry:

In the spring of 1968 I had occasion, on the specific recommendation of a colleague, a sailplane pilot and instructor in Kingston, Ontario, to find the SOSA Gliding Club and locate a gentleman, who confirmed to me, a perfect stranger, on the telephone, that he would introduce me to soaring.

We met, the introduction was conducted, and after the usual wait, I had a flight in a Blanik, with another fine pilot. My flight was delightful and inspiring. I returned that fall to become a member of SOSA and have been one ever since.

Not long after, I discovered that the gentleman who introduced me to SOSA, and I, have some common interests. As a consequence, our paths crossed occasionally, professionally and as pilots. I have come to admire and enjoy Wynne Thomas' perception, gentle wit, knowledge of the English language, and intellectual honesty. I still do.

I am not sorry I met Wynne on my first day at a gliding club, nor have I ever been sorry to have had the pleasure of his company, of the opportunity to share a laugh, a chuckle, or an oath with him. I doubt I ever shall.

Mr. R.I. Carlson
Islington, Ontario

BAIC, CANADAIR & “200” TROPHIES

The BAIC Trophy

is for the pilot making the best flight of the year.

The CANADAIR Trophy

is for the pilot making the FIVE best flights of the year.

The “200” Trophy

is for the pilot who, having logged less than 200 hours total gliding time at the beginning of the year, makes the FIVE best flights of the year.

Scoring:

1. Altitude gain	1.00 points/50 m
2. Free distance	1.00 points/km
3. Prescribed area distance	1.00 points/km
4. Distance to goal	1.25 points/km
5. Triangle	1.50 points/km
6. Out and return	1.50 points/km
7. Incompleted triangle or out-and-return:	
Distance to turn points reached	1.25 points/km
Distance after last turn point	1.00 points/km

Rules:

1. All flights to originate in Canada.
2. All goals and turn points must be declared before take-off.
3. Turn points for the prescribed-area-distance task must be declared before take-off but may be visited and revisited in any order subject to the requirement that consecutive turn points shall not be less than 50km apart.
4. Evidence of take off, landing, turn points and height gains shall comply with F.A.I. rules.
5. Only height gains require barograms.
6. Flights claims should be sent within a reasonable period to Jim Oke, c/o General Delivery, Southport, Man. R0G 1N0, so that they can be reported in Free Flight. Claims must be sent in during the year in which the flight was made.

FLIGHT REPORT FOR B.A.I.C., CANADAIR, AND "200" TROPHY CLAIMS

Pilot _____ Flight Date _____
 Sailplane: Type _____ Registration _____

Place Name of:-	Latitude	Longitude	Leg Distance
Starting			X X X
1st. Turn			km
2nd. Turn			km
3rd. Turn			km
4th. Turn			km
5th. Turn			km
6th. Turn			km
Landing			km

Altitude at low point after release _____ m Subsequent maximum altitude _____ m

1. Altitude Gain _____ points
 2. Free Distance _____ points
 3. Prescribed Area Distance _____ points
 4. Distance to Goal _____ points
 5. Triangle (a) Completed _____ points
 (b) Incompleted _____ points
 6. Out & Return (a) Completed _____ points
 (b) Incompleted _____ points

Height Gain _____ m @ 1.00 pt/50m = _____ points
 Distance _____ km @ 1.00 pt/km = _____ points
 Total Distance _____ km @ 1.00 pt/km = _____ points
 Distance _____ km @ 1.25 pt/km = _____ points
 Triangle Distance _____ km @ 1.50 pt/km = _____ points
 T.P.'s Reached _____ km @ 1.25 pt/km = _____ points
 Dist. from last T.P. _____ km @ 1.00 pt/km = _____ points
 Total Distance _____ km @ 1.50 pt/km = _____ points
 Distance to T.P. _____ km @ 1.25 pt/km = _____ points
 Distance from T.P. _____ km @ 1.00 pt/km = _____ points

Take-off Certificate O/O No. _____ Signature _____
 Task Declaration O/O No. _____ Signature _____
 Turn Point Photos. O/O No. _____ Signature _____

Landing Certificate O/O No. _____ Signature _____
 Barogram O/O No. _____ Signature _____
 Distances Claimed O/O No. _____ Signature _____

DATE _____

PILOT'S SIGNATURE _____

Flight Details

Points Claimed

Verification

Club Supplies

ITEM NO.	DESCRIPTION	PRICE (ADD POSTAGE)		
1.	F.A.I. Soaring Badges, "A" & "B" Sterling Silver Silver Plate - Screw back	\$ 7.50 2.50	7.	Weather Briefing Form N-052 (8 1/2 x 11 sht.) N/C
2.	F.A.I. Gliding Certificates & Badges: a) Application Forms for Certificates & Badges Available from Club C.F.I. b) Gliding Certificates - S.A.C. Member - Non-Member c) Badge - "C" (button or pin) d) Badge - Silver "C" e) Gold Plate - Those desiring Gold may request a letter of authorization to obtain a Gold pin from the maker. f) Diamonds - SAC keeps no stock but issues a letter of authority for the applicant to order directly from the manufacturer.	N/C 5.00 18.00 2.50 13.00	8.	Official Observer Application N/C
3.	F.A.I. Soaring Awards & Rules Booklet	N/C	9.	SAC Navy Blue Blazer Crest 9.00
4.	F.A.I. Sporting Code (English or French)	1.50	10.	S.A.C. Decal .25
5.	S.A.C. Instruction Manuals: a) Part I - Instructor's Guide b) Part II - Air Instruction Notes c) Part III - Students Notes d) Air Cards - set of 11 plastic cards (8 x 5) e) Air Exercise Check List f) Panel Check List - CISTRIS SWAFTS per set	.75 1.00 1.00 3.00 .25 1.00	11.	S.A.C. Cap (red, green or blue with white crest) 4.50
6.	S.A.C. Tephigram & Weather Briefing Booklet	5/1.00 or 25¢ ea.	12.	S.A.C. Glider Pilot Log Book 2.50
			13.	F.A.I. Cloth Badges - 3" diameter a) "C" .75 b) Silver or Gold 1.50

NOTE:

- Item 2 and 3 available from Mr. A.W. Burton
611-860 Blackthorne Avenue, Ottawa, Ont. K1K 3Y7.
\$5.00 processing fee for badge applications.
- All other items available from Box 1173, Station B,
Ottawa, Ont. K1P 5A0
or Mrs. T. Tucker, R.R. No.1,
Box 18, Kars, Ont. K0A 2E0.
- All cheques payable to S.A.C.
- Non Member Clubs: add 25% plus postage.



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and fully aerobatic**

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Directors' Meeting

October 27-28, 1979

The following are highlights of matters covered by your Directors at their recent Directors' meeting October 27th-28th held in Vancouver. In attendance were Dr. K. Doetsch, Miss Terry Tucker, A. Schreiter, A. Krieger (on behalf of T. Beasley), R. Flint, J. Williams, R. Matthews, C. Timm, and J. Tinkler.

Federal Government Support to SAC

K. Doetsch advised of the current status of this matter indicating that a brief had been forward by a number of amateur sport groups, including the Soaring Association of Canada on October 11, 1979. In this brief the sports associations affected sought, one more time, to draw to the attention of Mr. Paproski some of the adverse effects of withdrawal of government funding particularly in the areas of national co-ordination, volunteer morale, competition and training programs, technical development and participation in international competition. In effect the brief requested the Minister reconsider his stand with respect to organizations such as the Soaring Association of Canada and develop more flexible guide lines to accommodate sports such as soaring which do not easily fit into the Olympics/Junior Hockey mold. In addition to this brief Dr. Doetsch indicated that he had appealed directly by letter to other government agencies with which the SAC has dealings such as the M.O.T. and D.N.D., as well as directly to Mr. Joe Clark. Dr. Doetsch is to meet with Mr. Paproski on November 6, in response to the brief Dr. Doetsch regards this meeting as probably the last "kick at the cat" to preserve any kind of funding for 1980, failing which it appears we will just have to wait until we have fully complied with the new criteria of the government, namely the creation of at least six provincial bodies who receive funding for soaring from their respective provinces. Our President has requested the active support and assistance of each and every club and individual member in making our presence known and expressing our dissatisfaction with the attitude of the government on these particular matters by writing in particular to Mr. Joe Clark, Mr. Steve Paproski and to each of our local MPs. Members should speak with their Club Presidents in this regard. The success or failure of our efforts in this regard will have a direct influence on our pocket books in terms of the fees which will be required to be paid to SAC if it is to be in a position to maintain its current level of services.

Budget

The review of a preliminary budget for 1980 highlighted the fact that FREE FLIGHT magazine constitutes an inordinate drain on the funds of the Association due principally to a lack of advertising revenue. Members are encouraged to contact firms and companies in their own areas who they feel might be in-



terested in advertising in Free Flight magazine. Take a copy of Free Flight along and if successful, contact the Editor, Mr. Mark Perry, in Winnipeg, or Bob England, Bramalea, for further handling of such advertising. The Budget proposals for 1980 (the year in which, at present, all government funding is slated to cease) disclose that, with the present level of such services and at the current fees a substantial deficit will be generated. Dr. Doetsch expressed the view that he is firmly convinced that without further government funding the job of administering and running the Soaring Association will become much more complex and demanding than is presently the case and on that basis put forward a case for the hiring of an Executive Director to make SAC more visible both to its members, in terms of services provided, and to the public and government agencies with which we deal. There have been expressions of interest in such a job by a couple of individuals who are presently active members of the Association and who are contemplating job changes in the near future. In order to avoid losing one or both of the individuals concerned to other employment this issue will require resolution in the near future. If an Executive Director is retained this will add substantially to the deficit which we can expect to otherwise experience and would necessitate raising the annual fees for membership in the Soaring Association of Canada to somewhere in the \$40.00 range per member. Where, however, the Association is hit hardest by the withdrawal of funding is, of course, in the area of financing the sending of a team of pilots to the International competition in 1981. In this regard all members should consider seriously taking advantage of the tax deductibility of contributions to the Soaring Association of

Canada and in particular to the World contest fund.

Free Flight

Following the report of Mr. Mark Perry, the Editor, with regard to the serious problems he is facing with respect to the timely production of Free Flight because of the decentralized nature of that process at present, it was determined that the Editor should make all necessary arrangements for the graphics and printing of the magazine to be done commercially at a place in the same geographical area as the Editor (in this case, in Winnipeg) this would have the effect of centralizing all aspects of production, thus avoiding the disastrous time delays associated with sending the proofs for insertion of the graphics in one place and then having them sent to Ottawa for production and printing and mailing. The Directors felt that it was in the best interests of the Association that we continue producing Free Flight in its present format, being a more appropriate and appealing medium with which to attract the necessary advertising revenue than a newsletter type format.

Services to Members for 1980

The Associations has been able to obtain increased typing assistance for Terry Tucker at quite acceptable rates which should make possible a more efficient handling of the membership process next spring.

