UNI GLIDING

Official Journal Of The Adelaide University Gliding Club.

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EDITORIAL

Once again you are all saved by the appearance of yet another edition of 'Uni Gliding'. Once again I have crawled out of my primeval university slime to write another editorial. Once again you cry 'Oh no!' as you open the envelope.

But seriously, folks -

A great deal has been happening in the club during July. The Bocian starboard wing has been fabricked (will somebody PLEASE tell me how to spell that). A new unbreakable seat has been fitted to the Bergie. A diff has been obtained for the new winch. A winch shed and some doors for the clubhouse have been planned and should be attacked soon. Two more pilots, David Conway and Mark Raftery, have converted to the Ka6. Also, ETSA are pushing to mine coal only a few miles east of our field. On the other hand, the passenger door of our freshly painted and reconditioned bright shiny new super-you-beaut truck (pictured on front cover) was damaged when it blew open in high winds. A lot of time and effort was wasted when a version of the Bergfalke front seat (fibreglass this time) failed to set (sticky, floppy squares of material are not renowned for making the best aircraft seats). Finally, the diff extracted from a nearby dumped truck with much time and effort was found to be missing a half shaft. Not very major, but annoying.

But back to my familiar old plea; you know, it's not easy being a newsletter editor (sob, sob). It's even worse when nobody writes anything for me to print. (Cue violin music) I've struggled - God knows how I've struggled - I've asked people nicely, I've used threats of violence, but to no avail. All I ever find in the pigeon hole are a few mangy cartoons and a promise of an article just to keep me waiting. And waiting. You know, when I took up the job of newsletter editor (can it really only be fourteen months ago?), I had hopes that I could raise this humble publication to the level of 'National Geographic', 'Time', 'Nature' and 'The Phantom'. But those high hopes were based on the false, starry-eyed, naieve belief that I could inspire the literary enthusiasm in my fellow club members to produce even a small contribution to the newsletter now and then. Alas for my faith in human nature, shattered, destroyed, riven, by your unfeeling inhumanity. Yes, YOUR'S. I blame my current demented state of mind on YOU. You, who could have saved me from coming to this with a simple story about 'What Happened On Field Last Weekend', have pushed me over the edge. It's pitiful. And now - it's too late. It's probable that nothing can save me now. But there is still hope. Not any real, solid hope, but hope nevertheless. If you act immediately. If you take up your pen this very minute, and write. Write as if your very life depended on it, as indeed mine does. I don't care what you write ; article, story, poem, song, limerick. I don't care if it's happy, sad, or absolute rubbish. I don't care if it's written in crayon on the back of a cornflakes packet (though neatly typed on an A4 page would be preferable). I don't care if you can't write ; even the illiterate can draw cartoons or take photographs. And send it all in to me; you can give it to me in person, you can send it to my home address, or you can put it in the gliding club pigeon hole at the Sports Association Office.

Cover photograph - the bright shiny new super-you-beaut truck for the new winch shows off its new paint job. Thanks to Kevin Frost and Bert Heath for the work they've done on it.

NEXT GENERAL MEETING

The next general meeting will be held on Wednesday, August the first, at the usual 7:30 p.m. in the Jerry Portus Room. After the main business of the meeting, a talk will be given on CROSS-COUNTRY FLYING, by Redmond Quinn, so this is a meeting not to be missed by anyone who is serious about their flying. All are welcome at the meeting, and tea and coffee (and maybe even biscuits and cake) will be provided.

Just in case the next newsletter doesn't get out in time, (which it mightn't since I've got exams coming up about then), the general meeting after that is on Wednesday, 5th September.

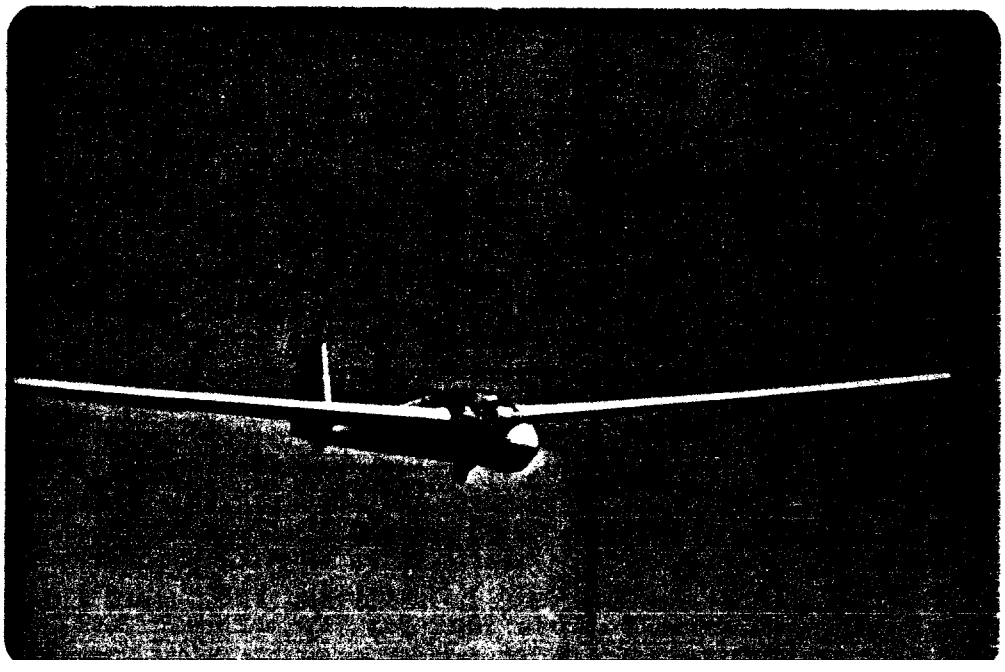
Also, I'd like to remind you that everybody is invited to come along to executive meetings as well - these meetings help people (especially the executive) to see how the club functions, and can be quite entertaining, even though we don't show video tapes or anything like that. The next one will be held at Jenni Sleigh's house, 78 Ferguson Ave., Myrtle Bank, at 7:30 p.m., on Wednesday, August 15. (Right in the middle of exams, of course.)

CLUB ACTIVITIES DURING THE TERM BREAK

The club will be active during the coming term break (25/7 - 2/8) in one way or another.

Flying will go on at Lochiel for as much as possible of the break, depending on availability of instructors, so it is probable that there will be the opportunity to stay up at the airfield for several days at a time; an excellent chance to advance your flying skills. Contact Jenni Sleigh, on 79 4995, for details.

Work will be continuing on the Bocian at Don's Shed, where the starboard wing will be finished off and a start made on the port one. Plenty of jobs will be available for even unskilled labour, and working on an aircraft in this way is a good way to learn about how a glider is constructed. Contact Redmond Quinn, on 44 5331, for details.



MINUTES: of the Meeting of the Executive Committee of the Adelaide University Gliding Club Inc. on Wednesday, 20th June, 1984 at 7.40 p.m. at the Secretary's Residen Myrtle Bank.

PRESENT: Mr. N. Abbott (President), Ms. J. Sleigh (Secretary), Mr. R. Norman (Treasurer) Mr. D. Conway, Mr. M. Raftery, Mr. D. Medlow (Airworthiness), Mr. A. McGrath, Mr. A. Rowen.

APOLOGIES: Mr. R. Quinn.

1. **Previous Meeting Minutes:**

Resolution 1: That the minutes of the previous meeting be accepted as a true and correc record.

A. McGrath/R. Norman - carried

2. **Business Arising from the Minutes:**

The electricity bill will be finalized by Nick Abbott.

3. **Reports:**

3.1. President:

Most of the President's report was deferred to general business.

3.2. Secretary:

The Secretary reported that there are two nominations for club letters - Andrew McGrath and Russell Norman. The issue of windcheaters was also raised again and the final cost was $15 for males and $14 for females windcheaters a $5.00 screen charge. Orders will be taken at the dinner. A letter was drafte and will be sent to 'Soaring' magazine in America in view of setting up a correspondence between our club and another club. There was also a letter drafted to be sent to Narogin Gliding Club in hopes of obtaining a new wheel suitable for our Ka6 (NB).

