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OPERATIONS COMPENDIUM

GLIDING AUSTRALIA

GLIDING AUSTRALIA OPERATIONS COMPENDIUM

Gliding Australia has published numerous articles from the Operations Department that cover all aspects of gliding safety and operational best practice. Here are many of these articles, taken from issues of Gliding Australia, presented in a single Compendium. We will add to this Compendium as new articles are published.

We hope that this publication will aid you in your gliding operations and help keep our sport as safe as possible.

Safe flying,

SEAN YOUNG

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THE BGA SAFE WINCH LAUNCH INITIATIVE

REPRINTED FROM SAILPLANE & GLIDING/ HUGH BROWNING

Hugh Browning reports a decrease in the number of fatal or serious injury accidents during the first five years of the BGA safe winch launch initiative and highlights elements for staying safe

All accident reports held by the BGA were reviewed during 2004 in order to identify clusters of the most serious accidents. It became clear that accidents associated with incomplete winch launches accounted for 30 per cent of all fatal and serious injury gliding accidents.

A project to reduce the frequency of winch accidents was begun. The importance of releasing immediately if the wing was dropping during the ground run was well known, and for some years the instructor's manual had been stressing the necessity to adopt a recovery attitude and restore the approach speed after a failure in mid-launch. However, the conditions for an accelerated stall and flick roll to inverted flight during rotation had not been established, and the combinations of climb angle, airspeed, height, reaction time, push over g, and recovery dive angle that would lead to a stall or hitting the ground nose first after a launch failure near the ground had not been determined.

After having quantified the rotation rate that would avoid an accelerated stall and flick roll during rotation, and having shown that the same launch profile would permit recovery after power loss near the ground, a booklet was published in October 2005 indicating how the hazards at each stage of a winch launch can be avoided by flying a particular climb profile and being ready to take the correct action when faced with adverse circumstances.

This 2005 communication has been followed by three subsequent editions of the booklet and a range of other communications, including video simulations of winch launch accidents on the BGA website. There has been considerable international interest. Requests for project material have been met from 11 countries. The modelling results were published in the OSTIV journal Technical Soaring in 2006.

The BGA has provided advice on winch driving to achieve appropriate cable speeds and accelerations. Some clubs have upgraded their winches to ensure cable speed is always adequate for safe launching in light winds.

Winch accidents in the five years from 1 October, 2005, to 30 September, 2010, are summarised in the table (left) and compared with those in earlier five-year periods.

IN THE FIVE YEARS FROM 2006-2010:

* There were four fatal or serious injury accidents, in comparison with 16 in the previous five years, a five-year average from 1976-2005 of 15.8, and a

WINCH ACCIDENTS 1976-2010

	FATAL INJURY	SERIOUS INJURY	FATAL/SERIOUS INJURY	FATAL/SERIOUS INJURY RATE PER 100,000 LAUNCHES	SUBSTANTIAL DAMAGE
2006-2010	2	2	4	0.41	22
2001-2005	7	9	16		34
1996-2000	2	9	11		42
1991-1995	8	10	18		47
1986-1990	4	13	17		47
1981-1985	5	11	16		40
1976-1980	5	12	17		55
TOTAL 1976-2005	31	64	95	1.20	265
ACTUAL FIVE-YEAR AVERAGE 1976-2005	5.2	10.6	15.8		44
WEIGHTED FIVE-YEAR AVERAGE 1976-2005	3.8	7.9	11.7		33

five-year weighted average of 11.7, which takes account of the reduced volume of winch launching compared with earlier years.

* The number of substantial damage accidents declined by 30 per cent.

* The reduction in the most serious accidents is attributable to fewer stall/ spin accidents; there was one fatal/ serious injury accident involving a stall or spin by a solo pilot, but nearly eight would have been expected at the previous rate.

* The frequency of accidents to experienced pilots from a wing-drop followed by a groundloop or cartwheel was unchanged. Two of the fatal/serious injury accidents were of this kind.

* Instructing accidents continued at 30 per cent of the total. Five of the 22 substantial damage accidents followed power loss in mid-launch and an abbreviated circuit.

These results are encouraging, but it will be very important:

* To retain the vigilance necessary to avoid stall/spin accidents.

* To convince experienced pilots to release if they cannot keep the wings level.

* For instructors to take over early if P2 is not coping correctly with a simulated or real launch failure.

The most critical elements for staying safe are:

* If you have difficulty in keeping the wings level before take-off, release before the wing touches the ground.

* After take-off, maintain a shallow climb until adequate speed is seen with continued acceleration. Then allow the glider to rotate at a controlled pace. If power is lost near the ground, immediately lower the nose to the appropriate recovery attitude.

* After power loss in mid-launch, adopt the recovery attitude, wait until the glider regains a safe approach speed, and land ahead if it is safe to do so.

Recent communications to pilots and instructors congratulate them on having achieved safer winch launches, but point out further effort is needed to achieve even fewer accidents.

Copies of a summary of the advice for safe winch launching have recently been distributed to clubs with a request that these leaflets be on permanent display to facilitate reaching all current and future pilots.

ACKNOWLEDGEMENTS:

Valuable contributions to the BGA safe winch launch project have been provided by Trevor Hills (mathematics and computing), Pete Masson (video simulation), Andy Holmes (cable speed issue and winch operations), Mike Wilde (design), and Keith Auchterlonie (publications).

For further information on safe winch launching, see www.gliding.co.uk/bgainfo/safety/safewinchlaunching.htm

TO: THE EDITOR,
GLIDING AUSTRALIA
DEAR SIR,

In 2004 the British Gliding Association reviewed from their extensive database all winch launch accidents going back to 1976, and identified the causes and how they could be prevented. The results were included in a booklet 'Safe Winch Launching' which was circulated and recommended to clubs. A survey, shown below, was conducted of accidents for the period 2005/10 and compared with the previous 5 year period as well as data going back to 1976. The results showed a reduction in the accident rate of 75% which is very impressive as over one million launches were conducted in each 5 year period, making it statistically valid.

How do the recommendations in 'Safe Winch Launching' compare with Australian standards? First, the GFA 'Winch Launch Manual' published in 1998 is an extremely comprehensive and well written document and has served the gliding movement well. I have nothing but praise for those who wrote it and have over the years, mainly on an amateur basis, devoted their time and energy to the cause of good training and safety in Australia.

There are two aspects of winch launch safety where 'Safe Winch Launching' and the GFA manual differ. The BGA advice is that if the minimum launch speed of 1.3VS cannot be maintained, then the pilot aborts the launch, adopts the recovery attitude, restores the safe approach speed and lands ahead if it is safe to do so. As I understand it the latest recommended GFA procedure is that as the speed deteriorates the nose of the glider is lowered to indicate to the winch driver that the speed is inadequate. If the speed increases the pilot resumes the climb, but if the speed does not increase, the pilot aborts the launch. It is also permissible to rock the wings as a signal to the winch driver to increase speed provided the glider is at a safe height and the speed is still above 1.3 VS. In the past pilots both in Australia and overseas have spun in either when rocking the wings or immediately afterwards. As far as I am aware the present situation is that no other gliding country still allows the wing rock signal. German friends say a radio is used if needed. The second difference is that the BGA train that a hand must be on the release at the commencement of a winch launch, whereas in Australia we permit it to be near the release. The BGA rationale is that an immediate release is sometimes needed to avoid an accident. The GFA advice to "locate identify operate" takes more time. The BGA records do not show one instance of an accident resulting from a premature release but many, including fatalities, when the pilot has been too slow to release. Perhaps a review of the GFA Winch Launching Manual might consider these aspects.

Pilots may access 'Safe Winch Launching' using an internet search. The BGA web page also has computer generated video accident clips and an interactive quiz.

HARRY MEDLICOTT

THE GFA OPERATIONS PANEL

The GFA Operations Panel commends Harry for bringing the BGA's 'Safe Winch Launching' brochure to attention and has no hesitation in endorsing its content. By way of clarification however, the BGA recommends a minimum safe speed of 1.5Vs in contrast to the GFA recommendation of 1.3Vs. With regard to the two points of difference to which Harry draws the reader's attention, the assertion that giving a 'wing waggle' has contributed to winch launch accidents in the past is not supported by analysis and should not be taken as fact. As for whether or not to hold the release, at present this is up to the pilot. The GFA system teaches that the pilot's left hand belongs near the release. If a pilot wants to take hold of the release during the launch, there is no 'rule' preventing this. It should be noted, however, that there are some gliders that require the manipulation of other subsidiary controls during a launch that means the left hand is not even close to the release. The key issue for pilots is to make sure they know and fully understand the function and location of all the controls and systems so that they can automatically identify the control without having to look (refer Operational Safety Bulletin No. 01/06). Harry recently raised these issues directly with the Operations Panel and, in the interests of improving safety and practices, our procedures are currently being reviewed.

GA

SELF LAUNCHING GLIDERS – PROS AND CONS

SHINZO TAKIZAWA – RTO OPS NORTHERN NSW

FROM THE OPERATIONS PANEL

This article by Shinzo mentions the use of wheel brakes during take-off and recommends the use of a headset. These two issues were probable causal factors in a fatal accident involving the launch of a motor glider late last year. In this accident the airbrakes deployed during take-off, the pilot did not recognise this was the reason for his degraded climb performance, presumably because he was under a high workload at the time, and attempts to warn the pilot by radio were unsuccessful because the pilot was not wearing a headset.

Lest anyone doubt the dangers of taking off in a motor glider with unlocked airbrakes, we direct your attention to an article by Derek Piggott on the DG website at www.dg-flugzeugbau.de/piggott-haken-e.html. We also recommend pilots flying motor gliders under power to use a headset or similar device to ensure the radio can be heard and they can communicate as required.

Shinzo Takizawa prepares to fly his Duo Discus at the NSW State Championships at Temora.

MY EXPERIENCES

Twenty years ago I flew a DG400. Before the actual flight I had a check flight in a Janus M, including an outlanding/re-start engine exercise over a different airport along a planned cross-country route.

I remember the decisions which had to be made on downwind trying to start the engine at abeam point. The engine started but with not enough power, so 200 to 300 feet were lost. When full power eventually came, the aircraft climbed enabling us to return to the home airfield.

At the time I felt this was a stressful experience, even though it was a planned exercise over an airfield. I imagined a real outlanding would be so much more stressful and likely to result in a mishap.

During a world championship in Sweden where I flew my own Nimbus 4DM I pushed the radio-talk switch instead of the engine start switch. Fortunately, I had enough altitude when I realised my mistake so I could start the engine. This is an example of what could happen during stress.

Another time, during a German gliding competition, I tried to start the Nimbus 4DM's engine over a city in an attempt to get enough height to make a finish in wet conditions. The engine opened, I pushed the starter but there was no response. I tried to retract the engine, still no response, meaning the glider was in a full airbrake open condition over the city. I did not have enough glide angle to fly away from the city into an open space with a suitable outlanding area. Fortunately, I found an airport in the city where I could land.

During a National team training week at Lake Keepit on a day of heavy rain, no one except Bruce Taylor and I wanted to go on a second run to Manilla. Bruce was high over the ridge. I went to Manilla and returned to the ridge working only zero. On top of the ridge and cruising towards Lake Keepit, the ridge was getting higher and higher so there was no choice but to find a good outlanding field. On downwind to a stubble paddock I started the engine, but there was not enough power due to a wet engine and I landed.

How many times have I started the engine during my flights over the past 10 years? Probably six times. On two out of the six occasions the engine failed to start, which shows us we should not rely on an engine to get us out of trouble.

IN GENERAL

In case of an outlanding, decision-making in a pure glider is quite simple. In a motor glider it can be very complicated because in our mind we think we can easily start the engine and avoid a paddock landing! Often it is a late decision and when the aircraft is getting low. The manual says, start engine at a reasonable height on downwind on to a landable strip.

TAKING OFF

The DG400's wheel brake is connected to the airbrake. Most of Alexander Schleicher's gliders are the same. Schempp Hirth's wheel brake is also connected to the airbrake, but the hand lever brake is not connected to the airbrake. ILEC, which is an engine control computer, has an airbrake lock sensor. If the airbrake is not locked and you try to start the engine an alarm sounds. (If a glider does not have a hand lever brake you must apply full air brake to activate the wheel brake). I believe it is a good idea to have a warning sensor installed in your glider.

HEADSET

We always use a headset to protect our ears from engine noise. A motor glider's engine noise does interfere with the quality of radio reception and transmission. It is hoped someone will develop an engine noise reduction system.

I am currently flying a Nimbus 4DM very happily, as after self-launching I always say to myself, "I do not have an engine," so my flights are getting better. One of my German friends, a world champion and owner of a Nimbus 4M, carries five litres of petrol for take off, so he has no fuel left for re-starting the engine. On one day at a world championship event in Poland, all aircraft had a technical outlanding, starting the engine in flight, and returned home. My friend got home without an engine, and won the day.

PROS AND CONS

PROS

Does not require a tug for launching

Can move to better lift beyond gliding range

Prevents outlanding and returns to the airfield

CONS

Requires a lot of engine maintenance

The engine is heavy

Complicates decision-making in case of an outlanding

FLYING IN AROUND AND ABOVE THE MOUNTAINS A COLLECTIVE WISDOM

Photo: Marty Taylor

FORWARD BY ANITA TAYLOR

Last year we lost one of our members in the mountains. I think about that member often, and the other friends we have lost. Our sport is wonderful, it's challenging and it's risky. We work hard to mitigate the risks. We train, we practice, we share experiences and safety hazards, we agree on standards, we share knowledge and we do all those things over and over again. The accident in the mountains led to a discussion between Bruce Taylor, Graham Garlick, Stuart Ferguson and Hank Kauffmann. I recorded their discussions and have summarised it here.

WITH ADDITIONAL CONTRIBUTION FROM GAVIN WILLS

TOP: Playing in the mountains beside Mt Cook.

BRUCE TAYLOR

Mountain flying is a difficult art to learn in Australia, as most of our cross-country areas are remarkably flat. For many of us, our only exposure is perhaps an annual wave camp at a remote, hilly site or, if we are fortunate enough, a trip overseas to somewhere with real mountains. Instruction on how to approach flying in the hills is therefore limited, and those who have become truly proficient have learnt through the school of hard knocks (hopefully not too often!) or have sought lessons from instructors overseas, such as Gavin Wills at Omarama.

There are some rules to be followed to avoid catastrophe, or at the least some unwanted adrenalin. Many of us have no doubt seen the diagrams in soaring manuals, but the reality of being low in among real hills on a windy day is another step altogether. When things go wrong, they tend to go wrong very, very quickly. A couple of thousand feet to the valley floor can vanish literally in seconds, and a moment's inattention near the crest of a ridge can see you in the trees before you have time to contemplate a way out.

"Mountain flying is an incredibly rewarding experience, and it will extend your skills immeasurably, ... "

The pilot needs to understand the wind above all else. Exactly how the sun affects thermal sources will help to make you a better cross-country pilot, but the wind is what will bite you. Imagine the landscape underwater, and try to consider where the water will want to flow. Air will only go over a ridge line if it can't get around the end, so small, short ridges will not provide much updraft and will only divert the wind around the ends. The longer a ridge, and the more perpendicular to the wind, the better it will work. As the wind tries to get over the top, or around the end, it will be squeezed in a venturi effect, which will mean that the wind at the top of a crest or around the end of a hill will be blowing much harder than the general airflow.

This effect brings about the greatest and easiest trap to fall into. Having soared up the ridge face in often strong, smooth lift, the pilot fails to realise that quite suddenly they have a much increased wind component to deal with. The effect is heightened if the pilot is circling up the front of the hill, and is tempted to keep circling without a much greater into-wind correction at the crest. Within seconds, or half a turn, the glider will be blown back over the top and will then be in heavy sink… along with a huge headwind to counter to get back out the front. This is a truly frightening experience, and can easily lead to crashing into the ridge-top.

You MUST avoid this scenario. Be prepared as you reach the crest to stay well out in front. If you are circling up the face, stop circling until you are well above the top. And finally, if it does happen and the picture looks really bad, consider bailing out downwind. This is a very dangerous option, as you must fly through heavy lee-sink, and most likely into terrain that you are not familiar with, but it may be your only option to avoid hitting the ridge.

The strength of lee side sink cannot be overestimated. When you are down at heights that are less than twice the height of the ridge, you should expect strong and continuous sink until you are back in front of the ridge, or at least some kilometres downwind. Most mountainous sites have a jumble of hills, and it is essential that you plan well ahead when you want to traverse from one ridge to the next. Usually when you are ridge soaring like this you will be down at altitudes where lee sink can be savage. It may be that you are only a couple of thousand feet above the valley floor, and this can vanish before you have time to blink. I have personally seen a brand new open class glider crash when it flew behind a ridge on a good, strong ridge day. Afterwards we looked at the trace, and saw some periods of 30 knots of sink. There will be no chance to select a suitable field, and if you walk away from the wreckage then that will be lucky. Stay upwind of high ground when the wind is blowing.

Invariably there will be no real horizon in the mountains, and it will be necessary to use your ASI more frequently until you become used to the deceptive nature of the view out the front. The most dangerous of these is when you are circling in the vicinity of a ridge, when your natural instincts tell you to pull up as you fly towards the hill. This is precisely when you need to ensure plenty of speed. Take great care circling against the hill, especially more gently sloping hills which will give you an illusion of safety until they come up to meet you.

ALWAYS keep a very generous margin of speed when you are close to hard ground. Use at least safe circuit speed plus half the wind speed, and if the air is turbulent, add some more. If you can't stay up at those speeds, then take the day off and come back when it is easier. All the action happens close to the ridge, and it is impossible to predict when you will encounter a strong gust that may want to tip you into the hill. Control response is critical in this situation. Even on a calm day, never approach a ridge that you want to cross in a direct, perpendicular direction. Always approach at an angle, so that if something unexpected happens you can turn away more easily.

Out in the flatlands, we can afford some time to contemplate the view, but among the hills, you must concentrate at a constant, high level. Work hard at this, and if you cannot maintain the required level, get high for a while to relax, or go home and return another day.

Mountain flying is an incredibly rewarding experience, and it will extend your skills immeasurably, but spending time with an experienced pilot, or better still flying with them for some hours will be time well spent. I can't overstate the value of good instruction, and if you are seriously interested, try a trip to Omarama in New Zealand. If you can fly the mountains in New Zealand, then you can manage almost anything.

BRUCE TAYLOR HAS FLOWN WORLD CHAMPIONSHIPS IN NEW ZEALAND, FRANCE AND ITALY IN THE MOUNTAINS.

WAVE FLYING BRIEFING POINTS

- Task specific Pre Flight Preparation is necessary. During Wave Flights we venture into an extreme environment of high altitudes, high winds and very low temperatures and can also experience severe turbulence at lower altitudes.
- If you have to ask the question, "Is it safe to fly?" you have answered the question - NO! Respect your operational thresholds.
- Maintain situational awareness. Mountain weather and your capability to navigate above cloud can change quickly at high altitude.
- Never compromise safety margins. Wave Flying is not Flat Land Flying, Flying above cloud presents new navigation challenges, and safe out-landing options are limited.
- Hypoxia is a real and ever present danger. Know your body and know your oxygen equipment.

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Photo: Ian Cohn

Mt Bogong from around 10,000ft.

MOUNT BEAUTY

Nestled in the Victorian Alps, Mount Beauty Gliding Club has excellent mountain soaring conditions.

Mount Beauty Airfield operations weekends and public holidays and by arrangement. Winch launching with a two seater and single seat fleet. 30 members with a range of private gliders and motorgliders. Located at: -36 44, 147 10 Tel# 0417 565 514.
www.mtbeauty.com/gliding

Photo: Marty Taylor

Joining the circuit, Omarama!

GAVIN WILLS

As a professional mountain, rafting and heli-ski guide I have spent my life enjoying and surviving adventures on many of the planet's rivers and mountains. But for me exploring the mountains by glider is the most challenging and rewarding sport of all.

However, the consequences of making a mistake while mountain flying can be serious and can quickly lead to:

- a land-out
- a complicated retrieve
- a remote area crash

So managing the risks of mountain soaring is important and maintaining an acceptable level of risk is half the fun. Of the many rewards not the least is that mountain soaring improves almost every aspect of a pilot's skill base and soaring knowledge.

To be safe the mountain soaring glider pilot requires:

- Carefully honed skills. These are essential in order to safely operate a glider close to the ground in windy conditions, sometimes reduced visibility and possibly in the company of other gliders and for long periods of time,
- Specialised high altitude knowledge and equipment for mountain lee wave flying.
- The ability to make accurate observations of the wind, sun, terrain and any clouds.
- A practical understanding of how the atmospheric engine functions in and around mountain areas. In other words where and how to find lift.
- Good situational awareness.

Just like one's first attempts at cross country flying, one gets into mountain soaring on a step by step basis. It's a journey where you wet your feet and learn to swim before heading across the river. I hope the following points may give both aspiring and experienced mountain glider pilots food for thought, things to research and a little help along their respective mountain soaring journeys.

"... for me exploring the mountains by glider is the most challenging and rewarding sport of all.... "

- Make sure you can easily land a glider over a fence and stop inside 300m. Be able to recognise 300m from the air.
- Hone thermalling skills for the typically narrow and feisty thermals found in the mountains. Be able to maintain constant speeds at high angles of bank with only occasional reference to the instruments.
- Learn to compensate for the lack of horizon when flying

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Photo: Sean Young

Gavin Wills in the back seat of his Duo Discus DD in the Southern Alps.

