# FREE FLIGHT

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**COVER PHOTO**
2-33 at Central Ontario Soaring Association's field. Photo by Bert Small.

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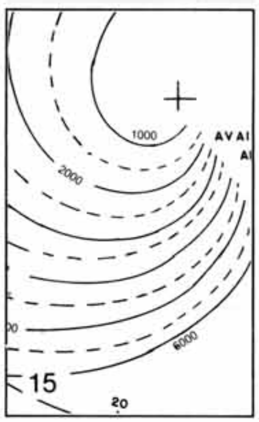

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# The Second German Glider Aerobatics Championships

by Peter Masak

How many Canadians have a glider aerobatic instructor's endorsement; or better yet, can boast of having participated in a world class glider competition? Canadian resident pilot Manfred Radius is such a man. As a novice competitor, he is worthy of special congratulations for his twelfth placing among seventeen entrants at the 2nd German Glider Aerobatic Championships.

Manfred flew a Start + Flug "Salto" with a colourful mix of glass-fibre and wooden ships, in a field largely dominated by Lo-100's - the old stalwart of aerobatic sailplanes. Originally designed about 20 years ago, the Lo-100 has been a benchmark for aerobatic enthusiasts with its high manoeuverability, modest performance and wooden structure.

Three of seventeen entrants at LINKENHEIM-HOCHSTETTEN, Germany, flew a Salto - a scaled down 13.6 m Libelle designed by the wife of the late Eugene Hanle, former Glasflugel owner. The Salto's performance isn't scaled down though - whether right side up or upside down. It is reputed to be capable of outrunning most contest ships at high speed, making it an outstanding, versatile cross-country sailplane. A rented Salto served as an ideal platform for advanced aerobatic training for Manfred Radius in Europe prior to the contest.

Initial exposure to aerobatics by Kawartha Soaring's Bogdan Wolski encouraged Manfred's interest. The culmination of six years of aerobatic experience led to attendance last summer at an aerobatic course in Belgium. Subsequently, he practised two weeks for the contest. This advanced training was provided by German master, Heinz Glasen.

Having a highly stressed fully aerobatic sailplane at his disposal enabled Manfred to experiment with some previously untried and unheard of manoeuvres. Exciting is an understatement! Imagine doing three rolls while at the same time executing a 360° turn!

Hosts of the two week aerobatic course were the German club I.G.K. (Interessen Gemeinshaft Kunstflug), whose primary role has been to encourage interest in glider and power aerobatics internationally.

Anyone in touch with power aerobatics will be familiar with the internationally recognized "Aresti" catalog - a collection of aerobatic sequences in schematic form. Until recently, no such catalog existed tailored to the unique requirements of

Some of the gliders participating in the championship. In the foreground is the Lo-100.

sailplane aerobatic enthusiasts. The inspiration behind the I.G.K. and the author of the new "Rating System ALFA for Glider Aerobatics (Bewertungssystem Alfa fur Segelkunstflug)" is Heinz Clasen - reputed to be one of the world's best pilots, both in glider and power aerobatic circles.

Figures 1 and 2 are samples of Manfred's program and provide an indication of the expertise necessary to perform a routine. Each competitor is required to assemble his own freestyle program from a catalog of aerobatic manoeuvres. Scoring is as follows: a mark out of ten is assigned to the competitor by the judges, based on how well the manoeuvre was flown. This number in turn is multiplied by a coefficient which indicates the degree of difficulty of the manoeuvre. Even judicious choice of sequences and careful planning are often not enough to prevent the most experienced pilots from having penalty points deducted for leaving the prescribed area. No points are assigned for flying in the wrong direction or flying below 200 m AGL. Automatic disqualification results from performing aerobatics below 100 m. In particular, the sequence must take account of prevailing wind direction to allow most manoeuvres to be flown into wind. Quick planning by the competitor is essential, as the unknown programs are given to the pilots on the eve of the first contest day.

Originally, 25 pilots registered for the aerobatic championship at LINKENHEIM-HOCHSTETTEN (near Stuttgart), including three Swiss and one French pilot. However none of these foreign pilots appeared for this biennial classic. Although still a German citizen, the only pilot coming from a foreign country was Toronto resident Manfred Radius. Both an experienced skydiver and sailplane pilot, Manfred has leaped from an airplane over 300 times and has earned a Gold C with one diamond and a double Lennie.

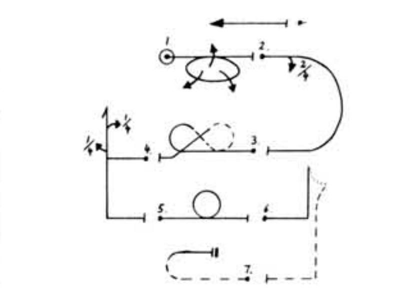
Seventeen pilots flew the first day, flying the first known program, followed by the first unknown program and ending with the competitors own freestyle program. Based on manoeuvres cataloged by Clasen's "BEWERTUNGSSYSTEM ALFA FUR SEGELKUNSTFLUG", each participant composed and submitted his own unique freestyle program to the chairman of the jury before the beginning of the championship.

The second contest day saw the elimination of eleven pilots after judging of the second known program, the second unknown program and the same freestyle program had been completed.

A battle had been shaping up during the elimination rounds between two favourites - Herbert Tiling in the H101 Salto and Helmut Laurson and his Lo-100. An error early in the contest had dashed Laurson's hopes of winning, but a slip by Tiling brought both experts back on equal footing for a shot at the title. In performing the "avalanche", Tiling had inadvertently allowed the glider to do two snap rolls instead of the requisite one at the top of an inside loop.

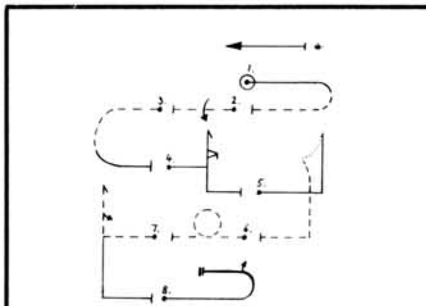
Thus the eventual winner was by no means a foregone conclusion as the six finalists looped, spun, rolled and cavorted through their final freestyle routine. Helmut

Instructor and student: German master Heinz Clasen seated on wing, competitor Manfred Radius seated in the H-101 Salto.



**1. UNKNOWN PROGRAM**

**1. 360° turn with 3 slow rolls to the outside.**
**2. Two point half a slow roll and half a loop.**
**3. 3/4 loop normal and 3/4 loop inverted.**
**4. Stalled turn with 1/4 slow roll on the way up and 1/4 slow roll on the way down.**
**5. Normal loop.**
**6. Tailslide backward with exit inverted.**
**7. Half a loop up from inverted into normal.**
***Wind Direction**



**2. KNOWN PROGRAM**

**1. Half a loop forward from normal into inverted flight.**
**2. Slow roll from inverted into inverted.**
**3. Half a loop from inverted into normal.**
**4. Stalled turn with half a snap roll down.**
**5. Tail slide forward with exit inverted.**
**6. Inverted loop.**
**7. Inverted stalled turn with half a slow roll down.**
**8. Half a slow roll on the top of a loop.**
***Wind Direction**

Sitting in this modified Lo-100 is the new champion, Helmut Laurson. On the right is Fritz Steinlehner Jr., craftsman of this fine machine. He placed 13th.


The 3 winners of the aerobatic championship:
1. Helmut Laurson 2. Herbert Tiling (Last champion) 3. Peter Hermann

Laurson emerged as eventual winner and was crowned as German glider aerobatic champion until the next contest two years hence.

FINAL STANDINGS

| | |
|---|---|
| 1. Helmut Laurson | Lo-100 |
| 2. Herbert Tiling | H-101 Salto |
| 3. Peter Hermann | Lo-100 |
| 4. Hermann Staltmeir | Lo-100 |
| 5. Gunter Cichon | LCF-2 |
| 6. Fritz Steinlehner Jr. | Lo-100 |

It seems unfortunate that interest and active participation in glider aerobatics is insufficient to warrant a contest on this side of the Atlantic. However, recent airshow performances by Toronto's Oscar Boesch and Dan Wolski have probably encouraged many awed spectators to look into soaring. Moreover, these exciting shows have likely encouraged some pilots among us to plan to sharpen our skills through aerobatic training.

However, a few words of caution are in order. Especially for the fool who might try his hand at flying competition manoeuvres in a glider not stressed for it.

The Blanik for instance is suitable for training of some basic aerobatic manoeuvres. Check with an aerobatic instructor or the sailplane's manual to determine which sequences the glider is capable of doing safely. It is essential that you never attempt any aerobatic manoeuvres on your own without having received proper instructions from a qualified aerobatic instructor. Remember; aerobatics can be fun, safe and a terrific skill builder if approached in the proper frame of mind.

# Letters

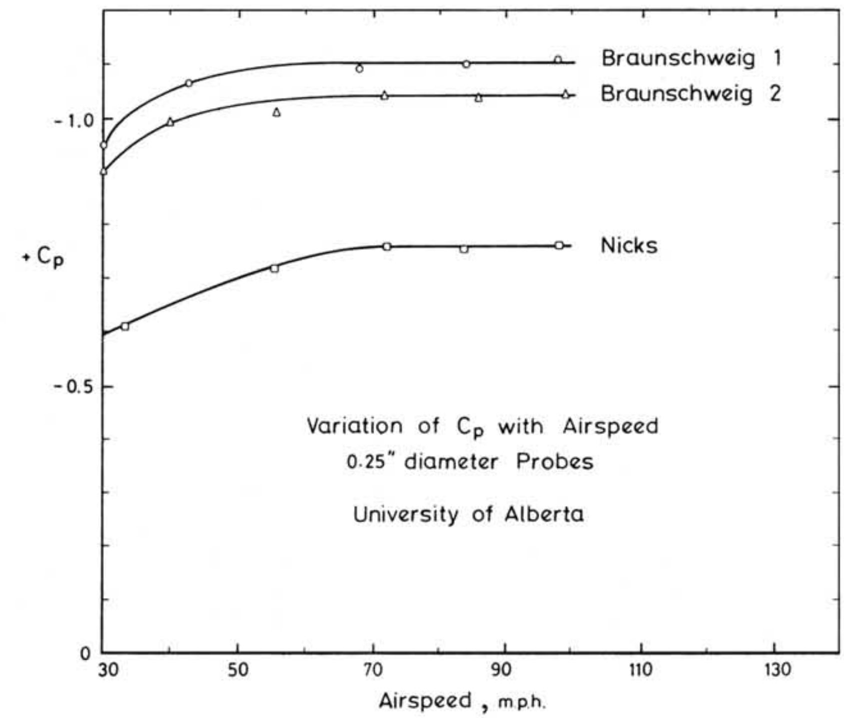
Dear Sir:

I noticed that a number of the sailplanes in the Nationals were sporting the new Nicks total energy probes. These probes are easier to construct that the Braunschweig type but have no other apparent advantage. They do have one serious disadvantage though - they do not provide full total energy compensation!