3.3. Treasurer:

There is about $1100 in the operating account and all bills including $300 for the loan have been paid off this month. There was $66.28 obtained in interest in the investment account. There is about $2300 spent of the $5000 Sports Association grant spent which is appropriate for this time of the yea Most of the money spent has been on major bills such as G.F.A. fees, petrol and fabric.

3.4. C.O.I.P.

Not present.

3.5. Airworthiness Officer:

A report was handed out and will be printed in the newsletter. The Ka6 is technically still airworthy but it is flying under the previous years' C. of. A. The new C.of.A. must be completed as soon as possible. The harness releas mechanism was incorrectly assembled at the previous C.of.A. and needs replace ment of that component and rewebbing of the harness. This is to be followed up by Russel Norman.

The Bergfalke is flying but needs urgent attention on the tailplane patches. The Bocian wings are progressing and one wing will soon be fabriced, then patches on the other wing can be started.
A D.I. (daily inspection) course is to be held at Gawler on the 27th July at 7.30p.m. Some members will be attending the theory (cost is $2 for notes) but not the practical on the next day. Mark Forster will arrange a practical

A work roster has been set up but needs expansion in numbers of willing hands. A teamleader will arrange the work and care for the shed and contents. Dennis advised us of his change of address to 66 Boucaut Ave, Klemzig but the new phone number is not yet available.

3.6. Newsletter Editor:

The newsletter is due tomorrow (June 21st) if all goes well.

3.7. Winch Officer:

Work on the winch done recently includes replacement of the head gaskets an oil change and new filter. Still to be done is a front end tune, work on the clutch and more cable on the drums.

Andrew McGrath notified the club that he had recently removed a veranda and the materials can be used to make a winch shed or wing extension for the hanger. The iron is in lengths of 8feet by 40feet and supports are included.

Resolution 2: "That the club purchase the veranda from Andrew McGrath and credit $50 to his account."

J. Sleigh/N. Abbott - carried

In the preparation for the new winch the differential has been disconnected but n taken out.
The club would like to acknowledge the work of Andrew McGrath and David Conway on the truck and winches.

4. **General Business:**

4.1. Next General Meeting:

The next general meeting will be held on Wednesday 4th July at 7.30p.m. in the Jerry Portus Room, at Adelaide University.

A video will be organised for this meeting.

4.2. Flying Calendar.

There is flying on Saturday only of this weekend (23rd June) and Mike Barnden will be instructing.

4.3. Next Executive Meeting:

The next executive meeting will be held on Wednesday 18th July at 7.30pm at the Secretary's residence, Mrytle Bank.

4.4. Any Other Business:

It was suggested that Kevin Frost and Bert Heath should be given a number of free launches each, in appreciation of their work on the new winch.

Resolution 3: "That the A.U.G.C. gives Kevin Frost and Bert Heath several free launches for their work on the new winch."

N. Abbott/R. Norman - carried

A letter of thanks will also be written by the Secretary.

The Bocian trailer is still at Murray Bridge and Russel Norman volunteer to contact them and ask them to bring it to Gawler so we can take it to Lochiel.

The Bocian fuselage, being held at Gawler, is being ruined by bird dropp corroding the paintwork. A team was organized to sandpaper the spots, then to tape plastic over all of the exposed parts and wing roots to pro tect it.

There was a suggestion put forward that the club provides an incentive for people to work on essential and authorized club projects. This would be in the form of free flying time (suggested at 3 minutes free flying for each hour worked on club projects). This could be introduced as a trial then the executive could be open to feedback and negotiations. Tim worked would need to be submitted as well as who the work was done with and only authorized club projects (for example, the Bocian wings and the new winch) would be accepted.

Resolution 4: "That the club, in appreciation of services rendered by club members, shall award flying time to the member's account commensurate to work done at the executive's discretion."

D. Conway/J. Sleigh - carried

Mark Forster was reported to have invited some members of A.S.C. to Loch on the weekend of the 21st July. This would include Barry Woodcock who is interested in doing some instructing for the club. Invitations to othe clubs (Whyalla, Balaklava, Murray Bridge, and Barossa Valley) will be extended in anticipation of the ridge season and flying from Lochiel.

A spare tyre and tube is needed for the Bergfalke and Russel Norman was appointed to look after tyres in the club.

The instructors have decided to implement some new rules (or reinforce the old rules). These include aerobic ratings required for any spin over half a turn and any turn which has an angle of bank greater than 60^{o}. Ridge soaring is also considered as cross-country so a cross-country rating must first be obtained before flying on the ridge.

The wreck of the Kaб NN was not bought by the club after inspection by N Abbott and Mark Forster.

A S.A.G.A. report will be submitted by Nick Abbott soon.

After the incident with Mark Forster and Andrew Sawyer re the flying of the Kaб it was stressed that a member must have executive approval befor using a club glider.

A letter will be sent to Andrew Sawyer in the hope of renewing his instructing capacity at our club.

A discussion followed on the status the club has obtained as a training club only, providing little incentive for more experienced members. It w concluded that there should be more emphasis on post-solo goals including cross-country and silver C certificates in an attempt to keep experience members continually interested.

There is an aerobatic course due to be run at Gawler some time in the future and Dennis Medlow will forward more information as it comes to hand.

Mark Raftery was appointed the public relations officer and a contact pc through S.A.G.A.

The A.U.G.C. will hold a regatta on the Australia Day long weekend in January primarily directed at sports class. Nick Abbott will be the contest director although the job may go to someone else if he leaves over

the holiday vacation. S.A.G.A. has booked a series of half hour radio times on 5PBA-FM and Mike Barnden is the announcer. It is possible that A.U.G.C. may obtain one of these half-hour time slots.

There was a discussion on the present and possible future aircraft in the club. The three aircraft we have now are suitable for the type of club we are (that is, predominantly a training club) but a major purchase may be required to upgrade the club fleet (mainly looking at replacing the Kab with a newer single-seater after its 20-yearly next year).

The Bergfalke floor and seat need replacing. David Conway will organise a new floor which will incorporate room for ballast, thus preventing further seat damage.

The President closed the meeting at 10.15p.m.

Signed as a true and correct record..M Abbott.....
date:..18-7-84.....

FOR INCLUSION IN ALL CLUB NEWSLETTERS OR MAGAZINES

S.A.G.A. SCHOLARSHIP

The S.A.G.A. is going to invest some of your money to secure a more tenable future for gliding. Without a strong, growing membership, clubs cannot maintain or update their fleets. Overheads are carried by a few and the cost per head is high, showing as G.F.A. subs, S.A.G.A. subs, club subs, launching fees and flying fees. A percentage of each cost is covering fixed annual overheads. Increase utilisation and increase the number of contributors and gliding becomes a relatively inexpensive sport once again. Increase our numbers and usage of airspace and we increase our say, providing we are sensible in our approach, in the future airspace planning.
Let's hope everyone can always enjoy the freedom we now have, and hopefully increase our freedom in time to come.

The plan is to offer a $500 scholarship between August and December for an ab initio, that is a beginner to cover his or her costs of going solo. "What a waste of our money," many will say. Well, it may be if we don't all try to sell gliding, with this as the carrot to get people to give it a go.

We are contacting the media, councils, sports organisations and others and trying to publicise the scholarship. We are producing a brochure containing club addresses and conditions of the scholarship. We are also producing posters to pin up in shops and other places which are prepared to distribute the brochure. However, we think that 900 S.A.G.A. members throughout the state can do a lot more than this to sell the scheme and get people out to give gliding a try.

Brochures and posters will be available at your club or you can obtain them directly from *Mike Barnden, 085 272237* or *Louise Armitage, 353 1349.*

If you have a friend who runs the local butchers, get him to put up a poster and keep 10 brochures for interested people. If you know a contact in radio, T.V., newspapers or magazines, see if you can get them to be interested. If you play Indoor Cricket or Footy, put a poster up at the club and some brochures behind the bar. Talk to your local publican. We will print as many copies as are requested and send them wherever they are required. 900 active members can make a very large impact.