GRAHAM GARLICK

There are many inhospitable parts of Australia with few places to outland, but yet offering demanding and challenging flying.

• The start of any proposed flying in the mountains involves research and preparation. Spend time walking. This gives an opportunity to watch and feel the weather. Cycling or driving helps. Google Earth is free and a very good preparation aid. Have some idea of the geology. Granite is great! Hot rocks in the evening maybe the harbinger of a homecoming. Farmers usually make good glider pilots because they smell and feel the weather.

• The flying of all aircraft is energy management, airline aircraft have to be able to divert, escape with an engine failure at all times. Flying sailplanes is no different. Flying in New Guinea is knowing all the escapes. If a turn is thrown, don't start it from the middle of the valley - start from the sides. Leave plenty of room to manoeuvre. Gliding is no different. We turn away from the hills. Throwing a 360° turn can be fatal. Not hard to work out time to fly a 360 x sink!

"The start of any proposed flying in the mountains is research and preparation... "

The pilot must know the sailplane and its handling, and should be comfortable flying close to terrain and trees. This requires many hours of practice.

The pilots should know the performance of the sailplane and the expected glide distance available per 1,000ft.

• The pilot should have a good appreciation of meteorology, the effects of anabatic and katabatic flows, and the effect of convergences. Discovering these is what makes flying in the mountains so fascinating and rewarding.

Know the wind at all times in the lee of hills. The down-draft maybe severe - watch the movement in the trees, run along the tops of ridges. That way, the benefit of thermals rising on both sides is gained.

Be wary of cloud, with the advance of sea air, as the base can drop dramatically. Thunderstorms can build up rapidly. Be cautious when flying between cloud and a saddle. Know what's on the other side - it may be severe downdraft.

• Always have an outlanding option. This means that the safe cruising level will be constantly changing.

GRAHAM GARLICK FLIES OUT OF BENALLA


Photo: Gavin Wills

Monster Wave - At 17,000 ft in the Dunstan Wave

below the mountain tops. Flat land pilots can practice this on a no lift day in the mountains by contour flying close to a mountain face while maintaining a constant safe speed. Note that, due to optical illusion, when one turns towards the mountain there is a tendency to lift the nose and slow up and when one turns away one tends to drop the nose and accelerate. Eliminate both tendencies.

● Because the ground is often close with little space for recovery, the maintenance of safe speed is essential. This retains good control response and helps avoid an inadvertent stall, spin or loss of control in turbulence. At GlideOmarama.com we teach the minimum safe speed near the ground to be the glider's slowest thermalling speed - at its current wing loading - plus 10 knots. Add 5 knots or more for every 20 knots of wind and 5 knots for turbulent conditions. As wind and/or turbulence increases move further out from the hill.

● When circling near the ground maintain a little top, or outside, rudder in the turn so the yaw string points down into the turn. This not only increases the wing's efficiency at slow speeds but more importantly a glider stalled in this configuration cannot spin.

● Know the rules of the air that are in effect below ridge top height. Maintain an excellent lookout and be aware that gliders flying in your general area are likely to end up in your airspace.

● When soaring below ridge top height, turn away from the hill and make figure eights.

● Circling below ridge top height is a specialised skill which should only be attempted following a briefing best done on a white board.

● Remember that true airspeed increases with altitude. The minimum safe speeds are, of course, all indicated speeds but the glider's turning circle increases with altitude so it requires more space. This becomes noticeable above about 8,000ft.

● Learn the terrain from a good paper relief map so you can carry the main features, generally mountains, rivers and lakes, in your head. Aviation charts seldom display terrain clearly. In the cockpit it's much easier to navigate from a paper map than an electronic moving map, which does not have the ability to zoom around as quickly as one's eye. The electronic map becomes a bit more useful after you know the terrain.

● Always know exactly where you are with reference to the mountains around you, to alternate landing points and to home base. The shortest route is often not a straight line.

● Know the essential land-out points and if possible get a pre-brief on them. Google Earth can be helpful to recognise locations and plan approaches. In the mountains one's safe landing area is often out of sight and may be many kilometres away. It's essential to know your land-out relative to your position and to have the confidence to make a safe approach and landing. Remember, the clever GPS may point you to a nearest land-out on the other side of a mountain!

● Before attempting mountain wave flying, understand the human factors involved in high altitude flight. These include hypoxia, hypothermia and dehydration. Ensure you have an operational oxygen system(s) suitable for your planned altitude. Know how it works and what to do in an emergency.

● Good situation awareness is essential in mountain soaring. It is the pilot's art of focusing on what is important at any one moment without losing sight of the big picture. It not only

☛ continued over page

HANK KAUFFMANN

● Mount your ASI high in the instrument panel and use it rather than attitude, as your horizon moves up the canopy as you thermal towards the mountain. This causes you to instinctively pull the stick back, which is the worst thing to do, when rolling towards the mountain.

"When thermalling or S turning near a mountain face you must increase speed to at least 65 knots when turning towards the mountain face... "

● It is very difficult to gauge distances from the ridge without a man-made reference - ridge soaring along a mountain face, the boulders may be the size of a house or the size of bricks and it is not until you see an eagle or a rock climber perched on one that you realise you are really close or miles away.

Bruce and I, when flying in the French Alps, were low one day, thermalling over a pine forest that was being logged. I assumed that, being logged, they were mature pine trees approximately 30m high and that we were at a safe height above them. Some days later, driving past the same forest, I was horrified to see that the trees were 4m tall and being logged for fence posts. We must have been very close.

● When thermalling or S turning near a mountain face you must increase speed to at least 65 knots when turning towards the mountain face, as a thermal gust under the outer wing can roll you into the mountain if you do not have good aileron control.

● When flying over grassy ridges it is very difficult to gauge your height above them, similar to flying over water.

HANK KAUFFMANN FLEW THE PRE-WORLDS IN THE FRENCH ALPS AND IS EXPERIENCED WITH RIDGE LIFT.


The Matukituki River near Lake Wanaka – a good escape   Photo: Gavin Wills

Photo: Marty Taylor

ABOVE: Dwarfed by Mt Cook

RIGHT TOP: Ridge running in 20 knots of wind along the Hawkdun Range, Omarama

comes with gliding experience but it is learned from other risk managing activities as well. Some pilots seem to arrive in the sport with it and others have to learn it.

- AWYA, AWYA, AWYA! Always watch your arse! At all times have an escape route and an escape plan for every situation. Anticipating problems before they arise helps develop escape strategies. For example:
- You have right of way over the incoming glider – but has he seen you?
- Turning towards the hill there is a puff of tail wind and the airspeed drops below safe minimum - what do I do? Which way do I go?
- Deep in the mountains in heavy sink - which way to turn? Towards my favoured land-out option or away from it?
- Know the winds at all times and in all places! At any one time it's nice to know the surface wind velocity, the ridge top wind, the cloud base wind, the wind at one's altitude and the high altitude winds that control the weather. Collect wind data on the go. Stored in one's head, this essential information helps locate lift, plan routes and predict soaring weather changes. Accurate observations and the storage and management of wind data is a habit that comes only with practice. Start doing it now!
- Understand the generic forms of mountain lift. They are:
- Ridge lift. This requires appropriately shaped ridges roughly perpendicular to the ridge top winds. Note that the valley wind may be different to the ridge top wind.
- Mountain thermals. The sun heats the terrain, ridges focus thermic lift, peaks trigger thermals and the highest mountains generally have the strongest lift. Thermal strength is governed by the thermal's fetch as well as the degree of atmospheric instability. Both thermal tops and cloud base are usually higher over mountainous terrain than over neighbouring flat lands.
- Convergences. A convergence is the meeting of two or more air masses which may differ in temperature, stability, moisture content or velocity. Lift often occurs at or near this meeting point. There are about six different kinds of convergences common to most mountain areas.
- Mountain lee wave. Waves are always present in the mountains unless something such as no wind, thermic instability or interference from other ridges or waves stops them. Classic text book mountain waves occur only when a stable laminar wind flow is vertically displaced by a perpendicular mountain trigger, winds increase with altitude and an inversion separates the lower unstable air mass from the laminar flow at roughly ridge top height. This very specific and relatively rare atmospheric condition causes the inversion and laminar flow to oscillate down-wind of the trigger in simple harmonic motion propagating the simple wave patterns that glider pilots love to surf. However, other wave forms familiar to the experienced wave pilot are often present. They are developed or modified from the classic by numerous factors including variations in the atmospheric profile, the wind's speed and direction, interference patterns, hydraulic jumps, virtual triggers, and the embedded effects of thermic or shear wave and wave-controlled thermals and convergences. Wave forms in and near mountains are both a common and complex occurrence.
- Work hard to really understand the relationships between the wind, the terrain and the sun. These relationships entirely control the form or forms of mountain lift that occur or dominate on any one day. To fully understand the relationship between the sun, the wind and the terrain is to know when and where to soar anywhere on earth!

Australia has fantastic thermal flying and some interesting mountains but just across the ditch is Omarama, New Zealand. It is part of the big Aussie playground and is arguably the best mountain soaring site on earth! We at GlideOmarama.com specialise in mountain soaring and love to share our knowledge. This, plus the spectacular mountains and the volatile weather, makes Omarama the perfect environment to learn more about the art and science of mountain flying. It's a place where one's knowledge and experience will expand rapidly far beyond what can be achieved in this short article.

GAVIN WILLS

GLIDEOMARAMA.COM

Photo: Gavin Wills

MIGHTY MONARO WAVE

BUNYAN WAVE CAMP

22 - 30 September 2012

Each year pilots from around Australia gather for the famous Bunyan Wave Camp, hosted by the Canberra Gliding Club at their airfield 15km from Cooma in the lee of the Snowy Mountains.

The camp has become a national event and receives support from the GFA and the NSWGA.

This year also marks the Canberra Gliding Club's 50th Anniversary and there will be a special celebratory dinner during the camp.

Canberra Gliding Club, has excellent location specific resources material on the subject of Wave Flying published on their website www.canberragliding.org

The most important document from our prospective is the briefing material written by Dave Pietsch titled 'WaveGuide' - Welcome to Bunyan and the Mighty Monaro Wave'. The basic theory of Wave Flying is covered very well in publications written by Helmut Reichmann and more recently Bernard Eckey, and others.

Local knowledge is essential. We require everyone who has not flown from Bunyan to receive a local safety briefing which will include a site check flight. Most are keen to take coaching flights in wave prior to taking it on solo. Overall the GFA safety culture is very good.

Pilots also need to be able to interpret weather forecasts not only to know when to fly but, just as important, when not to fly.

Weather forecasts and the Internet have improved access to and quality of information, but the ability to interpret and apply it to the area you are flying only comes with local experience. Pilots planning to attend should advise the club by contacting me.

STUART FERGUSON

0419 797508

ABOVE: Flying in wave above Bunyan looking west across Mt Kosciuszko, under cloud.

Wave conditions can be experienced at Bunyan year round, although it is more common in the colder months. This picture shows one of dangers of flying in cold, moist air, with ice accreation on the leading edge of the wing. It is vital to stay clear of cloud, as even a small amount of mist or wispy cloud can cause icing or canopy fogging.

There are many excellent club resources available for those who wish to experience the exhilaration of flying in, around and above the mountains. Research. Plan. Know the weather. Know the sailplane. And don't take risks.

GA

OPERATING AT NON-TOWERED AERODROMES AND RADIO USE

DENNIS STACEY, GFA
CHIEF TECHNICAL OFFICER
CTO@sec.gfa.org.au

There is no substitute for thorough flight planning. Even with adequate flight preparation, your flight may not eventuate as planned due weather or other unforeseen reasons. Murphy is alive and well! The following article is intended to be mostly generic. Some content is specific and applies to touring motor gliders pilots. I am sure that most GFA members will extrapolate the information which can be applied to their operation and requirements. I hope the majority of readers from the new GFA member to the crusty old GFA stalwart will find the content interesting and a good refresher.

When using the radio be mindful the squelch is correctly set and most importantly, the volume is adjusted so you can easily hear the radio. Many pilots have requested an airways clearance and had the volume turned down. The airways clearance is granted with appropriate instructions and the pilot hears nothing. When the fault is identified, the controller is frustrated and the sailplane or motor glider pilot is embarrassed. Before transmitting, pull the squelch and ascertain the volume. Be confident and when you transmit, speak clearly and be ready for the instructions that follow.

When approaching a CTAF, after completing your appropriate radio transmission, be ready for another station's reply. Speak close to the mic, possibly touching your lips, and speak with a clear voice, slowly and at a normal level. Press the transmit key before you speak, release it after you finish so you do not clip the first or last word. If in doubt of the correct phraseology, speak in plain, simple English.

Let us define a CTAF. The CTAF (R) was once defined as a cylinder 10 mile radius up to five thousand feet. This is an old definition but serves as a yardstick to what we should be thinking in terms of dimensions. The CTAF is a frequency on which pilots operating at non towered aerodromes should make position radio broadcasts. If a discrete frequency is not listed use the multi com frequency 126.7 MHz. These frequencies are normally not monitored by ATS. To achieve a greater degree of safety, CAR166C requires pilots of aircraft carrying a serviceable radio that they are qualified to use, to broadcast whenever it is reasonably necessary to do so to avoid a collision, or the risk of a collision, with another aircraft. Glider pilots overflying the aerodrome should avoid the circuit area and the routes commonly flown by arriving and departing traffic. Therefore, the CTAF is airspace in which aircraft entering, transiting or departing could be at risk of conflict and radio must be used to assist in separation. Recently an Air Ambulance departed Yarrowonga and conflicted at 10 miles (18km) with a sailplane thermalling at approximately 7,000ft. That aircraft and sailplane were by definition within the Yarrawonga CTAF. The sailplane was on the appropriate Yarrawonga CTAF frequency and both aircraft communicated by radio.

CAO 95.4 now states that a glider pilot must be qualified to use a VHF radio when acting as pilot in command. It takes time and practice to become proficient in radio use and radio procedures. The GFA Airways and Radio Procedures Manual is an excellent training manual for young and old. The manual now contains a self-test questionnaire for the student sailplane pilot and the current version will soon be available on the GFA web. The Level 2 instructor must complete a GFA Log Book Endorsement for the up and coming glider pilot as required by MOSP 2 and CAO 95.4. The student pilot will be required to demonstrate a level of proficiency and discipline in the use of radio and its operation and have knowledge and understanding of the phonetic alphabet and the use of basic phraseology. A pilot must pass the test and be logbook endorsed prior to solo. A reminder at this time to instructors of the other requirements and qualifications needed to be satisfied prior to solo. The GFA Articles of Association state you must be a member of a GFA affiliated club as well as a financial member of the GFA. The GFA Operations Manual 2012 states you must also have completed your GFA Medical Declaration of Fitness 'Appendix 1' or if not able to comply due health issues, request your GP to complete a Certificate of Fitness 'Appendix 2' found in the Operations Manual/GFA Regulations. The student pilot also must have passed Air Legislation.

The radio message has four parts to the content. For the inexperienced, I would suggest you try to remember the required content and practice at home or with another pilot. Think of different inbound and transiting scenarios and write down what you want to say on the radio. Later with practice you will sound like a professional and will not need to write the words down on paper. The four parts to the content are: who you are, what you are, where you are, and your intentions - **WHO, WHAT, WHERE and INTENTIONS**. The radio transmission format will start with who you are addressing and finish with, in the case of a CTAF, the CTAF name. For example, the radio transmission may sound like this: "Tocumwal traffic, glider Alpha Bravo Charlie wun zero miles west of Tocumwal, six tou_sand three hun_dred, tracking east, Tocumwal."

At any time you hear another aircraft within your location and you perceive that there is a collision risk, transmit stating the aircraft's call sign you are addressing, e.g.

"Cessna Delta Echo Foxtrot" - or - "All stations Tocumwal, glider Alpha Bravo Charlie is thermalling six tousand, fife miles west of Tocumwal, Tocumwal."

Your transmission format then covers who you are addressing, what you are, who you are, where you are and what you wish them to know. You then will finish the transmission with the CTAF you are addressing. The reason why you finish your transmission with the CTAF is some CTAF's are on a 'common' CTAF frequency such as Multicom 126.7Mhz or operating on a common broadcast zone frequency - more about that later. Another station outside the CTAF for some reason may miss the initial transmission and only hear the last part. They hear Tocumwal at the end and they know that the transmission was not intended for them. Otherwise, they would need to request a repeat of the transmission. Be mindful to keep your transmissions short and to the point. That is the main reason for standard phraseology, to abbreviate and also format the transmission to a common presentation. Use the radio frequency for its intended purpose and refrain from extended conversations in Class G airspace or in a CTAF. Also keep chatter to a minimum when on the gliding frequencies to avoid annoying your fellow pilots.

Pilots with experience know that being ahead of the aircraft will enhance safety and make the flight far more enjoyable. Currency and experience will certainly assist in this regard. Preparation and planning will enable you, at the appropriate time, to set up the sailplane or motor glider in advance for the next task at hand. **An example is setting the standby frequency.** By entering the next required frequency on standby you are prepared for the next job. A simple toggle or flip flop selection to the required frequency will make your task as pilot and radio operator seamless and easy. For example you are approaching Tocumwal CTAF, your radio is on area frequency or 122.7 glider chat and at 10 miles (18km) or so, and at a height and distance you regard to be within the vicinity of that aerodrome, you select or 'flip flop' from 122.7 glider chat and make 122.9 Tocumwal active. Make your transmission in the format stating who you are calling (CTAF), who you are (call sign), what you are (glider), your position (height, distance and relative bearing from the CTAF) and intentions (e.g. overflying from east to west or inbound). Stay on Tocumwal CTAF while transiting until you are satisfied you are no longer in the aerodromes vicinity. You may then flip flop/change to area frequency or 122.7 MHz. The frequency depends on your circumstances and your perceived risk assessment.

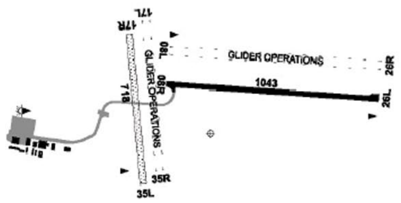
Your next turn point may involve crossing Corowa CTAF. When convenient, set the Corowa CTAF frequency of 132.45 MHz on standby ready for selection. This is naturally carried out well before arriving at the Corowa CTAF boundary. Remember when your eyes are located inside the cockpit operating the radio or your glide computer, be vigilant and keep maintaining your lookout and scan. Be conscious to try not to fixate within the cockpit for an extended period of time. For those sailplanes that do not have a radio which has a standby pre selection, be mindful to change to the next frequency before you may require the radio and when the workload is relatively low. A neat and well prepared laminated card in the cockpit within easy reach and marked with the appropriate CTAF frequencies for quick reference is advisable.

Please refer to the Aeronautical Information Package (AIP) Book, AIP MAP and ERSA for airspace boundaries, runway number and headings. Also refer to ERSA for special procedures/requirements that may apply at the airfield that you intend to operate or land. NOTAMS, if issued, must be obtained if the planned flight entails landing at a different destination airfield. It would be of great assistance to have a photocopy of current pages of ERSA for all airfields, registered and certified in the area that you intend to operate, just in case you may need one. If radio equipped, you must make all the mandatory CTAF radio transmissions for registered or certified aerodromes. Remember, all pilots are required to carry current charts. A reminder that your altimeter subscale must be set on area QNH. The QNH can be obtained from flight services or the altimeter set at the height of the airfield elevation before getting airborne. GFA members operate in the sky with many other sporting aviators and general aviation pilots within the airways system. All airspace users are required to operate on QNH reference. The GFA Regulations state that all sailplanes will set local QNH or area QNH on the altimeter below 10,000 feet.

When a sailplane is flown above 10,000ft AMSL, the altimeter is then set to a standard pressure setting of 1013.2 hPa and the pilot shall report height by reference to flight levels.

AIP Australia 15-Nov-2012 FAC B - 1

BENALLA **ELEV 569**
AVFAX CODE 3030
VIC UTC +10 YBLA
S 36 33.2 E 146 00.5 VAR 12 DEG E REG
AD OPR Benalla Rural City Council, PO Box 227, Benalla, VIC, 3672. PH 03 5760 2600, FAX 03 5762 5537.



REMARKS
AD Charges: All AVTUR ACFT.
HANDLING SERVICES AND FACILITIES
MOBIL/BP - Gliding Club of Victoria: D 2300-0700 (2200-0900 HDS), 1 HR PN. Phone 03 5762 1058, FAX 5762 5599. AVGAS, O117. No Carnet. AC, BC, V, MC.
AERODROME OBSTACLES
30FT PWR line outside N boundaries, 79FT water tower outside W boundaries, unlit 100FT radio tower, 973 W of RWS.
PHYSICAL CHARACTERISTICS

08R/26L	083	34c	PCN 10 /F /B /450 (65PSI) /U Grass. Central 18(60) sealed.	WID 30	RWS 90
17R/35L	164	24c	Unrated. Grass silt clay.	WID 30	RWS 90

AERODROME AND APPROACH LIGHTING
RWY 08R/26L LIRL PAL 123.4
RWY 17R/35L PTBL
ATS COMMUNICATIONS FACILITIES
FIA MELBOURNE CENTRE 125.2 Circuit area
LOCAL TRAFFIC REGULATIONS
1. RWY 08L/26R and 17L/35R for use by gliders and tugs/tailskid ACFT only.
2. Gliding OPS HJ. Simultaneous OPS from parallel RWY. CONTRA CIRCUITS IN OPERATION. **THERE IS NO DEAD SIDE WITH CONTRA CIRCUITS.**
3. Gliders and tugs use separate RWS 08L/26R and 17L/35R, marked by orange gable markers. Also AVBL for tailskid equipped ACFT.
4. Glider/tug circuits to N or E, other ACFT circuits to S or W. Other ACFT must not infringe glider circuit BLW 2000FT AGL. Right hand circuits RWYs 08R and 17R. Gliders/tugs right hand circuits RWYs 26R and 35R.
5. Tugs towing gliders DEP RWY 26 turn in the direction of the circuit by the earlier of either the AD boundary or 200FT AGL.
6. WHERE POSSIBLE ACFT SHOULD CONFORM TO ESTABLISHED RWY DIRECTION IN USE. Join circuit in downwind position or upwind along RWY 08R/26L or 17R/35L.
7. If use of a crossing RWY is operationally necessary a wide circuit to join a long final clear of established circuit traffic is advised. On DEP maintain RWY heading until clear of other traffic.