I made some tests in the University of Alberta wind tunnel of a Nicks probe and two Braunschweig probes for comparison at the request of one of our National team members who had noticed that the Nicks probe did not appear to be giving proper compensation when used on his sailplane. A total energy probe should provide a pressure coefficient of $C_p = -1.0$ for full compensation. The Nicks probe only produced $C_p = -0.78$ while two Braunschweig probes tested in the same position for comparison showed $C_p = -1.04$ and $C_p = -1.10$. The enclosed graph shows $C_p$ against airspeed for the three probes tested. All probes were made from 1/4 inch diameter tubing. Both the Nicks and Braunschweig probes showed very little sensitivity to yaw or pitch angles of up to ± 15°.

Since the only difference in construction is the use of two transverse slots for sensing pressure in the Braunschweig tube compared to a drilled hole in the Nicks tube, it would appear to be worthwhile to go to a little extra trouble to construct the Braunschweig type and thereby obtain the correct compensation.

David Marsden




# Notices of Motion to 1978 AGM

1. **By-Laws Addition, Section 3(a) Sustaining Members.**
   "Sustaining members shall be Clubs, Associations, Societies or Corporations having **as club affiliated members all those of their flying members who are eligible to fly,** and a minimum of five (5) club affiliated members, admitted as such by the Board of Directors who have paid the entrance fee of Ten Dollars ($10.00), and who shall pay such annual fee as may be fixed from time to time by the Board of Directors and who shall annually submit a certified statement of its members showing that a minimum of 5 club affiliated members has been maintained. Such Sustaining Members shall be entitled to 20 votes, plus 1 vote for each of its SAC members as shown in the said certified statement, at each meeting of the Corporation. In the event that any Club, Association, Society or Corporation is admitted as a Sustaining Member, it may be by notice in writing to this Corporation, nominate a representative who may on its behalf exercise all or any of its rights of membership until such time as such nomination is revoked. Notice of such revocation shall be given in writing to the Secretary of the Corporation. Each Sustaining Member shall remain so subject to the foregoing, and subject to the receipt of the annual fees and certified statement of members by the Treasurer of this Corporation."
2. **Membership Fee Increase.**
   A membership fee increase of $6.00 in each category is advised. (Pie charts showing this necessity have been published in FREE FLIGHT, see issue 5/77, Sept./Oct., pg. 17).
3. **Authority-Treasurer.**
   The Secretary-Treasurer (currently) have the authority to sign cheques without a co-signature for an amount determined by the Board of Directors. (Suggested amount for 1978 is $150.00)
4. **Secretary-Treasurer Salary.**
   Salary increase to $8100.00 annually effective July 1, 1977 is granted. (Item 7.01 - AGM 1977)

# Notes from the President

It's that time of the year again when the gliders are stored and the snowdrifts obscure the runways. Time for some reflection on our problems. Seems that from time to time an individual glider guider or a club gets caught up in governmental red tape. Do yourselves and the rest of us a big favour and check your problem with SAC before you tackle the sleeping giants in Ottawa. Someone else may have already won your battle on a different front. In other cases it pays big dividends to have a national organization backing your case. Often a quick check with Terry Tucker will save you money and ulcers. If you are contemplating the purchase of a glider outside Canada check the exact type description with the SAC technical Committee well before you put money down. If the specific aircraft you plan to import is not yet approved you can save yourself grief and money by coordinating your planned purchase with the Technical Committee.

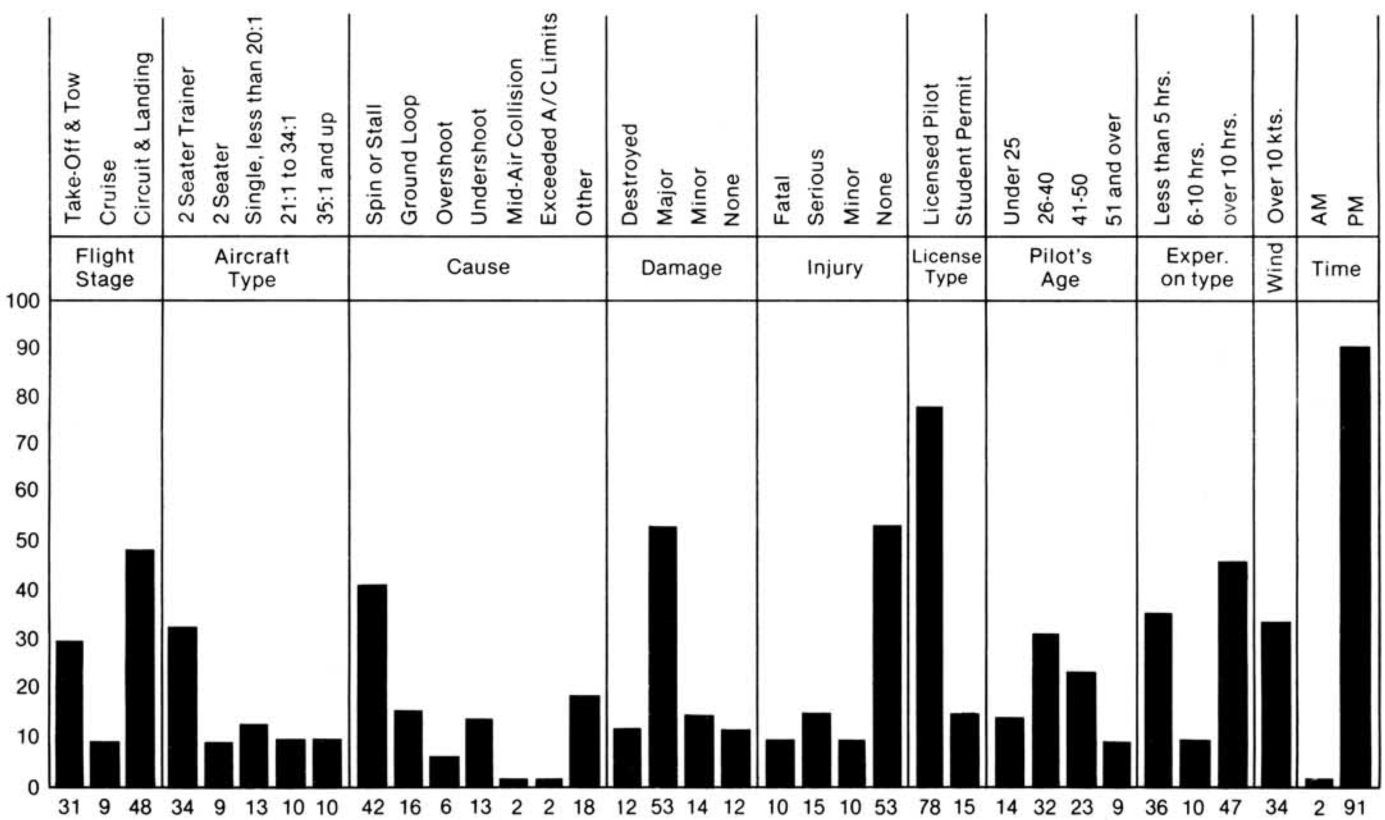
Paul Thompson and his World Contest Committee are working hard to get our Team ready for Chateauroux in July. Money is short, as usual, and you can help with a personal, tax-deductible contribution. Just mail your cheque to Terry Tucker. Ian Oldaker and his committee are busy preparing a CFI seminar in May. Make sure that your club's CFI or designated substitute attend this important event. Your entire club will benefit.

Transport Canada has made available their statistics on glider accidents since 1971. The graph below is a condensation of these statistics. Don't jump to conclusions. And consider that this time period covers approximately 200,000 glider flights. Overall, our record is excellent. But a careful look at the graph does show us areas where improvement is possible. It also demolishes the myth that the cross-country and contest pilots in their high-performance ships cause all the accidents.

Insurance negotiations for 1978/79 are well under way and the new schedule of rates will be available before the AGM. No doubt the rates will increase, but the plan itself will continue.

I hope to see many of you at the AGM in Winnipeg. A special thanks to the Winnipeg club for volunteering as hosts of the 1978 AGM.

**TRANSPORT CANADA**
**Reported Glider Accidents**
**May 1971 to July 1977**



# ANNUAL INSPECTION OF GLIDER

Aircraft Make__________ Model __________ Reg. No. __________

Date__________ Inspected By __________

As the Safety Officer for the Winnipeg Gliding Club, I have discovered how few glider pilots know how and what to look for when inspecting a glider. We in our club have a large student enrollment and when they are licenced, they are encouraged to participate in syndicates for further flying. What does this newly licenced pilot, or any other for that matter, look for when inspecting an ultra-light for airworthiness and possible purchase? Often, after an aircraft is built, the ownership is passed through many hands and the present owner doesn't have a thorough knowledge of the construction of his glider and cannot perform a proper annual inspection. How many owners of non-C of A aircraft know how to do a proper inspection annually?

Because the possibility exists that some, even many, accidents are caused by improper inspections, I felt it was time for a comprehensive checklist on the inspection of sailplanes, particularly homebuilts. This checklist could be used by prospective buyers, also sellers could have them made out and available. It could be followed for the annual inspection required by the MOT. It may follow that insurance would be valid only after this type of check is done. However, a good pilot should do one for his own peace of mind.