Available October 31st, 1979 are the new SAC calendars which may be ordered from Terry Tucker at a cost per calendar of \$2.50 (or \$2.25 on bulk orders of in excess of ten calendars). The Association's first foray into this area consists of one coloured photo in respect of a two month period which depicts the seasons associated with such months. By all reports this calendar is considered to be of a very high standard. Coloured slides and/or

Directors' Meeting

photos are presently being solicited for a "one photo per month" calendar for 1981.

The Association has in its possession the original tape of a CBC broadcast in August titled "Women in Gliding" which is 20 minutes in length. The broadcast is in the French language and member clubs desiring a video tape copy of same should contact the Association's Secretary, Terry Tucker.

A cable vision company in Eastern Canada will be doing a new program on sport which will include a one-half hour program on the sport of soaring which will be produced at no cost to the Soaring Association of Canada.

Instructional films on various aspects of the sport of soaring have been commenced by Glenda Stark, a member of the Gatineau Gliding Club, the first of which is known as "The Wing Runner". It is understood that additional film will be made in the spring next year on the myriad facets of our sport.

The Association will be producing a four-colour, two-sided brochure similar to that produced by the SSA which will be made available, at cost, to the member clubs of SAC for use in their own advertising campaigns. It is presently expected that the brochures will be available at the 1980 AGM.

A membership committee will be formed, headed by Mr. Chuck Keith of York Soaring which will be reviewing the questions and problems of how best to get the membership of SAC growing and the methods by which we will be able to fund internally our activities without government assistance. In addition a club package of materials will be prepared designed principally for new clubs to give them a more complete idea of the various facets of our sport and the services available to them through the Soaring Association. This package will include such items as a copy of the FAI rules, a copy of a log book, a copy of the SAC's FAI Claims Procedure book, membership application form, etc. etc. This package of materials will be forwarded to new clubs whose applications for membership in SAC are accepted.

Committees

1. Airspace

It is the recommendation of this Committee's head, Mr. Dave Tustin, that each club have one member who makes himself fully familiar with the airspace situation in his immediate area and advise the club on such matters and liaise with Mr. Tustin on airspace problems in order that the same may be brought to the attention of the Ministry of Transport. Mr. Tustin will be contacting each club for the name of such a person in the near future.

2. Historian

Mr. Le Cheminant has resigned from this position which gives rise to the search for a new historian to document our history. Anybody with suggestions as to a person or persons who might be prepared to fill this position should contact Terry Tucker at the earliest opportunity. It was suggested that we seek access to the storage facilities of the National Archives to ensure that our history is not lost or destroyed.

3. Insurance

The anticipated insurance losses for 1979



appear to be somewhere in the neighbourhood of between \$80,000.00 and \$90,000.00. Insurance premiums collected are in the \$150,000.00 to \$160,000.00 range and accordingly it seems reasonable to anticipate that the current rates will be retained next year. Mr. Schreiter advised that discussions are continuing with the agent with the view to increasing the public liability coverage from the current \$500,000.00. There has been a change in the organizational aspect of the insurance program whereby the agent, Wyatt International, now deals directly with Lloyds of London, as a result of which claim service should be substantially faster.

Al Schreiter advises that next year all premiums will be due by the end of April in respect of those aircraft on the insurance program in 1979 and which are intended to be included in the program in 1980. He also advised that, as a result of a recent situation in which liability could have been denied by the insurance company, all clubs ensure that prior to letting a new student go solo he has obtained all the necessary paperwork from the Ministry of Transport and that the same has been duly and properly signed and executed by the proper parties. Clubs are reminded that they must notify Terry Tucker immediately (within ten days) of the date upon which a new student goes solo for the first time. It is recommended that this information be phoned in immediately following the event, followed by a confirming letter from the clubs CFI within the ten day period.

4. Safety

Because of a very serious accident at SOSA last summer, clubs should be advised that the Ministry of Transport is in the process of reviewing and hopefully approving the use of Tost tow-hooks for tow-aircraft. After investigating the subject accident the MOT concluded that the Schweitzer tow-hooks will sometimes not operate in unusual loading situations which attributed significantly to the damage and injury suffered in the particular accident. The safety benefits to be achieved by switching to the Tost hooks cannot

however be assured unless the proper Tost double rings are in fact utilized on the tow ropes. It is anticipated that Tost hook will be approved for tow aircraft very shortly.

5. FAI

Mr. Tony Burton, Chairman of this Committee, has served notice of his intention to step down as Chairman effective the 1980 AGM and has retained the assistance of Mr. Dave Belchamber effective November 1 to replace him as Chairman. It is the intention of both gentlemen that they have the benefit of one another's assistance during the next four months to ensure a smooth transition for Mr. Belchamber to the position of Chairman beginning in March 1980.

To clarify a situation which has arisen all badge applications received by the Committee, be they in respect of a C badge (or better) alone or in respect of one or more badges claimed in respect of one or more flights, must be accompanied by the application fee of \$5.00. If, for instance, a pilot is applying for a C badge only his application must be accompanied by the \$5.00 application fee, together with the costs of the FAI certificate and of the badge itself which he will receive in respect thereof.

6. Technical Committee

It has come to the attention of the Directors that type approval procedures have been commenced since March 25th, 1979 (the date of the last Annual General Meeting) in respect of which the compulsory fee of \$250.00 have not yet been paid to the Technical Committee. Those pilots who applied for assistance from the Technical Committee with respect to type approvals for new aircraft and in respect of which the type approval procedure had not been commenced on or before March 25th, 1979, are requested to immediately forward their \$250.00 to Mr. Jim Henry.

Provincial Associations

Those Provincial bodies desiring affiliation with the Soaring Association of Canada may, by agreement, seek affiliation with SAC pursuant to By-Law 35 providing that the objects

or aims of the Provincial body are not in conflict with those of SAC. Provincial organizations desiring affiliation with SAC should contact SAC to commence negotiations on the terms of reference of such affiliation.

AGM 1980

The 1980 AGM is to be held in Ottawa, March 15th-16th. In addition to the ordinary business to be conducted at the AGM, sessions will be conducted on the SAC Insurance Program by Mr. Ron Wyatt and Mr. A. Schreiter, on safety issues by Mr. Ian Oldaker, on the procedures of the Technical Committee by Mr. Jim Henry, and on SAC funding. In particular, with reference to the SAC Insurance Program, members are requested to forward any questions which they may have in respect thereof *in advance* to Mr. Al Schreiter in order that Mr. Wyatt and Mr. Schreiter may adequately ascertain the nature of the concerns of the members with the Insurance Program. So that they may fully address their problems and concerns.

Nationals 1980

The bid by the Alberta Soaring Council for holding of the 1980 Nationals at Claresholm, Alberta has been accepted by the Board of Directors. 1980 nationals will be held at the Claresholm Airport commencing July 9th and ending July 20th inclusive. Start making your plans.

Worlds 1981

In view of the withdrawal of government

funding for the 1980 and subsequent years it was determined that SAC would only sponsor a team to the 1981 Worlds providing sufficient funds have been collected or are otherwise irrevocably or committed by the close of the registration period for participating teams as fixed by the host country, West Germany. The recent experience suggests that the cost of sending one team member to a world contest including glider rental, crew care rental, accommodation and food, will likely cost in excess of \$10,000.00. In order to ensure the participation of a full team in the 1981 Worlds all members are requested to begin considering methods and means by which the necessary funding shall be made available. It can be anticipated that registration for the 1981 Worlds will close late in the winter or early in the spring of that year, so we have got approximately 15 months within which to come up with the necessary \$40,000.00 to \$50,000.00. Preliminary contacts have already been made with various of the car manufacturers, both European and domestic, for the purposes of lining up crew cars and to the extent possible such contacts will be pursued in the area of glider rentals and others in the intervening period.

It was agreed to extend the terms of the loan by the Soaring Association to the World Contest Fund, in the amount of \$3,000.00 at 7% per annum, to July 1, 1980 in the hope that the early funding drive in 1980 will be

successful enough to see to the repayment of same to the general funds of SAC.

Motor Gliders

On the suggestion of some members, we will seek a holding position with the Ministry of Transport so as not to prejudice our ability to become involved in the type approval process of these aircraft in the future. Upon an initial inquiry from the MOT as to whether or not SAC desired to become involved in the type approval process on the same basis as that laid out for pure gliders, SAC initial response was in the negative based on the fact that to do a proper job of it would require a separate branch of the Technical Committee be set up because to do otherwise would overload those already in the Technical Committee. As this did not appear to be feasible at the time, the response to the Ministry of Transport's inquiry was that we did not wish to become involved and accordingly all type approvals with respect to motor gliders are presently handled solely by the Ministry of Transport.

If any of the above matters give rise to questions from the general membership they should contact their local zone Directors to have concerns noted so action may be taken in respect thereof at the earliest opportunity. We appreciate your comments and criticisms and look forward to your involvement in the resolution of our mutual problems.

1980 AGM

The Annual General Meeting is being held in Ottawa on the weekend of March 14, 15 and 16, 1980.

HOSTED BY THE GATINEAU GLIDING CLUB

LOCATION:

The Holiday Inn Central
100 Kent Street, Ottawa

COST OF ROOMS:

\$35.00 Single or Double
(advance reservation cards have been sent to all members)

MEAL PRICES:

\$16.00 Prepaid; \$20.00 at the door
(No organized luncheons provided)

For further information, reservation cards or forms, please contact
Mrs. Jessie Milc, 106 MacFarlane Road, Nepean, Ontario K2E 6V7.

Hangar Flying

Story and Photos by Peter Masak

Our peripatetic FREE FLIGHT correspondent, Peter Masak, sent along the following contribution from Sweden, where he was working for three months. Peter reports he has more material "in rough" about the O-40, Mu-27, 28 and winglets. He also promises more material for "Hangar Flying" if and when his schedule is a little less packed.

A New 17 m Class?

It seems that Messrs. Waible and Lemke are not yet satisfied with the spectacular performance that their latest designs have achieved. The ASW-20 and LS-3 both clock in at an L/D of 42.5, now the industry standard for the class. Schleicher and Rolladen-Schneider have added more gimmicks to their popular 15m span airplances apparently to make them more palatable as replacements for the once popular open class.

Both manufacturers have made their 15m ships into convertible 15-17m sailplanes. The intent is to make available an aircraft that is highly competitive in the 15m "Rennklasse" but by simply inserting one meter wing extensions the bird transforms into an open class ship (L/D approx. 44.45). Nifty!

Not choosing to believe his own factory tests, Wolf Lemke reports that he publishes a glide angle of 44 in his sales brochure in spite of a higher glide angle being achieved in comparison flight tests with the 15m LS-3 version. Similar performance is predicted for the 17m ASW-20L, which sports a retractable tailwheel (see photo).

This trend towards convertible sailplanes seems especially popular in Germany, accounting for roughly half of the new sales in the Rennklasse. The manufacturers would undoubtedly be overjoyed to see a new 17m class emerge; this development would surely see more deutschmarks in their coffers.



New LS-E wingtip with provision for wing extension, and ASW-20L retractable tailwheel.



F.A.I. BADGES

Tony Burton

The following
F.A.I. Badges
and Badge
Legs
were issued
Sept-Oct 1979.