CTAF 122.5
NOISE ABATEMENT PROCEDURES
1. NOISE ABATEMENT: RWY 17R/35L fly wide circuits to avoid overflying Benalla township.
2. RWY 26L maintain RWY heading to 1000FT AGL or until beyond hospital to left of extended centreline.

ADDITIONAL INFORMATION
1. CAUTION: Restricted area for Benalla explosive plant, R364 (1NM RAD of S36 29.3 E145 59.6, SFC - 2,000FT) is BTN 2.8 and 4.8NM N of AD on RCL for RWY 17/35. ACFT should be at or ABV 2,000FT (1450FT AGL APRX) at 2.8NM N of AD.
2. Manned balloon operations may occur in 3HR following first light and 2HR preceding last light.
3. Animal hazard (kangaroos) exist.

CHARTS RELATED TO THE AERODROME
1. WAC 3470
2. Also refer to AIP Departure & Approach Procedures

continued over page

QNH is altitude, QFE is height above a reference point.

When taking off and if radio equipped, a radio transmission stating such must be transmitted on the appropriate CTAF. At certified and military aerodromes a radio and the use thereof is mandatory. For motor gliders, a taxiing call should be transmitted stating who you are, what you are, where you are if relevant, and your intentions.

The following is a complex example but the radio calls are required. Most taxiing calls are not so laborious but the example at Benalla is a good one. At Benalla the calls should be, as per this example, a taxiing call, a crossing runway call, crossing another runway call and an entering and back-track call. These radio calls are made before the take-off and intensions transmission. So the first....

"Benalla traffic, Grob motor glider XQX taxiing for runway 26 right, crossing runway 17/35, Benalla."

When after crossing 17/35...

"Benalla traffic, Grob motor glider XQX crossing 26L entering and backtracking runway 26R Benalla."

You must not only call your intentions advising other traffic at Benalla but also have a good lookout both ways for aircraft taxiing and aircraft on final approach before entering the runway and crossing. Just think that you made the crossing runway call and the pilot on short final did not hear your call because he had the volume turned down. He is caught short as you taxi out in front of him and he is on very short finals! Could be very nasty! Same rule applies for gliders being towed to the launch point. You must remember to call when crossing the active runway, and also entering a runway and back-tracking.

And now the good part, carrying out the 'take off' transmission. For the club aero tow operation, your friendly professional club tug pilot will carry out the required radio transmissions for the combination as the tow pilot is in command. For a winch launch, the glider pilot or a responsible qualified crew member will announce the launch commencing if the operation is being carried out within a CTAF. Lastly the motor glider pilot will be required to make the radio announcement on CTAF. The call will be:

"Benalla Traffic, Grob motor glider XQX rolling runway 26R for circuits, Benalla" or **"Benalla Traffic, Grob motor glider XQX, rolling 26R, making right turn, departing Benalla to the north Benalla."**

Note: If departing Benalla on the 26L runway, you would need to maintain runway heading for 3 miles departing the circuit before setting course.

For the motor glider departing to the north for Yarrawonga, a departure call after the take-off while on climb is then made on the Benalla CTAF, **"Benalla traffic, Grob motorglider XQX departed Benalla time 12 (12 minutes past the hour), on climb four tou_sand fife hundred, tracking 355, Benalla."**

Once clear of Benalla CTAF change to area frequency.

The requirements at Benalla and Tocumwal are unique due to glider and power operations. ESRA have the procedures for glider and power circuit joining procedures and requirements. For a 'normal' airfield such as Burketown, a motor glider on the active runway would need to fly 3 miles maintaining runway direction before turning right so as to be clear of the circuit and traffic. That motor glider however could at 500 feet make a left hand turn and continue the circuit pattern departing on crosswind overhead Burketown. As you would expect, this is called an overhead departure, a standard pattern for GA aircraft to depart on track. This assists powered aircraft tracking outbound on the appropriate heading, tracking on the NDB or VOR. The NDB tracking is a bearing and the VOR has radials. So maintain runway heading for 3 miles after take-off to ensure being clear of circuit traffic before turning a right turn or make 3 left turns and depart overhead. Remember, it is good airmanship for motor glider pilots to transmit a departure call as stated earlier. The motor glider pilot can depart the circuit from any leg. This can be crosswind and downwind. Remember to depart the circuit on the downwind leg or overhead from mid field.

To enter the CTAF the pilot would make an inbound call stating intentions. **"Burketown traffic, Grob motor glider XQX is inbound 10 miles to the south, passing four tou_ sand fife hundred on decent, estimate circuit 53 (53 minutes past the hour), Burketown."**

Again, expect to receive a transmission from any inbound or outbound aircraft that may perceive there is a conflict. There may also be aircraft in the circuit pattern. The motor glider would track so as to enable joining a crosswind, downwind, base leg or straight-in approach. The Grob motor glider must be established by three miles if electing a straight-in approach and have transmitted his intentions. If electing a straight-in approach, the Grob must give way to any circuit traffic on base or downwind leg. If electing to carry out cross wind circuit join, it must be completed mid field. If a back-track is required after landing, call back-tracking and make another call when clear of all runways, **"Burketown, Glider XQX clear of all runways, Burketown."**

GFA AIRSPACE & RADIO PROCEDURES MANUAL

This is an excellent and informative book, and well worth a read and refresher. The GFA and its members under CAO 95.4 enjoy certain privileges. Our members are allowed, when appropriately trained, to gain airways clearance and enter controlled airspace in accordance with that clearance. GFA registered sailplanes and motor gliders also are approved to operate without a transponder, which includes operation in class E airspace below 10,000ft. We should maintain a listening watch on area frequency when the situation dictates. The AIP actually states that glider pilots are encouraged to monitor area frequency above 5000 ft. Be aware that other sport, general aviation or RPT pilots may expect that you are on area frequency and expect that you have just received their all stations transmission.

It is worth noting that the AIP (ENR 5.5-2) states that a listening watch at non towered aerodromes must be maintained by the tug pilot, or the winch, or winch tow driver. The winch driver, tow driver or tug pilot must then be able to advise glider traffic information to inbound or taxiing aircraft. Radio equipped gliders at non-towered aerodromes will use the CTAF. Except for gliders approaching to land, powered aircraft have priority in the use of runways, taxiways and aprons when a single runway or dual runway operation is established. The AIP also states that where a single runway is established and gliders operate within the runway strip, when the runway is occupied by a tug or glider, the runway is deemed to be occupied. Aircraft using the runway may, however, commence their take off run from a position ahead of the stationary glider or tug aircraft.

While on this Section of the AIP, it is further stated that gliders are not permitted to perform aerobatics within two miles of certified or registered aerodrome and not below 2,000 ft AGL.

Gliders are also not permitted to perform continuous turns or thermal on and within the live side of the circuit unless they monitor the CTAF and give way or maintain adequate separation from other circuit traffic.

Finally, where a winch operation is in progress at a certified or registered aerodrome, launching will cease and the wire will be retracted or moved off the strip when another aircraft joins the circuit or taxis for a departure, or when a radio call is received to indicate this. A white strobe is displayed by the winch or a yellow rotating beacon by the tow car or associated vehicle whenever the cable is deployed. Clear the runway as soon as practical.

Broadcast Zones are defined airspace volumes in Class G airspace for which a discrete frequency (CTAF) has been allocated. All operations, including those at aerodromes and landing sites within the zone shall use this CTAF as a broadcast frequency.

UNDERSTANDING BROADCAST AREAS:

Pilots are being reminded that recent changes to so-called large common traffic advisory frequency (CTAF) areas do not affect procedures at all non-towered aerodromes. **Large CTAFs are now known as Broadcast Areas,** or BA for short. Along with the name change there are several other changes, however these only apply to broadcast areas - the old large CTAFs. If an aerodrome or landing site does not lie within a broadcast area then procedures have not changed. Broadcast areas are based on the lateral boundaries of the old large CTAFs that cover grouped aerodromes and landing sites. These broadcast areas now have a vertical boundary – the base of controlled airspace or 5000ft whichever is the lower, or 8500ft if the area is below low-level class E airspace, or surface to a nominated level. This means the point at which pilots must change radio frequencies is now defined both laterally and vertically. Frequency change should now occur at the broadcast area boundary, rather than in the vicinity, at 10 nautical miles or as prescribed in the Aeronautical Information Package. This change removes the ambiguity about frequency change that existed at the old large CTAFs and standardises frequency management procedures. The new broadcast areas came into effect on 28 June 2012.

Find out more about broadcast areas in the Aeronautical Information Package (ENR 1.4 – 3.3) and the En Route Supplement.

I would now like to digress slightly at this point and state some very obvious requirements. **VFR (Visual Flight Rules)** flight takes place in VMC (Visual Meteorological Conditions). For VFR pilots, of which glider and motor glider pilots are, flight can only take place during daylight hours. First light begins at morning civil twilight and the day finishes at evening civil twilight. The VFR rules require VFR pilots to be on the ground 10 minutes before last light. Local factors that can affect last light are the nature of the terrain, cloud, haze and poor visibility. Remember, when at altitude there will be more daylight and as you descend you may find it may become uncomfortably very dark. Plan your flight so that you have enough light to survey a suitable paddock with a clear approach in sufficient light. For a sailplane to launch, it must take place after first light and be carried out in conditions meeting the VFR requirements. You may be interested to hear that the IFR minima for an IFR aircraft to take off are 2,000 ft visibility horizontal and 300 ft cloud base.

Be mindful that a sailplane and a motor glider stand out to other aviators, including regional airline pilots that fly in the same airspace. An LSA aircraft doing the wrong thing is just an aircraft. A sailplane or motor glider pilot operating in contravention to the rules and requirements places pressure on those GFA representatives who work very hard to keep sport flying and gliding privileges intact. We enjoy not being required to have an operating transponder unit and we would like to keep this privilege until the year 2020. Therefore, we must be seen to operate professionally while in airspace and use our radios in a safe and compliant manner.

Please comply with the rules, display good airmanship, be safe and enjoy your sport.

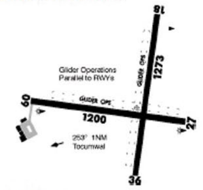
GA

AIP Australia 15-Nov-2012 FAC T - 1

TOCUMWAL **ELEV 372**
AVFAX CODE 3056

NSW		UTC +10	YTOC
S 35 48.6	E 145 36.2	VAR 11 DEG E	REG

AD OPR Berrigan Shire Council, P.O. Box 137, Berrigan, NSW, 2712. Council PH 03 5888 5100, Mobile 0417 885 152.



REMARKS
Operations Manager PO Box 137, Berrigan, NSW, 2712.

HANDLING SERVICES AND FACILITIES
AVGAS, H24 Aero Refuellers card swipe bowser - unmanned.

PASSENGER FACILITIES
AC/PT/WC/RF.

AERODROME OBSTACLES
Telephone Tower: 546FT AMSL 277DEG MAG 2.6NM FM ARP.

PHYSICAL CHARACTERISTICS

09/27	087	39a	5700/580(84PSI)	WID 30	RWS 90
18/36	177	42a	5700/580(84PSI)	WID 30	RWS 90

AERODROME AND APPROACH LIGHTING
RWY 09/27 LIRL (1) PAL+AFRU 122.9
(1) PAL + AFRU requires three one-second pulses to activate. (See INTRO para 23.5)
RWY edge light spacing: 09/27: 90M.

OTHER LIGHTING
TWY LGT: Blue edge.

ATS COMMUNICATIONS FACILITIES
FIA MELBOURNE CENTRE 118.6 4500FT

FLIGHT PROCEDURES
1. Gliding OPS HJ. Simultaneous OPS from parallel RWYs. CONTRA CIRCUITS IN OPERATION. **THERE IS NO DEAD SIDE WITH CONTRA CIRCUITS.**
2. Gliders & tugs use separate RWS 09L/27R & 18R/36L, marked by orange gable markers. Also AVBL for tailskid-equipped ACFT.
3. Glider & tugs CCTS to N or W, other ACFT CCTS to S or E. Other ACFT must not infringe glider/ultralight CCTS BLW 1500FT AGL.
4. Right hand CCTS RWYs 09R & 36R. Gliders/tugs right hand CCTS RWYs 18R & 27R.
5. WHERE POSSIBLE ACFT SHOULD CONFORM TO ESTABLISHED RWY DIRECTION IN USE. Join circuit in downwind position or upwind along RWY 09R/27L or 18L/36R.
6. If use of a crossing RWY is operationally necessary a wide circuit to join a long final clear of established circuit TFC is advised. On DEP maintain RWY heading until clear of other TFC.

CTAF - AFRU 122.9
ADDITIONAL INFORMATION
Animal & bird hazard exists.
CHARTS RELATED TO THE AERODROME
1. WAC 3457.
2. Also refer to AIP Departure & Approach Procedures.

THE WIND IN THE TREES

FIRST PUBLISHED IN KEEP SOARING, LKSC,

It was a windy day, perhaps 25 knots. There were whitecaps on the water and the windsocks were horizontal. The favoured runway was 20, almost directly into the wind.

I turned final at 70kts. Ahead of me were the trees that border runway 20. I watched the strip against the far edge of the trees... plenty of height. I cracked the airbrakes a fraction. Glancing occasionally at the ASI and checking my aiming point against the trees, I found that I was easing the brakes back in, to the point where I quickly closed them and had one of those brief anus-clenching moments... maybe I was a little low.

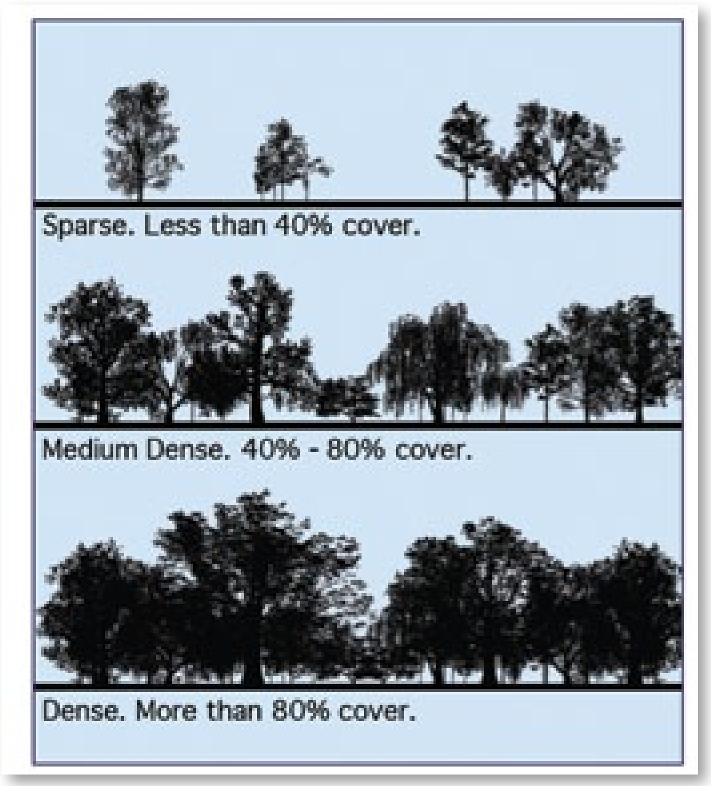
It only lasted a second or so but it was enough. With a headwind that strong, the safe option would have been to come in higher over the trees and land long. With trees in the way, the consequences of landing short were very bad. When landing long in that wind, the round-out and landing run would be short and there was heaps of strip to spare.

You can easily get into a habit of landing short because in theory, it's good practice for outlanding in small paddocks. In reality, though, best practice is to pick the safest place to land and make sure that you touch down and stop where you planned.

I believe that on this occasion, I had taken into account the effect of the headwind on the glider and was flying the approach at a sensible speed, but I had ignored the effect of the wind in the trees.

Trees can create a lot of turbulence or rotor. We're perhaps not so aware of the effect that a line of trees can have when they are directly in our flight path, especially on low final.

When looking at the way trees affect the wind, there are three main variables. The height of the trees, the wind speed and the density of the tree barrier.



The relationship between these factors is interconnected so that the higher the tree barrier, the further upwind and downwind their effect will be felt, so most calculations are related directly to tree height.

FLYING OVER TREES

At low wind speeds, less than 8 knots, the air flow over obstructions is fairly laminar and there is little energy in any rotor that a tree line may produce.

If you are flying over a tree line on low final in winds less than 8kts, a sparse tree barrier will provide little change in wind speed, little change to the airflow over the barrier and therefore little turbulence.

As the wind speed increases, the energy increases exponentially. Anyone who has launched from a cliff site in a hang glider will confirm that taking off between trees or bushes at 10-12kts is fairly trivial but at wind speeds of over 20kts, it is anything but trivial.

If you have successfully flown over a line of trees in 10kts, do not expect the air conditions to be the same at 20kts and more. Be exponentially more cautious.

We're all aware of the effect of wind gradient over a runway and the way that the wind speed becomes slower as it gets closer to the ground. We maintain a safe speed of about 1.5 times our stall speed because of this. However, what happens to the wind gradient over a rough surface like a field with crops or the tops of trees, is considerably more extreme.

Over a normally smooth grass strip, the wind speed increases by a factor of 1.4 between 3 and 30ft. So if you have 10 knots at 3ft, you can expect 14kts at 30ft.

Over a long grass or cropped field where the surface is rougher, the wind speed increases by almost two times. This means your 10kts wind has increased to 20kts at 30ft. A line of trees is also significantly rougher than a field!

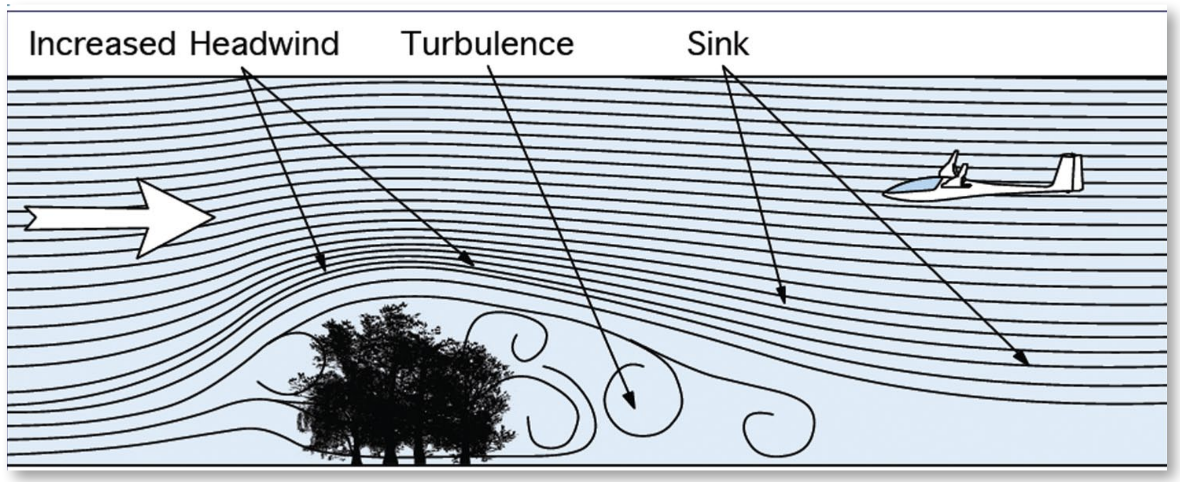
To allow for the increased wind gradient over trees, especially in strong winds, it would seem prudent to either make sure that you overfly with significant height to avoid the worst of the gradient, or that you add more than half the wind speed to your safe speed near the ground.

If you have energy in reserve, speed or height, you could choose to fly low and dive through the turbulence and wind gradient, but depending on the strength of the wind, this can be a risky strategy compared with staying high.

It makes sense to treat a moderate to dense tree line as if it was a hill when overflying it in moderate to strong winds and fly at least twice the tree height above to avoid the effect of the trees. In a strong wind, allow more vertical separation than this.

The density of the tree barrier is the third significant factor in assessing the effect of trees and can be divided into three broad types.

- An sparse or open barrier where there is less than 40 per cent tree cover.



- A medium dense barrier where there is between 40 and 80 per cent cover.
- A very dense barrier where there is between 80 and 100 per cent cover.

It's the medium and dense barriers which present difficulties for sailplanes in terms of over-flying a tree barrier on final or landing on a field bounded by dense trees.

LANDING IN FIELDS NEAR TREES

The graphs to the right show in the way wind speed varies with distance from a barrier. The barrier is shown in plan view and the graph shows wind speed on the Y axis against distance on the X axis.

The horizontal or X scale of these graphs is reduced and is about 1/10th the scale of the vertical axis.