The checklist I am proposing is designed for the non C of A glider, and therefore does not cover any glass ships, etc. It is quite comprehensive and applies to the various control systems, and it covers all other types of construction, i.e., wood, fabric, steel tube, stress skin aluminum. There should be a large margin to write comments in, such as, "not applicable to this aircraft".

I contacted the MOT, used checklists provided by the EAA, and several sailplane manufacturers to make this checklist. In some areas I had to scrape away the cobwebs on some ancient aeronautical engineering courses I once took and have long since forgotten.

Publishing this lengthy checklist in Free Flight during the winter months may produce some worthwhile comments or improvements. Perhaps in the future the SAC could make it available to the membership at cost along with any pertinent comments.

## Comments and Initial When Completed

Blank column to the left would be included on the actual checklist to facilitate comments, etc.

## GENERAL

1. Check condition of finish. In fabric covering no ringworm should appear when fabric pressed with finger. Check all riveting is done properly. Check all welds for cracks, all tubes straight, no corrosion.
2. Check fabric cover for rotting and age (puncture test if applicable). Check stitching and glued lap joints. Applicable to fuselage, empennage, wing, flaps, aileron, rudder and elevators.
3. If damage suspected under the surface, remove the surface. In wood and fabric - look for discoloration.
4. Remove all corroded and damaged areas carefully and sufficiently. Check surrounding areas and replace doubtful parts. If wood, sand affected areas to determine depth of penetration of dry rot.
5. Inspection of all joints - particularly glued wood - accomplished by gently flexing the parts or by tapping the joints with a small plastic mallet to listen to variations in the sound. Refer to A.D. No. 63/3 for checking wood glue joints, available from M.O.T.
6. Remember the enemy of a glider is trapped water. Ensure all areas are properly ventilated (see no. 2 above) weather-proofed and especially in wood and fabric - ALL DRAIN HOLES OPEN.
7. Double check all previous repairs done properly.

## COCKPIT

1. Check all placards properly posted. Do not exceed speed, compass correction, etc.
2. Check all instruments, capacities, lines and pitot tube, in flight, if necessary.
3. Check instruments properly marked (i.e., red line air speed, release knob painted etc.) and are all instruments visible to the pilot while in flight?
4. Check safety harness for damage and corrosion. Are they attached directly to primary structure and will installation and attachments withstand minimum 9 G forward load? Is there a separate harness for each occupant?
5. Check canopy for proper fit and locking, no cracks, blind spots and relatively distortion free. Ensure canopy made from recognized aeronautical materials. Check jettisonability of the canopy.
6. Will parachute, when worn, interfere with control cables or operations?
7. Will a dropped glove, etc. jamb any controls?
8. Check rudder pedals and return springs for proper tension and attachment.
9. Ensure grip properly glued onto control stick.
10. Check operation of water dump system and ensure both wings dump and also evenly.
11. Check general appearance, cleanliness, tears in upholstery, etc.
12. Ensure cockpit ventilation system working properly.

## CONTROLS

1. Remove seat and other obstructions as necessary. Check all cables and splices for wear and proper size (1/8" min.). Run bare hand over cable to feel for broken strands (needles).
2. Check cable pulley for cracks, alignment and lubrication. All pulleys are proper diameter for bends, proper size for cable and guarded. Replace or repair.

# GLIDER INSPECTION CHECKLIST

by Chris G. Pedersen

3. Check and if necessary, dismantle all push-pull controls to check for damage and excessive play. Clean and lubricate bearings as necessary.
4. Check all torque tubes, bellcranks and guide blocks for alignment, distortion, cracks, kinks, loose fitting, and securely attached. Replace any worn parts, bolts, pins.
5. All parts in system subject to rotation properly secured and safetied.
6. Remove and/or check all spring mechanisms for attachment, corrosion and strength. Replace and re-safety.
7. Check complete control system for ease of movement, all pulleys free, no interference with fuselage, empennage or wing structure throughout full control travel. Includes tow release, trim, spoilers, flaps and/or dive brakes. Lubricate as necessary.
8. Compare maximum control movements to original value.
9. Are control stops provided on all controls?
10. Ensure there is adequate room for full control throw when cockpit occupied.
11. Check the attachment, wear and condition of bolts in tow release mechanism. Replace and lubricate when necessary and re-safety.

## FUSELAGE & EMPENNAGE GROUP

1. Check stabilizer, fin and rudder surface for damage. Press down with hand to check for cracks.
2. Check stabilizer hinges for damage, cracks, operation excessive play, safetied. Remove paint, if necessary.
3. Check rudder hinges for damage (see no. 2 above).
4. Check all interior fasteners secured and safetied.
5. Clean out interior of mud, leaves and check for mice, etc.
6. Check interior properly weather-proofed.
7. Ensure all drain holes are open.
8. Lift tail and visually line up trailing edges of elevator and wings to detect possible distortion of fuselage.
9. Check fuselage surface for damage, particularly below.
10. Check, with flashlight, bulkheads and stringers inside fuselage for damage, i.e. metal cracks, tubing straight, kinks, corrosion, welds solid, rivets properly installed, and signs of dry rot and loose glue joints. Repair as necessary.
11. Look for loose stiffners, gussets and corner blocks.
12. Check all hardware fittings for cracks in the metal and for perfect attachment to bulkheads, etc. Look for elongated holes and worn threads.
13. Check the radio antenna mount and ensure the antenna lead is not resting on an abrasive surface.
14. Check the radio installation.
15. Check the battery installation. Ensure battery secure, look for corrosion, check proper venting. Clean. Ensure fuses are of proper amperage.
16. Check tail skid (wheel) for wear and securely attached. Clean and lubricate.
17. Check landing skid for wear, cracks and attachment. Clean.
18. Ensure landing gear attachment fittings and/or retraction system not cracked, corroded, bolts and holes not enlongated and all bolts secured and safetied. Clean and lubricate.
19. Check tires for proper inflation and wear. Repack wheel bearings as necessary.
20. Check brake system for wear, cracks and/or lines leaking. Note fluid levels.
21. Place glider on jacks and check retraction system, doors and attachments for clearance and operation.
22. Check landing gear warning horn for operation.

## WING GROUP

1. Check wing surfaces, ailerons, flaps and tips for damage.
2. Check aileron hinges for damage, cracks, operation, excessive play and

# When "O.K." is not OK

by Frits Stevens

safetied. Remove paint if necessary. Clean.

3. Check flap hinges and attachments (see no. 2). Clean. Also spoilers and/or dive brakes. Check dive brake box for dry rot, corrosion, etc.
4. Shake wings, elevator and rudder to find loose fittings.
5. Test all ribs under fabric for breaks and cracks by pressing down with hand.
6. Check all ply-covered areas for cracks, dry rot and loose glue joints (if tap testing with small hammer, use caution on synthetic resin glue joints). Repair as necessary.
7. Check for loose corner blocks, stiffners, gussets, etc.
8. Check for mice.
9. On the interior, look for cracks or kinks in metal ribs, formers, rivets in properly, corrosion or rust, all welds sound, any discolored wood or dry rot.
10. Check that all adjustable fittings are locked, secured and safetied.
11. Check all previous repairs done properly.
12. Check water ballast tanks and fill valves for leaks.
13. Check the interior of all struts weather protected and are not damaged by bends or dents.
14. Check wing attachment bolts are of proper size and not worn. Replace if necessary. Lubricate bolts. Check safety pins.
15. Check control hookup (as per no. 14). Look for elongated holes, worn threads. Check safety pins.
16. Compare angle of incidence of wings and tail.

## PRE-FLIGHT

1. Are all M.O.T. airworthiness directives and all service bulletins complied with?
2. Certificate of Airworthiness, Flight Permit, registration, radio licence and aircraft log book.
3. Do a weight and balance check. (when major repairs, additions or deletions have been necessary).
4. Check all flying controls for correct angular movements.
5. A complete walkaround inspection of glider should be accomplished to check that every bolt visible on the exterior is secured and safetied, that there is no visible structural damage, that all inspection covers and panels are in place and attached, and that all parts of the glider are in proper alignment.
6. After flight test submit CCI form to M.O.T. and enter results in aircraft log book.

This incident happened to me when I was taking a prospective student pilot up for a familiarization flight; my experience is well worth relating since it clearly illustrates the importance of pre-flight briefing followed by precise and unambiguous communication between the pilot in command and the passenger or student pilot.

One evening we agreed to give several familiarization flights prior to the regular student training program. After installing my passenger in the front seat of a 2-22, I explained the cockpit layout and in doing this paid particular attention to the altimeter; I told the passenger that we set our altimeter to 800' ASL and that the towplane would tow to 2800 ASL or 2000' above the ground. I, also, told the passenger that when we reached that altitude, i.e. 2800' ASL, I would ask her to pull the release knob. I warned her about the loud BANG that would accompany the release. While waiting for the towplane I described the take-off procedure. Then came the pre-flight check, the customary "all clear" and the thumbs up sign for takeoff. We were on our way with a normal ground roll and take-off. After having cleared the hydro wires at the north end of the field, I started "O.K. we -" BANG. We were no longer connected to the tow rope. "Oh, I am sorry; I guess we're not high enough, yet" came from my passenger in the front seat. (I had meant to say "O.K. we are off the ground now and on tow. You can look around and enjoy the scenery." But I didn't get that far. Activated by my enthusiastic "O.K." my passenger had pulled the release knob!) Fortunately, the wind was light and I was able to make a 180° turn, sideslip to lose altitude and make a safe downwind landing. My passenger was, then, able to tell me that we were at 1100' ASL (300' AGL) at the time of release. The passenger subsequently took another flight with me and it proceeded without incident. Needless to say, I didn't repeat the "O.K." at 300' AGL!

As a result of the incident related above, I have since been watching my selection of words more carefully. It is always important that the pilot and his passenger or instructor and the student clearly understand each other; their safety depends upon unambiguous communication. The passenger or new student pilot going up for their first flights are likely to be anxious, all the more reason for the pilot to carefully explain the manoeuvers that are going to take place before and during the flight. I, for one, limit my use of O.K. in the air until we reach release height; then I can safely say "O.K. pull the release knob". I hope that other pilots will learn from my experience and exercise similar caution.