GOLD BADGE

161 Dennis Miller, Regina

SILVER BADGE

539 James Brugger, Air Sailing
540 Bob Palfreeman, MSC
541 Stuart Young, SOSA
542 Luc Voeltzel, MSC
543 James Pattison, York
544 Eric Durance, Windsor
545 Lee Fasken, York
546 Raymond Chartier, Quebec
547 Ronald Hansen, York
548 Pierre Gavillet, Kawartha
549 Kate Estebany, MSC
550 Uwe Asche, London

DIAMOND LEGS

Goal

Spencer Robinson, SOSA

Altitude

Andy Gough, SOSA
(certified to England)

GOLD LEGS

Distance

Fred Schreiner, Windsor
Eric Durance, Windsor

Altitude

Leanne Laudrum, Vancouver

SILVER LEGS

Distance

J. Kemp Ward, Missisquoi
Kate Estebany, MSC
Uwe Asche, London

Altitude

Joseph Kupecz, Vancouver
Leanne laudrum, Vancouver
John M. Hunter, Toronto
J. Kemp Ward, Missisquoi
Gerard Pellerin, MSC
Robert Carlson, SOSA

Duration

Kurt Stauffert, Borden
Walter Kunster, Vancouver
Dennis Vreeken, Vancouver
J.I. Theilmann, Bonnechere
Joseph Kupecz, Vancouver
Leanne Laudrum, Vancouver
Dorothy Funk, Bonnechere
Allen Kirby, Kawartha
Edward Fischer, Vancouver
Peter Coulter, York
Robert Carlson, SOSA
Gilbert Barsky, SOSA
Serge Krieger, Quebec
Annemarie Van Maurik, York

Club Vol A Voile D'Asbestos

As we near the end of the season, some reflection on our first year with winch seems in order.

First of all we owe a hearty vote of thanks to that great winner Kemp Ward who came over on our first day this year to initiate two of our members into the arts of launching by wire.

It was not without a trifle of anticipation and scepticism that we embarked on the winch method. Our winch operators were yet to be trained and the winch newly built last winter had to be tested. The situation called for a very deliberate break-in period.

A winch operation manual was drafted last winter and was distributed to our members. This probably helped somewhat to reduce the number of inevitable snags and reduce the learning period. Any winching club is welcome to a copy; suggestions, protestations etc. will be received nonetheless.

While on the subject another vote of thanks to Lloyd Bungey for his excellent article in the July/Aug. 1979 issue entitled "The Techniques and Hazards of Winch Launches" obviously Lloyd has been around winches for some considerable time and his treatise will undoubtedly help us to "put it together".

In a British study there was mention of clutches and manual gearboxes. Must have called for some fancy footwork.

We had a very bare period for 12 weeks while cold fronts persisted on Monday through Wednesday but the last three weekends worked up very nicely.

We don't lay claim to any records except maybe to being the smallest club with nine regular and two day members for a total of 168 flight at 7 1/2 mins. average/flight to 10th October. Any takers?

Toronto Soaring Club

A successful social evening was held on September 22, 1979, at the Homestead Golf and Country Club.

The event was attended by 35 members, spouses and guests who all enjoyed an excellent dinner.

Following the dinner, a surprise presentation was made to club president, Willi Deleurant, on the occasion of his 25th anniversary with the club. The presentation consisted of a solar-powered watch and a commemorative scroll. When Willi recovered from his surprise, he made a gracious speech of acceptance and gave us a brief historical resumé of the Club.

The evening continued with dancing and refreshments in the local disco and a good time was had by all.

Bluenose Soaring Club

When we stopped our flying on October 27th for our combination Ham and Potato Scallop and Halloween Party, we had logged 976 flights. This is 52% better than last year and a record for BSC. We intend to go over 1000 before we shut down for '79.

Costume prizes for women went to Gisele Burglund and Terri McBride; for men: George Graham and John Clements. We had a "Chinese Night" supper party in September as well, also ably and amply created by Chef Ralph Olive and his Assistants.

On October 13th, Doug Girard took his twin-engined Pioneer II off the ground for its first test flight; and on October 27th he launched into a thermal for an afternoon of soaring.

Doug promises an article for **Free Flight**.

Ralph Olive painted up an attractive "5 Hour Club" billboard, and after the summers flying, the following names are thereon enshrined; Doug Girard, Ralph Olive, Christ Purcell, George Graham, and Tom Foote.

Since the November-December report, students Shirley Mercer, Gordon Waugh and Dick Vine have gone solo; Shirley in the Ka-7 and Gordon and Dick in the 2-22E.

After these solos the instructors were just dozing off when some new students came screaming onto the field. They had joined the club as a result of an "Introduction to Gliding" program put on during EAA 305's Labour Day Fly-In, to the tune of 81 intro flights. Like new students often do they soon showed a disrespect for established lines of authority by dumping CFI Jack Dodds out of his hammock and demanding instant instruction. Sensing a shift in the wind the rest of us instructors dusted the leaves off of our sweaters and hastened to take up stations beside the trainers; and thereafter instituted the ceremony of saluting (and/or bowing to) the students as they approached, thus bringing our student-instructor relationship more in line with that in place elsewhere.

Ralph Clark and Chris Purcell have overhauled the '53 GMC engine; and we hope to take it down to the airfield before snowfall.

Dick Vine has taken over the responsibility for building the pulley fair-lead system, thus relieving Dan to concentrate on his Eaglet fuselage.

Club members are talking more gliders, and by the time you soaring friends read this we may well be looking to buy anything from a 2-33 to a Ka-6. So if you or your club desires to sell your older glider and go for glass, or whatever, please contact us.

Mountain Soaring Techniques

By Lloyd M. Bungey

PART 3

MOUNTAIN SOARING PART 3

Parts 1 & 2 of this guide have dealt with the techniques to be used to efficiently use ridge lift and how to visualise where the lift will be when there is a wind blowing onto a slope. We will now consider situations where lift may be found on the slopes when the wind is not blowing onto the slope.

RIDGE LIFT CAUSED BY CURLOVER

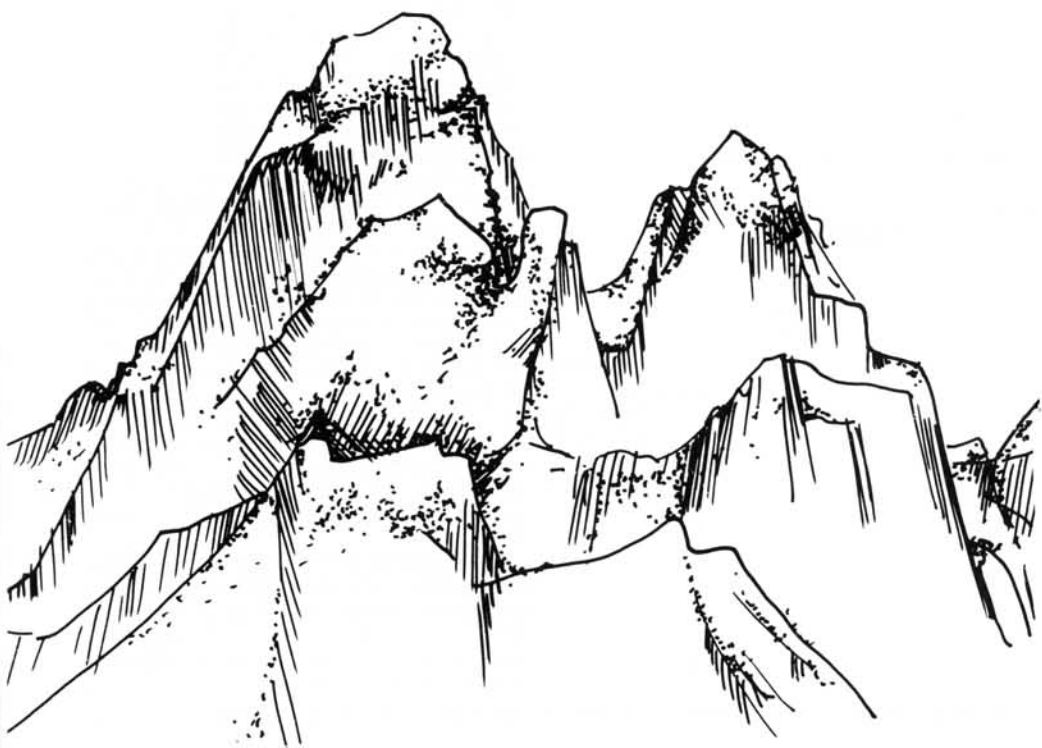
Although ridge lift generally is found only on the upwind face of a mountain, under strong conditions on certain mountains lift is sometimes found on the downwind face. In these situations there is often a band of strong sink further out from the mountain since the lift is being produced by curlover (see figure 12). This curlover is like a mini-rotor although the turbulence is generally less due to the friction effects of the slope. Sometimes when curlover lift is to be found on a slope it may be being produced by a rotor (see figure 13). In such a case it may be possible to transition directly into the wave from the rotor. When such a situation exists it may be recognised by the increased turbulence as one climbs higher up the ridge. This increased turbulence is due to the decrease in frictional smoothing of the rotor as it moves away from the face of the ridge. Often in such a situation it becomes quite a struggle to climb the last thousand feet or so needed to contact the wave.

THERMALLY GENERATED SLOPE LIFT IN LOW WIND CONDITIONS

On days of light breezes when the slopes are not producing ridge lift there are two types of thermally generated lift which can lead you up from the valley floor. The first is a layer of hot air sheeting up along the mountainside in small sections, the second is wind shadow thermals.

Where the sun hits the side of the mountain along a section relatively free from trees, the heating of the rocks leads to the heating of the air above the rocks. This heated air then rises up the mountain side usually staying very close in to the mountain for a considerable height until it either gains more energy and eventually peels off from the slope as a thermal or loses its energy and dies out. Such a sheeting of lift usually requires several rock faces to fully develop as a thermal. Each face in turn imparting heat energy to the rising stream. It is only at the highest level that it will break free as a thermal as each successive rock face which causes a bubble of hot air to rise from it in turn creates a void for the air rising from below to fill thus preventing the air from lower down breaking clear from the surface. To fly in such a layer of rising air usually requires flying in fairly close to the rocks and using ridge flying patterns rather than circling, since the band of lift is too small to get even half a turn completed without flying out into the sink below the sheeting layer. Figure 14 illustrates this type of situation.

Often when utilising such lift, a long extended scratch is necessary with considerable periods being spent just holding height while waiting for a pulsing of the lift caused by a thermal bubble passing through. Often in such situations, it pays to fly a pattern which sweeps along a large rocky sec-



tion with scrappy bits of lift and mild sink the combined effect of which is to just hold you at your height and wait until a bubble is encountered before reducing the beat to a small figure of eight to extract as much height as possible from the bubble before reverting back to the long sweeps. To try to work the scrappy bits of lift at the expense of the long sweeps often results in a frustratingly slow rate of progress while a series of good climbs in the bubbles are left to others.