A tree barrier will affect the wind speed both upwind and downwind. The biggest effect is downwind of the tree line and it's not until about 30 times tree height that the effect ceases to be significant.

Putting this into numbers, an average 15 metre high tree barrier will be felt 450 metres downwind... almost half a kilometre.

Closer to the tree line there will be increasing sink, wind gradient and turbulence. Overhead the tree line, there will be a compression zone with increased wind speed relative to the height and density of the tree barrier.

The dense tree barrier behaves as if it was solid and at ground level, the wind speed close to the tree line will be close to zero. Further away from the barrier at around five times the tree height, gusts are caused by rotors from above.

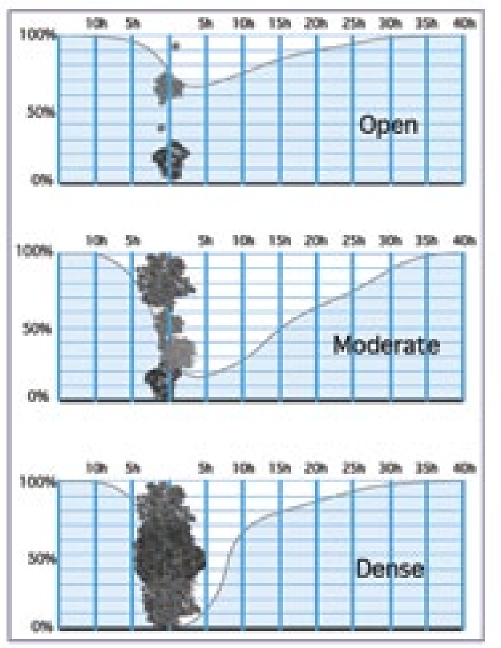
Because wind filters through a moderately dense tree line, it behaves slightly differently to a very dense tree line and the lowest wind speed is found some distance further away. In fact, the overall reduction in wind speed is greatest with a moderately dense barrier.

With less than 40 per cent tree cover, the effect on wind speed is minimal with the low point at about five times tree height away from the barrier.

With a moderately dense barrier, there is some wind immediately behind the trees and the greatest overall wind speed reduction. Wind speed reaches a low point at a distance of five to ten times tree height.

A very dense barrier will have almost zero wind immediately behind it, but the wind increases more rapidly with distance. In the near zone from 0 to 10 per cent tree height, significant gusts can be expected.

If you are landing in a field bordered by a sparse or open barrier of trees, only a small drop in wind speed will be felt about 5-10 times the tree height from the tree line. But if the barrier is dense or moderately dense, you need to make a significant allowance for the effect of the trees on the wind.



As a final note, for its own personal reasons, wind prefers to travel around barriers rather than over them. Friction over the barrier also changes the direction of the wind to the end that the wind blowing over the barrier is closer to straight on. This means that the wind at the ends of barriers may not only be stronger but the direction will be different.

If you are landing in fields surrounded by trees in moderate to high wind, you need to be aware that an approach over trees or a landing towards a tree line will be affected.

Because of the speed and mass of sailplanes compared with flexwing gliders, many of these effects can be ignored most of the time, but if the wind is stronger than normal, be prepared!

It is a fairly alarming feeling to think that you are about to grease it in over the tree line and find that at the last moment, you are suddenly dropping towards them... or to have made a perfect approach and be rounding out nicely only to find that the wind speed has suddenly dropped and you are approaching a stall or a hard landing.

A downwind leg in a strong wind can be quite exciting as you see your aiming point zip past unnaturally fast, but that's the time to assess the wind direction and speed and if necessary make an adjustment to your plan.

If you do a diagonal leg between downwind and base, you will have plenty of time to adjust your position in relationship to your chosen landing point and make sure that your final leg over any obstacles is flown safely, with plenty of height.

GA

In December 2012 there were two controlled flight into terrain (CFIT) accidents where cognitive tunnelling is considered a casual factor. In both cases the pilots were on final approach and collided with trees. The first was a fatal accident at Narromine NSW during the NSW State Gliding Championships, and the second occurred three weeks later at Tocumwal NSW where the pilot survived. The circumstances of each were slightly different but both shared similarities:-

- Both pilots were experienced;
- Both pilots were flying at low level at high speed;
- Both pilots were under stress (one the result of a long cross-country flight, and the other from getting low in circuit);
- Both pilots had their attention diverted by outside issues (one pilot was concerned about a vehicle on the runway, the other was focussing on a line of trees on the approach);
- Both pilots collided with trees in their peripheral vision.

Wickens and McCarley (2008) note that there are four primary forces that move the attention of a skilled person to selectively attend or sample sources of information:

- salience (target conspicuity factors);
- effort (the amount of cognitive and physical effort it requires to switch attention to and search for the relevant stimulus, and the amount of spare effort available due to other tasks being conducted);
- expectancy (extent that a particular stimulus is expected to occur or be present at a particular time and place);
- value (importance of the stimulus to the person's tasks at that time).

In a fast-changing, time-limited, complex sensory environment, the mind's ability to prioritise inputs and make appropriate responses may be reduced in a high-effort, stressful situation. Fixation and cognitive tunnelling are more likely in these circumstances, and early contingency planning and prioritisation of options are therefore important.

Although collision hazards such as trees in close proximity would have high importance, the effects of low expectancy and low value can mean that an imminent collision problem may not be detected.

Pilots need to take particular care when flying close to the ground, where workloads are high, time and energy budgets are reduced and the margins for error are low. *GA*

THE INVISIBLE GORILLA PHENOMENON

ARTHUR DAVIES
SOUTHERN TABLELANDS GC

I was inspired to write this piece by the points raised by the president in issue 10. If anyone is reading this & has not watched the video as suggested by the president, please do so before reading any further. Type "invisible gorilla video" into google will get it. It is informative to get a group of people to watch it & to compare the results each person gets.

There has been a lot of research done on people's perceptions and how information is processed by the brain. A lot of this research is very relevant to pilots. A very good book on these issues is 'The Invisible Gorilla' by Christopher Chabris & Daniel Simons, published by Harper Collins in 2010.

The brain has evolved to carry out very complex tasks. In order to concentrate on a task, the brain narrows down its focus, excludes extraneous inputs, & puts all the brain's capacity onto the main issue. Generally this is a very good thing as some of our higher level thinking would not be possible without such a narrowing of focus. Further the eye is not a camera, the retina's image is processed through several stages to extract the image we see. For instance there is a separate stage that just looks for movement, another that looks just for edges, yet another that processes colour, and so on. The brain takes information from these centres and assembles it into a cohesive, relevant picture. Without this processing the brain would be overwhelmed with raw data and simply could not function, Note however that much irrelevant data is ignored in the process. This is shown very graphically in the first chapter of the book where examples of ignoring irrelevant data can be a problem. The most entertaining example gives the book its title.

This is very relevant for pilots. By concentrating on the task at hand, such as lining up with the runway on final, decent angle correct for the aiming point etc, it is all too easy to lose track of other factors such as an unexpected object approaching the runway. This sounds silly but analysis of the performance of very experienced airline pilots in simulators showed that a significant proportion, when faced with a stressful landing, such as descending through cloud and then having to make a decision to land or not once in clear air, missed crucial information. The worst was being oblivious of another aircraft on the ground taxiing onto the runway. This happened years ago to a KLM airliner, and hundreds died. So if a pilot misses an important point, it is not appropriate to tell the pilot to concentrate harder. THE POINT WAS PROBABLY MISSED BECAUSE THE PILOT WAS CONCENTRATING VERY HARD ON THE TASK AND THE BRAIN 'TURNED OFF' EVERYTHING ELSE.

A similar issue is that of defining the task. You need to be sure you give yourself the correct task to do, or your brain will concentrate on the one you think you want rather than the essential one. The best example I know of this aspect is in driving.

Governments,especially in Australia, put in more and more speed cameras and speed control signs under the pretext of road safety, but in reality for revenue reasons, I suspect. Research done, especially in English universities, shows that the rate of crashes goes up under this excessive regime. This apparent anomaly was investigated by tracking drivers' eyes while driving on both real roads and in simulators. The driver's eyes during normal driving spend most of the time watching the road looking for other vehicles, obstacles, pedestrians, etc. Under the strict speed regime, however, the driver's eyes scanned the sides of the road, looking for new speed signs, and the speedo. Much much less eye time was given to watching the road & scanning for problems. The driver's task is changed from 'watch for traffic & potential problems' to 'concentrate on speed and avoid fines'.

In one area of England where surveillance and excessive signage was removed, the rate of crashes REDUCED by around 20%. In this context, even non traffic related signs have been found to be a serious distraction. So when you are setting yourself or another pilot some task or other, make sure the task is always to fly safely and not to set a goal in such a way as to narrow down the brain's focus away from good airmanship and inadvertently onto some other goal. Make sure the task does not become the equivalent of 'avoid fines' rather than 'avoid obstacles'.

A similar factor the book covers is the invisibility of the unlikely. For instance, a disproportionate number of motorcyclists are hit by cars than is statistically likely, even allowing for the behavior of a few idiots. In a number of cases, the motorist literally did not see the bike, and instead was watching out for the much much more likely other cars.

Another issue raised in the book is that of self assessment. Most people over estimate their own abilities and hence they are prone to get into trouble from over confidence. This tendency has been well documented, so the pilot may well not be the best person to judge their own abilities. A point for pilots to keep in mind when an instructor says you are not ready for a new task.

Some of you may be aware of the tendency to become mesmerized or fixated by an object, especially an isolated one, and the tendency to turn towards it. I do not know the detailed mechanism behind this phenomenon but it is real enough. There was a lone tree beside the road many years ago on a long straight stretch in South Australia. Quite a number of cars kept running into it when on the road alone. The problem was solved by cutting down that last tree! Planting more trees would have worked equally well but it was very dry country. It is very easy to become fixated on something when flying, especially when on final, definitely something to be aware of.

Some other aspects of the eye/brain combination should also be kept in mind. Try looking straight ahead, then look quickly to a point on your left. You will not have seen a moving panorama of your surroundings as your eyes swings to the left, you will see the field directly ahead, then the field to the left with nothing in between. The brain turns off all visual images as the eye swings until it settles on its new point of focus. Only then is vision turned back on. You think you have instantly switched from one visual field to another, BUT YOU HAVE NOT. It takes a significant proportion of a second for the eye to take in the new field and for each layer of the brain to analyze their aspect of vision and for the brain to produce a new coherent visual field. You are literally flying and driving blind until the new visual field is in place.

In summary, I would strongly recommend this book for a very interesting, relevant and sometimes scary insight into how your brain/eye system functions, how it can sometimes deceive you and how it could get you into trouble. This recently researched insight into brain function is especially important, I think, for instructors. Forewarned is definitely forearmed, so get a copy and read it. I bought an extra copy for our instructors to share. *GA*

Difficult Conditions and Final Glides

DICK SASSE

This last soaring season has been a very enjoyable and moderately successful one for me, but the annual WA State competitions held in January proved to be very difficult and disappointing from the organizers' point of view. In fact, in spite or perhaps because of record high temperatures of 45°C on several of the days, we were only able to fly five out of the allotted nine days.

There was plenty of cloud: one day, in fact we had 30ml of rain, and more in other parts of our operating area, but most of the days were just hot, blue and windy.

The best height gained one day was by the ultimate championship winner, Swain Johnson, 8,000ft A.G.L. My best was 5,700ft A.G.L., so low level and distressingly hot flying was the norm as were out landings rather than the exception.

I was one of the lucky ones to escape and managed to get home each time. Subsequently I was asked, "How do you do it?" Well the simple answer was, "The element of luck, outweighed the element of skill."

However, on giving it some thought perhaps I have a couple of suggestions which may help our budding cross country and competition enthusiasts. A couple of cliches—'One good turn deserves another', 'If your onto a good thing, stick to it', 'The devil you know is better that the devil you don't', and perhaps 'Patience is a Virtue'. As opposed to, 'A faint heart never won fair lady', and to be sure you're not going to go very far, or win many competitions if you're too patient. A compromise is needed there.

Our Club uses a winch for launching, so immediately we haven't the luxury of an obliging and skilful tuggy dropping us off in lift. Our winch usually gets us to about 1,200 to 1,300 ft which means we've got to start looking for lift pretty quickly – even before we launch, on the launch itself, and immediately on release. Get the aircraft trimmed, the wheel up, and self in soaring mode pretty damned quickly, and grab the first indication of lift. The lift is not likely to be anything but weak, but we've only got at best 500 to 600 ft to play with, and on the law of averages the thermal will get better so 'stick to it'.

As regards to final glides - final glide as we all know is perhaps the most important phase at cross country. Certainly it can be the trickiest. Yet in some ways it can be the easiest to practice. In fact in every episode of gliding, cross country or even local flying it can be practiced.

In local flying we will, of necessity, always have our landing area in sight but the opportunity is there always to practice getting the glide angle right in all wind directions and speeds, and bearing in mind we must allow for those extra feet to make a correct circuit.

One suggestion to allow for circuit height is to pick a sight about 6 or 7km beyond the landing area as the aiming point. This will give about 800 ft over the landing area. *GA*

HUMAN FACTORS IN GLIDING

As in many other sporting activities, accidents and incidents in gliding result in considerable pain, suffering and costs to individuals, families, friends and clubs and damage - or in some instances destruction - to sailplanes and equipment.

BY JOHN HUDSON

The focus on safety, and accidents and incidents in particular, is reinforced by initiatives including legislation, checklists, check-flights, procedures, training and refresher training and accident or incident reporting and investigation. These procedures are now commonly included in a Safety Management System – SMS.

Ensuring gliding activity is undertaken safely is, or should be, the prime objective and responsibility of every participant. This requires a conscious recognition of safety with a focus on actions to eliminate or reduce the risks and impacts of accidents and incidents to a level as low as is reasonably practicable.

It is now widely appreciated that human involvement in these activities is a common factor in many accidents, incidents or events that occur – the Human Factor.

ACCIDENTS & INCIDENTS

Despite our best efforts, accidents and incidents will unfortunately continue to occur. In the ideal world, these would be restricted to those events people have little or no control over.

It is appropriate here to briefly ponder a couple of aviation accidents - the Airbus onto the Hudson River event in USA and the Qantas Airbus A380 engine explosion in Singapore – two of the few recent incidents that may be considered genuine accidents.

What is an accident or incident? Much has been written about this. A definition I like is one expressed by recognised international safety expert James Reason as any unwanted or unplanned event. These events are those we should be reporting, investigating and communicating, broadcasting the outcomes widely and in turn allowing all participants within the gliding movement to benefit from these free lessons.

A simple example of an incident, an unplanned or unwanted event, is an aerotow launch failure. If the instructor operated the release as part of a training sequence, it was a planned event and requires no further follow-up. However, if the release was operated in error, the incident should be reported and followed up to determine why the release was operated and how a repeat event can be prevented.

Responsible organisations in a wide variety of fields, including heavy transport by air, road, rail and sea, nuclear energy, space travel, medicine and various arms of sport aviation – are developing Safety Management Systems, or SMS, to better manage safety outcomes.

SMS's are the result of many significant industrial accidents – Space Shuttle Challenger (USA), Piper Alpha (North Sea). Bhopal (India) and the Concorde crash (Paris).

Important features of an SMS include safety statements and objectives, risk analysis and review, incident and accident reporting and follow-up, personnel training and human factors.

HUMAN FACTORS

Human Factors in Gliding is the name given to the study of how glider pilot performance is influenced by their environment, including;

- Effect on the pilot of glider cockpit design, temperature and altitude.
- The functioning of body organs.
- The effect of emotions and attitude.
- How well or poorly we communicate and interact with others.
- Impact of pilot attitude, knowledge and discipline on judgement and decision making.

Specific Human Factor incidents are classified as errors or violations.

Errors are unintended occurrences – such as entering a wrong number into a navigation device. A violation is to consciously or intentionally transgress – like flying at airspeeds above Vne or not conducting checks.

At this point, it is appropriate to highlight that not all Human Factor events have a negative outcome. A good example of positive Human Factor outcomes is the landing of the Airbus on the Hudson River by Captain Chesley B Sullenberger in 2009. Here, no rules, procedures, checklists or training system existed – and without the direct input of the crew, the outcome had the potential to be significantly different.

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In almost every reported accident or incident, there is a Human Factor involved. These 'factors' exist in every field where people are involved - including equipment and systems design, manufacture, operation, maintenance and repair or modification.

In some instances, the impact of Human Factors may be eliminated or minimised by automation, but it is not possible to automate every action or activity. The outcome of a Human Factor event may range from very minor to very serious.

There are many other aspects to human performance that need to be considered and addressed including, among other items:

- Training, retraining and updating
- Supervision - Attitude to risk taking, unsafe acts, etc
- Environmental factors – weather, altitude, cockpit ergonomics, locality familiarity, sailplane familiarity
- An individual's personal condition including drugs, alcohol, fatigue, currency, experience, knowledge, self-discipline, judgement, distractions, vision, fitness, decision making ability, skill, situational awareness, illness anddegree of hypoxia,

It is difficult for an individual to prevent an incident that was not intended to occur. Some of the very best and most experienced people and personnel can and do make the very worst mistakes. Experience is no guarantee against a Human Factor event. Many highly experienced people have become involved in significant events with very negative outcomes.

What causes a Human Factor event? This question is difficult to conclusively answer. As mentioned above, some Human Factor events have such a positive outcome while others have enormously negative results. Some Human Factor incidents have a latent aspect, such as when tools or equipment are left lying around which someone later trips over.

In all gliding activities, there are likely to be Human Factor events. We must therefore develop and use strategies to eliminate or minimise the negative outcome of these events. The strategies include a recognition of the frailty of human performance, the influence of Human Factors and methods to manage them.

EXAMPLES OF HUMAN FACTORS

Design

- Different layouts in glider cockpits.
- Cockpit ergonomics

Inspection / Maintenance

- Cracked bolts or fittings not identified at inspection, which subsequently fail in service.
- Parts and components which are incorrectly reassembled or reinstalled after inspection.
- Items or components overlooked in an inspection.
- Conducting maintenance to less than acceptable standards.

Operations

- Not conducting relevant checks.
- Omitting an item in checks.
- Landing a sailplane wheels up.
- Exceeding a design airspeed limit.
- Not reporting a heavy landing.
- Incorrect completion of Daily Totals (Airframe or Engine Hours) or Landings in a Maintenance Release.
- Entering incorrect information into co-ordinates in a GPS or Navigation system, as occurred in the Air New Zealand DC10 accident at Mt Erebus in Antarctica.

ADDRESSING HUMAN FACTORS

How do we minimise Human Factors ? It is necessary initially to readily accept that humans - people like you and me - do make mistakes, regardless of experience or how many times we have completed a task. The errors are likely to increase as the likes of fatigue, hypoxia or boredom set in. You may see that the end of a long day in the cockpit, when the potential for errors increases, is when you really need to be switched on for final glide determination, increased lookout, radio calls, separation from other gliders, approach and landing and the additional workload possibly associated with that.

Having accepted that we can make simple errors that have high potential impacts, various strategies can be developed to minimise the potential for errors. These include:

- Always flying at high altitude with supplemental oxygen.
- Smoothing out the peaks and troughs in workload
- Planning the arrival
- Complete checks early, with double-checks
- Double-check critical items - water ballast, under-carriage, radio frequency, etc

Use a written CHECKLIST/s

Don't undertake manoeuvres that increase risk, such as a low level finish.

Recognising this issue provides the opportunity to address it. Every Human Factor identified should be broadcast far and wide so we can all learn from the lessons provided, as we won't individually live long enough to learn all the lessons from our own mistakes.

We so often hear of aviation incidents or accidents where investigations have failed to identify any problem with the onboard equipment, engines or systems - in otehr words, a perfectly good aeroplane - but a mishap still occurs.

As I write this, Human Factors have been linked to TV episodes on Flight 447, where a perfectly good A330 was hand flown stalled through 40,000 ft before it hit the water with disastrous consequences and in another accident, a seemingly perfect Asiana Airlines Boeing 777 crashed on landing at San Francisco in good weather.

We must be ever vigilant to the potential for Human Factors to influence our flying activities and involvement. GA

REDUCING UNDERSHOOT RISKS & IMPROVING SAFETY IN CIRCUITS

This article is intended to help instructors and pilots understand undershoot risks better, to understand and apply suitable risk mitigation measures and, in particular to adopt practices that will make for better, safer pilots, in all environments.

DREW MCKINNIE, CANBERRA GC, REGIONAL MANAGER OPERATIONS NSW, GFA OPERATIONS PANEL

Flying from Bunyan airfield, home of Canberra Gliding Club, is exhilarating and demanding. The 'weather factory' gives us thermal, ridge and wave lift. The geography and meteorology combine to keep us on our toes. None of our grass runways are flat, all sloped, plus we have hills in the circuit area and limited off-runway landing options. Given the strong effects of wind, lift and sink at our site, high operations and training standards plus vigilance are needed to reduce low circuit and undershoot risks. The lessons we have learned and applied can be of benefit to the wider gliding movement, to improving training and the safety of our operations.

Let us ask some fundamental questions. Why do glider pilots sometimes get caught out too low on base or final approach, trying desperately to get back to the home airstrip or facing an outlanding close to the field? Why do seemingly experienced, well-trained pilots sometimes find themselves in dire straits, facing undershoots or dangerously low approaches? Why do normally sensible pilots sometimes erode their safety margins, either scaring themselves or damaging their gliders and injuring themselves? Why do high wind conditions and turbulence markedly increase the risks of undershoots? What shortcomings are there in the gliding training system that might be contributing to undershooting incidents? How might pilots modify their flying practices and perception so that they may reduce their exposure to undershoot risks?