I hope to see all clubs gearing up for trial flights and an influx of badly needed new members. Underworked instructors may soon be very busy logging up hours. Your club should be one of those that benefit - you can ensure that this is so by publicising this scholarship and helping and encouraging newcomers to give our sport a go.

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5 PBA FM

From August there will be a 30 minute programme on 5 PBA FM run by the Gliding Association. The programme will be run fortnightly on Thursday between 5.00 and 5.30 p.m. The programme will be a magazine format with either a topic, theme or interview between light music.

5 PBA FM broadcasts on the FM band - 89.7; the far left hand station on the band. The station commences evening broadcasts at 5.00 p.m. and broadcasts from Salisbury. It can be received throughout the northern community of Adelaide. I can receive the station at home at Mallala.

This is a new venture for S.A.G.A. and, if successful, may be continued. The cost is very low and the media coverage large. The programme needs interesting stories or interesting personalities from clubs to sell their club to the public. It is *vital* that gliding people come forward with their tales, from home-builders to first solo, from wirelaunchers to 1000km flights. Please contact me on 085 272237 or Louise Armitage on 353 1349 or either of us at work on 258 9855.

We have purchased 13 programme slots and if we get support from the gliding movement and a response from the public we will continue, or even enlarge, this service. Clubs can sponsor the station individually at $20 for 3 sponsorship slots, which is cheap advertising.

I am hoping to liaise with the weather bureau and get a gliding forecast put on 5 PBA FM. The station is prepared to put a long-range weekend forecast to air on Thursday night and Friday on the breakfast show, and an accurate forecast on a Saturday morning.

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PUBLICITY

Let's get people to start looking at us! That means getting the public to come and see us. Give them an accident and they will be there in droves but these are expensive to arrange, so let's give them an airshow.

All clubs have been asked to consider this option; however, all committee members are busy and possibly unwilling to shoulder the burden of organizing such a show. It needs members to come out of the woodwork prepared to do the work of co-ordinating and organizing a show which could take place in 12 months, after much careful planning.

The media would love it, the public would love it and our membership would increase, because we could guarantee lots of coverage and really push our own product; since we would be the organizer and could ensure gliding as the main theme of the show, using other more flamboyant sports aviation people as the draw cards.

If you are interested in helping, ring a committee member now and if your club is not interested, ring me or Louise and volunteer your services. You do not need to be an instructor, a hot shot pilot or a long-standing glider pilot, just willing to help.

LET'S START AN S.A.G.A. ANNUAL SPRING AIR SPECTACULAR

NEXT SPRING !!

MIKE BARNDEN

Minutes of the meeting of the executive committee of the Adelaide University Gliding Club, Inc. on Wednesday, 18th July, 1984, at 7:30 p.m. at the Secretary's Residence, Myrtle Bank

PRESENT: Mr. N. Abbott (President), Ms. J. Sleigh (Secretary), Mr. R. Norman (Treasurer), Mr. D. Conway, Mr. M. Raftery, Mr. D. Medlow (Airworthiness), Mr. A. McGrath, Mr. B. McKenney.

1. Minutes of the previous meeting:

Resolution 1: That the minutes of the previous meeting be accepted as a true and correct record.
N. Abbott/M. Raftery - carried

2. Business arising from the minutes:

There was no business arising from the minutes.

3. Reports:

3.1 President:

There was concern expressed about the attitude to club posessions. Recently the new winch passenger side door was bent and the driving has become reckless. The new members act by the example of the older members so the experienced members should set an example. For this reason, only D.I. inspectors should use the dolly to take aircraft out of the hangar. David Conway (winch officer) has been nominated to start up the new winch each time he goes on field but the new winch truck should not otherwise be used.

The instructors course has been timetabled for the weeks just prior to the exams and a letter will be written by the President to ask for consideration in this matter for the future.

The organization within the club is improving and there is a new Ka6 tyre on field, and a spare winch tyre. A spare tube for the Bergfalke is also being considered. The club-house will have work done on it probably during the University holidays and the northern end will be filled in.

An advertisement has been placed in 'Australian Gliding' for the January regatta. After discussion by the executive, it was decided to make the regatta a purely winch launching event.

The Bocian needs a new wheel hub and enquiries will be made into tests required for the hub if it was made within the club. Enquiries were also being made for the purchase of a Bocian canopy.

3.2 Secretary:

The design for the windcheater was yet to be finalized but orders have been submitted.

3.3 Treasurer:

The Treasurer reported that there is $1,083.71 in the operating account and $2,025.00 left of the Sports Ass'n grant.

The Bocian canopy is going to be a major expense and the possibility of a supplementary grant or a grant for a capital purchase from the Sports Association was discussed.

The members accounts had a debit of $120 overall and a credit of $280 overall but the treasurer would like all accounts in the black. There was a proposal put forward that members with debit accounts over $20 will be charged 5% interest per month, and members with credit accounts over $20 (and under $150) will have their accounts credited with 5% interest per month. The financial implications of the scheme will be examined in more detail and the proposal will be brought before a general meeting before action is taken.

Resolution 2 : "That the person who brings back the flight sheet is responsible for finalizing details and making an an effort to collect the money from all people who owe it."

R. Norman/J. Sleigh - carried

The new tyre for the Ka6 cost $58.

3.4 C.O.I.P.

Not present.

3.5 Airworthiness Officer:

The log book for the Bergfalke (GZM) has been found.

The statistics for the two flying aircraft were presented. March was the best month for GNB at 23 min/flight average, and February was the best month for GZM at 23 min/flight. Total flying hours for June were 72 hours in ZM, and 50 hours for NB.

The Bergfalke C. of A. is due in October. There has still been no repair work on the tail plane of the Bergfalke and this should be attended to.

Work on the Bocian is progressing well with a healthy work roster on three nights each week.

The D.I. course at Gawler is on the 27th July and a cross country course at Gawler running for 6 nights is in the first two weeks in August; Tuesday, Wednesday and Thursday nights each week. The instructors course is being held at Port Augusta on the 4th, 5th, 11th and 12th of August.

S.A.G.A. has advised that the deadline for the government grant is September, 1984. There are also new airspace restrictions in the Eudunda region and eastwards from 0 to 5,000 feet. The areas are declared several times a year and are based on a 'see and be seen' principle. The ab-initio scholarship given by S.A.G.A. is open to one nomination from each club.

3.6 Newsletter Editor:

The next newsletter is due early next week.

3.7 Winch Officer:

The winch needs a dry chemical fire extinguisher.

Resolution 3 : "That the club purchase a fire extinguisher for the winch."

D. Conway/J. Sleigh - carried

4. General Business:

4.1 Next General Meeting:

The next general meeting will be held on Wednesday 1st August at 7:30 p.m. in the Jerry Portus Room, at Adelaide University.

There will be an instructional talk on cross country soaring and flying for advanced solo pilots by Redmond Quinn.

4.2 Flying Calendar:

There is flying for the next two weekends. It was emphasized that trainees have priority and that new people should be encouraged more on field.

Resolution 4 : "That a duty pilot must be nominated who shall ensure training priority."

N. Abbott/J. Sleigh - carried

4.3 Next Executive Meeting:

The next executive meeting will be held on Wednesday 15th August at 7:30 p.m. at the Secretary's Residence, Myrtle Bank.

4.4 Any Other Business:

The AUGC regatta may be the state competition for Sports Class and more organization is necessary.

Resolution 5 : "That a contest committee be formed, consisting of N. Abbott, R. Norman, A. McGrath, D. Conway and B. McKinney."

D. Medlow/N. Abbott - carried

Mark Forster will be payed $7 for the electricity costs incurred by the club.

Resolution 6 : "That $7 be credited to Mark Forster's account."