WIND SHADOW THERMALS

Wind shadow thermals may follow a similar behavior to the "sheeting" of lift described above or may behave like normal thermals but are caused when the sun heats the lee side of a slope under light wind conditions. In such a situation the air on the lee side of the slope is shielded from the wind and sits in place being slowly heated until it finally commences rising as a thermal (see figure 15). Here it may be possible to circle quite safely as there is no wind tending to push you toward the slope, or it may be necessary (or more comfortable) to fly such lift in a figure of eight pattern until the thermal breaks well clear of the slope. However, no matter whether circling is used or a figure of eight pattern, the basic rules of flying close to the ground must be applied, fly as cleanly as possible and maintain the airspeed high enough so that the sailplane cannot possibly stall.

LATE EVENING EFFECT

In a similar manner to the way in which a wooded or swampy area may act as a heat sink during the day and release weak thermals toward evening, so too will timbered areas cause the release of evening slope lift in the mountains. Consider the situation depicted in figure 16.

As the sun moves down below the top of mountain A, the air in the valley between the mountains becomes shaded and commences cooling. However, the air trapped between the trees in the bottom of the valley is warmed by the heat trapped by the trees during the day. This air will then commence moving sideways up the slope due to the pressure of the cooler, more dense air above it. This air will move up the slope towards the sunny side due to the syphoning effect of the air rising off the rocks still in the sun. This band of rising air will be too narrow to be workable at the lower levels but higher up, in the sunny area, it reinforces the air rising off the heated rocks to produce a band of smooth steady weak lift.

AVOIDING THE SINK

Because truly mountainous areas offer only limited possibilities for landing, an important aspect of flying crosscountry in such areas is to be able to maximise your glide angle when necessary, not to stretch your glide to the next field, but to get you to a field safely after you have been imprudent enough to overestimate the conditions (or underestimate the sink). Often, when crossing open valleys to get from one ridge to another substantial areas of heavy sink will be encountered, especially if there are areas of wave lift at higher altitude. At such times a cautious approach to the height needed is better than a trusting belief in your manufacturers glide angle. Once in trouble however, your only op-

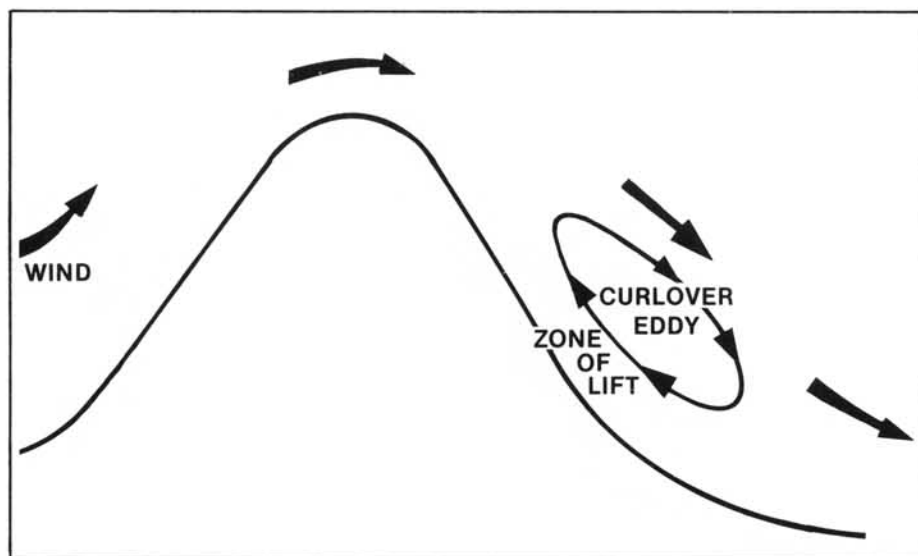


FIG. 12

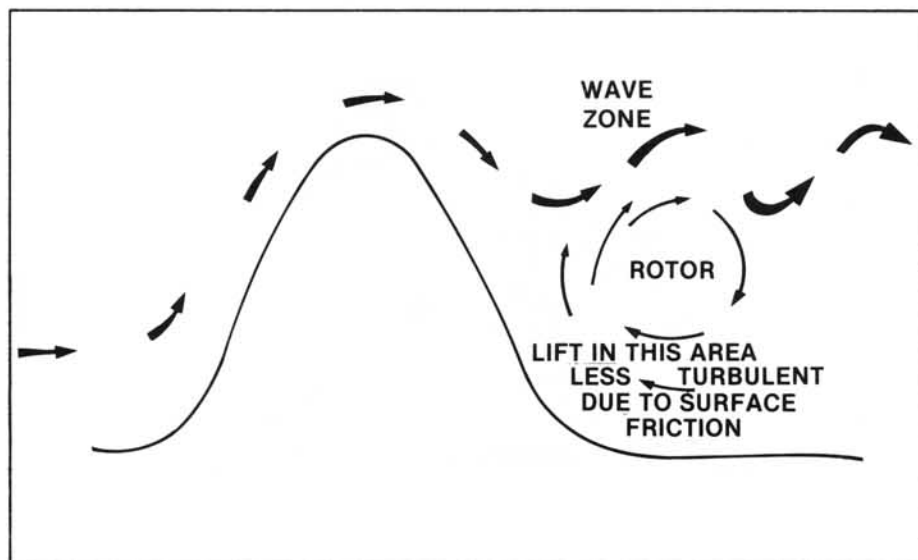


FIG. 13

tion is to keep reminding yourself that the designer has given you a good glide angle which can be improved upon by avoiding the sink, taking advantage of any bubbles of lift to be found, and by adhering to the speeds to fly (there is always a nasty temptation to fly too fast when things look grim).

When scraping your way out of a bad situation it is practically always best to head for the sunny side of the valley and fly close to the rocks to get the advantage of any weak areas of rising air. In strong wind situations this of course will not apply but in those situations most pilots rarely have to scrape out of a narrow valley since running downwind to a slope facing into the wind will usually find lift. It is the weaker days that usually tempt one to go just a little further, until some heavy sink causes a crisis. If down lower than a few hundred feet below the mountain top it is often better not to attempt to scratch up in really weak lift if a usable field is not within range but rather to fly straight through it, milking it for as much height as possible along the way.

To turn out from the rocks to start working the lift will often put one into sink which costs more than the small amount of lift just gained. Only stop to work the good lift areas.

DANGERS OF SLOPE SOARING IN CLOUDY CONDITIONS

Outside of the obvious, flying or stalling into the mountainside, the potentially greatest danger of mountain flying is being caught by cloud. Quite often some of the best flying around the mountains is to be had in conditions of high moisture. On these occasions the ridges may be topped with cap clouds caused by the moisture condensing out of the air part way up its ascent of the mountain. Such a cloud may appear to be static sitting part way up the mountain, however such is not the case, the cap cloud is a dynamic cloud forming steadily at the leading edge and dissipating at the rear as the air warms up as it descends down the back of the mountain. Since the cloud is dynamic, changes in moisture content or temperature of the air in which the cloud is forming can produce very

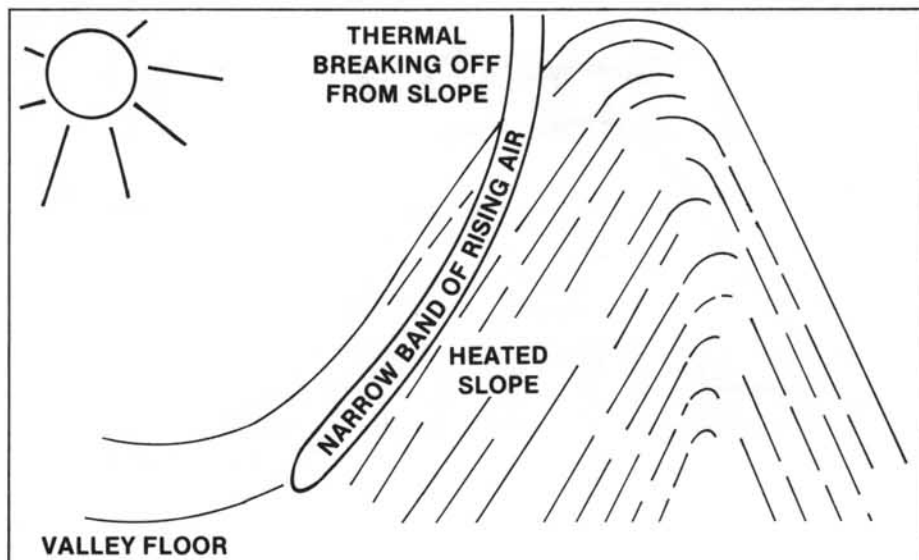


FIG. 14

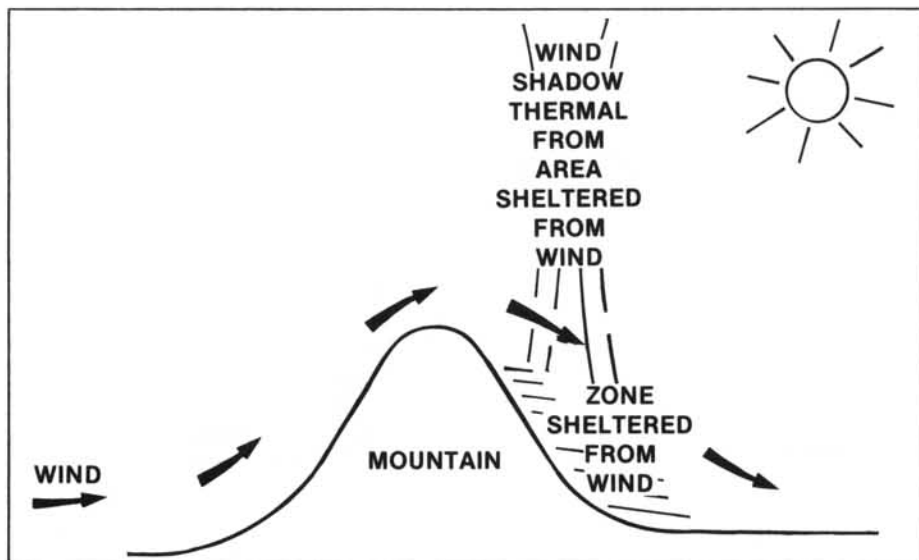


FIG. 15

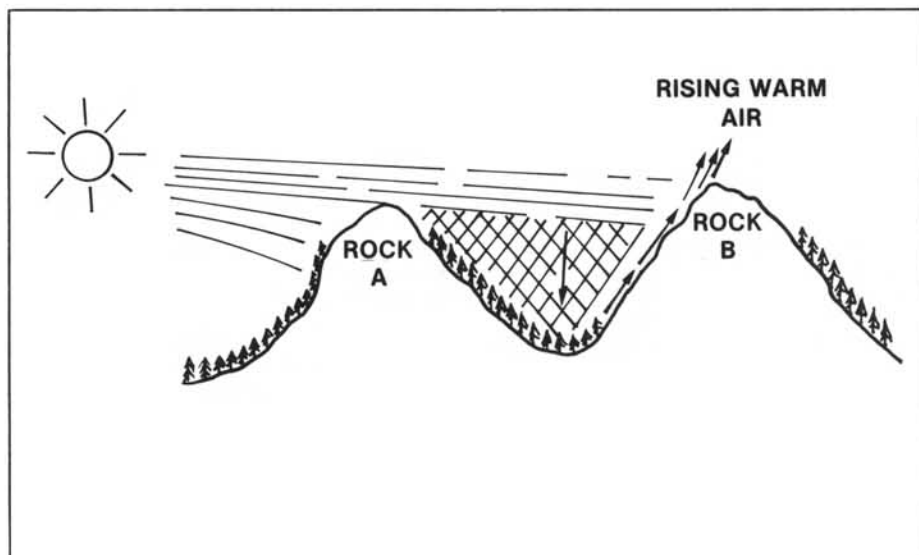


FIG. 16

rapid changes in the cloud. To soar up the face of a cap cloud requires an appreciation of the hazards involved and a constant watch on the changes occurring.