Limiting the consequences of errors is important. We must always, at all costs, avoid straining ourselves through a fence. This is a particularly nasty type of accident, with very high damage potential for both pilots and gliders. We must also avoid stall-spin accidents, low energy arrivals with high vertical rates of descent. These, too, will ruin your day, your health and your glider. We must also avoid loss of directional control, burying a wingtip in the ground or a fence, or another glider, or hitting obstacles short of the safe landing area. Wing to ground impacts during final turns and undershoots are exceedingly dangerous.

The opposite category, overshoot accidents, hitting an end obstacle on landing, is comparatively rare. Note that the risk of hitting overshoot obstacles is higher with launch failures, where a late approach to an unexpected landing is attempted far down the strip.

We all know the theory of what we need to do to avoid undershoot - or so we think – until it happens. We have all heard the words drummed into us, “Safe speed near the ground, fly a safe circuit pattern, watch wind drift, move the base leg closer in high wind conditions, turn in early if in sink" et cetera. So why does it happen to pilots who should know better? What factors increase the probability of pilots making errors, or being exposed to environmental conditions resulting in undershoot? What are the risk drivers? Try listing some of these before reading on.

In summary, key undershoot risk drivers include:

1. Poor circuit joining, often exacerbated by a late break-off decision, or joining too low for the conditions.

2. Poor energy management, management of attitude, airspeed and height in the circuit, poor monitoring of the available energy budget, often due to flying by landmarks or fixed ground reference points.

3. Poor workload management in the circuit, leading to a lack of monitoring of the important energy and angle issues.

4. Poor time management, exacerbated by lack of awareness of the limited circuit time budget, particularly the short time from abeam the aiming point on downwind leg to the base leg turn.

5. Poor monitoring of the vertical angle between horizon and intended aiming point, and the rate of change of that flattening) angle, particularly from abeam aiming point-on downwind to the base leg turn.

6. Insufficient response to perceived changes in this vertical flattening angle or rate of change of angle.

7. Excessive aiming point or launch point fixation, pressing on in a marginal circuit instead of turning in early and modifying the circuit.

8. Denial, decision paralysis, freezing under stress.

9. Exposure to exceptionally strong microbursts, rotor and thermal downdraughts, associated with local area meteorological conditions.

10. Exposure to low level curl over from slopes, outflow winds, wind shear, wind reversal, wind gradients, rotor turbulence, associated with the terrain on the approach path.

11. Optimism error, over-estimation of glider performance, particularly when flying a lower performance glider after recent operations in higher performance sailplanes.

12. Wet wings, ice on wings, or glider incorrectly configured and producing excessive drag.

13. Pilot incapacitation or degradation induced judgement errors, such as from heat stress, dehydration, low blood sugar or illness.

14. Sheer stupidity.

WHAT WE CAN DO TO MITIGATE THESE DRIVERS?

1. First, think about the landings you have done which have been less than tidy. How many of those were preceded by a poor circuit, joining too wide and flat, too low, too slow, too late, or even too close overhead, from a crowded position? Poor circuit joining is a common precursor for flat or shallow circuits, low scrapes and high undershoot risks. Skinny, low flat and low energy final glides can contribute to this risk driver. Also, late decisions and poor break-off discipline contributes to degraded workload management. In cross-country flying we must be aware of these risks, build in a suitable safety factor so that we join circuit at a safe height and angle to the aiming point, not at a flat, shallow, late and scary position.

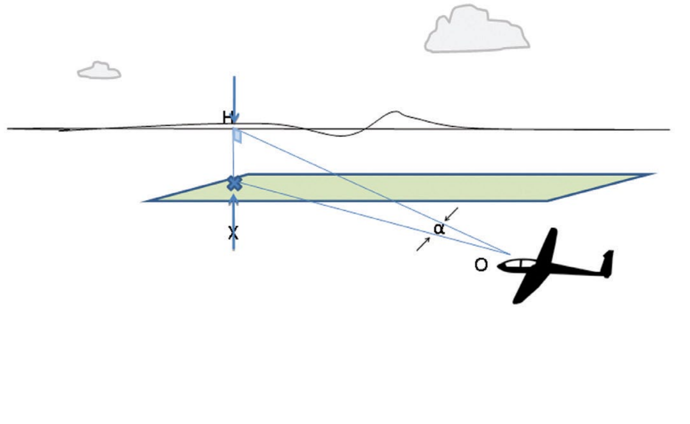

FIG 1 – FLATTENING (SHALLOWING)
Pilots sense decreasing angular rates and flatter perspectives to easily perceive flattening trends in circuits

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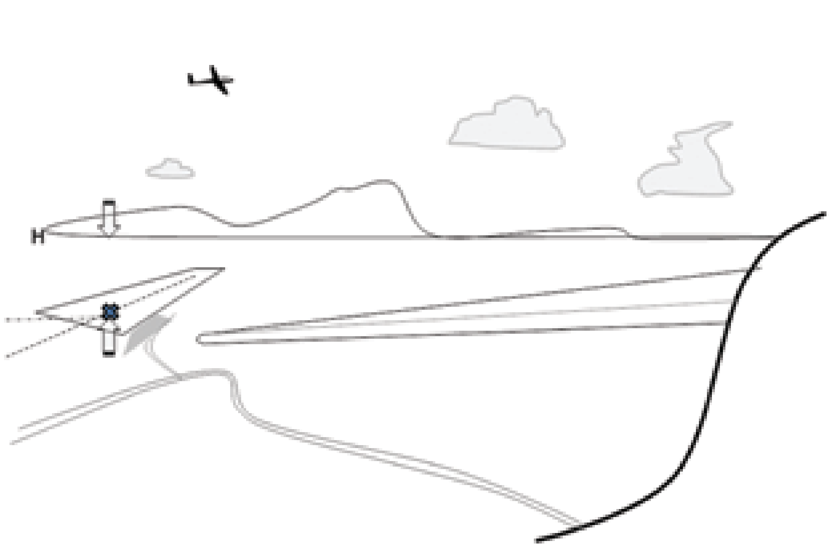


FIG 2 – THE CRITICAL BASE LEG TURN
Judging the right moment to commence the base leg turn requires attention to monitoring the vertical angle and angular rates to the aiming point, good time management and visualisation of the final approach path angle.

2. We put much emphasis on energy management in our glider pilot training. The sad fact is that when flying in strong winds or turbulence, some pilots struggle to maintain safe energy, often because of poor management of attitude and insufficient use of trim. Chasing the ASI in lumps, bumps and gusts is a recipe for trouble, for being 'behind the aircraft', and when that happens, the focus on height and changing angles back to the aiming point is diminished. Those who fall into the trap of flying circuits by landmarks and fixed ground reference points, expose themselves to much greater undershoot risks in high winds and turbulence. Circuit judgement is supposed to be adaptive, not formulaic. Establishing a well-trimmed configuration early in the circuit, occasional quick glance checks of airspeed and trends, slower or faster, combined with good attitude control enable better control in gusts and turbulence, better anticipation and less risk of sinking below a safe glide slope back to the aiming point.

3. Poor workload management, leaving FUST checks and radio calls too late, focussing on the wrong thing at the wrong time, not monitoring the right things at critical times in the circuit, particularly height loss and flattening circuit angles, is a major undershoot risk driver. High workloads and stress also lead to fixation on single stimuli and problems, to the exclusion of all else. Workload management problems leading to 'cognitive tunnelling' and 'single issue focus' can lead to missing other high priority tasks and fundamental errors. The converse, good workload management and a clear focus on high priority issues, is effective in mitigating these risks. This also goes with good circuit joining judgement and discipline.

4. Time management practices are closely related to workload management, but the key issue here is an awareness of the (limited) time budget available in the circuit. There are numerous variables that may affect the time taken to fly downwind, base and final legs. Glider performance, circuit height, circuit width and length, airspeed, wind speed, turbulence, approach glide slope, all may vary the time taken. Try timing circuits, yours and others! You may be surprised how little time is taken ir some conditions.

THIS IS THE CRITICAL ISSUE

When flying in strong winds, note how much this diminishes your time budget on downwind, from abeam the aiming point to needing to turn base leg. Think about it. If you are used to 60kt circuits in still air or 10kt winds your downwind ground speed may be 60-70kts. Wher weather brings 25kt winds, you may be flying at 70kts with a huge tailwind, probably stronger aloft, covering the ground at 95kts or more. You may have only 10 seconds in strong winds past the aiming point to the base leg turn depending on your circuit height, maybe less in a low circuit, and the effects of a 5, 10, 15 sec delay error ir starting that turn will be all the more serious.

The lesson is this. In strong winds, you have much less available time on downwind leg. Don’t stuff around. Once you fly past the aiming point, your time management focus must be on monitoring height, attitude for safe speed, vertical angle to the aiming point and the rate of change of that angle. When past abeam the aiming point on downwind, focus! Time means energy.

5. How do we judge height or altitude above ground level? There are lots of cues and clues for seeing altitude above ground level, many of which we use unconsciously. They include the ability to see detail of objects on the ground, surface texture relative size, changing perspective, shadows, rate of movement over the ground, plus our eye height relative to distant high ground features. There’s an altimeter, too, which could mislead some and lead to laziness in judging height by eye!

Our training emphasises seeing the correct angle betweer horizon and the intended aiming point. We are coached to see circuit angles that might be steep or flat, and to correct them ir flight. Now ask yourself, why is it that pilots find it difficult tc judge and consistently fly downwind legs at a correct vertica angle between horizon and aiming point? Why do we find it difficult to accurately estimate angles other than 45, 90, 180 270 and 360 degrees? What angle is a 'correct' angle below the horizon for a typical circuit, or a high wind circuit?

HUMAN PERCEPTION

Here’s where we get to an aspect of human perception that many people are not aware of. Human beings are quite prone tc errors in seeing and estimating absolute angles. Human beings are, however, much better attuned to seeing rates of change of angles. We are in fact very proficient at seeing angles changing and reacting in ways to minimise that rate of change of angle We might find it difficult to accurately estimate the actua vertical angle between the aiming point and horizon – but we find it easy to see whether that angle is changing, flattening or steepening, or staying constant.

Why am I labouring the point on terminology issues? The reason is referring to angles in absolute terms like - good, steep and flat - about the size of the angles, trigger you to different perceptive cues than words describing their rates of change - constant, steepening, flattening, shallowing or worsening. The human brain is wired to work better with changing angles. Some of our best instructors already use this technique and language instinctively, intuitively and unconsciously – because most of us are unconscious of why we are so adept at operating in a 3D world. In the air, in a circuit situation, we not only see the horizontal angle between straight ahead and the aiming point and vertical angle between the horizon and the aiming point, we also see the rates at which those angles are changing.

So here's the key issue – we must be attuned to seeing the vertical angle to the aiming point, plus the rate at which it is flattening or steepening. The faster it is flattening, the bolder the correction. When you fly from still air into sink, the vertical angle goes from being near constant, to flattening, to flattening even faster – and this is the visual cue we must be attuned to reduce undershoot risks.

IF IT FLATTENS, A TURN IN HAPPENS

If it flattens, a turn-in happens. Think about it, remember those words – when embedded in your mind they have the power to improve your monitoring and trigger the correct response to worsening - that is, flattening or too flat - vertical angles.

6. Let's assume you can see the angles flattening – but what happens if your correction is not enough? The angles will still flatten, but slower. What happens if you over-correct? The angles will go from flattening to steepening. It is self-evident that under-correction to flattening angles is potentially more hazardous. Again, the faster it is flattening, the bolder the correction. This is particularly important in high wind circuits, when several corrections may need to be made, and quickly!

7. Flexibility and adaptability to changing, worsening situations requires us to be prepared to acknowledge that your plans to land at a chosen point might have to change. Why do pilots get press-on-itis? Why do we get launch point fixation, and leave the decision to modify or land elsewhere too late? Here you have to look for answers within yourself, as to your own character, your psychological predisposition to accept risks, to stick with a decision – or your preparedness to choose to change, to reduce risks, to accept less convenient yet safe options. In check flights, this is also a test of instructor risk tolerance and discipline, a test of thresholds of intervention. Undershoot risks must be managed properly, with great care and discipline to avoid realising the risks inadvertently.

8. If you have difficulties managing high stress, high workload situations, or a tendency to freeze, then this might require some deliberate training and confidence building, some scenario analysis and practice under instruction. Pre-planning emergency responses helps reduce stress and workload. For example, we routinely assess launch failure options in the O check in CHAOTIC. On a given day, we should assess other suitable runway or paddock options if caught out. If training does not help, then this begs the question as to whether gliding is the right sport for you.

GUSTS AND DOWNDRAUGHTS

9. Another risk driver is meteorological. Any one of us can get caught out flying into adverse gusts and downdraughts. At one level the risks are avoidable, we can choose not to fly in conditions conducive to downdraughts. The reality is that conditions can change very quickly at our weather factory, so some of the risk mitigations are linked to your own deliberate exposure to 'interesting conditions', plus development of your own meteorological knowledge and ability to read the sky.

The good news here is that there is much informal learning to be gained on the airfield, just talking with your flying peers. Delving into good gliding weather texts, meteorology office web resources, weather watcher and aviation weblogs and forums, also helps to build this ability to read the sky. Some of us are weather nuts and love to understand and discuss these phenomena. Knowledge helps us to reduce the risks, to avoid the bad air, or if encountered, to get the safest path to the ground, which in some cases might not be the home airfield!

10. Peer knowledge, local briefings and knowledge are also critical to understanding the smaller scale meteorological risks associated with the terrain overflown during the final approach. Curl-over, wind shear, gradient effects, outflows, even rotor, can combine to exacerbate an undershoot situation. Anticipation of these localised effects is a key risk mitigation strategy, keeping that extra margin when operations on a particular airstrip, terrain and wind combine against the pilot.

HUMAN FACTORS

11. The next risk driver is associated with human factors - a fallible human element. When we fly one or two glider types frequently, we can 'get in a groove' regarding their expected performance. If they are relatively high performance gliders, then a pilot launching and landing in a lower performance glider can unwittingly over-estimate the glider performance and fly too flat a circuit. Sometimes this is referred to as a recency effect or an optimism error. Human beings being diabolically complex, it is also possible for optimism error to set in when flying a higher performance glider, again being over-optimistic in allowing for its improved glide path.

12. It is possible for the glider to be producing much more drag than normal. Many plots will under-estimate the effects of wet wings or, even worse, ice on the wings. This can occur, for example, descending through moist air from a high altitude wave flight. Excess drag can also result from incorrectly configuring the glider in the circuit, with brakes cracked open, or wrong flap settings, or operating the wrong controls at the wrong time.

13. An insidious error-producing risk driver is that associated with pilot incapacitation or degradation, dehydration is probably one of our highest risk drivers here. If you have water onboard, it is usually a good idea to have a sip prior to commencing circuit. Wearing a hat and suitable sun protection is also essential, even in cold weather. The risk mitigation approaches come back to pilot health and prior preparation.

14. With respect to sheer stupidity, in my Navy service we had a proverb, nothing is sailor-proof! Author **Robert Heinlein** summarised this aspect very well in 'Time Enough for Love: The Tales of Lazarus Long', with his wise advice to 'never, ever, underestimate the ingenuity of fools!' Airmanship expert **Tony Kern** has also touched on this subject in his book 'Darker Shades of Blue: The Rogue Pilot'. **James Reason's** books on 'Human Error' and 'Managing the risks of organisational accidents' also highlight the inevitability of human beings making errors, and of us finding new ways to do that.

My intent here was to provoke readers, through a series of questions, into thinking about the reasons why seemingly competent, well trained pilots find themselves all too frequently in horrible, low, flat circuits, with undue exposure undershoot risks. Then I asked, what are the causes and what can we do to reduce exposure to undershoot risks? Some of the answers are found in improved awareness of undershoot risk drivers.

Achieving reduced exposure to undershoot risks requires us to do a whole bunch of things right, including perceiving and reacting to the right angular rate and other cues, as well as managing a tight time budget well in all conditions. Advances in the science of human perception and psychology of decision-making can help us. Most pilots are quite unconscious of their innate abilities, so it is hoped that better awareness, better perception will improve pilot performance and safety.Y our feedback and commentary is welcomed. We all stand to benefit from improved dialogue on these issues. I wish all glider pilots lovely buoyant skies and safe, happy landings. **GA**

SPIRAL DIVES

AND LARGE SPAN GLIDERS

BY CHRISTOPHER THORPE

OPERATIONS
If you have any questions or feedback please contact me at **cop@glidingaustralia.org**
CHRISTOPHER THORPE

During the Safety Seminar at Gawler last October, I was approached by a member who expressed concern that while we have a strong emphasis on spin training and recovery, he believed the same could not be said about spiral dive recovery.

The member explained that there were gliders around that had a propensity to spiral rather than spin and cited an article by the late Stan Hall of the USA titled 'Probing for the Smoking Gun' that reviewed the fatal accident involving a large span Nimbus 4 in Nevada USA during 1999. In his article, Stan provides his own thoughts on what happened and the reasons why, as he felt the NTSB accident investigation report finding of 'pilot error' was too simplistic. A copy of the article can be read in the Soaring Society of Canada's magazine 'Freeflight' 2/2004 available from the SAC website.

Stan's article highlights the problems flying large span gliders and is worth a read. However, it is also worth noting that this is Stan's opinion only. Two further accidents involving Nimbus 4 in-flight break-up occurred since he wrote that article, one of which Stan knew about but had no details of, as the investigation had not been completed. One of these two accidents occurred in Spain on 31 July 2000, and the other in South Africa on 22 November 2007. An earlier inflight break-up of a Nimbus 4 had also occurred in New Zealand in January 1995 when flown in turbulent conditions.

What these reports highlight is that large span sailplanes can be easily upset in the right conditions, and following a spin or spiral dive they will rapidly accelerate if inappropriate techniques are used to recover, with structural failure a likely result.

Whereas a spin is characterised by the nose down and usually rapid rotation of the glider with a low or flickering indicated airspeed, a very high rate of descent and lack of response to the ailerons and elevator, a spiral dive is different. In a spiral dive the speed increases rapidly, the controls feel heavy but are still effective and 'g' increases if the stick is held back or moved back. The rotation rate is markedly slower than most spins, and unless the dive is very steep the rate of descent is not usually as high as in the spin. To recover from a spiral dive one must ease the stick forward to reduce the 'g', roll the wings level using co-ordinated ailerons and rudder, and then smoothly return to normal flight.

Now speed can become very high in the spiral dive if the pilot fails to recognise that it is a spiral dive, and/or does not roll level before pulling out. There may also be a strong temptation to pull out the airbrakes to limit the speed, usually when it is already well past Max Rough Air.

While most airbrakes are designed to limit speed, the criteria that define 'speed limiting' differ from type to type and it is not uncommon for the 'speed limiting' brakes of FRP gliders to be so only as long as the dive angle does not exceed 45°. In addition, while airbrakes can be used at very high speeds, they aren't specifically designed to be opened at high speeds. If you are going to use the airbrakes, open them before, rather than after, exceeding the higher limit speeds.

Some of the reasons for avoiding opening the airbrakes at very high speed are:-

- The forces on the airbrakes will be very high and they will almost certainly slam open violently when unlocked.
- There will probably be damage - possibly serious - to the glider structure, not to mention the airbrake mechanism. This damage may make it impossible to close the airbrakes.
- More significantly, the redisposition of the loads around the airframe, wings in particular, due to opening the brakes may effectively reduce the structural strength of the glider.

If the speed is very high it is better to slow down by pulling out without using the airbrakes. It is also a good idea to avoid rolling level and pulling out at the same time as the stresses on the glider in this situation are quite large.

FURTHER OBSERVATIONS ON SPIRAL DIVES

What is not well understood is the ease with which many gliders will enter a spiral dive, including from a mishandled spin entry. During flight training and reviews, checking Instructors often fly with pilots, including some instructors, who are spin averse. Quite often, a spin averse pilot will, at the point of the stall-spin entry, relax the backward pressure on the stick as the wing starts dropping, and it is from this unstalled, wing low, diving and rolling attitude that a spiral dive begins and quickly accelerates. This is compounded if the spiral dive is not recognised and the pilot applies more forward elevator pressure as per spin recovery, thereby steepening the dive and increasing airspeed further. If the pilot then pulls back on the elevator when high airspeed is recognised, this will cause an increased rate of turn and higher 'g' loadings, with a substantial increase in the risk of damage and injury.

Most instructors will attest that inadvertent spiral dives from mishandled spin entries are commonplace. For example, Puchacz gliders are often cited as a readily spinning type but they will easily enter a spiral dive from a mishandled spin entry just from relaxing back pressure on the elevator near the stall. The DG1000 and Janus will also easily enter a spiral dive from an incipient spin attitude, and will accelerate very quickly given their low drag. It is for this reason that we do not have to intentionally demonstrate spiral dives and recoveries.

That said, if a student or pilot under review inadvertently fails to enter a spin and instead starts a spiral dive, this must be corrected immediately and the symptoms of spiral dive entry identified. These symptoms must be contrasted with the very different symptoms of stall and spin. As previously stated, to recover from a spiral dive the pilot must find the horizon, roll wings level, ease out of the dive, and only use airbrakes if 'g' loadings are low.