D. Medlow/J. Sleigh - carried

A set of rings has been dropped in the western (clubhouse) quadrant and should be found. A crack in the Bergfalke canopy also needs attention.

The Bocian fuselage being stored at Gawler has now been covered in plastic to prevent deterioration.

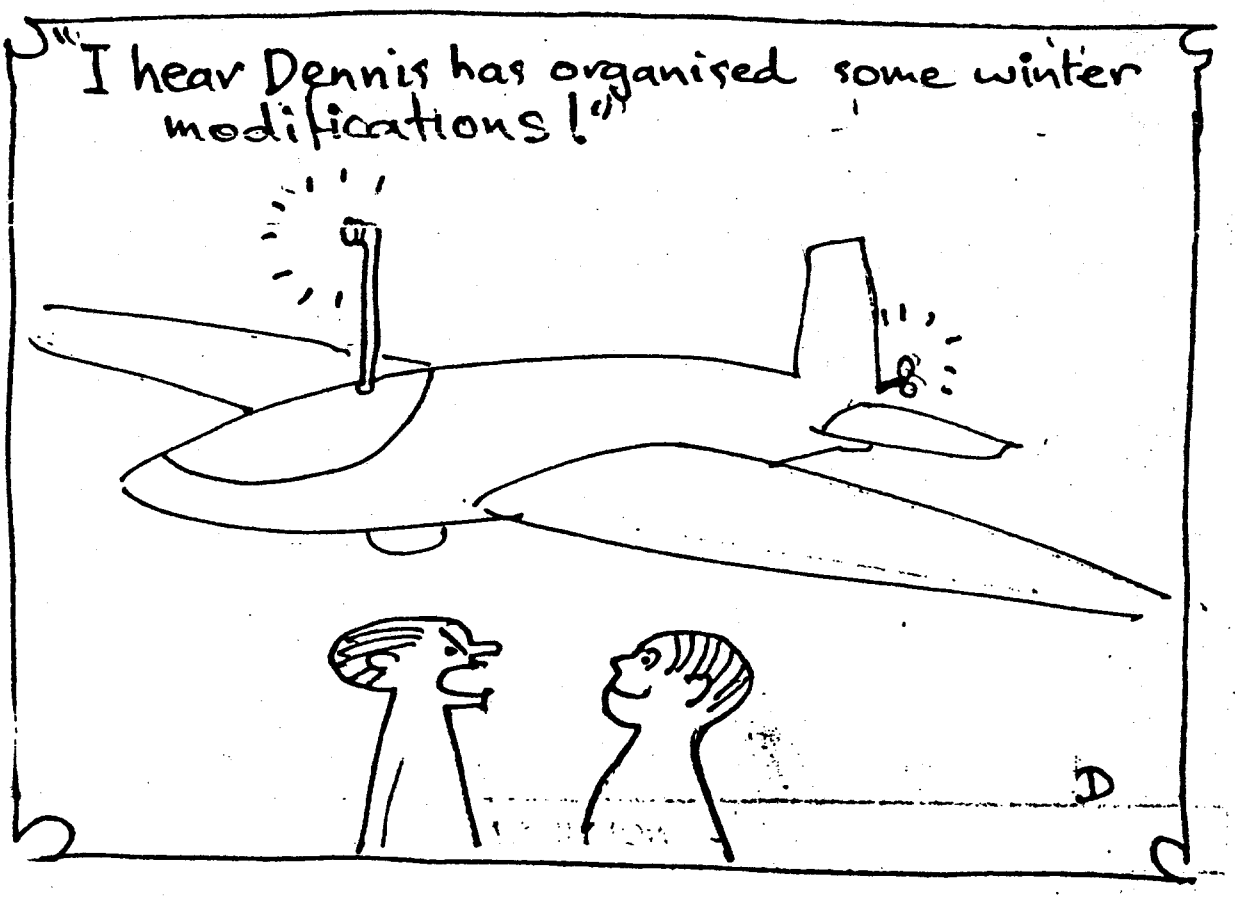
In appreciation of the time and work Redmond Quinn and Mark Forster have contributed to the club it was suggested that flying time be credited to their accounts.

Resolution 7 : "That Redmond Quinn and Mark Forster be credited

with a one hour flight to their accounts."
N. Abbott/A. McGrath - carried

The President closed the meeting at 10:10 p.m.

Signed as a true and correct record:.....
date:.....



CONGRATULATIONS TO
MARK RAFTERY & DAVID CONWAY
ON CONVERTING TO THE KA6
ON SUNDAY, 22/7.
ALSO TO BOB McKENNEY
(& DAVID CONWAY) ON GOING
SOLO!!

Aunty Amy Returns....

Dear Amy, I have a prblem- several actually.You see I am a member of a gliding club,which is made up mostly of those wonderfull people called (sigh..) 'Engineers'. The problem is I am only an an an ARTS student(sob),I try so hard to fit in,I talk about girls all the time,I drink a lot and even use words like 'stress' and 'L/D' and and oh god its so depressing they make me feel like an inferior being,like an animal sob sob sob what CAN I do? They even make fun of my sunglasses sob.. yours in suicidal frustration, BA.

Dear BA, try 125 mg of sodium penta-cyanide sulphate with your muesli.
helpfully yours,Aunty Amy (BE).

Dear Amy,I am the only active female member of a male dominated club. I like them all very much,and I was wondering if you would think it to forward of me to ask them all to a pyjama party at my place?
yours in anticipation,pyjama strings.

Dear pyjama strings,indeed i do think it would be too forward.Do you often get these strange desires? One at a time would be much more suitable.

Dear Amy,I am an instuctor at the Adelaide University Gliding Club.I can't help but feel my superior flying skills,wonderfull personality and keen sense of humour along,of course,with my many other good points,too many to mention here,set me above the rest of the club members. I'd really like to join in and just be one of the group,but i find it difficult to socialise with the scummy peasants. What can I do?
Please Help, leftout.

Dear leftout,I doubt whether the rest of the club would want you to join their group anyway. You would be better off just sticking to your little elitist instructors panel.

Please send any letters to Aunt Amy, c/o AUGC pigeon hole in the Jerry Portus rooms.

THE TREASURERS REPORT

Statement of Accounts

National Bank Account	$ 1186.17
Sports Association Account	$ 2110.00
Members Accounts (debit)	$ 212.00
(credit)	$ 318.00
TOTAL	$ 3190.17

* Well as you can see ,will still have far to many red accounts.If you owe the club money please pay now and avoid the consequences.