There are three different ways that one can get into trouble with the cap cloud. The first is by simply flying into the cloud through inattention. As with all cloud flying this may lead to rapid disorientation. The second way is by having a change in moisture content (or a lowering of temperature) cause the cloud to "jump" out from its established position and extend into the clear air you are flying in. To be caught in this situation can be quite alarming and the only defence is to turn away from the mountain before you are enveloped and fly rapidly away from the cloud as it forms. At times like these it's very comforting to have a reliable turn and bank to help you fly a straight course away from the mountain as the cloud forms around you.

The third way cloud can lead you into trouble is by not forming. If you are flying up a band of cloud along a ridge, it is very easy to treat the cloud as a face of the ridge and use it as your reference. However, if a lowering moisture content of the air should result in the cloud not perpetuating itself, then as you climb along the face of the last piece of the cloud as it is blown in towards the mountain you will be drawn in towards the mountain face by it. This process may occur quite quickly or a gradual lowering of the moisture content may draw you in over a period of a few minutes.

This can be especially insidious when it occurs near the top of a saddle where you may be drawn over the saddle onto the backside of the slope and into the downwash of the mountain before you realise what is happening. In this situation you may find the sink too great to allow you to penetrate back over the saddle and the cloud preventing you from escaping by flying downwind away from the crest. The only defence against being caught in this manner is to familiarise yourself with the ground beneath you and to use it as your reference in gauging your clearance from the slope.

Flying around the mountains in cloudy conditions may be especially exhilarating but at such times you should be especially wary and prepared to take evasive action if you even suspect the conditions are changing. With cloud, the old adage "better safe than sorry" is well worth following.

In conclusion, mountain soaring offers challenges and difficulties which are of a different nature to those of most flat areas. It requires intelligent assessment of terrain, and at all times it should be heads up soaring. Because of the heavy sink which may be encountered between areas of lift it is often essential to use rather generous safety heights when proceeding from one source of lift to the next. Generally it pays to fly along the sides of the valleys rather than in the centre since the sides are where the sun and the wind will be generating the lift. In sunny conditions the sunny side should be favoured. In strong conditions, a generous safety margin of speed should be allowed to account for gusts and once below the mountain tops turbulence should always be expected and allowed for.

THE TIME HAS COME..... Bert Small

*"The time has come," the pilot said,
"To think of many things:
Of cu's - and ships - and ceiling facts -
Of barographs - and rings -
And why the clouds are growing not -
And whether to rig the wings."*

(Apologies to Lewis Carroll - Alice in Wonderland)

After three full seasons in soaring, I believe that the time has come to attempt my first cross-country flight. This will not be a technical "how to" article about soaring cross-country, but rather a simple chronicle of how I did it, or didn't do it, whichever proves to be true. Come along with me and live through the planning, the actual attempt still yet to come and the final result, whatever that will be.

By way of a short history, I now hold duration and altitude for both silver and gold. Now I have to start doing some distance flights to complete the badges.

The attempt that I am planning will be for silver distance and will require a flight from Peterborough, Ont. to Orillia airport by way of Omemee, Lindsay, Brechin and on North to lake St. John where Orillia airport is located. A distance of 50 miles. More than enough for Silver distance and, if I land short of Orillia, I will still have a chance of completing the task. I will be using the club M-100-S for this flight.

In preparation I have completed the following:

- *Read every book available about soaring and cross-country techniques.

- *Prepared two charts showing my intended course with 5 mile segments indicated and numbered. I will leave one chart behind so that after landing out a phone call back to the gliderport will identify my position for a ground or air retrieve. Also on the chart I have noted our airport phone number and paper clipped my landing certificate to the back.

- *Taken a familiarization flight in a power plane along the intended flight path at 1000'-1500' altitude to study the terrain and see possible landing areas enroute. This flight is also an aid to navigation, as I now have quite a clear picture of landmarks to head for when the great day arrives.

- *Tested the club barograph to make sure that it's working properly.

- *Made sure that the trailer has a current license and a car will be available with a compatible hitch and electrical connections. Of course if I make it to Orillia airport or land in a good field I will be able to call the gliderport for the tow-plane and a trailer retrieve will not be necessary.

- *Selected clothing to wear which will allow me to be comfortable in flight, but also carry extra clothing in anticipation of cooler weather in late afternoon or evening in the event I have to wait for a tow or retrieve. Included are long pants and a sweater.

- *Food and drink for in-flight and after landing, consisting of a sandwich, an apple, a granola type bar and a can of cola.

The great day to try it came during our flying week in July. The cu's started forming early and by 11:00 a.m. it was obvious that I should make the attempt to-day.

Everything was ready for me to go except the barograph wasn't sealed and the only OO was up flying with a student, and he was staying up. I had to wait impatiently until he landed and when he finally did and sealed the barograph it was 12:10.

My take-off time was 12:20 and the lift was

plentiful all during the tow. I had an arranged release point at 2000' over Fowlers Corners, but at 1800' we were in strong lift so I decided to release early. I pulled the release at 1900' and climbed immediately to 4000'. Now cloud hopping around the field for 15 minutes to get the feel of it and at 5000' made my first move toward my goal.

I read once that to get high and stay high is a good tactic in soaring, so that is what I tried to do. Each cu that I tried on the way produced good lift and when I arrived over Omemee Gliderport (the first 6 miles of the 50) I hadn't lost more than 500' anywhere along the way. I now climbed back up to 5,500'.

Looking NW I could see my next stepping stone which was Lindsay airport ten miles away. I left Omemee now and cloud hopped towards Lindsay. Progress was slow as I had a head wind and every time I stopped to circle to stay high, I lost some ground back towards my starting point. But I slowly gained and I found myself directly over Lindsay thermalling at 5000'. The airport was at a comfortable angle and would be an easy glide to there from this height.

Now circling in lift NW of the airport I could see that the sky was completely clear of clouds in the direction I had to go. Any visible clouds were too far off my course to consider heading for them. I decided to head for my destination anyway and if I didn't find anymore lift, I would allow myself 3000' altitude, enough for a glide back to Lindsay. I needn't have been concerned, as I continued to find lift out in the blue, although not as strong or as plentiful as before.

I gradually lost altitude now as I pressed on, but found enough lift to gain some additional miles. At this point I had been flying for about 2 hours and by way of a reward, every time I found lift I took a bit of my apple. It was a good thing I wasn't starving, as I think I only had 3 bites for the next 10 miles and I was now losing altitude at a steady rate.

Looking ahead to the Trent Canal I picked a likely looking field near the southern tip of Canal Lake and I arrived over it at 2000'. I now had 35 miles behind me, but still not enough for the distance due to penalties for altitude differences etc.

Now I was seriously losing it, so I studied my field from every angle, as I continued to scrape for lift. There was a gravel pit a mile away, so I flew over that expecting a boomer, but all I got was sink...back to the field and circle around the farm...downwind entry picked out....1100'....and I can't find anything....circle, around and around....no lift....100'-900'....a bank into the downwind circuit to land....and there it was....500' per

minute up and I just continued to circle all the way back to 4000'. What a great feeling. I had read about saves similar to that, but always suspected that the stories were somewhat exaggerated. Now I had one of my own to remember.

After rewarding myself with two big bites of the apple, the lift topped out at 4000' so I left my field and headed out once more for my destination. As I crossed the Trent Canal looking ahead I could clearly see Orillia Airport. The town of Brechin was directly ahead of me now, so I thought I would fly over it to see if it would produce some lift. Nothing doing. I tried another gravel pit near town, but still no lift.

With my goal in plain sight 10 miles away, I could actually see the runway, but I was losing height rapidly. No more lift, still no clouds and I continued to circle hopefully over the most likely looking areas of the ground below. At 2,500' I saw the field that I wanted. it was the longest one around and appeared to have a very low crop on it, judging by the clearly visible brown ruts of a farm road up the middle of it. As I lost altitude, my objective (Orillia Airport) disappeared in the distance and at 2000' I decided that this would be my best landing spot, unless I connected with another thermal and got back to 4000' or more. It was about then that I noticed the shadows angling across the line of the final glide into the field. Looking carefully I could see what was causing them. Telephone poles! Now I knew I would have wires to cross over before touchdown, but the field appeared long enough so that the wires would not be a factor in a safe landing.

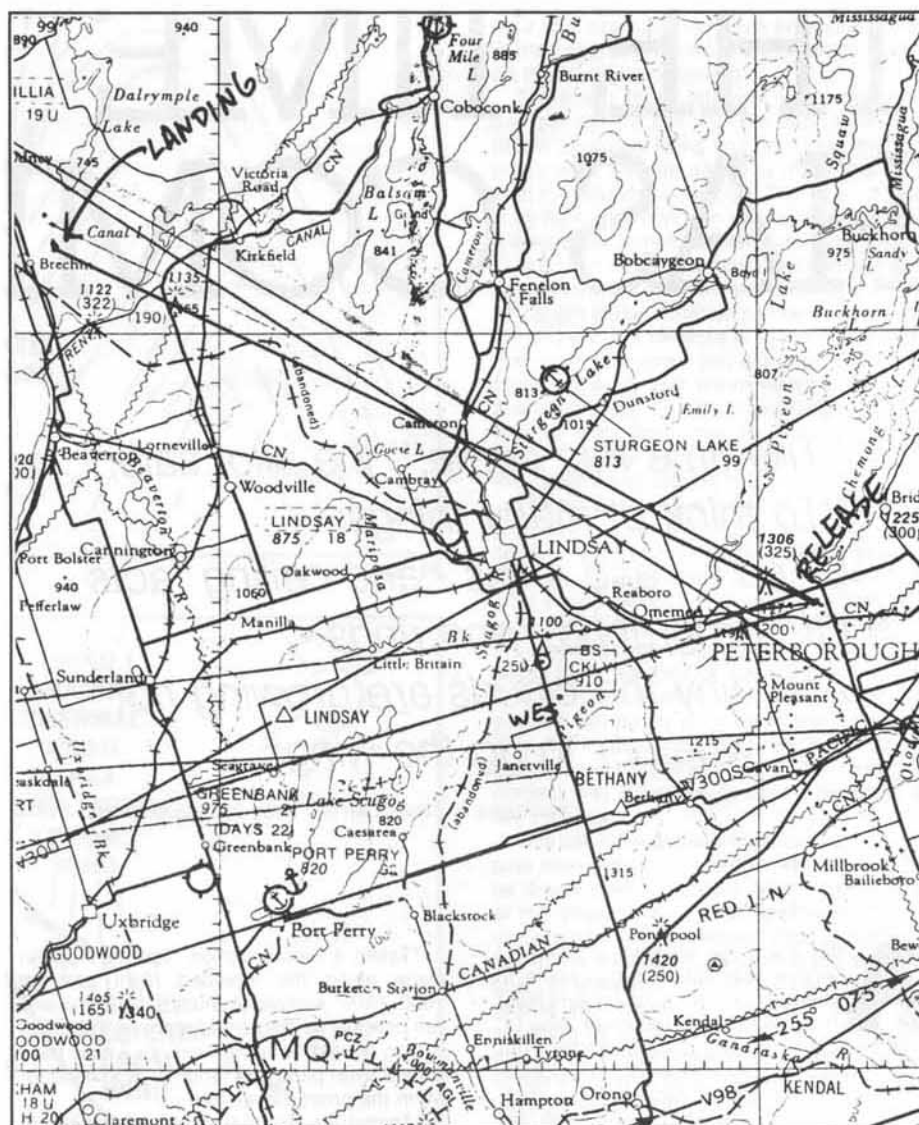
There were a few tantalizing touches of lift and I carefully tried to centre it, but couldn't do it. Now at 1500' I continued to circle as I mentally set up my circuit pattern of downwind, base and final for landing.