1. www.ntsb.gov/investigations/fulltext/AAB0206.html
2. www.sac.ca/index.php?option=com_docman&task=doc_download&gid=218&Itemid=88
3. www.fomento.gob.es/NR/rdonlyres/F5ECB77D-9D11-425A-9AA9-ED7A7C68CB45/11977/2000_028_A_ENG.pdf
4. www.caa.co.za/resource%20center/accidents%20&%20incid/reports/2007/8395.pdf

GA

A BLEEP MOMENT

BY DREW MCKINNIE
CANBERRA GLIDING CLUB,
REGIONAL MANAGER OPERATIONS NSW

PRACTICE BECOMES REALITY

I sat in the glider, still in the long grass and weeds, stopped safely in the undergrowth. For a minute I just sat there with the canopy closed, hands in a prayer-like position in front of my face, as I tried to calm down, slow my deep, fast breathing, slow my racing heart and the surge of adrenalin. I was safe, intact, and grateful to be sitting there uninjured. Scott came over the hill in my vehicle, down the side of the runway, and stopped nearby. "Are you OK, mate?" he called as I climbed out of the ASW20 and checked the glider's structure. With huge relief and a wry smile, I replied, "Yes, I'm OK. Wow, that was scary! And close!"

About two minutes previously I had lined up in my ASW20L VH-GVN on Bunyan Runway 33 on a pleasant sunny Monday, 23 September 2013, during our wave soaring camp. I was looking forward to a gentle spring thermal flight. Frank Johann had taken off in his ASG28 behind the Southern Cross tug CPU, and I was about to have first launch of the day behind the Canberra Pawnee MLS, with Jon (Blok) Blacklock at the controls. ABCD-CHAOTIC checks were completed. 'O' in the check had wind N at 12 kts, slightly right of centreline, landing speed 60kts. Options ahead on runway, then ahead and left of the orchard, downhill towards the hangar strip Runway 16 or the corner paddocks N and NW of the field, or Runway 12 or 09 if higher. No obstructions, competent crew.

ROCKS, FENCES, POWERLINES, STOCK AND TREES

Bunyan's runways are all grass, none of them are level, all have down or up slope, with cross slope in some areas. Runway 33 sloped gently downhill. The airfield paddock is full of rocks in many places, with heavy tussock grass and weeds off the runways. Because many neighbouring paddocks are also full of rocks, fences and powerlines, stock and trees, off-field options were very limited. My options were therefore focussed, as is usual, on known clear paddocks and other runways. These options all pre-supposed sufficient altitude and energy to reach them safely and execute a turn if required.

Takeoff in GVN was normal. As the glider accelerated, I went from flaps negative to neutral, setting 3, took off and followed the Pawnee as it separated and climbed. Everything seemed normal. Well down the runway the tug began a gradual left turn, and I no longer had the option to land ahead on the runway. As it approached the boundary road north of the airfield, in a climbing left-hand turn, the tug suddenly seemed to stop climbing and decelerated – then rocked its wings vigorously in the emergency release signal. We were no higher than 200ft, probably 150-180ft above the downward sloping ground, as I pulled the release. I had an "oh bleep" moment as I released, still in a left turn, banking steeper left with the decelerating Pawnee's left wingtip growing closer.

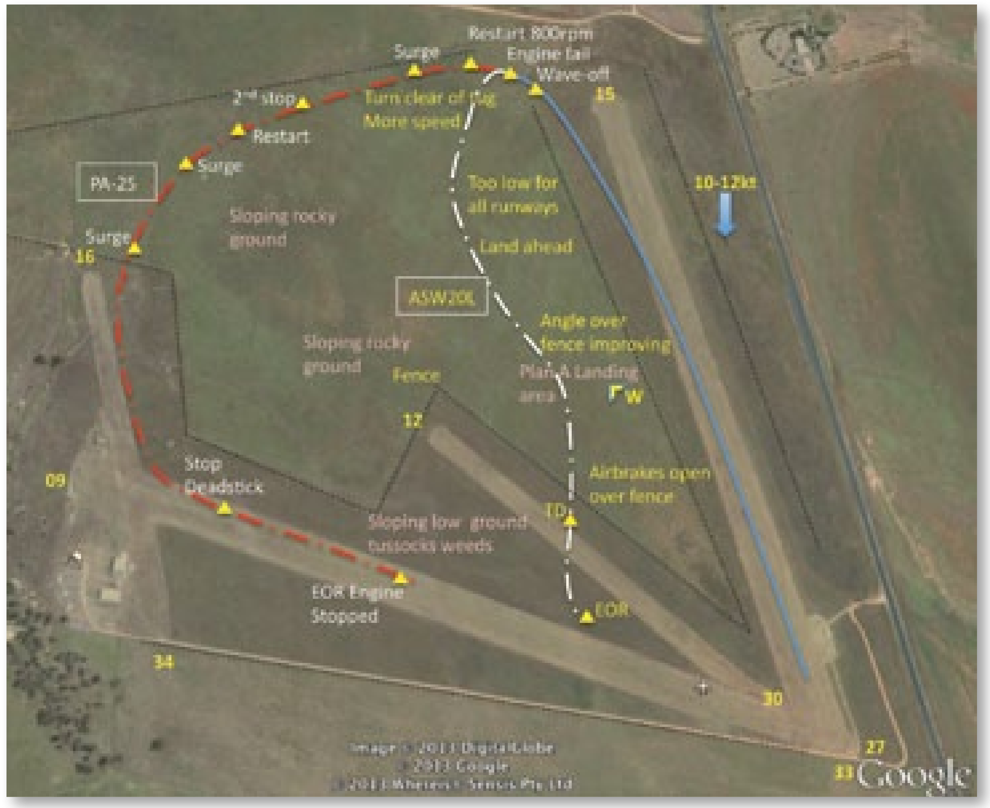
It was an extremely dynamic situation – there was no thought of rolling into a right turn, as my immediate priority was remaining clear of the decelerating Pawnee and I judged I could not risk a climbing right turn. The options of reaching the paddocks north of the airfield, or Runway 16, disappeared as I tightened the turn hard left. At the same time I glanced at the ASI and saw the decreasing airspeed trend, dropping towards 50 knots, and I knew I had to gain airspeed fast – so I pitched the nose forward to regain safe speed near the ground. I remember calling out loud, "No! No way! Safe speed near the ground all the way into the flare!" No way was I going to allow a stall-spin to develop, even though I was really low over rising ground as I turned left.

As I rolled straight and level, heading roughly southwards, I saw that I was much too low to turn back and uphill to runway 15 reciprocal and complete a safe turn – and there were fences to avoid. I looked ahead and right, uphill towards the end of Runway 12, again way, way too low to reach safely. My next thought was that I would have to land ahead on the airfield paddock near the windsock, among the numerous rocks and holes in the long grass. I felt a stab of apprehension, as I envisaged probable damage to the glider – but at least I had airspeed and would be safe into the flare. That option would also require avoiding fences near the runways.

OPTIONS

I looked desperately for an alternate option, and saw that the vertical angle to the fence north of runway 12/30 was improving, steepening! I headed slightly right, following the downslope of the ground towards the fence and runway 12/30, and decided to pass up the landing option near the windsock and land across runway 12/30, over the fence, with a 12kt tailwind. On the far side of runway 12/30 was an area of long tussock grass and weeds, then the main runway 09/27, then the south boundary fence. I was far too low to attempt a turn to align with runway 12, but I also resolved to try to aim and steer slightly uphill, to assist in slowing down as quickly as possible. When I was sure I would clear the near fence I turned slightly left, and approaching the fence I opened airbrakes and aimed as close as possible to the edge of runway 12.

Moments later I flared and touched down on runway 12 with full airbrake, and plunged ahead into the long tussock grass and weeds, feeding in progressive left rudder to steer more uphill. To my surprise I did not reach runway 09/27, instead slowing very rapidly in the long grass and weeds. There were no rocks, no holes, no bangs, just the whipping sounds of long woody stalks hitting the wings. I was down safely! Glider inspections back at the launch point confirmed no damage.



Blok, the Pawnee tug pilot, had a rotten time with engine power loss, an engine failure as I released, restarted in flight, and max 800rpm in engine power surges. He limped back with irregular and partial power to runway 09, and landed dead-stick. I understand that subsequent investigations by our LAME showed that the Pawnee had suffered a mechanical failure in the distributor, with the top bearing overheating and melting the plastic, causing the ignition timing to jump and left magneto to fail, hence severe loss of power. To his great credit, Blok also landed safely, with no further damage. We shared a few relieved smiles and refreshments later.

As a Level 3 instructor, I have initiated dozens of launch failure and rope break emergencies as training scenarios for students and trainee instructors, as well as for instructor revalidations. Many times I have arranged for tug pilots to give wave-off signals as part of emergency training. These scenarios require care to plan and execute, but they did not cause much anxiety, as I was always sure of reaching a safe runway option. I learned to fly gliders at Woomera SA on the auto tow wire, so cable breaks there were frequent, and handled properly, were safe to recover from.

On 25 August 1987 I had a launch power failure in a Schweitzer S2-22 at Bunyan, due to Pawnee carburettor icing after a high launch, and I landed ahead on runway 09. As a Pawnee tug pilot, I once aborted a launch in September 2012 due to power loss and landed ahead on runway 27. So I knew power failures were possible, and planned accordingly. As this actual emergency showed, the best plans might never be practicable.

GOOD LESSONS LEARNED FROM THIS INCIDENT

- The training works! After an initial unpleasant surprise "oh bleep" reaction, the essential actions kicked in - get off tow NOW, keep clear of the Pawnee also turning left, manage safe speed near the ground at all costs all the way into the flare, plan the emergency outlanding, keep concentrating on flying to the safest possible land ahead option.
- We normally turn right after releasing the tow. In a launch emergency you cannot assume you will be able to turn right after release - particularly if you are already in a left turn.
- If you are flying a fast slippery glider behind a draggy towplane, and the power fails, the towplane will decelerate and you will need to manoeuvre quickly to avoid it. You cannot under-estimate how quickly bits of towplane airframe will grow in your field of view.
- The situation was very dynamic, rapidly changing, and the preconceived notions about outlanding options on other runways or adjoining paddocks were quickly gone.
- Planning 'O' for Outside / Options includes safe speed near the ground for the conditions on the day, as well as launch failure options. That is an essential discipline, for all pilots, every launch. I couldn't use the planned options, and I sure needed the airspeed!
- While we might plan for launch failure options, the fact is we normally expect a benign launch, given the reliability of our towplanes and the rarity of engine failure events. Launch emergencies are by definition an unexpected event, and disbelief, fear and stress will occur. Murphy's Law may well conspire, as it did in this case, to have the emergency occur in the worst possible position.
- There was no way I was going to allow a stall-spin scenario so I was very focussed on safe speed near the ground above all else. That meant trading altitude - with not much available - for airspeed, decreasing in a steepening turn to avoid the Pawnee, and then maintaining a safe attitude all the way into the flare.
- I had a safe paddock option near the windsock - Plan A, and I would have used it if there was any doubt about avoiding fences. If I had been in the lower-performance two-seater Puchacz, rather than the ASW20, I think I would have had to land ahead near the windsock.
- Monitoring changing vertical angles to fences and obstacles allowed me to find a safe alternative landing area.
- I judged that I was too low to even contemplate turning near the ground to align myself with a runway. Landing ahead on the airfield paddock across a runway was far safer than risking cartwheeling the glider in a low turn.
- Put another way, even if you can reach a runway, you might not be able to land along it – but perhaps across it.
- No matter how experienced or inexperienced you are, after a fright like that you will experience strong fear responses and adrenalin letdown symptoms. The other instructors agreed I should relax and calm down for a couple of hours before flying again! Getting back on the horse later, for a fun soaring flight, was a good way to relax and recover.

GA

GLIDING DURING EXCESSIVE HEAT

Glider pilots fly under a range of weather conditions. While the sport is progressively more dependent on ageing members who in some cases also have health issues, we strive to maintain a high level of safety consciousness, but I believe we may be falling short when it comes to excessive heat issues and how those situations are defined.

The construction industry has a well researched and proven weather policy. It basically covers rain, wind and heat. Those on construction sites are in the main relatively young and healthy. Nevertheless, work in the sun when temperatures exceed 35°C is generally considered unsafe. Possible consequences to fellow workers and nearby public are seriously considered.

GLIDING OPERATIONS

- Excessive wet results in the cessation of gliding activities.
- Excessive wind results in the cessation of gliding activities
- Excessive heat results in the highly motivated cross country or badge pilot expecting a launch at an optimum time and this we must continue to cater for safely.

Ultimately, these experienced pilots make their own decision in regard to their own safety. However, we need to consider the remainder of our operation.

- Air experience flights and training are different. Should we consider cancelling these activities during excessive heat as we do for excessive wind and rain conditions? With both of these activities the passenger or student is totally dependent upon the pilot in charge and tug pilot, both of whom may have been exposed to the heat for several hours.

I believe we should review at lease these two activities and give guidance to our members. The Club has the responsibility for providing a high level of duty of care for the public and dependent members.

- Tug Pilots, Instructors, AEF pilots and ground crew are unfortunately not immune from the effects of excessive heat. They all carry the responsibility for the safe application of their particular activity. Unfortunately, our ageing members are among the most conscientious and stoically strive to provide the needed service. Performance degradation due to excessive heat can be insidious and even result in the loss of consciousness without warning. Even the young are not immune from this as I well remember National Service trainees from Laverton during the Queen's visit collapsing unconscious due to heat only seconds after assuring those in charge that they were feeling well. There was no warning.

In making a policy decision, I believe we would need to consider medical advice. We should also take notice of considerations made by other organizations who have a responsibility for safe operations during high temperatures.

ALAN BRADLEY,
ADELAIDE SOARING CLUB

HEAT STRESS

An aircraft left in the sun will obviously 'soak up' heat - especially those with a large expanse of Perspex. Gliders are prime examples of the potential for the effect of heat-soaking.

The advantage of good visibility from the 'glass bubble' brings the disadvantage of high cockpit temperatures when left even for a short time in the sun.

Temperatures within cockpits may rise to 15-25° above ambient temperatures and the surface temperatures of items within the cockpit may be even higher, in some instances even high enough to cause true burning of the skin.

A principle of physics, taught to most of us at school or learned by experience, was that black or dark objects are good absorbers of heat so we should ensure that our clothing is light coloured, preferably white, to reflect as much heat as possible.

Headgear is useful and will help to keep the head cool, especially if there is a layer of air between the hat and head.

While you expect the heat to dissipate once you get airborne due to cooler ambient air and the loss of heat due to convection, conduction to the cooler air and radiation from the heated aircraft structure, there is the risk of heat absorption beneath the canopy from solar radiation.

The 'greenhouse' effect of the Perspex 'bubble ' is very real, particularly if the flight is not to any great altitude and is extended more than a few hours.

The effect of getting into a hot cockpit and being exposed to solar radiation is akin to gentle cooking.

As our bodies produce energy internally for us to live, to drive our internal engine, heat is produced. We take in fuel, food and drink, and convert it into energy for life. The heat produced is usually lost to the environment as with any other machine, by radiation, conduction and convection to the surrounding environment. In addition, our bodies produce sweat - liquid on the surface of the skin - which evaporates to provide additional cooling.

If we are in a hot environment we are unlikely to lose much, if any, heat by radiation, conduction or convection to the surrounding air or structures. Our only facility for cooling is this evaporative effect of losing fluid.

Quite obviously, to produce sweat we need a reserve of fluid within our bodies and this topic of fluid balance will be discussed later.

What happens if we cannot keep our temperature down? Our design specification calls for very narrow limits for the internal core temperature. To go outside those limits will produce a severe reduction of performance.

Studies show that aircrew make more control errors in hot environments than in temperate ones and the errors are characterised by unpredictability.

Typically, errors were made in speed, altitude and heading control movements. Attention was narrowed and learning ability impaired among student pilots. Newly acquired or little-used skills were affected first, as one would expect.

Heat stress will add to other stressors such as fatigue, sleep deprivation and emergency situations and may influence the most vulnerable phase of flight, landing - especially after a long day of flying.

DEHYDRATION

Mention has already been made that in a hot environment, cooling of the body may only occur through the evaporation of sweat. The formation of sweat depends on fluid being available within the body to be brought to the skin surface to produce this cooling effect.

The body contains a large quantity of water, about 60 per cent of body weight. We maintain a balance of this fluid by drinking and eating and then excreting excess fluid through the kidneys.

We have all experienced the after-effects of drinking large quantities of fluid over a short time period. There is a need to rapidly lose the excess fluid through the kidneys.

On the other hand if we deprive ourselves of an adequate water supply the body uses its own stores to produce sweat and if the store is not replaced we lose more fluid than we can afford. This is dehydration.

The extent of the dehydration is related to the amount of sweat lost and the amount of fluid we replace by drinking.

Once the ambient temperature rises to 33°C, our only chance of keeping the body temperature down is by evaporating sweat. At that sort of temperature the body needs at least four litres of water a day, even without any untoward exercise.

The fluid replacement must be spread reasonably uniformly throughout the day. If we exercise, then we require more fluid.

As an aid to cooling, the drinking fluid should be cool. Iced water is not always easy to drink. Tea and coffee are best avoided as they contain caffeine, which is a diuretic. A diuretic is a substance promoting excretion of urine from the kidneys which is not what is required in this situation.

When we sweat we also lose salt, but there is no need to concern ourselves on this count unless we are to be in the hot environment, working and sweating, for more than a couple of days.

If we are in that position then salt should be added to your meal as the most palatable means to that end.

It has been suggested that your fluid intake should be spread throughout the day. You cannot wait until you feel thirsty, it is too late by then, and you are already dehydrated.

A better indication is the frequency of the need to urinate and the colour of your urine. Once it is darker than a pale straw colour you should drink at least 250ml of fluid every 30 minute, or more frequently if you are actively working.

Symptoms of dehydration include headache, muscle weakness, drowsiness, nausea and impaired vision. All the symptoms appear vague and could be related to other conditions, but in a hot environment dehydration must be considered as the likely cause.

The performance of a complex psychomotor task like flying will be affected in an insidious manner and you may not be aware of your deficiencies until too late.

OPERATIONS

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The GFA does not have a Policy for flying in hot weather as most pilots prefer to take personal responsibility for their own actions by managing risk through their own choices. So whether or not to fly in hot weather is very much up to pilot choice.

Notwithstanding, GFA does provide guidance and resources in this area and the booklet 'Basic Gliding Knowledge' has some fundamental information around hydration and heat stress at Chapter 11. There is also some useful literature in the 'Medical Facts for Pilots' folder in the Operations Documents on the GFA website.

Pilots can avoid heat stress by wearing appropriate clothing - shirt, pants, socks - that wicks away sweat, shorts, short sleeve shirts where appropriate, white or light coloured clothing, head gear to assist in cooling, proper sunglasses, and plenty of sunscreen to prevent sunburn and skin cancer. You should also hydrate with water. If your urine is dark you're not adequately hydrated, and if you have not urinated in the last hour you're not adequately hydrated.

A very good article on Heat Stress titled 'The Heat is On' was published in the old 'Aviation Safety Digest' in the early 90s and is reprinted here.

CONCLUSION

Flying in the summer months can be fraught with danger unless we think ahead.

- Attempt to provide shade for at least the cockpit of the aircraft.
- On the ground have as much cockpit ventilation as possible, doors, window and 'bubble' open.
- Ensure you have prepared yourself with adequate rest and fluid intake in the days beforehand.
- Wear sensible clothing to reflect heat and protect again solar radiation.
- Have a sun screen agent of your choice with a high blocking factor; 15+ is safest.
- Drink plenty of fluid during the day, aim for at least 250 ml every 30 minutes.

SUNBURN

Sunburn may destroy skin cells and produce scarring such as one might see in a person burnt by fire or scalded by hot fluid.

Sunburn causes a change in the skin not unlike a severe allergic reaction, with swelling and blistering. This process is accompanied by pain, and if it occurs in the region of joints, a substantial degree of immobility.

We are all aware of these dangers and if we set out to 'sunbathe' we usually take precautions by not exposing our skin for too long or protecting the skin with suitable sun screen applications.

Problems arise when we bare our skin for what we think will be short periods of time and forget the effect when the sun is beating down on bare skin through a side window or even under a glass bubble of a cockpit.

It is in these situations when we are trapped without additional clothing or sunscreen agents that we run into trouble and give ourselves yet another stressor with which we have to cope on top of possible dehydration, heat stress and all the difficulties of flying. GA

LINING UP THE HOLES IN SWISS CHEESE

Most accidents are not caused by the aircraft just hitting the ground as the final act of flight that the pilot could not control. Accidents occur from a combination of events, any of which, if mitigated, could have prevented the holes in the cheese lining up.

BY MAX SPEEDY, SOUTH GIPPSLAND GLIDING CLUB

Any search engine will bring up a host references about the Swiss Cheese Model. Quoting from Wikipedia:

In the Swiss Cheese model, an organization's defences against failure are modelled as a series of barriers, represented as slices of cheese. The holes in the slices represent weaknesses in individual parts of the system and are continually varying in size and position across the slices. The system produces failures when a hole in each slice momentarily aligns, permitting (in J.T. Reason's words [University of Manchester academic who proposed the theory in 1990]) "a trajectory of accident opportunity", so that a hazard passes through holes in all of the slices, leading to a failure. (en.wikipedia.org/wiki/Swiss_cheese_model)

While I am not an expert, I have to relate my own gliding accident that took place about 50 years ago. A single seater, late finals, all ready to land and my hand slipped off the air brakes, which promptly snapped shut. The aircraft gained lift. I overcorrected and then went into a pilot induced oscillation (PIO), getting bigger and bigger until I hit the ground and wrote the aircraft off from its nose back to the rear of my seat. I emerged shaken but not injured. I certainly caused the damage to the aircraft with my PIO, but what caused the accident? My hand coming off the air brakes? Being complacent on finals after an exhilarating flight? My first solo on type and not knowing the air brakes could retract so sharply? There are possibly more factors but these are enough. None of them in my view the sole cause but all had something to add. If any one factor had been mitigated, I'd probably have landed safely rather than hitting the ground like I did. Nowadays, I try out the air brakes briefly on downwind when I fly an aircraft new to me!