Statement of Cash Flow

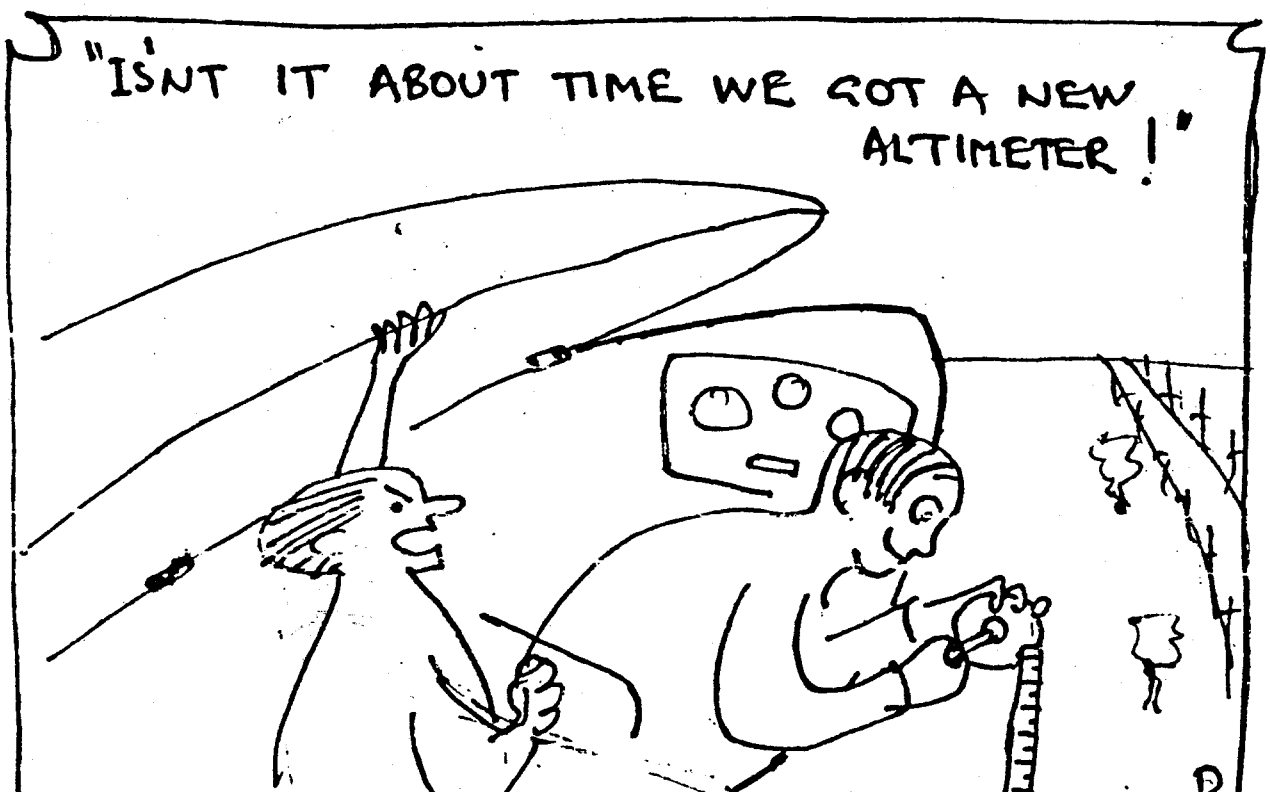
The following is summary of our cash flow for the month of June :

EXPENCES

Winch (old)	$ 64.00
Aircraft	$ 82.26
Loans	$ 300.00
TOTAL	$ 446.26

INCOME

Members Accounts	$ 330.16
Grants	$ 662.00
TOTAL	$ 992.16



NOTICE TO TRAINEES:

Do you sometimes wonder why,when you doing a launch that the instructor suddenly screams at you 'TOO STEEP' or 'PULL BACK..PULL BACK' when you are climbing at an attitude that was fine last time with a different instructor?

As you know,the correct launch attitude is 45^{o}. The climb attitude, represented by $\emptyset$ should then be defined by

$$\emptyset=45^{o} = \text{constant.} \quad (1)$$

However,this is not the case as 45^{o} is not constant (a simple proof which will be covered in a later article). In fact the correct relation is given by

$$\emptyset' = \emptyset k + v(\rho + \mu) \quad (2)$$

where $\emptyset'$ is the actual climb attitude.
$\emptyset=45^{0}$ (the angle quoted by the instructor).
k is the Instructors Climb angle coefficient (see table 1) and depends on the instructor.
v is an adjustment factor dependant on airspeed and can be determined from

$$v = V \quad (3)$$

where V is the airspeed (in knots) and is an aircraft dependant constant. (This is a straight line approx. for V 40 knots)
This simply means the faster the airspeed the greater the the climb attitude,and is usually most noticable when the airspeed approaches Max. launch speed.(This is known as McGraths Principal). The converse applies for low airspeeds (the relation becomes highly non-linear at airspeeds of about 34-36 knots and severe sign changes of the climb attitude are observed,usually accompanied with strange high-pitched wailing noises from the rear of the aircraft.)

ρ is a probability factor and is proportional to the likelyhood of a cable-break ie if the cable is likely to break the climb attitude is adjusted to make sure it does.

μ is known as the 'pole-bending' factor and is a scaled integer dependent upon the purpose of the flight and is given in table 2.

TABLE 1: INSTRUCTORS CLIMB ANGLE COEFFICIENTS

Instructor	#1	1.50	(thinks he's a lawyer)
	#2	0.60	(thinks he can fly powered aircraft)
	#3	1.05	(thinks he can design winches)
	#4	1.10	(thinks GFA can't operate without him)
	#5	0.90	(the Claytons instructor)
	#6	1.00000etc.	(digs up pots)

TABLE 2: POLE-BENDING FACTOR

Trainees sixth circuit of the day:	0
Trainee:	1
Male passenger flight with instructor:	2
Female passenger flight with instructor:	5
Aerobatics desired on circuit day or new solo pilots determined to get a good launch:	7
Hangar flight with aerobatics and passenger:	10

warning: factors greater than 8 risk bending the stick or spraining your wrist.

DRAG AWARENESS

In Simple English, The Lowdown on Slowdown

by ORAN W. NICKS

Two kinds of people talk about drag: those who don't know any more about it than you do, and those who know so much more that they can talk only in equations, coefficients, vector diagrams, Greek letters and other mystifying symbols. Here is an unusual discussion of drag by a man who knows a whole lot more about it than most of us, but who contrives to explain it in terms that even a glider pilot can understand. Want to know how many pounds of penalty drag is causing you, where and how, and what to do to cut it down? Read on. The author spent 12 years with North American and Chance Vought, 20 years with NASA (half of them as Deputy Director of the Langley Research Center) and the last four running the wind tunnel program at Texas A&M University. He is Chairman of the Technical Board of the SSA, and an active pilot of his own LS-1f. -Ed.

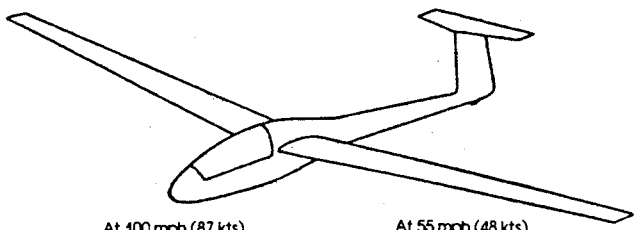
All soaring enthusiasts are aware of the importance of drag. Experts who make scientific studies of soaring speak of it in terms of coefficients, variations with Reynolds number, dynamic pressure and other expressions having vague or unknown meanings to most of us. Since drag needs to be understood by all who soar, there ought to be some way to relate its causes and effects in terms more easily understood.

The problem of learning to speak "Aerodynamics" before discussing drag with an aerodynamicist is somewhat like having to learn French before conversing with a Frenchman. Perhaps, if we are lucky, the Frenchman has already learned English and is able to communicate in that form. With that simile in mind, why, then, can't an aerodynamicist who also speaks English translate for us? At the risk of speaking "Aerodynamics" with a bad accent, I've decided to give it a try.

First, let's discuss the drag on a sailplane as a total force, measured in pounds, that is trying to hold us back. In a glide, we are always going "downhill", and like the kid on the skateboard, the steeper the hill the faster the speed. Of course, the less the drag, the faster we can go a given slope—the kid with bad bearings will have to find steeper hills to go as fast as he would like. Similarly, the more drag we have, the steeper our glide and the quicker the flight is over at the bottom of the "hill".

Figure 1

DRAG ACCOUNT BY COMPONENT—15 METER SPAN WINGS LEVEL



	At 100 mph (87 kts)		At 55 mph (48 kts)	
Total Drag	≈ 37	lbs.	Total Drag	≈ 23.8 lbs.
Wing—60%	22.2	lbs.	Wing—80%	19.0 lbs.
Body—25%	9.3	lbs	Body—12%	2.9 lbs
Tail—10%	3.7	lbs.	Tail— 5%	1.2 lbs.
Other— 5%	1.8	lbs.	Other— 3%	0.7 lbs.
1%	≈ 0.37	lbs.	1%	≈ 0.24 lbs.