At 1200' it was obvious my flight was over, so I concentrated solely on the inevitable. As this would be my first off-field landing, I wanted to be sure that I had investigated every contingency.

Now I started my downwind leg, judging the correct angle to safely cross over the wires, but also being careful not to come in too high. A right turn onto base and then a turn to final. The angle looked good to clear the wires and I held half spoilers up the wires and then opened them full, which dropped me down fast. A flare, a short glide and touchdown. I rolled a short distance and came to a full stop with half the field left in front of me.

Now I just sat there quietly for what seemed to be five minutes, but was probably thirty seconds. I thought about the flight, the fact that I was down safely without damage to myself or the sailplane and exhilarated with the idea that I just might have enough distance for the "Silver C".

I opened the canopy, feeling a little like the first man on the moon, stepped outside, took off the parachute and weighted the upwind wing with it. Looking around for the crowds of people and young boys who are always supposed to arrive, I was amazed that absolutely no one was in sight. Now I walked the entire length of the field to judge its safety for the tow plane landing and tow. Satisfied that



there would be no problem, I headed for the farm house to get my landing certificate signed and to call back to our airport for a retrieve. As I approached the house the inevitable farm dog came bounding out after me, terribly upset by my presence.

It was barking and growling and skimming low over the ground towards me. I quickly thought the best approach was to show a lot of friendly gestures and kind words, so I stopped, squatted low to the ground, slapped my thigh and said....C'mon puppy....C'mon....over here....you're a nice puppy....etc. The dog was a long way from being a puppy but perhaps the flattery got to it, as it became less and less aggressive and I even noticed it was now wagging its tail. I kept calling it puppy and it came right up to me, laid down on the ground in front of me, belly up and demanded that I scratch it....which I did! Now we were friends....too friendly....as I walked, it jumped up and down beside me scraping its sharp claws on my bare legs. I decided that was better than being attacked, so I put up with it until we reached the farm house door.

I knocked and since the screened windows

were open, said clearly in a hopefully friendly voice, "Hello...is anyone home???...Hello!!" A lady now appeared on the other side of the screen door and I said with a smile, "Hi, I just landed a glider in your field."

She replied, "Oh my Heavens...another one!!" And shot me a quick smile in return.

"It sounds like you have experienced this before then."

"Well, not really, the first one was a real aeroplane!"

So much for the credibility of gliders.

Holding up my landing certificate, I asked if she would sign it for me, at which point she invited me into the kitchen motioned to a chair and said, "Would you like a glass of iced tea or anything?"

"Thank you. Perhaps a glass of water."

She got the water for me, put on her glasses and proceeded to sign her name, address, etc.

With the paper filled out she wondered how we would get the glider out of the field, so I explained about a trailer retrieve and a tow-plane retrieve.

"Get the tow-plane," she said, "I'd like to

see that!"

I then used her telephone to call our glider-
port, described my position, the condition of
the field including a warning about the wires.
They said they'd be about an hour. I gave
them the farm phone number in case they
would have further questions later.

Now I needed a second signature on my
paper, so I asked Mrs. Harrington who else
was around the area. She said her neighbour
down the road was home and maybe I should
try there.

Thanking her for her kindness and
hospitality I proceeded down the dusty road
to the adjacent farm.

You guessed it! As I approached the farm
house, not one, but two dogs came bounding
and growling out after me. I suddenly had that
helpless feeling once again! My friendly
technique had worked with the first dog so I
repeated my phony greeting. They never did
get overly friendly, but at least they didn't
bite. They kept their distance and grumbled at
me as I trudged along. Now I came across
four boys playing in the front yard. They
hadn't seen me land.

"Hi, I just landed a glider in the field over
there, is there anyone home who could
witness my landing?"

"Sure is, come on up to the house and I'll
get her."

On the way to the house they each took
turns looking at me sideways, as though I
were some kind of extra-terrestrial being, little

green man or weird space creature

Unfortunately they had to wake up my next
witness, who must have been afternoon nap-
ping on the sofa, and wasn't quite as cheerful
as Mrs. Harrington. However I couldn't blame
her as I was imposing and after all I woke her
up with some kind of rambling about a glider
in a field. After reading my paper very careful-
ly and looking out her front door to see the
glider in the field and probably being
somewhat assured by her neighbours
signature, she finally signed it. Now I headed
back to the field with four boys leading the
way and two dogs trying to sneak a bit out of
the back of my leg.

When we got to the glider, the boys looked
it over as though it were some strange craft
from outer space and I invited them to sit in it
if they wanted to. Only one was interested
enough and once inside he went through all
the possible flying motions with the stick and
rudder.

At this point I could only wait for the tow-
plane, but I walked the field once more, just
to be sure there were no hidden hazards.
When I was satisfied that a safe landing and
take-off could be accomplished, I sat under
the wing in the shade, opened my small pack
and ate lunch that I had brought with me.

A sandwich and cola, finished off with the
rest of the apple was very satisfying and I
split the granola bar with the two farm boys
who were still waiting with me for the tow-
plane to arrive. I had enlisted the aid of one of

them to hold the wing out of the grass on
take-off, so at least he had better not leave.

Sitting in the cool shade provided by the
wing with the sweet smell of alfalfa in the air,
munching on my lunch after a successful
distance flight must be one of the high points
in my life. Pure satisfaction. Although, only 40
miles from "Mother", I felt as though I was
Karl Streideck after his 1000 mile record
flight in Pennsylvania. I suppose everyone's
first cross-country flight is like that.

The tow-plane arrived, made a pass over
the field, landed on the farm road and we
worked out some signals for take-off.

The four boys and Mrs. Harrington were
now gathered there eagerly waiting for the
event.

I said thanks all round, did the cockpit
check, signalled the boy on the wing to raise
it, the slack was taken up, I waggled the ruder
as prearranged. OK for take-off.

Just before full power was applied, I gave a
smile and a thumbs up signal to the boys and
Mrs. Harrington. They all responded with
smiles and waves all round.

....with a roar of full power from the tow-
plane, the prop wash blowing in their faces,
they watched us take off into the late after-
noon sun. They saw us become mere specks
on the distant horizon and finally
disappear....the experience was over for
them.

I think they enjoyed it!

....I know I did.



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SIGMA

A PROGRESS REPORT

Story and Pictures by David Marsden

Operation Sigma was set up in 1966 with the objective of building an all-out racing sailplane for the British entry at the 1970 World Championships in Marfa, Texas. No compromise in performance was to be made for considerations of cost or ground handling since this sailplane was intended only for international competition. The idea received quite a bit of publicity through the B.G.A. and generally caught the imagination of the whole gliding world as an exciting, innovative project. The super slim lines of the resulting sailplane with its distinctive vertical fin and extreme aspect ratio (36:1) added to the anticipation that this would indeed be the forerunner of an entire new breed of racing sailplanes.

Unfortunately, practical snags are sometimes encountered in even relatively small innovations and this sailplane incorporated a new type of variable geometry wing with many technical problems to be overcome. The aerodynamics dictated a very high

aspect ratio, and this in turn resulted in structural problems. The wing chord at the root is only 27 inches, and in order for the flap mechanisms to work when the wing is loaded, wing bending had to be kept within reasonable limits. Tip deflection of the 69 foot wing is only 15 inches under a normal 1 g load. In order to keep these small deflections, the wing was built with thick aluminum alloy skins. Wing skins on the centre section of the 3 piece wing are 5/16 inch thick and although thickness is reduced toward the tip the minimum skin thickness is 0.080 inches. Of course the wing is a bit heavy, in fact the centre section weighs 348 lbs. and the entire wing weighs 893 lbs. (Anyone like to crew for the Nationals?)

The wing section was designed by Professor Wortmann as a pair of wing sections; a high speed wing section with the flap retracted which becomes a highly cambered low speed wing section when the flap is extended to increase the wing chord by 36%.

Aerodynamics estimates indicated that climb performance comparable to current competition sailplanes could be achieved in the flap extended configuration even when the flap retracted wing loading was 12 lbs/ft². Needless to say, the straight glide performance of a 21 metre sailplane with a wing loading of 12 lbs/ft² would be phenomenal. A maximum L/D of nearly 50:1 at 67 knots was predicted and at 100 knots the L/D would still be about 36:1.

The sailplane was built at the British European Airways shops in London, and had its first flight in September 1971. Problems with the way the flap fitted into the wing were evident and although many attempts were made to improve the fit they were not successful. Much of the expected high speed performance was lost due to the poor fit of full span roll spoilers and the flexible shroud on the underside of the wing.

Aileron control was somewhat compromised because only very small chord ailerons on

the end of the moveable flap could be used. Turns at low speed required full aileron in the "holding-off" sense to maintain bank angle. About 9 seconds were required to reverse a 45° bank turn when flying at 55 knots. Use of roll spoilers reduced this to about 5 seconds.

Fairly extensive flight tests were carried out to determine stability and handling characteristics and performance, which was pretty good in spite of all the defects. Measured performance is shown in Figure 1. Measured maximum L/D was 41.5 at 62 knots and at 100 knots L/D was still a respectable 25:1. But this kind of performance was still a disappointment, especially following the initial high hopes for the aircraft, and the disadvantages of somewhat unsatisfactory lateral control together with its heavy weight for ground handling made it unattractive even for competition flying.

In June 1977, the following notice appeared in *Soaring*.

Advanced Research Opportunity!

At press time, SSA received an insertion order for the following classified ad:

SIGMA 21M PROTOTYPE GLIDER is available for further research. Operation Sigma, Ltd., will give the aircraft to the most suitable applicant presenting proposals for further research. Applications and/or requests for further information to F.G. Irving, Department of Aeronautics, Imperial College,

Sunaero

aviation co. Ltd.