In a major airline disaster in 2009 (Air France Flight A447), in which over 200 lives were lost, one of many contributing factors was that the two co-pilots' task-sharing was weakened both by incomprehension of the situation and by poor management of the 'startle effect', leaving them in an emotionally charged situation.

In gliding, the closest I can come to an analogy would be that here, any person realising a problem exists - not necessarily the instructor or the pilot in command - MUST do something about it. The fancy label would be crew resource management (CRM). It implies that there is time for nice discussion, which is not always the case, but silence is not the answer either. Aircraft have flown into the ground because one pilot thought the other was flying!

Looking at gliding accidents, the ones which seem to be most dramatic are the low level spin of an aircraft trying that final turn into wind at the culmination of a turn-back off a low launch. These accidents frequently involve injuries or death. Mid-airs may be more spectacular but they are rare and in numbers terms, aircraft flying into the ground claim most fatalities and serious injuries.

In this scenario, coming off a poor or aborted launch at low level, you have three major actions and considerations. In order of importance they are:

1. Adopt a safe flying speed -- 1.5Vs+ ½ wind speed for level flight. For an aero-tow you are possibly at or above this speed and with a reasonable aircraft attitude to maintain that speed. Off a winch launch, your nose attitude can be very high and the aircraft can stall very quickly and be unrecoverable in the height available unless you take aggressive action to lower the nose to adopt that safe speed. You have less than 2 seconds to react. Even then, it may take another 5 seconds to build up to **1.5Vs+ ½Wv. This is your 1st Action and 1st Priority.**

2. Release the tow. Pull the yellow knob twice.

3. Where can I land safely? While the 'startle effect' will have taken place at the instant of launch failure, now is the time for a calculated response. If you have done #1 and #2, your decisions from here onwards can determine whether you do or don't line up the holes in the cheese slices to let that 'trajectory of accident opportunity' through and whether you die or live.

How high am I above the ground and does that height allow for my next manoeuvres? Before you regain 'normal' flight off an aerotow, you may lose 50 to 75ft. Off a winch launch, it could be 150ft. If you elect to turn back, then two 180° turns, one to turn back and the other to line up on finals, will cost you possibly another 150ft. Adding wind gusts and friction effects close to the ground, which translate into more height loss - all the time flying at that safe speed - means the total height needed for 360° of safe turns and recovery from the failed launch is 300ft as well as the height lost for however long you are on this abbreviated downwind leg to return to land on the airfield.

Presuming a turn-back was the best option, your airspeed is the number one priority. With all angles of bank, stall speed increases. Turning downwind, your total lift will be adversely affected with wind gusts and friction effects close to the ground demanding close attention to maintaining 1.5Vs+½Wv. The temptations are to keep the nose up to stretch the glide as well as to counteract the impression - far more so closer to the ground - that airspeed is increasing because ground speed is high on the downwind leg! A safe outlanding into wind outside the airfield is preferable to spinning in off that last turn trying to make the impossible happen. To hell with any inconvenience for a recovery crew - this is NOT a priority or a consideration for you at this point.

The non-manoeuvring area is usually depicted in terms of the ground ahead of the launch point, and so into wind. For a low launch, give serious consideration to how much higher you need to be to safely negotiate that 'dead' zone once you turn downwind and where you will then be in relation to the runway. A low launch and a turn-back do not have to be fatal. If the airspeed drops off it can be corrected and so on. But do nothing to any or all of these, including managing the 'startle effect', and a totally different outcome is likely.

My message is that working out beforehand what your actions in flight should ideally be at various specific nominated heights - 'At so-and-so I can do... At something else I can then do...' - and understanding that these things can happen to you, will keep the holes in that cheese from lining up. When do you do this? During the O of the pre-take off CHA-O-TIC checks is your last chance.

By the way, I have successfully out-landed and, in another life, I was shot down flying American combat assault helicopters in Vietnam but that's another story. *GA*

AIRSPACE CLEAR FOR LAUNCH

It should be obvious to all that it is essential for pilots preparing to launch to be aware of any airspace activities in their vicinity and the threat, if any, posed by the presence of other aircraft.

Lookout is the principal method for implementing see-and-avoid. Effective lookout means seeing what is 'out there' and assessing the information that is received before making an appropriate decision.

Every glider pilot is familiar with the wingtip runner's, or cable hook-up person's, advice to pilots "all clear above and behind" prior to the commencement of launches; however, the true intention of this advice is not always fully understood.

The 'above and behind' advice is intended to inform the pilot of any activity in that airspace that is not readily (or possibly) visible to the pilot from his/her position when seated in the glider ready for launch.

It does not, in its standard form, advise the pilot of all local airspace activity. Nevertheless, there are many occasions when launch assistants do provide more extensive advice to pilots, and at many clubs it is standard practice to do so in order to enhance operational safety. For example, clubs operating at sites where:

- parachute operations are conducted;
- contra-operations are conducted, such as taking off downhill and landing uphill,
- crosswind operations are conducted across the operational runway, or
- a glider will occasionally fly a circuit on the opposite side to the standard circuit direction,

will carry out an "airspace clear for launch" check that covers all of these potential areas of conflict to achieve the required situational awareness.

However, it must always be accepted that the ultimate responsibility for proceeding with any launch rests with the pilot, and the pilot must be satisfied that the surrounding airspace is safe to launch into by whatever means the pilot chooses to establish its status.

Nothing should happen with regard to taking up slack until the Pilot In-Command (PIC) has ascertained the airspace is clear for launch. Launch crews must not pressure the PIC to abbreviate pre-flight checks and situational awareness. Launch point discipline and hygiene is vital; distractions must be avoided and onlookers kept out of the way.

Beware of launch crew dilution of PIC responsibility. The launch crew may assist in improving the PIC's situational awareness but their input does not obviate the PIC's responsibility.

PIC fatigue, particularly for instructors and tug pilots conducting multiple flights, may detract from lookout and situational awareness, or introduce complacency and lax airspace clearance checks. Pilots must be vigilant to ensure this does not occur.

Training for wing runners, forward signallers and other ground staff must include specific training on systematically scanning airspace and providing reliable advice to the PIC. At many clubs, very junior members are often involved in these duties, so proper briefing and supervision is required.

Supervising instructors should routinely monitor the PROCESS of airspace clearance, and intervene if there are shortfalls in either PIC or launch crew checks or lookout.

Remember also: ANYBODY can, and must if they perceive a conflict or danger, initiate a halt to proceedings with the words "STOP, STOP, STOP". Whenever possible, raise one or both arms with palms and fingers outstretched as a visual cue.

AIRFIELD OPERATIONS

Gliding operations must always be conducted in a manner that conforms to GFA requirements and those for operations at the site in use. They must also be conducted in a manner that is predictable and minimises the possibility of potential conflicts. For example:

- The GFA recommendation for having both a 'wing-tip' signaller and 'forward' signaller for aerotow operations ensures the maximum monitoring of airspace during the launch sequence.
- Launch points should be chosen on the basis of providing the maximum visibility of airspace on approach, overhead, in the circuit (both sides) and into which the glider is about to launch.
- If the airfield is large enough, different take-off and landing strips could be employed to separate launching and landing gliders.

It should always be remembered that if there is a possibility for conflict, it will almost certainly occur one day.

TUG PILOTS, SELF-LAUNCHING SAILPLANE PILOTS & WINCH/TOW CAR DRIVERS

Tug pilots and self-launching sailplane pilots should comply with the requirements of CAR 246 and manoeuvre their aircraft so that they are able to observe incoming and outgoing traffic as well as traffic on the manoeuvring area of the aerodrome, in order that they may avoid collision with other aircraft during the takeoff. Also be alert to vehicles engaged in towing and retrieving gliders or cables.

Winch/tow car drivers must check the area ahead of the launch for other taxying aircraft, traffic on crossing runways, etc before applying launch power.

AIRBORNE PILOT'S RESPONSIBILITIES

Consideration should always be given to the manner in which the circuit is joined, particularly when returning from cross-country flights, in order to minimise the risk of conflict.

While pilots preparing to land have right of way, they should always be aware that it is prudent and responsible to ensure that they remain clear of airspace used by launching gliders and other aircraft. They should also ensure that their activities are predictable and do not unnecessarily conflict with other aircraft taking off.

Pilots flying while winch launching is in progress must be particularly conscious of the necessity to remain clear of the launch area. The winch end of a runway should also be considered a potential hazard and be given a wide berth. It is recommended that pilots stay outside a 500m radius of the winch and that pilots should never approach and land from the winch end unless in an emergency or operationally necessary. It is recognised that some winch clubs adopt a policy that allows pilots to 'get away' from the launch and thermal in the vicinity of the winch immediately following a launch. Apart from this concession, the winch launching area during winch launching operations must be a strictly adhered-to 'no-fly zone'.

RADIO

The primary tool of alerted see-and-avoid that is common across aviation is the radio. Radio allows for the communication of information to the pilot from the ground or from other aircraft. Radio is also useful for the wing runner, to aid in situational awareness, monitoring of gliders or aircraft that might affect the launch operation, and monitoring tug pilot communications.

A radio announcement prior to each and every launch is a standard operating procedure at many gliding sites and is expected by other operators. It is always prudent to make prior radio announcements of launch intentions on the appropriate frequency or frequencies in the interest of enhancing overall safety.

For aerotow combinations, the tug pilot should give a rolling call when ready to launch. With winch launching operations, GFA recommends all launch signals, including the 'take-up slack' and 'all out' commands, be given on the CTAF or local aerodrome frequency. These additional calls improve situational awareness for pilots flying in the area.

CONCLUSION

There have been many occasions when launches have proceeded when local airspace safety has been compromised, sometimes with serious consequences.

The club's SMS is a proven system and set of processes for managing risk that ties all elements of the organisation together and ensures appropriate allocation of resources to hazards and safety issues. Pilots, training panels and a club's or organisation's Safety Committee should consider their local circumstances and adopt policies that best suit their situations within the framework of required operational procedures.

Many clubs will no doubt confirm that their current procedures are safe. However, no club or pilot should be content that because there have not been any problems that there will never be. Complacency is a major risk driver, from a human factors perspective. Independent checks of procedures, including Operations Safety Audits and advice from visiting Regional Managers of Operations, Level 3 instructors or State Safety Managers, can improve the integrity of processes and procedures. Analysis of near misses and incidents can also inform better procedures. GA

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WIND? WHAT WIND?

BY LEIGH EVANS, BUNDABERG

Understanding the wind speed, direction and the the surfaces or obstacles that the wind is travelling over are essential considerations when setting up for circuit and landing. Leigh Evans shares some of the cautionary experiences he has had over the years.

My first experience was quite a few years ago. It was early in my Kookaburra glider flying days. I had recently obtained my passenger rating and had a passenger to fly. The country strip was fairly short with an approach over some trees and a small hill. The day was fairly windy with a brisk westerly blowing along the strip. The winch launch was bumpy but normal. Upon my approach I added a few knots for the wind as usual. All went well until about 150ft on final approach when I experienced a sinking feeling, I reacted by pushing the stick forward automatically. I then found myself at 50ft ready to round out!

Luckily the landing was normal and my passenger was happy with the flight. I spent quite a few nights thinking about the quick descent, and why it had happened.

Forward a quite few years and a many more launches, this time passenger-flying a Twin Astir. The flight was normal with a fairly strong sea breeze crosswind on the strip. The strip has been carved out of scrub and so there are dense trees, of average height, alongside the strip. The strip is at least 300ft wide at most points. On the last third of the strip the trees have been cleared back so the trees are another 150ft clear of the strip to give a bit more clearance for the usual pie van and vehicle parking area.

I was passenger-flying and it was the normal passenger flight with the usual landing. As usual I elected to land back at the departure point flying along the strip at a comfortable speed and height of about 100ft. The crosswind was quite strong but fairly smooth. I was tracking parallel along the strip and about a third of the width of the strip in from the scrub, allowing for the crosswind. At the point where the side of the strip has been cleared, if all is going to plan, one deploys the airbrakes and then rolls to a stop at the departure point.

All was going to plan. As I was approaching the cleared tree area, I deployed the necessary airbrakes. Without a hint, I was now at 20ft above the strip. I can only liken it to missing a step and then continuing on as though nothing had happened. I had neither the time to register or react to the change. In the blink of an eye the aircraft had descended vertically at least 50ft without attitude change or warning. The landing then continued as usual. I questioned the changing conditions over trees, then no trees, severely affecting stall speeds!

My third experience was again in the Twin Astir and again a passenger flight. The crosswind on this occasion had strengthened and so I elected to go onto the very narrow, short, tree-lined crosstrip which was more into the now strong wind. I factored in a little more then usual the safety speed and height for the wind and trees factor for the strip. On final approach over the last of the trees onto the crosstrip, the aircraft dropped abruptly, about 10ft I guessed, and then continued on to a normal landing.

Memories of the other occasions flooded back, and the safety factor I had unconsciously factored in probably saved me on this occasion as well.

Pilots need to keep in mind the stall characteristics of their modern, fantastic plastic machines in windy conditions. GA

This article has been published with the kind permission of the author who works in the firm's Sydney office. While written for a broader aviation audience, the thrust of the article is relevant to all of us who fly sailplanes.

The GFA regulation in respect of flight reviews is contained in the GFA Operational Regulations at paragraph 3.3.5, which states: "A solo pilot shall undergo an annual competency check (Annual Flight Review) in accordance with the GFA Instructors Handbook." This means a pilot must not fly a sailplane in command if the pilot has not, within the period of 12 months immediately before the day of the proposed flight, satisfactorily completed an annual flight review.

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Further guidance material on the conduct of Annual Flight Reviews is contained in Operations Advice Notice (OAN) 02/12 that is available on the GFA website.

Flight Reviews Minimise Mid-Air Surprise and its Costly Consequences

BY KRISTIN HIBBARD, ASSOCIATE, HWL EBSWORTH LAWYERS

Many people believe that flying is a much safer form of travel than driving. In particular, the safety of Australian airlines and aviation agencies are highly regarded internationally. Nevertheless, the consequences of an aviation incident can be devastating and ongoing vigilance is necessary to ensure high standards of safety endure.

Pilot competency is a significant factor in the safety of our aviation industry. The stringent training of pilots ensures they are able to get themselves and their passengers back on the ground safely. This training becomes particularly important when disaster strikes. The remarkable talents of pilots have regularly averted, or minimised, disaster in a range of scenarios, including when engines have failed mid-air, fires have ignited on board and during adverse aerodynamic situations. Pilots are trained to remain calm and confident when an emergency strikes. Most recently, a pilot on the NSW north coast made an exceptional emergency landing after his light aircraft lost power above a caravan park.(1) It is therefore essential that pilots maintain their proficiency with regular training and checks.

The Civil Aviation Regulations 1998 provide that both private and commercial pilots must not fly an aircraft as pilot in command if the pilot has not, within the period of two years immediately before the day of the proposed flight, satisfactorily completed an aircraft flight review. Aircraft flight reviews were an initiative of the US Federal Aviation Administration, and they provide pilots the opportunity to restore degraded skills and gain new knowledge. A recent investigation by the Australian Transport and Safety Bureau (ATSB) highlighted the importance of pilots taking every opportunity to refresh their knowledge and skills, at a minimum by undertaking a flight review every two years. In April 2012, the owner-pilot of a Cessna 150 aircraft was manoeuvring his aircraft at low level when the aircraft aerodynamically stalled. The aircraft subsequently crashed and the pilot sustained fatal injuries. A subsequent investigation by the ATSB revealed the pilot had not completed a flight review for a number of years, which increased the risks of flying the aircraft.(2)

The number of flight hours accumulated by a pilot does not alleviate the need to conduct regular flight reviews. Even pilots who fly regularly can lose proficiency in non-routine procedures and in the recognition and avoidance of risks, which may be restored by completing light reviews. Notably, a recent report by the ATSB examined pilot experience and competence and found that the overall performance of low-hour pilots matched that of higher hour pilots, with the only difference being how many exceeded the required standard.(3) It remains essential for all pilots to undergo regular flight reviews.

Compliance with the Civil Aviation Regulations, and in particular the satisfactory completion of an aircraft flight review, can also affect insurance coverage. In Johnson v Triple C Furniture and Electrical P/L [2010] QCA 282 the Queensland Court of Appeal considered the insurance coverage of a pilot who had failed to complete an aircraft flight review within the period of two years immediately before the day of subject flight. There, the aircraft owner's insurance policy contained an exclusion clause which provided that the policy did not apply while the aircraft was operated in breach of communications issued by the Civil Aviation Safety Authority (CASA) from time to time.

CASA communications were defined as "recommendations, regulations, orders or bylaws, which would be regarded as an appropriate authority by aviators … in relation to airworthiness, air navigation and the legal operation of the aircraft …" Such communications included the Civil Aviation Regulations, with which the pilot had failed to comply. The Court ultimately concluded that the insurer was entitled to decline indemnity on the basis the pilot had not completed his aircraft flight review. Consequently, a failure to complete an aircraft flight review may leave an aircraft operator exposed to significant losses and/or claims for which they are not insured.

Flight reviews are just one important way in which the continuing proficiency of pilots is ensured, and consequently the safety of flight.

As safety is always a key priority for the aviation industry, it remains important that all industry participants continue to comply with relevant laws and industry standards.

1 http://www.abc.net.au/news/2013-07-07/light-aircraft-narrowly-misses-crash-landing-near-casino/4804458

2 Australian Transport Safety Bureau, Collision with terrain involving Cessna 150, VH-UWR, AO-2012-059, Final – 18 June 2013

3 Australian Transport Safety Bureau, Pilot experience and performance in an airline environment, AR-2012-023, 17 July 2013procedures.

GA

DECISION FATIGUE

BY BERNARD ECKEY

The soaring forecast hinted at one of these brilliant gliding days in South Australia. A trough was just slightly to the east of the airfield and cumulus clouds were forming as early as 10:30 am. I was half way through the daily inspection of my ASH 25 when a promising youngster walked into the hangar. He was obviously keen to come for a flight and was promptly invited to hop in the back seat. Both of us had an early lunch and just over an hour later we were self launching into a promising sky.

The day turned out to be as good as advertised. After reaching our start altitude we had little trouble finding strong lift. At times the vario was reading between 8 and 10 knots and the only real problem was to stay below the 9500ft airspace limit. We were sharing the joy of flying the big bird and decided on a town called Peterborough as our first turn point. An unusually light wind of only 5 kts ensured excellent progress on our way to Hawker in the Flinders Ranges – about 280 km north of the airfield. Oxygen was turned on when cloud base got close to 10,000 feet and from then on we focused on following the energy lines by lining up the clouds. It worked very well indeed. Just two hours into the flight our computer was indicating an average speed of almost 120km/h – not from crossing the start line, but from take off.

My co-pilot indicated that he had never been this far north before and he was enjoying the flight. Being more than content with our progress we decided to turn at Parachilna – about 100 kilometres further north than originally intended. Soon we both enjoyed a splendid view of Wilpena Pound and Lake Torrens. The white carpet of salt on this dry lake was glinting in the afternoon sun and made for a very impressive sight indeed.

While approaching the second turn point I took the controls again. Soon we were on our way to Blinman but instead of climbing at 8 to 10 knots I was suddenly accepting lift of only half this strength. I was not happy but due to the unforgiving nature of the terrain I climbed back to cloud base just to play it safe. In addition my circles were not always in the strongest part of the thermal but somehow I did little to correct it. Instead I put it down to being on the wrong side of the trough. No wonder we had a relatively slow patch but fortunately things improved quickly when we were abeam Wilpena Pound again. From then on everything was back to normal and we had an uneventful flight home. Good streeting and strong climbs ensured that we completed our 700km flight in 5:20 for an average speed of just over 130kph.

Back in the car and on the way home I tried to make sense of our slow spot around Parachilna and Blinman. This was not the first time that about half way through a flight I found the going quite tough and that my speed dropped at least temporarily. What had caused this slow spot? Both of us had consumed plenty of fluids during the flight so dehydration was definitely not to blame. However, by now lunch was almost 3 hours ago and the reason for my average performance was perhaps due to a reduction in blood sugar levels. But that was possibly only a long shot. The most likely reason was a temporary drop in my willpower to find the strongest thermals and extract the maximum rate of climb.

While contemplating all these questions I remembered reading an article in *The New York Times* dealing with 'decision fatigue'. I knew that I had filed it away and when I got home it did not take long to find it again.

LOW ON MENTAL ENERGY

Let me share the author's findings with you right now. He points out that extended mental work is wearing us down. No matter how rational or high-minded we are trying to be, we can't make decision after decision without paying a biological price. It is very different from ordinary physical fatigue where getting tired or becoming exhausted is easily recognised. However, getting low on mental energy is a highly insidious process and we are not consciously aware of it. The more choices we make throughout the day the harder each one becomes. As our task continues our brain gets exhausted and looks for shortcuts. One shortcut is to act impulsively instead of first expending the energy of thinking through the consequences. The other shortcut is the ultimate energy saver – doing nothing. Instead of agonising over decisions we are avoiding any choices. Ducking a decision often creates bigger problems in the long run, but for the moment, it eases the mental strain. No doubt, there are plenty of aviation mishaps where these mental shortcuts are a contributing factor.