# If you DROOP do it SAFELY

by Frits C. Stevens

(One way not to droop; Failure of an inadequate droop aileron system.)

Our experiences with a recently installed droop aileron system in a flapped high performance sailplane have demonstrated the inadequacy of some droop aileron designs. The system in question is illustrated in Figure 1. The aileron bellcrank was moved to the droop position through its eccentric mount by means of a steel pushwire; there were no stops or locks on the system.

During a practice flight, immediately after becoming airborne the pilot suddenly experienced a violent shaking of the wings. He immediately released and, fortunately, was able to safely land the plane on the runway. Spectators on the ground were aghast to observe that during this episode both ailerons were moving in unison from full up to full down position. Upon examination of the aileron control system, it was discovered that the wire activating the droop aileron system had broken and as a result the bellcrank could now move freely around its eccentric mount and allow the ailerons to move in unison from their full up to their full down positions. One shudders to think of the consequences of this happening higher above the ground!

Clearly this design is inadequate and extremely dangerous. However, I am aware of at least two similar designs that were considered this past year. One was installed and has now been removed and the inherent dangers were recognized in the seond just before installation. Anyone contemplating improving the climbing capability of their flapped ship by adding a droop aileron system should carefully study their design with respect to the consequences if it fails as well as other safety concerns.

In addition to the failure of the droop aileron system, several weeks earlier I had experienced what I believed to be aileron flutter. This occured when a strong thermal was encountered at fairly high speed; the wings started shaking rather violently and this shaking could be stopped by applying positive flap to slow the aircraft. The previous owner and builder of the sailplane assured me that he had never experienced flutter in the seven years he had flown the ship and flying under all kinds of conditions. In retrospect, however, the droop aileron system was a recent modification and he had not flown the aircraft extensively with the droop system installed. After the failure of the droop system, we decided to eliminate it and fixed the bellcrank in the normal position. We have not experienced flutter since that time. It is of interest that the builder of our plane had installed a similar system in his newly built sailplane and, also, experienced flutter problems with it. Although we have no proof, we feel that the flutter problems may have been due to "play" in the ailerons as a result of the inadequate droop system. A safe system should probably include a positive lock mechanism for the normal and desired droop systems.

Fig. 1.
**DROOP AILERON SYSTEM**

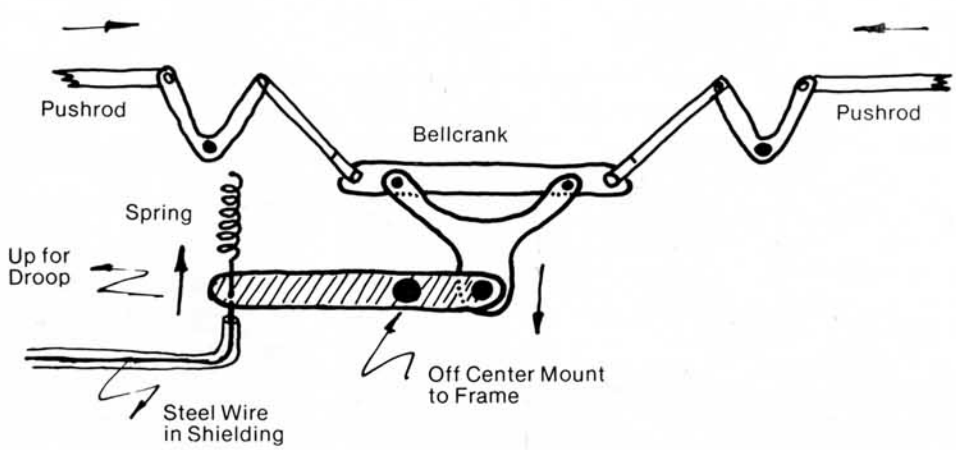



FIGURE LEGEND

Figure 1. - The bellcrank is mounted to the frame in an eccentric (off-center) fashion. Thus when the droop aileron control lever is activated the left side of the bellcrank mount is pushed up and as a result the bellcrank moves down (see arrows), the pushrods are pulled in and the ailerons droop down. Other than the wire itself there are no stops or locks on the droop system.

# FINAL GLIDE COMPUTER

by George Adams

This article will go through the steps in constructing a Final-Glide Computer for the LS-1. The approach can be easily applied to any other sailplane type. The computer is similar to the Williamson Computer in principle but in addition has a map and a course cursor on the back. It can be made of cardboard and a sheet of clear plastic with a bit of map for a few pennies.

No effort will be made to develop theory or explain the approach used as this would make the article too long and involved. It is anticipated that by following the steps a sailplane pilot can make a computer for any sailplane provided its polar is available.

Figure 1 shows an exploded view of the computer. All components can be made of cardboard except the Spiral and the Cursor must be transparent. The size is determined by map distance and scale used for the final glide distance, the 6" x 6" size used gives a radius of 3" and at 8 miles to the inch represents 24 miles of glide to the center which is probably a maximum that is needed.

**Step 1 Obtain the Polar** in Speed vs L/D

From the LS-1 we obtain the following data:

Table 1

| Speed km/h | Sink Speed m/s | L/D |
|---|---|---|
| 70 | .58 | 33.5 |
| 80 | .60 | 37. |
| 100 | .77 | 36. |
| 120 | 1.06 | 31.4 |
| 140 | 1.51 | 25.7 |
| 160 | 2.17 | 20.6 |
| 180 | 2.93 | 17.1 |
| 200 | 3.90 | 14.2 |
| 220 | 5.10 | 11.9 |

$$L/D = \frac{\text{Speed (km/h)}}{\text{Sink (m/s)}} \times \frac{1000}{60}$$

**Step 2 Converting the Measuring Units**

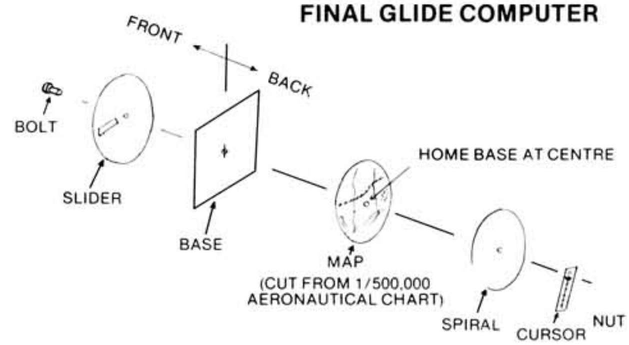
Since the indicators on the LS-1 are in knots the metric units in Table 1 must be converted to knots. From conversion tables found in text books:

1 km/h is .5396 knots

1 m/s is 1.943 knots

Then from table 1 we note that 70 km/h is 37. knots and .58 m/s sink is 1.13 knots, etc.

Fig. 1
**EXPLODED VIEW OF A FINAL GLIDE COMPUTER**




**Step 3 Glide Slope**

The final glide takes place from a known position to the location where we intend to land. Since the slope of the final glide for a given speed on the ASI is affected by the wind the following relationship holds:

Table 2

$$\text{glide slope} = \frac{\text{speed plus or minus wind speed}}{\text{sink speed}}$$

Note: all speeds are in the same units (knots), plus for tailwind and minus for head wind. From steps 1 and 2 the following values are determined:

| Speed Kts. | Glide Slopes Tail wind 10 kts. | Glide Slopes Tail wind 20 kts. | Slopes Head wind 10 kts. | Slopes Head wind 20 kts. |
|---|---|---|---|---|
| 37.8 | 42.3 | 51. | 24.7 | 15.7 |
| 43.1 | 45.4 | 54. | 28.3 | 19.7 |
| 54.0 | 42.6 | 49.3 | 29.3 | 22.6 |
| 64.7 | 36.3 | 41.4 | 26.5 | 21.6 |
| 75.5 | 29.1 | 32.6 | 22.3 | 18.9 |
| 86.3 | 22.8 | 25.2 | 18.1 | 15.7 |
| 97.1 | 18.8 | 20.6 | 15.3 | 13.5 |
| 107.9 | 15.6 | 16.9 | 12.3 | 11.6 |
| 118.7 | 12.9 | 14.0 | 11.0 | 9.9 |

**Step 4 Glide Slope Plotting**

The logarithm of the glide slope is plotted onto the base in polar cordinates, see figure 2. The range selected is 10 to 60 and is plotted over 180 degrees.

The following equation applies:

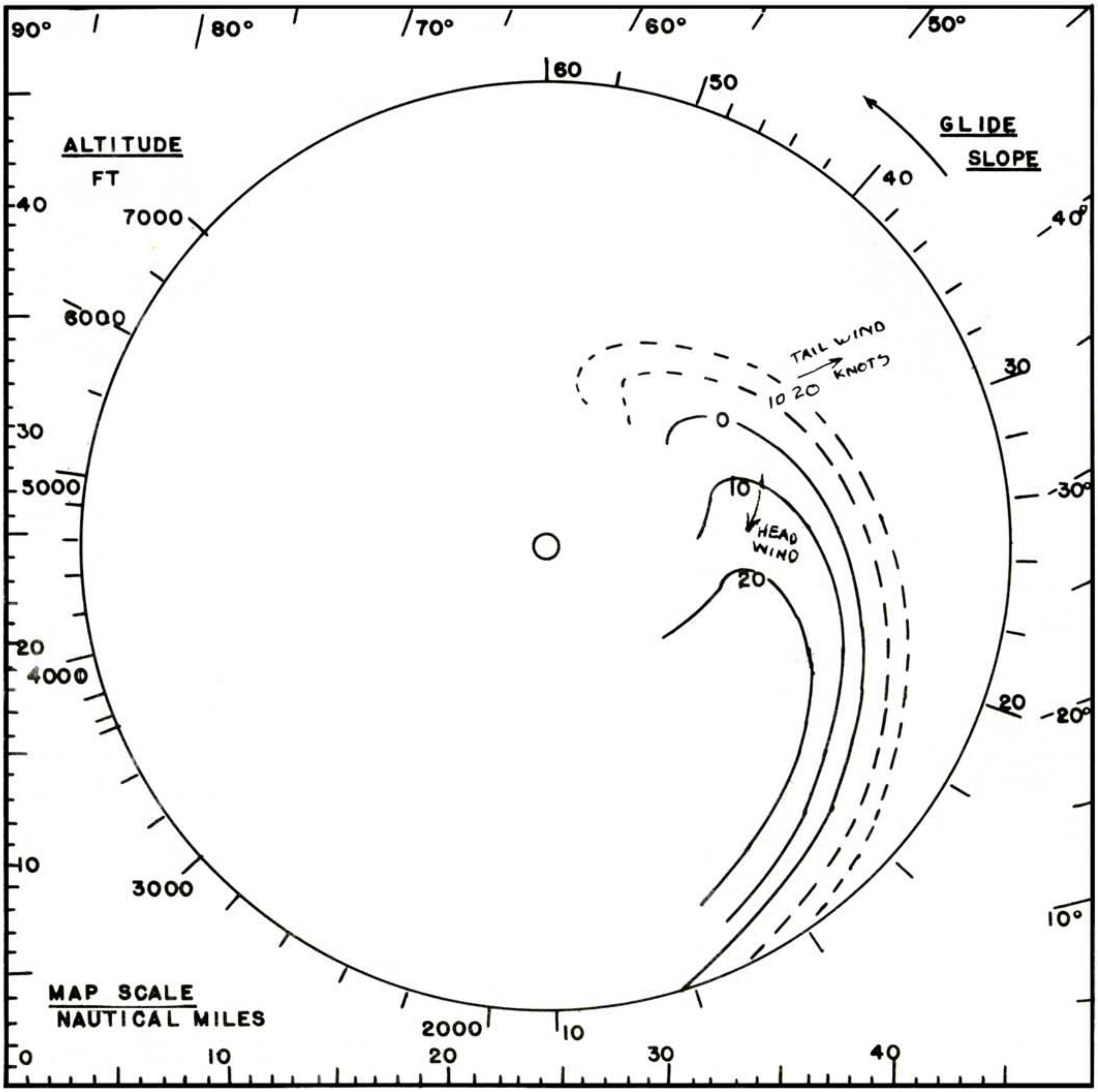
180 = log 60 - log 10 then at angle, A, the slope, s, is;

$$\frac{A}{180} = \frac{\log S - \log 10}{\log 60 - \log 10}$$

$A = 231.5(\log S - 1)$.

Then values of 'S' at Angle 'A' in degrees are:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| S | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| A° | -70 | -51 | -35.8 | -22.4 | -10.3 | 0 | 18.3 |
| S | 12 | 14 | 16 | 18 | 20 | 22 | |
| A° | 23.8 | 33.8 | 47.3 | 59. | 69.6 | 79.2 | |
| S | 24 | 26 | 28 | 30 | 32 | 34 | |
| A° | 88. | 95.7 | 103.5 | 110. | 117. | 123. | |
| S | 36 | 38 | 40 | 42 | 44 | 46 | |
| A° | 129. | 134. | 139. | 144. | 149. | 153. | |




| S | 48 | 50 | 55 | 60 | 70 |
|---|---|---|---|---|---|
| A° | 157.5 | 161.4 | 171.5 | 180 | 195 |

**Step 5 Polar Plot of Speed**

Circles representing speed are lightly drawn on the front of the base over the sector covered by the glide slope. These circles are only used for plotting and are of no use when the calculator is finished. The speed range is 0 to 118.7 knots. A scale that will fit the 3" radius is selected, in this case 1" equals 40 knots.

Using the speed polar coordinate versus the glide slope plotted in the previous step, the polars given in table 2 are plotted. There will be four curves for the wind conditions and one for zero wind. e.g. for zero wind at 54 knots the glide slope will be 36 and is plotted at an angle of 129 degrees from the top of the calculator, see figure 2, 54 knots will occur 1.35" from the centre.

**Step 6 Plot Distance**

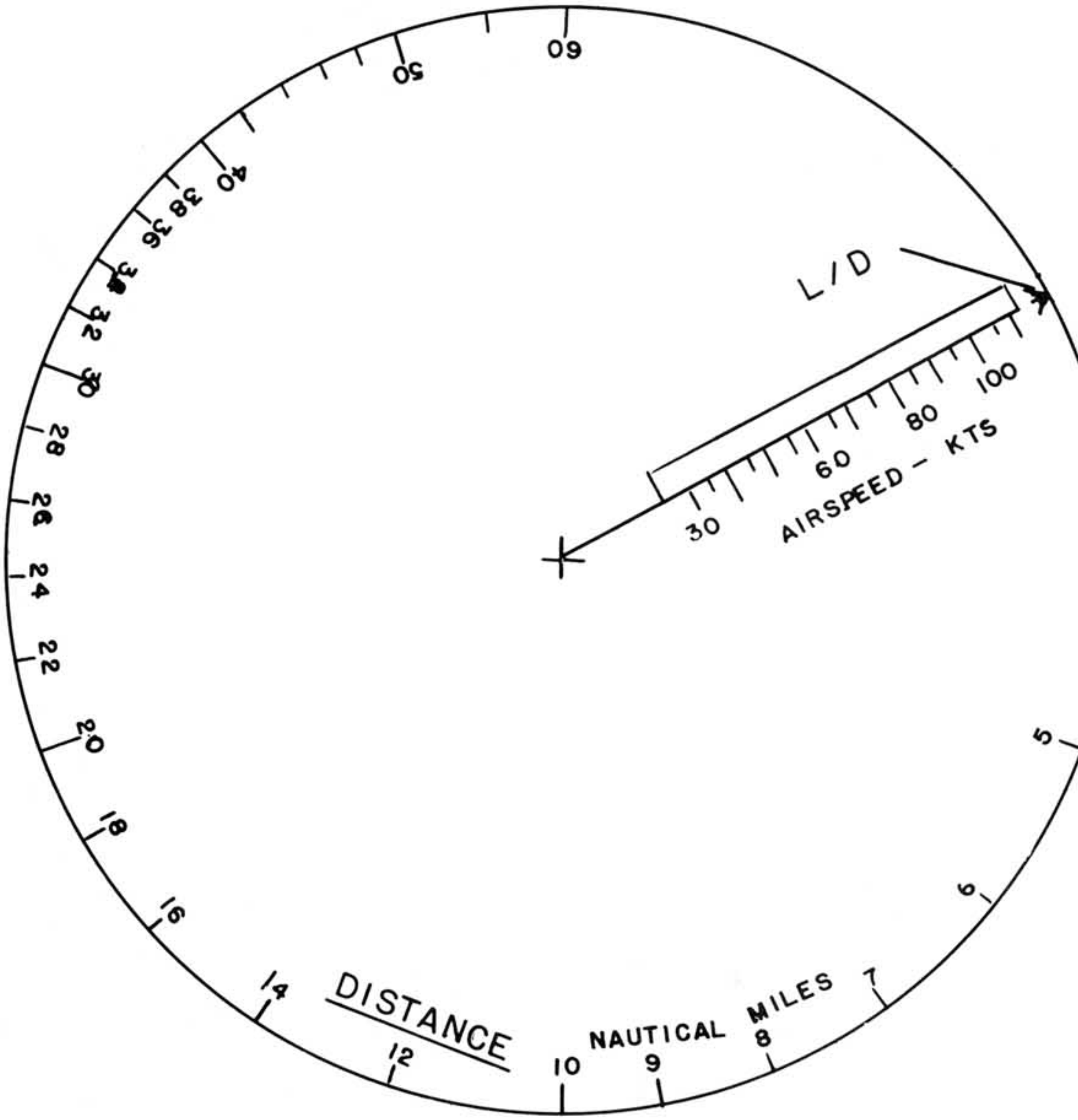
The distance that can be covered in a final glide is related to height and the glide slope, i.e.

$$\text{glide slope} = \frac{\text{distance}}{\text{height loss}} = \frac{\text{nautical miles}}{\text{feet} \times 1.645 \times 10^{-4}}$$

Table 3

| Altitude loss ft. | Distance nautical miles Slope 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|
| 1000 | 1.65 | 3.3 | 4.95 | 6.6 | 8.25 | 9.86 |
| 1500 | 2.47 | 4.95 | 7.41 | 9.9 | 12.3 | 14.8 |
| 2000 | 3.3 | 6.6 | 9.86 | 13.1 | 16.4 | 19.7 |
| 2500 | 4.12 | 8.22 | 12.35 | 16.4 | 20.6 | 24.6 |
| 3000 | 4.95 | 9.86 | 14.8 | 19.7 | 24.7 | 29.6 |
| 3500 | 5.76 | 11.45 | 17.3 | 23.0 | 28.8 | 34.5 |
| 4000 | 6.6 | 13.1 | 19.7 | 26.3 | 32.9 | 39.4 |
| 4500 | 7.42 | 14.7 | 22.2 | 29.6 | 36.9 | 44.5 |

Fig. 3
**SLIDER**




| | | | | | | |
|---|---|---|---|---|---|---|
| 5000 | 8.25 | 16.4 | 24.7 | 32.9 | 41.1 | 49.3 |
| 5500 | 9.06 | 18. | 27.2 | 36.1 | 45.9 | 54.2 |
| 6000 | 9.86 | 19.7 | 29.6 | 39.4 | 49.3 | 59.2 |

The scale used for the glide slope, step 4, is used in a counter-clockwise direction on the slider. For the LS-1 use values 5 to 60 given for 'S'.

**Step 7 Plot Altitude loss**

The slider is located in the base. Lightly mark the edge of the slider on the Glide Slope side of the base. Then using values listed in Table 3 mark off altitude losses versus distance with the mark set at various glide slope values. Some fiddling may have to be done with the scales to obtain a nice balance. Note that at a given slope; distance and altitudes must agree, eg. with the mark on the slider pointing at 40 on figures 2 and 3 overlaid, 4000 feet should be located opposite 19.7 miles, 2000 feet opposite 9.8 etc.