For the sake of illustration, the drag of a 15-meter sailplane is presented (Figure 1) at two conditions: 1) a cross-country or high-speed case and, 2) for maximum glide or a low-speed case. The total drag is about 37 pounds at 100 mph and is reduced to about 23.8 pounds at 55 mph. You probably expected it to be less at a lower speed, for after all, we are familiar with the change in resistance as we change speeds. It's very important when swimming in a fluid called water that our resistance is greater as we go faster, and believe it or not, air is a fluid that behaves in accord with the same laws as water at the speeds sailplanes fly.

Drag Breakdown By Component

Figure 1 shows the contributions of major components to the drag. In cruise flight the wing contributes 60% of the total drag or 22.2 pounds. Of course the wing provides the lift to make flight possible, and its size is determined by the

weight of the glider and the speeds to be flown. If we could always fly fast the wing could be smaller and its drag would be less, but we have to be able to fly slowly to thermal and to land safely, so the wing size is greater than required for cruise.

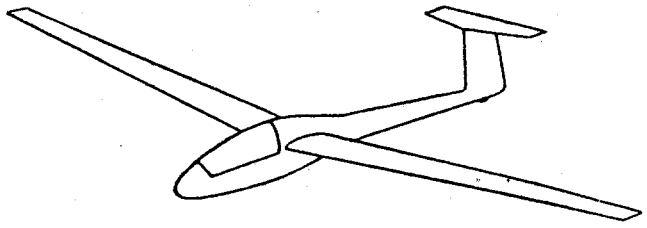
The body is just a streamlined fairing around the pilot and payload, but its cross-sectional area and its surface or "wetted" area are important parameters affecting drag. The supine seating in high performance sailplanes helps to reduce both the cross-section and the wetted areas.

Vertical and horizontal tails are necessary to meet the requirements for stability and control, which determine tail sizes and therefore tail drag. For optimum cruise conditions we could almost do without them, but alas, we must haul them around so that they will be available when we want to manuever, change speeds, change center of gravity or balance conditions, and deal with turbulence and gust disturbances. On most airplanes, the "tail group" contributes about 10% of the total drag during cruise. When the wing is doing a lot of lifting at low speeds, the tail drag percentage is less only because of the increase in wing drag.

When drag values for all major components are added together, they total somewhat less than the drag measured for the complete sailplane. Things like tail skids, total energy probes, air vents and such have to be included in a category called "other".

Figure 2

DRAG BREAKDOWN BY CAUSE—15 METER SPAN WINGS LEVEL



	At 100 mph (87 kts)		At 55 mph (48 kts)	
Friction	53%	19.6 lbs.	29%	6.8 lbs.
Pressure	32%	11.8 lbs.	9%	2.2 lbs.
Induced	10%	3.7 lbs.	57%	13.6 lbs.
Interference	5%	1.9 lbs.	5%	1.2 lbs.
TOTAL	100%	37.0 lbs.	100%	23.8 lbs.

The main point to be gained from this account is the obvious fact that as far as sailplane drag is concerned, "the wing's the thing!" As we will see later, in addition to the effect of area already mentioned, its airfoil profile, its planform, and its aspect ratio (span divided by chord) are especially important to drag.

Drag Breakdown by Cause

Now let us look at the drag account from another viewpoint—just what are the causes for drag and how much is each contributing? For now we will examine the drag causes for the entire sailplane **(Figure 2)** and afterward we will go into more detail about each.

At high speeds, friction is the big one at 53%, almost 20 pounds. This is a function of surface area, so the smaller the sailplane, the smaller friction drag would be. It is also very much affected by surface shape and smoothness.

Pressure drag is caused by the fact that the sailplane pushes air out of the way as it passes through, making the air turbulent, "stealing" energy from the moving object. If the object passing through air didn't cause flow turbulence or separation, pressure drag would be zero.

Induced drag is a term applied to the drag effects caused by lifting surfaces. Sometimes it is called "the drag due to lift." They say you can't get something for nothing; the drag that is caused by the production of lift is a price paid by a wing. Actually the induced drag is determined by how hard the wing is having to work to produce lift. If you water ski, you know how hard the rope pulls your arms when you're going very slowly. The drag is greater because the angle of the skis is greater in order to keep you from sinking. A wing has the same problem—it must be inclined at a greater angle of attack at low speeds to produce enough lift to balance the weight, which is the same at all speeds. This accounts for the almost four-fold increase in induced drag at 48 knots over that at 87 knots.

Where the wing joins the body and where tails join together, turbulence is created by interference, which causes additional drag. Its effects are usually more like pressure drag, but interference also affects friction drag when it triggers laminar flows and makes them transition to turbulent flows. Interference also can be manifested as induced drag. A classic case exists when the wing and tail are "lifting" in opposite directions. This is generally the case, for a requirement of stability is that the tail must push down for balance when the wing center of lift is anywhere aft of the center of gravity. The down-load on the tail forces the wing to provide even more lift, in order to offset the weight plus the tail down-load. Designers try to set wing and tail incidences to optimize balance for stability over a range of conditions, but this form of trim drag is hard to avoid entirely.

Perhaps your curiosity is now whetted enough to want to know more about why the things happen that we have just discussed. I remember an old saying that "The guy who knows how will always have a job, but he will always be working for the guy who knows why!" Perhaps knowing "why" will help you become a better pilot. I'll try to keep this part as simple as the accounting comments, but it will be tougher.

Friction Drag

If you were pulling a bobsled along snow and came to an icy place on the road, you would expect it to pull easier. If the snow had melted and you came to bare ground, you would expect more drag. Friction is at work! What if you could pull your sled onto a cushion of air; there would not seem to be any drag—but there would be. It would just be a good deal less.

Streamlined shapes seem to move so easily through air that we are fooled, but you may be sure that the fluid (air) scrubbing past the surfaces of a wing or body produces drag. If air were more viscous, like honey, you would believe it created friction; again I remind you that air *is* a fluid and at low speeds behaves according to the same basic laws as liquids.

Friction drag is affected by the density and viscosity of the air, as well as its speed along surfaces, but the three big things affecting the friction drag of sailplanes are:

1. The length of surface contact where scrubbing occurs.
2. The roughness of the surface that is being scrubbed by the air.
3. The waviness or local contours which may cause variations in the pressure field along the surfaces.

It has been determined experimentally that air flowing

along a perfectly smooth, flat plate will "transition" from laminar flow to turbulent flow after a finite distance. No matter how smooth the surface, there is friction and the air scrubbing the surface finally slows more and more along the length until it becomes turbulent and builds up on the surface. If the surface is roughened, this happens in a shorter distance. Slowing the air is the cause of drag, so naturally friction produces more drag the longer the air and surface are in contact.

Waviness effects simply tend to thicken the thin layer of air near the surface as the flow cannot follow the ups and downs. This thickening of the boundary layer at the surface encourages the earlier transition to turbulent flow, much like the effects of roughness.

Pressure Drag

Stirring iced tea with a spoon creates eddies and mixing because of the turbulence, and of course, creates drag on the spoon. An object moving through air tends to do the same. If you move the tea spoon very rapidly, the disturbance effects are obviously greater; thus pressure drag increases with speed. In fact, drag varies greatly with speed changes; for example, the drag is doubled when speed changes from 52 knots to 74 knots.

What is happening when the object is moved through the fluid is that the pressure builds up on the upstream side. If the flow around the body filled in immediately around it without turbulence, there would only be friction drag. But unless the shape is ideally streamlined and no friction exists, there will be some separation and eddying produced by the body. You know from experience that streamlining greatly reduces drag, but we hope to give you some quantitative feel for the significance of streamlining.

Ways of Reducing Friction and Pressure Drag

In the real world it is impossible to separate friction and pressure drag effects on a sailplane; two examples are offered to put them in better perspective. To do this I will first compare familiar shapes **(Figure 3)** and show experimental results of actual drag measurements.