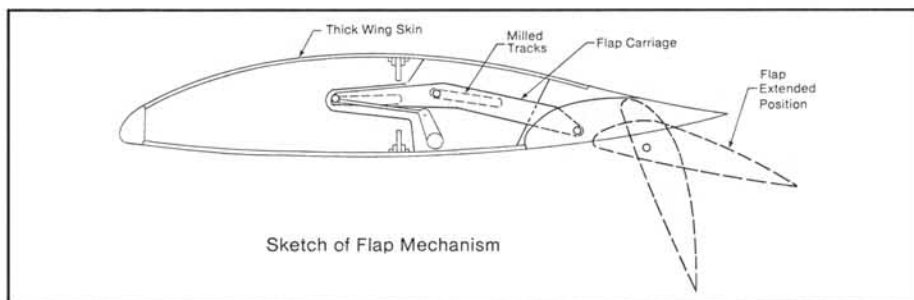
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Sketch of Flap Mechanism

London SW7 2BY.

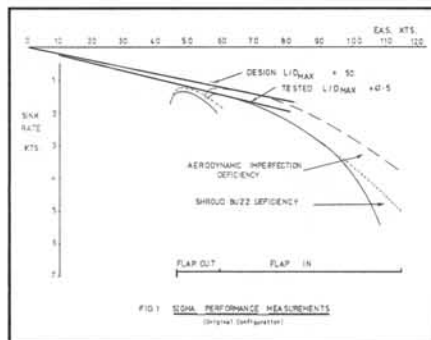
This terse announcement is a disappointment and an opportunity: A disappointment to those enthusiasts of the world gliding community who have followed the British variable-geometry sailplane project from its inception, hoping that it would be a major breakthrough in advanced sailplane technology; an opportunity for those in a position to do so - wherever they may be - to carry on a splendid quest that epitomizes the finest tradition of scientific research.

Unsubstantiated reports from England indicate that financial constraints forced the abandonment of the effort because of protracted and persistent sealing problems between the main skins and extensible trailing edge of the *Sigma*'s unique airfoil.

The existence of so sophisticated a machine represents a tour de force in itself. It would be an unconscionable waste of first-rate research talent and a substantial financial investment to allow the *Sigma* project to drop by the wayside. It is to be hoped that serious soaring people everywhere will not let this happen. Call attention to this advertisement where it will do some good.

My proposal which was accepted from among 12 submitted, involved removal of all the original flap mechanism and its replacement by a slotted flap of the type used on Gemini. The diagram in Figure 2 shows the general arrangement of the new flap mechanism. Advantages of the slotted flap are:

- (a) Simpler mechanism for flap extension since less flap travel is needed.
- (b) Better lateral control because outer portions of the flap are used as ailerons.
- (c) Deflection of up to 75° of the inner 65% of



span of the flap allows a steep approach for landing and a low touchdown speed.

(d) The manually operated mechanism allows conversion from climb configuration to cruise configuration (flap retraction) in less than one second with minimal pilot effort.

About 17 hours have been flown to date since modifications were completed. Two 30 minute flights were made in England and the rest have been in Alberta this season. *Sigma* has proven to be easy to fly. With its new ailerons there is no problem keeping the wings level on take off. Although there is no real problem getting off the ground, the rate of climb in still air is only about 250 feet per minute behind the Super Cub towplane. One demonstration tow behind Airtech Canada's Wilga was a treat with about 600 ft/min rate of climb. On a thermal day the climb rate is improved by running through a few thermals.

Once off tow, handling in thermals is quite good with the flap extended. Time to reverse a 45° turn at 55 knots is about 4 seconds, quite fast for a 21 metre sailplane. Thermals can be flown comfortably at 45 knots indicated with out 30° bank. There is remarkably little noise at circling speed with only a soft, low pitched resonant sound of air going through the slotted flap.

Thermals flown with other sailplanes did

not show any very significant differences in climb rate. No doubt a lightly loaded 20 metre sailplane will be able to stay up in weaker thermals but the fact that *Sigma* with 11.75 lbs/ft² wing loading can climb as well as 15 metre sailplanes at about 6 lbs/ft² wing loading is an indication of how much it is possible to increase wing loading by the use of slotted flaps.

Performance flight tests indicate a minimum sink of about 140 to 150 ft/min at 42 knots, about the same minimum sink as the original. The major difference is the improvement in controllability at that speed. Retracting the flap results in a gentle nose-down pitch followed by a fairly rapid increase in speed. Typically, the flap is retracted at a speed of about 50 knots and in the time taken to retrim the speed will be up to 75-80 knots. There is little wind noise with the flap retracted and it is quite easy to inadvertently let the speed slide up to more than 100 knots.

A number of high tows were made to measure the glide performance with the new flap system installed but the results showed quite a lot of scatter. In any case, they are only interim results in the process of aerodynamic development, and modifications are continuing to improve this performance. The current maximum L/D is about 43:1 at 60 knots and is still 35:1 at 90 knots. Above 100 knots there is a big increase in drag caused by the ailerons floating up to act like spoilers. The aileron control mechanisms are being modified to provide much more rigid control of aileron deflection, and on the basis of flight test results to date this should make the L/D at least 22:1 at 120 knots.

Sigma is at last approaching a stage of development where it can be considered "operational". It is achieving a good part of its performance potential. Most important, *Sigma* shows that the concept of using a slotted flap for a variable geometry wing is feasible and does produce superior performance. A redesigned production version of *Sigma* could have an empty weight of about 800 lbs. and carry 600 lbs. of water ballast to bring the maximum wing loading up to 12 lbs/ft². Such a production aircraft could no doubt achieve the original projected maximum glide ratio of 50:1 rather than the 43:1 currently measured for the prototype model. When flown without water ballast it would be able to fly in thermals at 36 knots and would have a minimum sink of about 115 ft/min at 34 knots, based on flight test measurements of the present aircraft.

A Great Ship and a Delight to Fly

For further information please contact:

George Couser
735 Riviere aux Pins, Boucherville, Quebec J4B 3A8
(514) 655-1801

Technical Data	PIK-20D	PIK-20E
Span	15.0 m	15.0 m
Aspect ratio	22.5	22.5
Empty weight	220.0 kg	290.0 kg
Max. weight	450.0 kg	470.0 kg
Water ballast	140.0 kg	120.0 kg
Wing loading	29-45 kg/m ²	36-47 kg/m ²
Best L/D (max. wt.)	42 @ 117 km/h	41 @ 117 km/h
Min. sink (min. wt.)	.56 m/s @ 73 km/h	.61 m/s @ 77 km/h
Stall speed (min. wt.)	60.0 km/h	66.0 km/h
Rate of climb		4.0 m/s
Take-off to 15 m height		300.0 m max.
Cruise		135.0 km/h
Fuel consumption		16.51 /h

THE 1981 WORLD CHAMPIONSHIP

to go or not to go

Mr. A.O. Schreiter,
3298 Lone Feather Crescent,
Mississauga, Ont. L4Y 3G5
(416) 625-0400 H
(416) 239-8171 B

Although 1981 seems a long way off, the Soaring Association of Canada has to make a basic decision very soon. Do we send a Canadian Team to Paderborn, Germany, or do we forget about it? It's a question of money. Past experience, adjusted for 1981 conditions, tells us that it will cost about \$45,000 to finance the attendance of a Canadian Team of 4 pilots, 8 crew, 1 captain and four suitable aircraft with trailers and retrieve cars. About \$5,000 will be contributed by the team members, leaving a balance of \$40,000 to be raised by the SAC.

Because the present Minister of Sport in the federal government has decided to continue the shabby policy established by his predecessor, we can no longer count on financial support of the federal government while representing Canada at international sports events. Can we raise the necessary funds entirely on our own? That question must be answered soon, and the answer depends on you.

Why should you care? After all, most of the SAC members are not active competition pilots, and even of the competition pilots only 4 will get a chance to fly in the World Championship. What difference does it make to your Sunday afternoon pleasure flying if Canada is represented at a World Championship? These are legitimate questions and they deserve debate.

Let's see what could happen if the SAC decided not to sponsor future World Championship entries. The most immediate result would probably be the collapse of future Canadian national championships. With the incentive of earning a place on the Canadian Team many, if not all our top pilots would drop out of the Canadian competition and invest their time and effort in one of the large US Regionals, and enter the US Nationals as foreign competitors. It would be a cheaper way to hone their skills and massage their egos. This would soon affect the Canadian regionals, and would be the beginning of the end of competition in Canada. A novice soaring pilot would then have a choice of either limiting himself to local soaring around his club, or enter US competitions. He might as well join the Soaring Society of America. The weakening of the Soaring Association of Canada would soon spread to other areas, such as instruction, government liaison, technical review etc. At that stage it would adversely affect every soaring pilot in Canada. Instead of a healthy, growing sport practiced in thriving local clubs it would become a dying art practiced by a few.

If you think this is an unnecessarily gloomy forecast, look around in other parts of the world. Every country regularly represented at the World Championship has a healthy, thriving glider population. Countries not usually represented at World Championships tend to have small, struggling glider populations, limited to the eccentric rich. Examples in the first category, with populations similar in size to Canada (or smaller) are Sweden, Denmark, Belgium, Holland, New Zealand, Australia, Austria, Switzerland, etc. Examples in the second category are Spain, Greece, Ireland, Japan, India, Egypt, etc. There seems to be a definite relationship between the health of our sport and participation in the World Championship.

Canada has been represented at World Championships for over 20 years and our teams have progressed steadily. The Canadian Team's point standing in the last World Championship was the highest ever. Now does not seem the right time to quit.

How can we continue to send a team? The easiest way would be for every member of the SAC to contribute \$20.00 to the team fund. It would be a tax-deductible donation and, for most members, would amount to \$12 or less after tax. But we know there is no easy way. The majority of Canadian soaring pilots is a generous lot when it comes to buying sailplanes, various, radios, parachutes etc. Money for these items is no object! But when it comes to contributing to a National Team we are proven, certifiable cheapskates (you can prove me wrong by making out a cheque for \$20 and mailing it, *right now* to J. Knowles, W/C Treasurer, 543 Cayley Dr., London, Ont. N6H 3G5). Because we can't count on being able to do it the easy way, let's get prepared for the hard way.

I need a few dedicated volunteers from coast to coast who will donate time, skills and/or connections to the fund raising effort. If you know, or have access to, any business executive at the top level of a national company please write to me right now and give me the information. DO NOT contact anyone yet. If you are willing to contribute time and effort, let me know right away. If you have any particular fund raising and/or PR skills or experience, let me know. We must form a national fund raising committee very soon to tackle a big job. If you want to help, get in touch with me *now*.

Let's make sure that there will be a Canadian Team at Paderborn, Germany in June 1981!



The Ambulance in the Valley

Twas a dangerous cliff, as they freely confessed,
 Though to walk near its crest was so pleasant;
 But over its terrible edge there had slipped
 A duke, and full many a peasant.
 The people said something would have to be done,
 But their projects did not at all tally.
 Some said "Put a fence 'round the edge of the cliff",
 Some, "An ambulance down in the valley".