**Step 8 Plot Speed on Slider**

From the centre of the slider to the light mark draw a straight line. Mark off the airspeed in knots along the radius using the scale in step 5, i.e. 1" = 40 knots. Then cut a window above this radial leaving enough material so that the edge of the slider does not tear. See figure 3.

The front of the computer is now finished.

**Step 9 Map**

Using a standard aeronautical chart draw a 3" radius circle with your landing site at the centre. Cut out this section and place it on the back of the base.

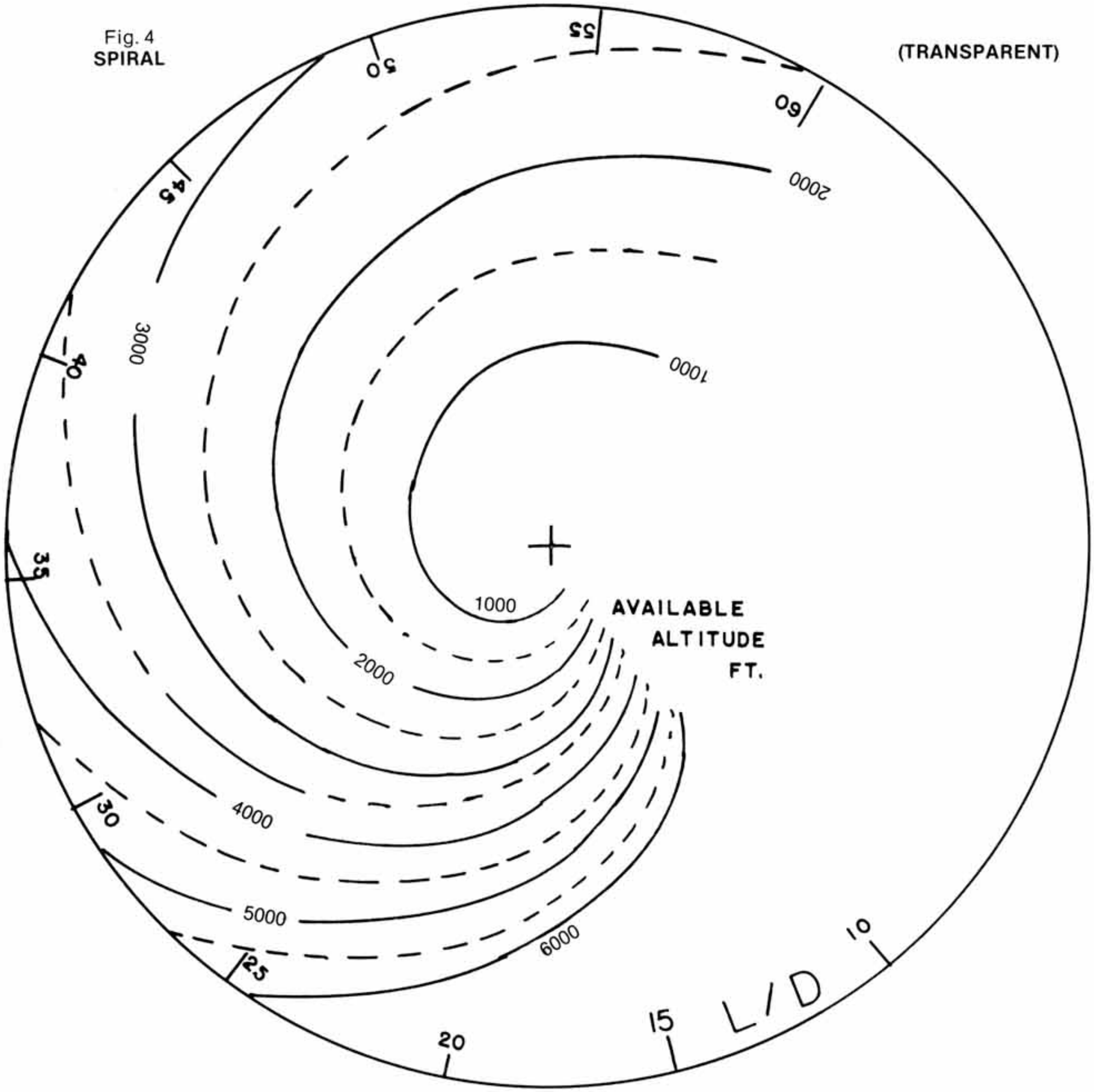
**Step 10 Spiral**

On the transparent spiral draw lightly (they will be erased after the spirals are plotted) a series of radial lines representing a range of final glide slopes, say 10 to 60. Mark slope values on the circumference.

The data in Table 3 is now plotted as spiral curves. The radial ordinate is the map scale, see figure 4. Note 1" is equal to 6.45 nautical miles and the spiral is applicable to any glider.

Fig. 4
**SPIRAL**

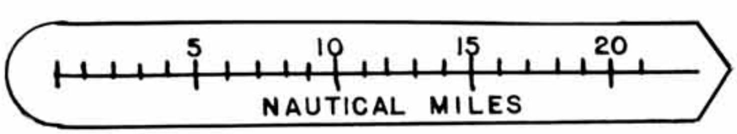
**(TRANSPARENT)**




**Step 11 Cursor**

The cursor is a transparent strip that marks out the track of the final glide on the map. It overlays the spiral. A straight line is drawn down its centre with distance marked off as per the map scale, see figure 5.

Fig. 5
**CURSOR** **(TRANSPARENT)**




**Step 12 Assembly**

The parts are assembled in the order shown in figure 1 using a self locking nut and screw. An additional feature is to mark off the map scale and angles from a corner around the edges making the unit a protractor as well as a handy scale.

**Summary**

The unit shown is to scale within the accuracies of reproduction thus it can be traced directly onto material to make a computer. The only part that will change with various gliders are the polars plotted on the front of the base (5 curves). The values plotted for the LS-1 should be fairly close for all Standard Class sailplanes.

# World Contest Update

Here is an update of the World Contest Committee's progress as of mid December.

The fund raising is going quite well to date, with a fund total around $20,000. This includes a grant from the government. The grant has conditions relating to the proper training of the team prior to the actual contest. The Committee is presently establishing a training program that will include competitive flying for all team members in the spring and summer months leading up to the team departure in early July.

As you might have noticed in the last issue of Freeflight, the team fund was bolstered by $1,000. A donation from the Canadian 99'ers Inc., an organization of women pilots. We thank them for their donation and encouragement to the SAC World Contest Team.

Pilots on past Canadian teams have always had to dig deep into their own pockets in order to represent Canada in World Championships. The Committee's aim for the '78 team is to send four pilots, eight crew members, one team manager, and maybe a meteorologist to France and not have any of them empty their own pockets to represent Canada. This must be one of the few, if not the only, truly amateur sports left in the world with no commercial support for the pilots.

Our goal is to raise $40,000. We are half way there, but the second half is the toughest. To do this we must have the help of the soaring pilots of Canada. If each SAC member were to donate $5. or $10., this could make the difference. Ten dollars does not go very far these days, but collectively it could make this team become the first financially solvent team in Canadian history, and it's tax deductible. Anyone donating over $5. will receive a tax deductible receipt. The address is below, and thanks.

Now here is the team update:

Al Schreiter has been elected as Team Manager, and thanks to Al our aircraft lineup will include one Mosquito, two Cirrus 75's, and we hope to fly over one Canadian aircraft, probably a Mini-Nimbus. The final arrangements for this lineup are being made right now.

You will note, even though there are three classes, we have elected to go with the two fifteen metre classes. Our chances of procuring a competitive open-class ship seem extremely low. (There aren't many 604's in this world.)

The difference between this year's team and past teams is that we are hoping to be able to afford to take a meteorologist this year. All the successful teams in World Contests have at least one met. person, and the pilots seem to feel it is the single most important factor for a high placing team. After all we have very good pilots to represent us, and given an even chance we could be right up there with the fast guys.

Paul J. Thompson
World Contest Committee Chairman
145 Little John Road
Dundas, Ontario L9H 4H2


* THERE IS! Please send a donation to the WORLD CONTEST COMMITTEE CHAIRMAN PAUL THOMPSON, 145 LITTLEJOHN RD. DUNDAS, ONT. L9H·4H2

OUR TEAM SHOULD GO FIRST CLASS

P.S. Any donation over $5.00 is tax-deductible

# CFIs' SEMINAR 1978
## 14, 15, 16 May at SOSA

## Schedule

13 May Arrival and Registrations
14 May Presentations of Papers
15 May Flying 2-seaters and single seaters at SOSA
16 May Workshop Sessions and Adoption of Recommendations

Plans are now well advanced for this seminar, the theme of which is "The Developing Pilot". There is much to get through during the three days so unfortunately attendance is being restricted to CFIs and a few SAC officers.

## Call for Papers

You are invited at this time to contribute a short paper or papers on any of the subjects shown below, for presentation at this seminar during informal sessions on the first day. If you are not CFI of your club but would like to contribute a paper, you are asked to contact your CFI to ask him to present it for you. Notification of your intent to write a paper should be sent on the form below as soon as possible.

Papers are invited for the following sessions:
1. Club Operations
2. High-Performance Aircraft
3. Accident Prevention
4. High-Altitude Flying
5. Training

Papers can range over a wide spectrum but should be aimed at training and safety, and could include the following titles:

1. **Club Operations** - concept of the job of CFI, typical club winching or aerotow procedures, cross-country training programs, etc.
2. **High-Performance Aircraft** - Flying these machines, flying checks prior to flying this type of machine, club program for progression to glass sailplanes, etc.
3. **Accident Prevention** - Club safety programs, typical review of an accident, handling the difficult or accident-prone student, annual checks for aircraft (ultra lights), typical club accident and incident reporting system, etc.
4. **High-Altitude Flying** - In Eastern Canada - where to go, who to contact; in Western Canada - mountain flying, equipment, your first wave flight, HAI courses, etc.
5. **Training** - The roll of the SAC Instructor Courses, typical post-solo training, teaching the difficult student, etc.