(1) *Streamlining*:

For comparison I have taken one-foot lengths of three familiar shapes:

Figure 3

STREAMLINING REDUCES DRAG
These Sections Have Same Drag at 100 mph (87 kts)
0.32 lbs. Per Foot of Length

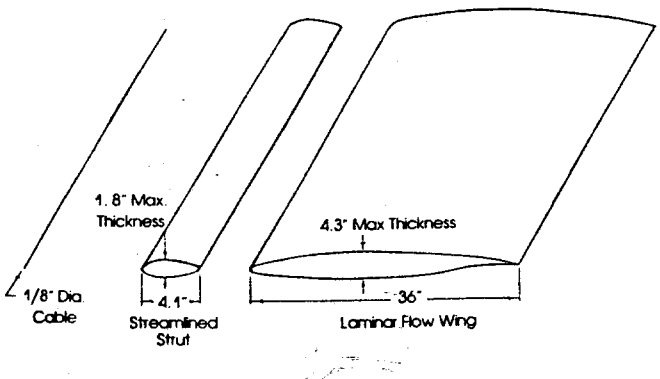
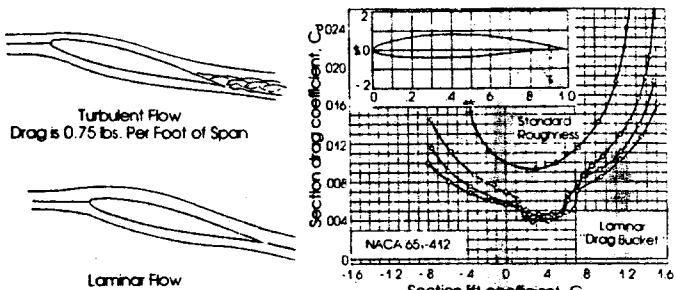


Figure 4

LAMINAR FLOW REDUCES DRAG
Wing Profile Drag at 100 mph (87 kts)
Combined Friction and Pressure Drag
12% Thick, 36 Inch Chord Section



1. A stranded cable
2. A streamlined strut
3. A laminar flow wing

From drag data obtained and verified over the years by many experimenters, we find that the same lengths of a 1/8 inch diameter stranded cable, a four-inch chord streamlined strut, and a three-foot-chord section of laminar flow wing have the very same drag at 100 mph or 87 knots. Using the experimentally obtained drag data shows that a foot of each produces about a third of a pound of drag at 100 mph, and lower but roughly equal amounts at lower speeds.

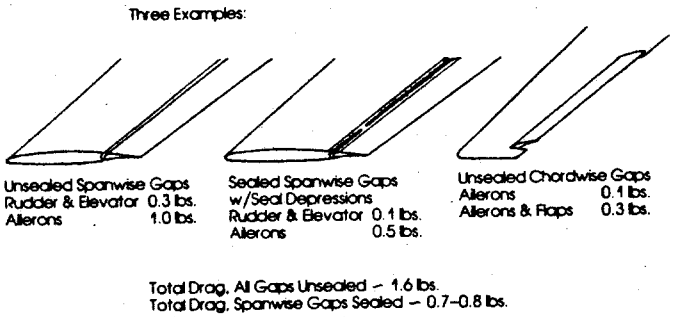
(2) Laminar Flow

In the case of the wing section, laminar flow is a big help in reducing drag. During the 1940's researchers at NACA Langley found an amazing effect they named a "drag bucket" while testing airfoil sections of different shapes in a wind tunnel **(Figure 4)**. The facility had been carefully designed to produce almost undisturbed flows past their models, and aptly named "The Low Turbulence Pressure Tunnel." The term "drag bucket" was coined because the drag coefficient plotted against lift coefficient showed extremely low values over a certain range of lift values, making a plot that looked like it might hold water as shown in Figure 4. They also found that when they artificially roughened their models, the drag increased dramatically; in fact the "drag bucket" disappeared and drag more than doubled for some lift values. These new airfoil sections were named "laminar flow airfoils" because it was shown that the large extent of laminar flow was the cause for their drag reduction. While most sections used on gliders today are slightly different, they are descendants of the family of NACA-developed laminar flow shapes that have been tailored to sailplane conditions.

Induced Drag

As already mentioned, induced drag, the drag due to lift, is affected by such things as the span-to-chord ratio (aspect ratio) of the wing, the planform, the wing twist and the shape of the tips. All of these also influence the distribution of lift along the wing. The wing designer takes these factors into account, making tradeoffs between aerodynamic performance, weight, cost, and maneuverability. Most of the induced drag effects are evidenced as vortex flows around wing tips, so long slender wings with relatively small tips tend to cause less induced drag. Tip shape is also important

Figure 5



because it is high pressure air leaking from the lower surface to the upper surface which causes vortices to form. This "stirring" of the air by the wing tip transfers energy to the air which is dissipated—this loss is induced drag.

Interference Drag

In addition to the interactions between wing, body and tails, moveable control surfaces, spoilers, and air vent systems also cause drag. Some of these interferences are inherent in the design and some may be affected by the pilot. Control surface and flap gaps may create interference drag which can be reduced by sealing. Some sample data are provided in **Figure 5** to give an idea of the importance of these sources to sailplane drag.

One of the most insidious forms of drag in soaring is caused by air leaks. Because air is invisible, there are no obvious indications of flows into or out of sailplane canopy cracks, or around wing roots and spoilers, except for hissing sounds. Pilots must have cooling air inside their glass cages or they would melt, so some form of "controlled" leaks into and out of the cockpit is necessary. It is extremely difficult to quantify the drag due to all possible leaks, but a look at some of the classical cases may be informative. **Figure 6** illustrates these effects.

The cooling air system with the lowest drag would take in air at a place where the inlet would not disturb external flows, gradually diffuse and pass the air through the body at very low speeds, and exhaust it at the tail of the sailplane through a duct sized to bring the flow back to free stream velocity. This idealized system would still produce some drag, but not nearly as much as most cooling systems. The nose is a good place to take in air, although some designers have worried about disturbances the inlet might cause to laminar flow over the body and have located inlets aft under the wing.

Figure 7

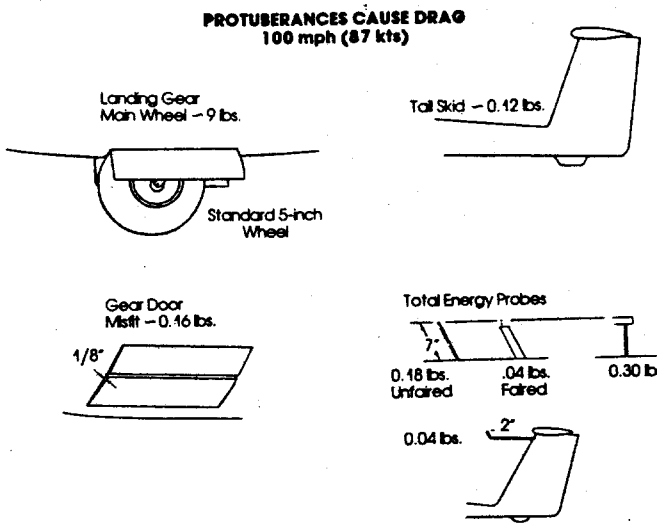
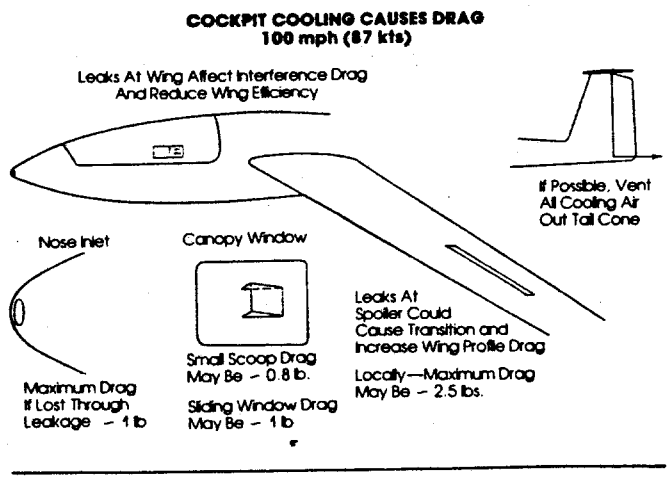


Figure 6



A more serious concern is cockpit sealing to preven flows in or out of the sailplane at places other than specifi cally intended. Pressure variations along a fuselage, over wing root or past a wheel well door can cause circulativ flows into and out of the ship which interfere with th normal airflow along the surfaces. These create a momen tum exchange drag and may also cause disturbances in th external flow field. For example, if the air taken in at th nose exhausted out the edges of the canopy through leak about one pound of drag would result. This does not eve take into account interference effects caused by boundar layer disturbances. Leaks through the wing and exhaustin around spoilers could be more devastating. They coul cause boundary layer separation and turbulence over 1 15% of the wing span, seriously increasing drag locall perhaps adding 2.5 pounds of drag.