The lament of the crowd was profound and was loud,
 As their tears overflowed with their pity,
 But the cry for the ambulance carried the day
 As it was spread through the neighbouring city.
 A collection was made, to accumulate aid,
 And the dwellers in highway and alley
 Gave dollars or cents — not to furnish a fence,
 But an ambulance down in the valley.

"For the cliff is all right if you're careful", they said;
 "And if folks ever slip and are dropping,
 It isn't the slipping that hurts them so much
 As the shock down below — when they're stopping".
 So for years (we have heard) as these mishaps occurred,
 Quick forth would the rescuers sally
 To pick up the victims who fell from the cliff,
 With the ambulance down in the valley.

Said one, to his pleas, "It's a marvel to me
 That you'd give so much greater attention
 To repairing results than to curing the cause;
 You had much better aim at prevention.
 For the mischief, of course, should be stopped at its source.
 Come, neighbours and friends, let us rally;
 It is far better sense to rely on a fence
 Than an ambulance down in the valley."

"He is wrong in his head", the majority said;
 "He would end all our earnest endeavour.
 He's a man who would shirk this responsible work,
 But we will support it forever.
 Aren't we picking up all, just as fast as they fall,
 And giving them care liberally?
 A superfluous fence is of no consequence
 If the ambulance works in the valley."

The story looks queer as we've written it here,
 But things oft occur that are stranger.
 More humane, we assert, than to succor the hurt
 Is the plan of removing the danger.
 The best possible course is to safeguard the source
 By attending to things rationally.
 Yes, build up the fence and let us dispense
 With the ambulance down in the valley.

L'Ambulance dans la Vallée

La crête était dangereuse, tout le monde le savait,
 Pourtant la vue était si belle que chacun s'y rendait,
 Paysans, roturiers et même le duc du cru,
 Au fond du précipice en grand nombre avaient chû,
 Le soir au coin du feu les langues allaient bon train
 Mais ces conciliabules n'aboutissaient à rien.
 D'aucuns disaient: «il faut un garde-fou».
 D'autres: «une ambulance au fond du trou».

Chaque jour la liste des morts s'allongeait
 Et le peuple à grands cris un remède exigeait.
 L'idée d'une ambulance finit par l'emporter,
 Et la rumeur un jour atteignit la cité.
 Après une belle campagne à la télévision
 Les citoyens, montrant de bonnes dispositions,
 Se cotisèrent pour leurs frères malheureux,
 Offrirent une ambulance à ces pauvres pouilleux.

«Faites-donc attention en approchant la crête!
 Ceux qui glissent et se cassent la binette»,
 Disaient-ils, «font un départ quasiment indolore
 Mais c'est l'arrivée qui leur fait bien du tort».
 De cette étrange façon ces braves gens raisonnaient,
 Et chaque fois que du ciel un pauvre bougre chutait,
 Dans la vallée aussitôt on voyait arriver
 La belle ambulance avec ses infirmiers.

Mais un beau jour un trouble-fête leur dit:
 «Je trouve que c'est bien du souci
 Que d'essayer de réparer les dommages
 De ces malheureux qui tombent ainsi des nuages.
 Il serait plus simple de tuer le mal à la source
 Et la douleur serait aussi plus clément à la bourse.
 Amis, vous excuserez ma si grande insistance,
 Un garde-fou vaut mieux qu'une belle ambulance.»

On le hua en disant: «ça va pas dans la tête?
 Prends garde à toi ou ce sera ta fête!
 De quoi te mêles-tu? pour les pauvres victimes
 A la quête as-tu même donné un centime?
 Silence! Nous n'avons rien à nous reprocher,
 Car lorsqu'ils tombent, vite on va les ramasser.
 Ta palissade n'est qu'une idée de fou
 Car l'ambulance les attend tout au fond du trou».

Lecteur, si cette histoire excite ton imagination
 C'est que la réalité souvent dépasse la fiction.
 La morale de cette fable s'énonce simplement;
 Prévenir et non guérir, c'est ce qu'on dit souvent.
 Au lieu de ramasser les pauvres trépassés
 Il serait plus humain d'écarter le danger.
 Plutôt qu'une ambulance au fond de la vallée
 Installons des barrières pour mieux nous protéger.

Grandma Made It!!!



Ruth Moore

Wow!! I finally made it. I have my Glider Pilot's licence. I began to think that I would never fly well enough to qualify. Now at last it is all behind me and I can hardly believe it. I was so excited when I found that I had passed that I hugged everyone at the flight line. Perhaps to some new pilots (and older ones too for that matter), this reaction may appear somewhat overly enthusiastic. In my case however I have a particular cause for rejoicing apart from the undoubtedly, heady feeling all newly licenced Glider pilots may feel. I am a 58-year-old grandmother.

Why should a woman of 50 plus take up gliding you ask? Really quite a logical question. I suppose the answer lies in the fact that in my case my husband was a pilot with the RCAF during the war and he had promised to teach me to fly after the war was over. Having become familiar in my early married life to hearing pilots discuss their students and the relative merits of various aircraft and many other aspects of flying, there was created in me a wish to learn how to fly. I could visualize the freedom experienced in the vast and limitless heavens and I had a great desire "to cut the bonds of earth."

My desire was not realized for many years after the war, however, as money was scarce and there was a family to raise. A move to Winnipeg 13 years ago created for me an opportunity to pursue a new career; namely, that of becoming a teacher and attaining two University degrees. This was accomplished in my early fifties and began the year my husband and I became grandparents. When this goal had been reached it seemed to prove to me that anyone could do just about anything that they set their mind to providing they were willing to work for it.

One day (by chance) while out for a Sunday drive, we happened upon the Winnipeg Gliding Club and saw all the beautiful gliders lined up at the flight line. We couldn't resist stopping to watch. Finally we ventured closer and saw some people keeping time sheets and doing many other crewing jobs

necessary. The various activities were explained to us by very enthusiastic and friendly club members and before we knew it we both were taken up for "Fam" flights.

Just to be in a plane again (albeit without an engine) awoke in my husband all his old love of flying. For me I felt that now at last was my opportunity to learn how to fly. It didn't occur to me that perhaps I was too old. I didn't feel old and my attitude was that "you are as old as you feel". I began my lessons with the only woman gliding instructor in the Winnipeg Gliding Club. Even though Hazel Flint was young enough to be my daughter, she never made me feel old or foolish but was what I considered to be a kindred spirit. She had faith in me and felt that I could do it. It is amazing what a good feeling it gives you to know that someone believes in you. Maybe it was because I was a woman and that we thought as women even though many years separated us. Hazel's enthusiasm for my efforts was catching and gradually others began to think that just maybe I might be able to do it after all.

My husband meanwhile had received his licence while I was still struggling to get it all together so that I could take my first solo. Because of my age, I expect, it took me 53 flights before I finally went solo at last.

By this time Hazel was no longer instructing as she was occupied with a new baby but a new instructor, Jack Davies, and Hazel's husband, Russ, had taken me on and worked with me until they felt I was ready.

The day I went solo for the first time was very exciting. When I realized that I was actually flying alone it was an indescribably unfettered feeling I will never forget. Upon landing and receiving my bouquet of prairie grass and flowers and my "A" badge I was enveloped in a feeling of disbelief that I had really soloed. It was several hours before the realization of the event hit me. No one who has soloed for the first time I'm sure will ever forget the heady excited feeling that it gives you.

Time went by and after a holiday in Britain there wasn't too much flying time left for me that year. The following year started off for me with two good check flights. The next flying day I was hopefully expecting to go solo but I arrived at the field only to learn that Jack Davies had been sent to South America by his company. Thereafter I flew no less than 33 more times with a variety of instructors. It wasn't until Hazel's husband, Russ, rescued me that I was sent solo for the second time. It was a case of flying with too many people none of whom knew my flying or else were not qualified to send me solo. During that low period my flying deteriorated and I became so discouraged that I nearly gave it all up. I was almost beginning to agree with what some must have thought, that I was really too old to take up flying and in addition I was a woman.

After Russ sent me solo for my second time it was all clear sailing. I wrote my MOT ground school exams twice, as I had to pass these exams in the same year as I qualified for my flying licence. I managed to pass each time successfully so that all I needed was the licence check flights.

That week was the culmination of all the weeks, nay months, of flying and trying. When I was putting the glider into full spins in both directions during my final check flight with our C.F.I. Ian Oldaker, I couldn't help but think to myself; "Who says a 58 year old woman is too old to learn to do this. Why this is FUN."

So come on all you women out there. If you want to experience real freedom and the joy of soaring join a Gliding Club. You won't be disappointed. YOU can do it too!

Postscript: I would be interested in knowing if there are any other women my age or older who might be flying now or who have flown in the past in any other Gliding Club in Canada or elsewhere. Also, what is or was the oldest age that any woman received her licence.

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Important Notices

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Effective, **1 February 1980**, there will be a new F.A.I. Awards Chairman taking over from Tony Burton. He is:

David Belchamber
29E Varley Drive
Kanata, Ontario
K2K 1G4
(613) 592-5516

Tony Burton will be travelling extensively in 1980 so it is very important that all FAI Award claims are directed to David Belchamber to **avoid delays** in processing.

Please take note of the following change of address for SAC secretary-treasurer, Terry Tucker. Her new address is:

R.R. No.1
Box 18
Kars, Ontario
K0A 2E0
(613) 489-2038 8:00 a.m.
- 6:00 p.m.

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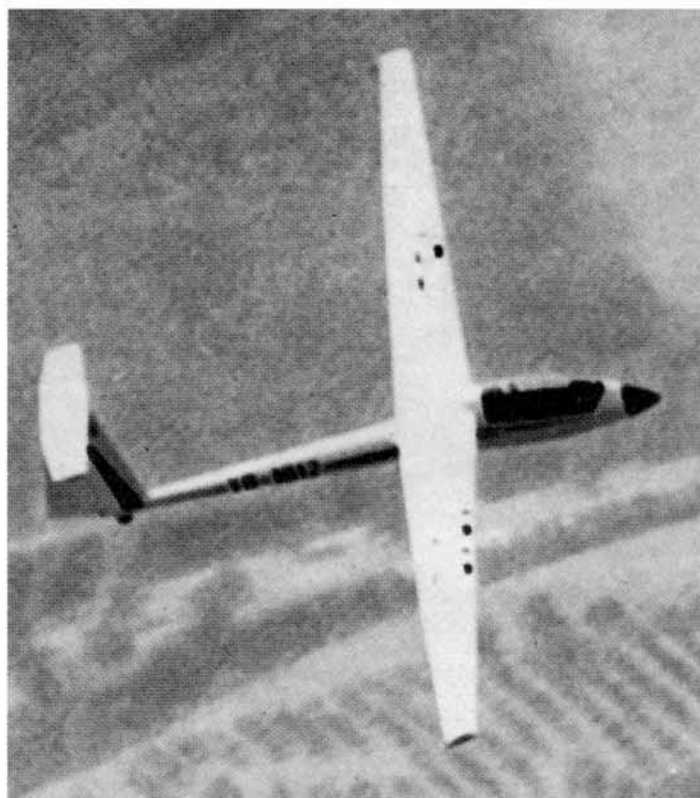
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