Further information on this seminar has been or will be sent to all CFIs; if you wish more information, this may be obtained by contacting your CFI or either Chairman below.

| | |
|---|---|
| Ian Oldaker | Max Harris |
| Chairman, Instructors Committee | Chairman, Safety Committee |
| 30 Prescott Crescent | 3521 Ashcroft Crescent |
| Pinawa, Manitoba R0E 1L0 | Mississauga, Ontario |
| | L5C 2E6 |

## Notice of Intent to Submit a Paper to the CFIs Seminar 1978

I wish to offer a paper (maximum about 3 pages long) for this seminar.

TITLE OF PAPER ____________________

SUGGESTED SESSION ____________________

BRIEF OUTLINE ____________________

____________________

____________________

NAME(s) of AUTHOR ____________________

Address for notification of acceptance: ____________________

____________________

If not CFI, please indicate who you have asked to present the paper at the Seminar:

____________________

This form should be sent to the address below as soon as possible. Notification of acceptance will be mailed as soon as possible also to you. Receipt of final manuscripts is required by 1 April 1978 to ensure adequate planning and scheduling for the Seminar.

Ian Oldaker, Chairman, SAC Instructors Committee, 30 Prescott Crescent, Pinawa, Manitoba R0E 1L0

# SPEED CONTROL IN EARLY

When you started flying you may have become a little frustrated with the three dimensions of the flying environment and with trying to control the 'plane with three controls at once ... some students do. This may have persisted for a few sessions until things began to click into place - and then you wondered - what was all the fuss about anyway? Let's review speed control.

Speed can be controlled and/or monitored in three ways - by listening to the air noise as the 'plane flies at different speeds, by the attitude at which the 'plane flies or by monitoring the airspeed indicator (ASI).

Let's listen to the 'plane. This is an excellent technique and, once we have developed our hearing system to tune it to speed and to the aircraft we are flying, the method will be with us for all our flying, in any weather, whether or not the ASI is functioning; think of that, they sometimes malfunction. One or two disadvantages exist, and we must beware. If we fly sideways (or yaw), more noise; and when we change aircraft, different noise. Remember a 2-22 is quite a bit noisier than a 2-33; a 1-26 is also noisier than that nice new Astir. Don't be fooled when you decide to fly the older glider for the first time in a month. You could find yourself flying it much too slowly!

Flying by attitude. By "attitude" I mean the angle that the glider makes with the horizon - it could be nose high for example, or we could have a nose down attitude. It will vary a bit in turbulence, but if we keep the attitude as constant as we can by making small (and I mean small) control movements, then the speed will "average out" to the usual speed for that attitude. If, when practising gentle turns, the nose "drops" (or should I say the attitude becomes nose down?) then the speed will slowly begin to increase. You may not notice at first because trainers often increase speed slowly, so that when you pull back on the stick to slow down again, the nose may go too high! Even if you hadn't noticed until the fellow in the back seat said, "Er, do you think our nose is dropping (there I go again) or our speed is increasing?" - then if we merely adjust the attitude back to "normal" by a small movement of the stick, the speed will slowly come back also to the desired normal value. If we have no horizon to look at so that we can notice these attitude changes, the above procedure becomes a bit more awkward, but the principle still applies.

"Chasing" the ASI is a hopeless technique. The ASI should be used to "monitor" the speed, i.e. to look at every now and then - because we should of course be

# AND LATER FLIGHTS

by Ian Oldaker

looking out more than 95% of the time. If say, we wish to fly at 45 mph, the needle position will be, for example, at 2 o'clock. A mere glance then will tell us that it is at say 3 o'clock, i.e. we are a bit too fast. The fact that it is 49 mph doesn't much matter - we now know that we are flying a bit above our goal speed. (Airline pilots use markers or "bugs" on their ASIs to show desired speeds.) If we chase the needle we often overcontrol and the 'plane will often overshoot the desired speed, requiring us to control the other way again!

We can use "attitude to maintain our position behind the towplane, our vertical position that is. If for example, our nose is too high, maybe some turbulence put it up there, then we will "climb" relative to the towplane. So a small movement forward to bring the glider to the correct attitude will stop this relative climb. We then adjust our vertical position, in small steps if we like. When again in the correct position we can then adjust the attitude back to normal for the tow.

Attitude can be a great help with speed control when coming in to land when it is more vital to fly at the correct speed. At such times we are busy with dive brakes, downwind checks, etc., that we can only monitor the ASI every now and then, but this is vital. For example we could be flying downwind at our usual airspeed, but because of a strong wind, our ground-speed is much higher. Now, because of our low altitude compared to normal we "notice" our apparent high speed. We now have to beware of inadvertently pulling back to fly our "usual" airspeed - in such a case we could well do this subconciously and find ourselves stalled and spinning at a very low altitude. It now becomes academic knowing you are in a spin so close to the ground - better to avoid it in the first place. So monitor the ASI!

Listening to the speed helps in the circuit too, but say we are sideslipping? And what if we are using flaps? Different noise each time - so monitor the ASI!

Our attitude helps too - it will be nose down compared to our normal flying attitude in a trainer, but as we fly on final through a strong wind gradient attitude won't help us maintain our speed. The glider has inertia - it refuses to increase speed quickly enough, we may have to stuff that nose down having seen the speed drop off - so monitor the ASI!

Years later when we may be flying a glass or metal slipper our attitude may well be a bit more nose-up when approaching to land! In these sailplanes small attitude changes produce relatively large speed changes so the ASI must remain our prime speed monitor.

# GOSSAMER

For a man to fly like a bird under his own power is the oldest dream of aeronautics, going back at least to the Greek myth of the inventor Daedalus, who escaped from the Labyrinth on wings covered with feathers held on by wax. The modern era of man-powered flight began in 1935, when two British engineers developed a propeller-driven "flying bicycle" that traveled through the air for short distances. In the 1950's a British industrialist, Henry Kremer, offered under the auspices of the Royal Aeronautical Society a substantial prize (now worth about $86,000) for the first man-powered flight to meet certain demanding conditions: the craft had to take off unassisted from level ground in a wind of 10 miles per hour or less, fly in a figure-eight pattern around two pylons half a mile apart and pass over a 10-foot hurdle at the start and finish. The use of stored power or buoyant gases was forbidden, as were any stops or assistance along the way.

Over the years Kremer's challenge gave rise to a series of delicate, broad-winged flying machines. Several were able to make extended straight flights, but none could negotiate the course; the turns proved too difficult from the standpoint both of maneuverability and of power. Now a new type of aircraft developed by Paul B. MacCready, president of AeroVironment, Inc., of Pasadena, Calif., has finally succeeded where others had failed.

MacCready's craft, the Gossamer Condor, is aptly named: it is 30 feet long and eight feet high, has a 96-foot wingspan and a total lifting area of 835 square feet and yet weights only 70 pounds. The disproportionate size of the wing is necessary to get maximum lift at low speed. The craft is propelled by pedalling a bicycle chain connected to a propeller behind the cockpit which hangs from the center of the wing. A stabilizer mounted on a thin boom extending to the front of the wing and fitted with two small ailerons helps to control pitch and yaw and dispenses with the need for a vertical control surface. The craft is maneuvered into a turn by directly twisting the wing with the aid of a lever, which can be set at a predetermined turn radius. Once the twist of the wing is set, the stabilizer can still be manipulated to maintain control during the turn.

The main difference between the Gossamer Condor and preceding man-powered aircraft is that it was inspired by hang-glider technology. These light-weight gliders gave MacCready the idea of using a aluminum-tube skeleton braced with piano wire. Says MacCready: "The fact that the basic structure was very easy to build, modify and repair made an integrated development program possible. We could build a new wing in two weeks, and a new stabilizer in three days." The craft's design, he says, "is a mixture of the simplest and the most advanced aeronautics technology" Although the airfoil and the propeller were designed with the aid of a computer by AeroVironment's vice-president, Peter P.S. Lissaman, no plans for the craft were ever drawn up. Instead the design evolved over a period of a year, during which 12 successive models were built and improved on.

No custom-made materials were necessary. The fuselage was built from balsa wood, corrugated cardboard (which also forms the leading edge of the wing), sheets of Styrofoam and a thin skin of Mylar. Obviously every attempt was made to keep weight to a minimum. The project called for an investment of about $25,000 and thousands of man-hours in unpaid time. MacCready and his collaborators first built small-scale models to check the bracing and construction techniques. Then they went to a version with an 88-foot wingspan but no propeller. Finally they built a full-sized version complete with a propeller and a bicycle seat. To pilot the craft MacCready hired Bryan Allen, a 24-year-old championship-level bicycle racer who is also an experienced hang-glider pilot.

The craft was tested in the Mojave Desert. At that time it was discovered that the ends of the wings were too broad to allow for reasonable maneuverability at the craft's low speed (seven to 11 m.p.h.). When the ends of the wings were made narrower, it became necessary to further reduce drag by enclosing the pilot in a streamlined Mylar cockpit. With the pilot in place the finished craft weighs 207 pounds and required about .35 horsepower to fly in a straight line. Says MacCready: "It is the absolute minimum

PHOTOGRAPH COURTESY OF PAUL B. MACCREADY

# WINGS

airplane."

In February, MacCready and his collaborators moved the plane to the Kern County Airport in Shafter, Calif. The airport was chosen because it is relatively deserted, has a large hangar and has lighter winds than most airports in southern California. On August 23, after some final modifications on the fuselage, MacCready decided to try for the Kremer prize. His confidence was bolstered by a "confluence of beneficial factors": Allen was trained for his best effort, the wind conditions were satisfactory and Bob Richardson of the Kern County Department of Airports, who had been approved by the Royal Aeronautical Society to verify a successful flight, was present.

As Allen pedaled powerfully the Gossamer Condor accelerated down the runway for 30 feet and took slowly to the air. Moving at about 11 m.p.h., it traveled the specified figure-eight pattern around two markers half a mile apart, although because of the large wingspan and low speed of the craft the turns had to be wide and flat. When the successful flight was completed, the craft had covered from takeoff to landing a distance of 1.3 miles in seven minutes 22.5 seconds, and had won MacCready and his collaborators the Kremer prize.