It is common knowledge that protuberances like ta skids, landing gear, total energy probes, antennas and suc cause drag; but from the number of these "drag items" see on sailplanes, it is worth looking at the values for some them. In **Figure 7** several typical items are shown, indica

ing the drag penalties that might be associated with them.

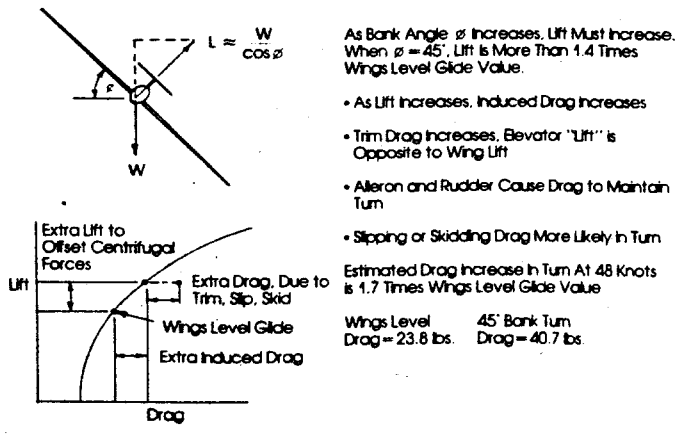
Finally, changes in the sailplane flight loading conditions should be mentioned for they can cause significant changes in drag. Increases in gross weight resulting from the addition of water or other ballast obviously change the lift requirements for the wing. Since induced drag is proportional to the square of the lift value, induced drag is increased significantly with an increased loading. For example, if the weight were to increase 10%, the induced drag at a given speed would increase 20%. Also important is the center of gravity position, as this affects the trim requirements and may result in larger tail down loads for balance. The drag variation caused by a shift from a forward CG to an aft CG may amount to about one pound at cruise conditions. This is approximately a three per cent variation in total drag, a number which may be highly significant to the racing pilot.

Maneuvering Drag

Another effect of significance in soaring is the drag caused by maneuvering, the most common maneuver being a simple turn. **Figure 8** summarizes the nature of these effects. Because of centrifugal forces, the wing has to provide lift in a turn greater than the weight of the sailplane, thus increasing the induced and control surface drags required to maintain the turning attitude. At a 45° bank angle, the lift must be increased to about 1.4 times the value required in a wings-level glide at the same speed; this causes the drag to increase to about 1.7 times what it would be for a wings-level glide at the same speed. The reasons are: 1) the induced drag is increased at greater lift values, 2) the trim drag is increased to maintain balance with the greater lift, 3) aileron and rudder misalignments are used to maintain attitude during the turn, and 4) there is a high probability of some slipping or skidding in a turn which increases drag. Serious pilots may want to do some experiments and simple calculations concerning the effects of turning on lift and drag.

Designers have reported that for design optimizations they assume that average bank angles of about 40 to 45 degrees are common. Since the sailplane drag at 48 knots in a wings-level glide is about 23.8 pounds and increases to 40.7 pounds in a 45 degree bank angle glide, it is obvious why pilots who are able to climb straight ahead do better than they would in circling flight.

Figure 8



Summary

Drag is obviously "the enemy" in soaring flight. Not only are the design characteristics and the physical condition of the sailplane important, but the ways we prepare and operate the craft influence its drag. Of the major components, the wing is by far the largest contributor to drag, and its airfoil profile, aspect ratio and surface condition are critical to total sailplane drag. Streamlining is not only a matter of aesthetically pleasing shapes but also a product of sealing leaks, proper venting of air and treatment of interference regions. Air leaks are common causes of drag that can be reduced with owner attention. Finally we see that the way we fly can have a dramatic impact on drag. The most pronounced variation due to piloting is the effect of maneuvers on induced drag.

Yes, an awareness of the causes and effects of drag should be ever present in soaring. With a bit of study and with a reasonable application of TLC, we should all glide a little bit farther, faster or longer—and maybe all three!

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All of the numbers generated in this presentation were based on sound experimental and analytical data; however, in the process of generalizing and simplifying, the numbers necessarily become more qualitative than exact. Please consider them for the insight they provide—as "representative" only—and not as directly applicable to your specific sailplane. For those who wish to delve more deeply, a list of references is provided after the article.

—Oran W. Nicks

AIRCRAFT NOTES

The first in a series of three dealing with Uni aircraft. This month, the Ka6 (VH-GNB).

The Ka6 - VH-GNB

The Ka6 (also known as the K-6) is a single seat, high performance sailplane designed by Rudolf Kaiser. Variants include the K-6B, K-6BR, K-6C, K-6CR, K-6pe and K-6E built by Alexander Schleicher.

Our Ka6, an ES-Ka6, is a version of the K-6CR built under licence in Australia by Edmund Schneider Ltd (presently at Gawler).

It should be noted that all versions of the K-6 are NON-AEROBATIC (according to GFA NGS notes).

Our Ka6 (serial number 79) was built in 1965 with final inspection completed on the 4th of May , 1965 . It's first Certificate of Airworthiness was issued on the 28th of July, 1965, by C. G. Patching, GFA Chief Technical Officer/Airworthiness.

Its first owner was Mr. J. Reid. He sold it to Millicent G. C. in March 1967, who sold it to Uni Gliding in April '81. A glance through the log book shows many cross country flights, the longest recorded being 370 km which gave N. MacLenman of Millicent his gold distance and duration. The same fellow attempted (and possibly completed, log book entry obscure) diamond goal two weeks later!

Unfortunately the aircraft has also had its share of injury, the first recorded damage being on the 7th of November 1965 when the starboard fuselage was damaged on an outlanding. In October 1974 it was damaged by cattle while waiting for a retrieve. In January 1979 it was damaged in a landing requiring starboard wing repairs. Lastly (hopefully for ever), our own club severely damaged the starboard (again) wing when the Bocian hit the aircraft whilst taxiing on 2/8/81. It remained out of service until 17th of October 1982, more than twelve months later.

As at the end of May 1984 the aircraft had flown 1440 hours and had survived 2991 landings. The dubious distinction of piloting the 3000th landing goes to Redmond Quinn, on 16th June 1984.

The past few paragraphs do not do justice to the long history of the aircraft, its log book makes for interesting perusal. Let us hope it may have many hours of life associated with AUGC.

D. P. Medlow, AUGC Airworthiness Officer.

Ban Ko Noi
Sisatchanalai
Sukhothai Province
Thailand 64130
10. June 1984.

Dear Club,

A quick note to enclose a couple of ·nished cartoons from your far northern contributo Haven't got a magazine for a while. If the problem is postage please take it from my account a I like to get the old mag. I get a little news from the odd correspondent but obviou like me most club members are too busy for frivolities like writing!..

I did ask (last letter) for a summary of a "damage" done at 1 Tandva St. to ease my mind (I imagined Redmonds new winch ha gone berserk & wrecked the place).

I hear Bob is cropping the field this year— it always brings a particular set of difficultie such as ground loops! Most of what I hear of the club is good so congratulations to the new exec.

I miss flying so hope to do a little in Nov—Dec. Please try to have at least one air craft flying (this is know locally as dry tropical lunch

Love to all. Don.