Now that the competition is over MacCready wants to take a vacation from an activity that has absorbed nearly every hour of his spare time for the past year. The Gossamer Condor, he says, was "a crude vehicle with one purpose only - to win the Kremer prize. It was a compromise between a sophisticated design and a finite amount of time, money and effort." MacCready believes, however, that his basic design could be refined to reduce its weight from 70 pounds to 55 and make its wing surface smoother. Then the craft would require only .29 horsepower to stay aloft, making it possible for an athletic bicyclist to fly it for several hours. As for the victorious craft, it is slated for retirement. MacCready hopes it will find a place in the Smithsonian Institution.

# Hangar Flying

### Andre Beaulieu, Air Cadet Pilot of the Year

Air Cadet Andre Beaulieu of 313 Edmunston Squadron, N.B., was named 1977 winner of the Jonathan Livingston Seagull Trophy, presented annually by the SAC to the top Air Cadet Glider Pilot trained in Canada.

Air Cadet Beaulieu took basic gliding training under a summer program operated at Marysville Airport, N.S., and sponsored by the Canadian Forces. At the completion of his course he was awarded a DoT Glider Pilot Licence and the Air Cadet Gliding Wings Badge.

The Canadian Forces last summer operated five Air Cadet glider pilot training units across Canada and graduated over 280 glider pilots. As a means of rewarding the top cadet in each location, the Air Cadet League arranged with the Schweizer Aircraft Corporation of Elmira, New York to further train five selected cadets for passenger carrying status as laid down by the DoT.

During a special competition held at the Schweizer Soaring School, Cadet Beaulieu topped the group as the most outstanding cadet.

### A New Canadian Record???

According to an MoT document, a certain well travelled Kestrel landed at Vancouver International Airport during August 1977. Since this Kestrel was known to have been in Ontario on the previous Sunday, some sort of Canadian record may have been set, such as the first E to W crossing of the Rockies by a glider. If the borrower submits to SAC satisfactory evidence of a normal flight (i.e., that the landing in question was preceeded by a take-off) and also sends payment for the landing fee of $1.30 (see below) the owner will refrain from prosecution for hijack or similar act.

### Sigma 21M Prototype Glider Coming to Canada

In June of 1977 an announcement was made that the SIGMA prototype would be given to a suitable applicant who would undertake further research on this variable geometry sailplane.

SIGMA is an advanced British sailplane project which was hopeful of a breakthrough in sailplane technology but was plagued with flap sealing problems and perhaps financial trouble as well.

Twelve proposals were submitted and it was decided that the best proposal for further development was the one from Dave Marsden of Edmonton.

Dave is a former SAC Director, Gold C pilot, holder of Canadian records and designer of the Gemini two place variable geometry sailplane. The Gemini utilizes slotted flaps which have proved effective and successful. Dave has also designed a 15 m racer, the Spectre, now under construction; it also features full span slotted flaps.

Dave Marsden is a professor of Mechanical Engineering at the University of Alberta and at present is on sabbatical at the Cranfield Institute of Technology in England. Modifications to the SIGMA flap system will be started at Cranfield and continued later in the year in Edmonton.

### 1978 AGM

Don't forget the SAC AGM in Winnipeg on March 18th. The Winnipeg Gliding Club is host for the meeting to be held at the Marlborough Hotel. See page 18 of the November/December 77 issue of FREE FLIGHT for complete details. And incidently, if the hotel prices are the only reason why you aren't planning to get to the AGM this year; contact Harvey Bachman at 928 Waterford Avenue in Winnipeg who will arrange for you to stay at the home of one of the members of the Winnipeg club.

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Vancouver Int'l Airport BC
V7B 1T6

| DESCRIPTION | AMOUNT/MONTANT |
|---|---|
| Aug 77 - CF-FGP. Slingsby T592 - 1 domestic landing @1.30 x 1 | 1.30 |
| ACCOUNT DUE WHEN RENDERED / PAYABLE DES RECEPTION — PAY THIS AMOUNT / MONTANT A PAYER | 1.30 |

DISTRIBUTION OF CREDIT / REPARTITION DU CREDIT

| FOLD / PLIER | Responsibility / Responsabilité | Activity / Activité | Warrant / Autorisation | Encumbrance / Charge | Line Object / Art Org | Amount / Montant |
|---|---|---|---|---|---|---|
| | 415799 | | | | 8470 | 1.30 |

# Club News

After several years of practically zero growth, the Vancouver Soaring Association experienced a year of almost explosive growth in 1977. From the 70 flying members of 1976 the club has grown to 115 flying members in 1977.

There appears to have been several reasons for this remarkable growth. First, we started the year off with a shopping centre display which was followed up during the following week with an "introduction to soaring" evening to which all who had expressed an interest in learning more about soaring were invited. This produced a small number of new members at the start of the season and some more new members later in the season as people who had heard about the display from friends came out to club activities.

The Air Cadet program also resulted in the V.S.A. gaining some new members since seven of their graduates from the last two years training programs decided to continue their gliding activities by joining a soaring club. This is the first time in quite a few years we have had people joining us after Air Cadet training.

Another source of the growth was a ground school conducted in conjunction with a local night school. In addition, several glider pilots moving into the Vancouver area helped to compensate for members who moved away. We also managed to attract back some older glider pilots who had not been active for several years, including one who had not flown since the Luftwaffe was grounded in 1945. Even after such a long lay off he was soon solo again.

After the mid-point of the season, the biggest factor for a continued growth became the enthusiasm of the students who were doing their own PR for us. With new solos every other week, little else was needed to keep them motivated. It was a struggle for our twelve active instructors and ten tow pilots to keep them satisfied without wearing themselves out; especially when four of them are doing duty as both instructors and tow pilots. Somehow they managed and seven ab-initios soloed, four power pilots converted to gliders and seven pilots with previous soaring experience were converted to ridge soarers after varying amounts of dual familiarisation flying.

As far as badges went, only one pilot pursued a high goal; Bruce Macgowan completed all three legs of his Silver "C" in a two week period. Some of our more experienced pilots were active in various contests with four flying in our B.C. contest, four in the U.S. Region 8 contest and three making the long haul to Hawkesbury for the Canadian Nationals.

Overall 1977 was a record season in terms of growth of the club (increased 64%), number of launches (1652, up 48% from 1976) and hours flown in the four club owned sailplanes (648, up 26% from 1976). We can only hope that we can keep the momentum up in 1978.

# Class Ads

**FOR SALE**

PZL variometer model WRS-5D, total energy compensator model KWEC, and flask. $70.

Richard D. Robinson,
48 Checkendon Drive,
Rexdale, Ontario M9W 2Y9

**FOR SALE**

Schweizer 2-22, SN 160, Requires work, will sell at $2500 or trade on 1-26, 2-33, 1-34, 1-35 and Schweizer combination trailer.

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(613) 692-3622

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Bergfalke II overhauled by Scheibe 1967 and rated 0 time, total since 355 hours. Basic instruments front and back. Exceptional condition with BF III features. Open trailer custom built to factory standards. Parachute as new. Asking $5500.

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PIK 20B, special factory finished wing, contest sealing, low empty weight (510 lbs). Top class 15 m performance at much less than new price. Factory trailer and fittings, instruments optional.

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(613) 731-6997

**FOR SALE**

Scheibe MU13D-3, Excellent condition. Enclosed metal trailer, wing stands etc. Glider is one-of-a-king antique.

G. Bryan MacDonnell,
R.R. No. 3, Senger Rd.,
Kelowna, B.C. V1Y 7R2
(604) 860-2192

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Falke 25B T.T. 190 hours
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Sault Ste. Marie, Ontario
(705) 254-3678 or (705) 253-1262

**FOR SALE**

TERN CF-QXI featured in FREE FLIGHT articles - flies like a bird and outclimbs all but floaters. 300 km in 4 1/4 hours. Two people can derig and load into full enclosed aluminum trailer ready for road in 30 minutes. Nose hook (c.g. hook can be fitted), powerful scissor-type dive brakes to get you into smallest field, excellent 2 piece canopy with sliding clear vision panel. PZL 10-0-10 knot vario, PZL 1 1/2 turn 0-140 knot ASI, 0-30000 ft. altimeter, compass, 1-26 type vent also on panel. White with green under fuselage - new paint planned for the wings this winter. Built 1969-71, flown in subsequent Nationals (12th), Regionals (1st, Sports Class). $5600 and she is yours. Aluminum trailer with electric brakes available for $1350 extra.

Ian Oldaker,
30 Prescott Crescent,
Pinawa, Manitoba R0E 1L0

**FOR SALE:**

Almost new 1976 Blanik C-GIMP, SN026602, TT 25 hours and 40 flights all in Sept. & Oct. 1977. Special option Tost CG hook - the ultimate in winch and auto launches. Factory tail wheel. 2 altimeters, 2 airspeed indicators in knots, 2 compasses, 2 electric T & B's, 2 mechanical Kollosman long case supersensitive R of C's, 2 "G" metres, 2 A20 oxygen regulators, Soaring instruments audio electric vario, 12 volt 3.SAH NiCad battery pack, parachute plus loads of spare parts. The Blanik has been stored since day one in superstrong aluminum and steel frame enclosed trailer with mechanical surge brakes. Trailer has clamshell lift top which gives minimum cross section area for great highway towing. Price $17,000, FOB Halifax, FST paid. Eligible clubs can apply for $1050, FST rebate. Will trade up against Kestrel, Open Cirrus, Pik 20BC, Nimbus or similar high performance type. Will consider delivering to Montreal/Toronto area for expenses.

Peter Myers, Apt. 5, Bldg. 1,
5846 South St., Halifax, N.S. B3H 1S6
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PIK-20Bc and factory trailer, carbon spar, water ballast, PZL instruments, Ball 100 vario and audio, zero time. Price $21,900.

A. Heinemann,
R.R. 1, Gormley, Ontario
(416) 727-9566

**FOR SALE**

PIK-20B and factory trailer, glass spar, water ballast, instruments, Braunschweig tube. C of A until September 18, 1977. Price $20,900.

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(416) 727-9566

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