This raises the question how all this fits into the story of the above flight and what we can learn from such experiences. Surely, it cannot be ruled out that I was getting mentally tired. It was a hot, humid day and after a long drive to the airfield, lengthy flight preparations and after some coaching I was beginning to suffer from 'decision fatigue'. As a consequence it is likely that I did not expend the same mental energy into finding the strongest thermals as earlier in the day.

In addition, I was getting a little lazy in terms of climbing efficiently. Fortunately, Eric Stauss - a young but very competent co-pilot - was occupying the back seat. It allowed me to hand the ASH 25 over to him and give my weary brain a little rest. I can honestly say that it made the flight back to base a little easier. Thank you, Eric!

The other lesson revolves around food intake. Perhaps my mental slackness could have been avoided by eating some fruit and by doing so keeping my blood sugar levels up. Food is partly turned into blood sugar, which the brain needs if it is to perform properly and avoid fatigue. However, the body's storage capacity for blood sugar is very limited. If we are not eating small amounts of suitable food every two hours or so we are at risk of making very poor decisions towards the end of a flight.

The lesson is obvious and very plain to see! In future I will take some fresh fruit on every flight that is likely to take longer than three hours. Of course, I always take sandwiches (plus other suitable food) on my long-distance flights, but on this occasion I did not expect to fly for 700 km and stay airborne for well over 5 hours. And that clearly points to the last and final lesson of this flight. Always expect the unexpected!!! GA

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LOW THERMALLING

The recent discussion on the GFA Forum about low saves during the Horsham Grand Prix has prompted some pilots to question the GFA Operations Panel's view on low thermalling. The GFA Operational Regulations states that a sailplane must fly above 1,000ft over a built-up area or 500ft above ground unless taking off, landing or ridge soaring. See Paragraph 6.5 for exact wording and exceptions. This article also expands on the low-level flying article in *Gliding Australia, issue 32.*

The discussions have seen diverse views ranging from an acceptance that pilots should be able to thermal away from a low height, to contrary opinions in favour of a mandated minimum thermalling height set between 500ft and 1,000ft depending on pilot proficiency and other factors. I think both extremes have over-simplified the argument, which is not as straightforward as stating that thermalling at or below a particular altitude is either safe or unsafe.

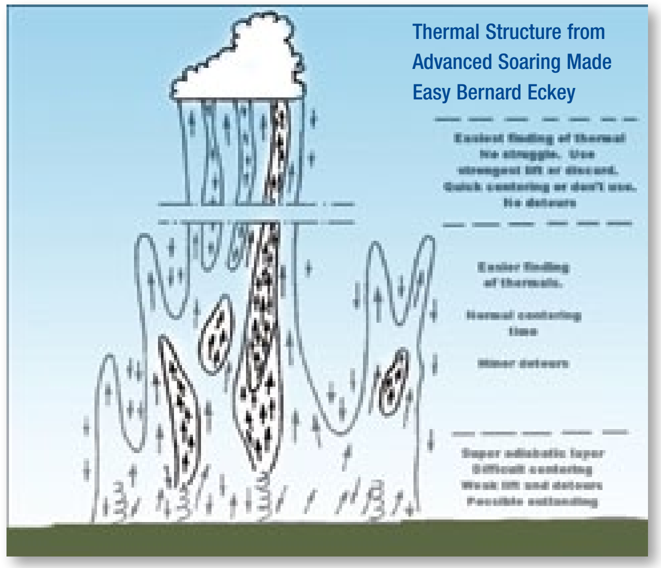
I disagree with the concept of mandating a minimum height for thermalling for a few reasons:

If we say that it is unsafe to thermal below X feet, people could assume that it is safe to thermal above X. In reality, there are still risks in thermalling above X that will continue to reduce as the thermalling height increases

Even if a pilot is cleared down to a specific minimum thermalling height, on some days or even during some flights, this minimum height would need to change due to weather, aircraft type and handling characteristics, pilot fatigue and dehydration, thermal structure, turbulence and other factors. Therefore, nominating a fixed height may give a false sense of safety that may not be warranted

There's no point in having a rule that isn't enforceable, just to give the appearance of being safe. I agree with the concept of a minimum height during competitions as this is enforceable and puts all competitors on a level playing field, however for normal club cross-country flying I don't think that mandating a minimum thermalling height will necessarily improve safety

So, having said what I think doesn't work, what's my alternative solution? I think the solution lies in educating pilots to assess their own ability and in-flight conditions to make a sound airmanship decision as to what height they break off the flight and transition from 'soaring pilot' to 'landing pilot'. An understanding of relevant threats - which are not directly attributable to pilot actions - and errors - which are due to pilot actions - will help pilots to understand and manage the following risks associated with low level thermalling and therefore decide whether it's more prudent to land or whether it's safe to try to thermal away -



Thermal Structure from Advanced Soaring Made Easy Bernard Eckey

THREATS

- Thermal structure at low level. The article on Thermals in *Gliding Australia, issue 14* explains with a useful diagram why low level updrafts are disorganised and not all updrafts eventuate into a thermal. [See diagram, below left.]
- Thermal gusts. Effects of vertical gust at higher AoA flap settings increased. Exacerbated in large wingspan gliders;
- Mechanical turbulence from wind over terrain, ridges, trees, buildings and other obstacles;
- Wind gradient and shear;
- Adverse aircraft handling characteristics. Some aircraft have a propensity to spin with little warning versus other more benign aircraft;
- Pilot experience and recency;
- Unfamiliarity with aircraft type and impending stall indications;
- Effect on aircraft drag and stalling speed due to rain, wet wings or excessive insects;
- Pilot fatigue and dehydration;
- Pilot stress factor if low over marginal or unlandable terrain or insufficient paddock selection/evaluation;
- Terrain, obstacles, wires.

ERRORS

- Thermalling slower than safe speed near the ground plus half wind speed;
- Inaccurate airspeed control;
- Poor rudder coordination – over-rudder in turns with opposite aileron (e.g. the GFA spin entry technique). Skid is much, much more dangerous than slip, particularly at high AoA, particularly in large wingspan gliders;
- At low altitudes, susceptibility to ground speed and turn radius illusions in windy conditions leading to inappropriate control inputs;
- Turning away from landing area at low altitude and flying into sink;
- Drifting out of gliding range from selected paddock in weak thermal;
- Not configuring the aircraft for landing due to late transition from 'soaring pilot' to landing 'pilot';
- Inappropriate trim setting;
- Errors in flap setting;
- Fixation, press-on-itis, optimism bias, decision errors;
- Over-reliance on technology (final glide computers, altimeters for height reference over unknown terrain elevation);
- Inaccurate height estimation.

A review of 713 SOAR accidents and incidents from September 2011 reveals 55 terrain collisions, not including hard landings, with pilot experience levels ranging from tens of hours to tens of thousands of hours (median total hours 732 hours/621 launches), hence these types of accidents are not confined to any particular experience level. Of the 55 terrain collision accidents, 17 resulted in injuries or fatalities. Therefore, given the risk and consequences of an undesired aircraft state when pilots don't appropriately manage threats or errors, it is important that pilots are aware of their capabilities and limitations when thermalling at low height.

PATRICK BARFIELD
Regional Manager Operations NSW

HITTING THE SILK

FROM KEEP SOARING , LKSC, JOHN CLARK

Parts of this article were previously published in Keep Soaring, however it has been revised after G Dale's talk about his experiences of bailing out after a mid-air during an English competition in 2012. G described the experience as "intense"... but believes that parachutes are part of gliding and that everyone, whether training or breaking records, should wear one.

G said, "I remember stabilising the glider after the aircraft touched and thinking I could maybe fly away, but then the thing went right out of control."

He jettisoned the canopy and harness and was thrown out of the glider, which was nose-down.

"I looked down to my left and I could see the glider upside down and quite close, but then I realised it was falling faster than I was."

Most of us wear parachutes but few of us have ever been shown how to wear them, how to bail out of a glider or how to fly a parachute, let alone to land in one.

"I saw the woods and the railway line and the main road, so I had to learn to fly the 'chute pretty quickly.

"Apparently when I was lying in the field some member of the public turned me over and put me in the recovery position, which might have saved my life because I was coughing and choking."

PARACHUTES

Wearing parachutes in gliders is not mandatory in Australia but most of us wear them. That's a good start, but you need to know how to operate a parachute before using one! Before looking at parachutes in sailplanes, a look at parachute deployment in other gliding activities is interesting.

Paraglider pilots will throw a reserve chute for practice. They will also deploy their chutes very low down. There are several cases of pilots using their reserve parachutes more than once in a flight.

Hang glider pilots will not open their parachute for fun, however lots of them have used a parachute and in the large majority of cases, the pilots have survived.

Sailplane pilots are not so lucky. Fully 50% of sailplane pilots will not be able to get out of the aircraft to have a chance to deploy a parachute. That's a fairly frightening statistic and might explain why there is so little training in parachute deployment.

Parachutes will deploy at a remarkably low altitude. There are 'chutes certified to deploy below 67 metres. Several glider pilots claim that their chutes successfully opened well below 300 metres. The biggest problem is getting out of the sailplane.

G Dale says that we should consider parachutes and the risk of bailing out as part of gliding, think about it more, and rehearse an 'exit check' in the same way as we routinely do a CHAOTIC and FUST check.

REHEARSING A BAIL-OUT

The sequence with a bail-out is Canopy, Belt, Bum, Cord. It is essential to practice this as a sequence in every type of aircraft that you fly so you don't waste valuable time.

As they say, subtly, every aeroplane is different. Almost every type of sailplane has a different method of releasing the canopy, Many have different seat belt harness releases and the rip cord handles on parachutes can be in different places.

Every time you take off, and as soon as you are stabilised after take-off and have time to spare, practice your deployment sequence. Make sure you know where the canopy release is. With your eyes closed. Reach out and touch it. Many canopy jettison handles are shape coded so they have a unique feel compared with the canopy latch.

Identify the seat belt harness release, reach out and touch it. Look at the ripcord handle. Move your hand to the ripcord handle. Remember that in many cases you may be spinning or tumbling and it will be difficult to move your hands towards the ripcord handle without considerable effort.

When skydiving, you may be told to get stabilised before pulling the ripcord but when bailing out of a glider, it's recommended that you pull the cord immediately, before any tumbling makes this difficult or impossible.

It is essential to look and touch! A hang glider deployment will serve as an example. The celebrated Robbie Whittal deployment goes like this. Robbie was in an aerobatic championship above Monaco when he did a bad loop and had to throw his parachute. He grabbed at the deployment handle and tugged like mad... again and again. Some time later, puzzled by the non-appearance of a parachute, he looked down and saw he was tugging at his camera strap, which did not slow his descent.

Get into a habit of practising bailing out. Hopefully, you will never need to.

The most important thing about parachutes is to have one when you need it. If you do fly without a parachute, then most of what follows will not be important to you.

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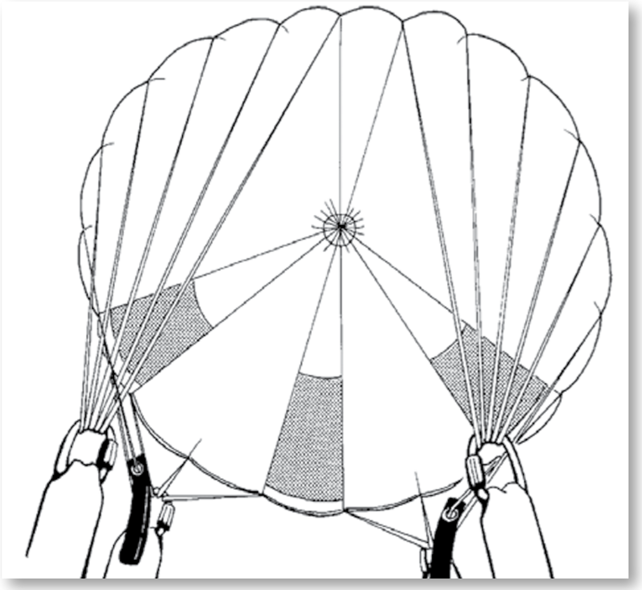

The second most important thing is that your parachute must work when you need it.

A parachute is designed to reduce the level of ordure you are in from above your head, to just below your nose. Most emergency parachutes will open. The failure rate of a skydiver's main chute is relatively high because of its design and the way it is packed and repacked. However the failure rate of backup parachutes is very low.

PARACHUTE REPACKING

A parachute which has not been recently repacked will most likely open OK, but it may take longer than a recently repacked canopy. The recommended repack time of emergency parachutes is 6 months. However the 6 month repack cycle of a sailplane parachute should be taken as the maximum if you get more than usually hot and sweaty in the cockpit or if a parachute gets wet from a spilt water bottle.

WEARING A PARACHUTE

There is a right way to put on a parachute. The chest strap should be secured before the leg straps are done up. This should be done as a routine so the chest strap is always done up first and not forgotten.

Before putting on your parachute, open the back flap a little to expose the rip cord cables. The cable ends should extend well through the grommet openings and be safetied. Check the rip cord handle. It should be securely fitted all the way into its pocket or elastic loop. Some pilots put a piece of coloured tape on the handle for rapid visual identification.

Check for the general integrity of the container. The canopy should not be visible. If a round external spring loaded pilot chute is installed, make sure it is secure around its circumference.

Parachutes should never be left in a cockpit. They should be stored in a cool dry place. UV light degrades nylon rapidly and although most sailplane parachute harnesses are made of reasonably thick material, why take the risk by leaving a parachute unnecessarily exposed to sunlight?

Nylon also absorbs water and loses strength when wet. When yachting, most spinnakers fail when they first come out of the bag. Once the spinnaker dries out, it increases in strength by as much as 10%.

WHEN TO BAIL OUT?

There are several main reasons why we might want to bail out.

- After a mid air collision with an aircraft or large bird. Probably the most likely event.
- Failure of an essential control system of the sailplane.
- Failure of the aircraft structure which renders it unsafe.
- Smoke or fire. More likely in self launching gliders.

If one of these events occurs, there are many possible outcomes. At one end of the spectrum, the glider is obviously unflyable and at the other end, the glider is still flying and controllable but there is a significant doubt. An example of this is where a pilot had a mid-air collision but decided there was no damage. He landed and found that one side of his horizontal stabiliser had broken off.

The glider may be controllable but it's suspected that something is seriously wrong… for example, the tail dolly has been left on or an aileron linkage has parted in flight or the glider has been incorrectly rigged.

In one instance of aileron disconnection, the pilot never noticed until the aircraft had landed. In another, the pilot called for help from another pilot who flew over and saw the aileron flapping. In this case the pilot elected to bail out rather than risk landing the aircraft with only partial control.

In a flyable but doubtful condition, the pilot should spend a moment considering the options.

Is the glider really damaged? If a collision impact is not visible from the cockpit, it's safer to bail out than run the risk of staying in the glider. If the impact area is visible, for example on a wing, then it might be possible to remain with the glider.

Is the damage significant? A bird strike may cause damage but probably not of the same magnitude as a collision with another aircraft.

Is the terrain over which the aircraft is flying suitable for landing in a parachute? Will this condition change?

Is there enough altitude for a successful parachute deployment?

In the case of a fire in an SLG, most engine compartments have a fire rating of perhaps 5 minutes before the fire will spread and perhaps damage control linkages. In this case, is the glider low enough to land safely or high enough to allow for a successful bail-out?

At the opposite end of the range of possibilities, the sailplane is obviously in unflyable condition and immediate and rapid bail-out is the only option. Regrettably, when a glider is damaged this badly, the chances are that not only is this decision time unnecessary, but the immediate problem is how to get out of the glider.

If there is the slightest hint that the glider is unflyable, then immediate and rapid exit is the only option… and this should be planned for and rehearsed as far as possible!

In this somewhat idealised view of things from a PA parachute manual, a pilot appears to have bailed out of a perfectly serviceable aircraft.

THE BAILOUT SEQUENCE

The sequence is **Controls, Canopy, Belt, Bum, Cord.**

CONTROLS The first thing to do is to stabilise the glider if possible and open the airbrakes to slow it down. A Piggot hook is useful here because it allows the airbrakes to be locked open as well as preventing them opening when not required.

Gliders are slippery by design and will accelerate rapidly into a spin, spiral dive or some uncontrolled manoeuvre. Opening the airbrakes will slow the glider down and give you a little longer to get out.

If significant parts of the wing are lost in a collision, the resulting motion may be chaotic. G forces may build very rapidly so that a pilot does not have the physical strength to push out of the cockpit or is in danger of blacking out so it is essential to act fast.

To ensure that you do not partially release the chute, pull the ripcord firmly and keep pulling until your arm is completely outstretched.

If the controls are working well enough to stabilise the glider, do this now. It will make getting out a lot easier.

Once the canopy is released, you can then push the stick forwards and try to outside loop or bunt the glider. If the elevator or tail boom is broken, the glider will probably nose over into an outside loop by itself, however, this is good for a fast exit.

CANOPY Glider canopies are fastened and jettisoned in many ways depending on whether they are front, rear or side hinging. The canopy jettison lever is coloured red, but almost every glider manufacturer has a different idea about the shape, size and position of these levers.

Jettisoning the canopy may not be straightforward. You may have to pull levers using enough force to break safety wire connections. If you fly a glider without a parachute, then you don't need to worry about this stuff. You can safely wire the canopy jettison levers closed because you are not going to need them.

Having released the canopy, it may fly back in the slipstream and bean you. This happens enough times that Professor Roeger of the Aachen University in Germany invented a simple hook-shaped pin located at the back edge of the canopy which solves this problem.

If you have a Roeger hook fitted, the front of the canopy should lift and then pivot around the pin before flying off. Most new gliders have a Roeger hook fitted, and most older gliders can have them retrofitted.

If your glider has a single canopy jettison handle, locate and hold the lever, lean forwards as much as possible and shield your face with one arm as you pull the lever with your other arm.

Many gliders have a headrest attached to the canopy. Leaning forwards will minimise the risk of being hit by the headrest as the canopy flips up. If you need to pull two levers, just lower your head as much as possible when jettisoning the canopy.

Use this head-down time to locate the seat belt harness release.

There's no guarantee that the canopy will fly off by itself. The pilot should be prepared to push hard upwards against the acrylic to force the canopy off the cockpit. Once the canopy has been released, things inside the cockpit may get fairly chaotic because of the force of the slipstream.

IF IT'S POSSIBLE, PUSH FORWARDS ON THE STICK AND PITCH OR ROLL THE GLIDER INVERTED.

BELT Release the set belt harness. Don't just feel for the harness release, look at it before operating!

BUM If you are lucky, the harness releases easily and you will be thrown out of the glider. Most likely you will release the harness and find it difficult to lever yourself up and out of the cockpit. If the glider has entered a spiral dive, the G force may quickly and easily exceed 2 G. That's going to double your body weight.

Why not lie down on your back and get a friend of similar size to lie down on top of you. (Let people know what you are doing first!) Now, put your hands down on the ground and try and push the two of you up far enough to clear a notional cockpit side.

Many pilots who have had to exit a glider this have found it very hard and it may take several attempts and require almost superhuman strength. Don't give up! The chaotic motion of the sailplane may mean that the next time you try, you will succeed.

The late pilot and writer Jochen Ewald frequently commented on the need for small bumps or hollow purchases to be put in a cockpit floor to allow a pilot to dig their heels in and lever themselves out.

If the sailplane is an SLG and the engine is extended or running, this whole procedure may have to be modified because the engine should be stopped and retracted before bailing out.

Use the emergency or manual override to retract the engine. If the propellor is still turning, don't worry, it will stop when it hits the engine bay doors. Hopefully the manual retract switch is latching, so as soon as you have started the retraction process, you can get on with the rest of the bail-out process.

CORD As soon as you have got clear of the cockpit, pull the rip cord and you have survived! Of course, it is not so easy and you are by no means safe yet.

THE RIPCORD

Pull your parachute rip cord. Look for and locate the rip cord handle, grab it with both hands if possible. If you can only get one hand on the rip cord handle, your other hand can be used to stabilise the hand on the rip cord. The rip cord should then be firmly pulled all the way out with a circular motion across the body.

Possibly the biggest impediment to pulling the rip cord is going to be tumbling and the second, the violence of the airflow. If you start to tumble, G forces may build up so fast that you are unable to bring your arms back in towards your body to pull the rip cord so pull the cord as soon as you can after exiting the glider.

If you are tumbling and cannot reach the handle, then get into a face forward, spread-eagle position like a sky-diver to stabilise the tumbling and allow you to reach the rip cord.

The chances of your canopy not opening are very small. If the parachute does not open cleanly, then fight it! There are some 'interesting' videos around on the internet taken by sky divers who have had a partial opening failure of their parachutes pulling on the bridle and lines to get the canopy to inflate.

Suspended in your parachute, and quietly descending, you're probably elated that you have survived but take a moment to

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consider your next options. Where are you going to land? It is well worth avoiding power lines, roads, trees, buildings, water and downwind landings.

STEERING A PARACHUTE

Most emergency parachutes can be steered. The parachute's instruction manual should have details on this.

Typically, the parachute will have vents towards the rear of the parachute and can be steered by pulling on the two webbing handles attached to the risers, or pulling on the rear risers themselves.

The handles have to be pulled firmly down to chest level. The parachute will continue to turn until the steering line is released and take about 3 seconds to stabilise.

Remember, when the parachute is being steered or turning, the descent and forward speed both increase, so get your steering done early.

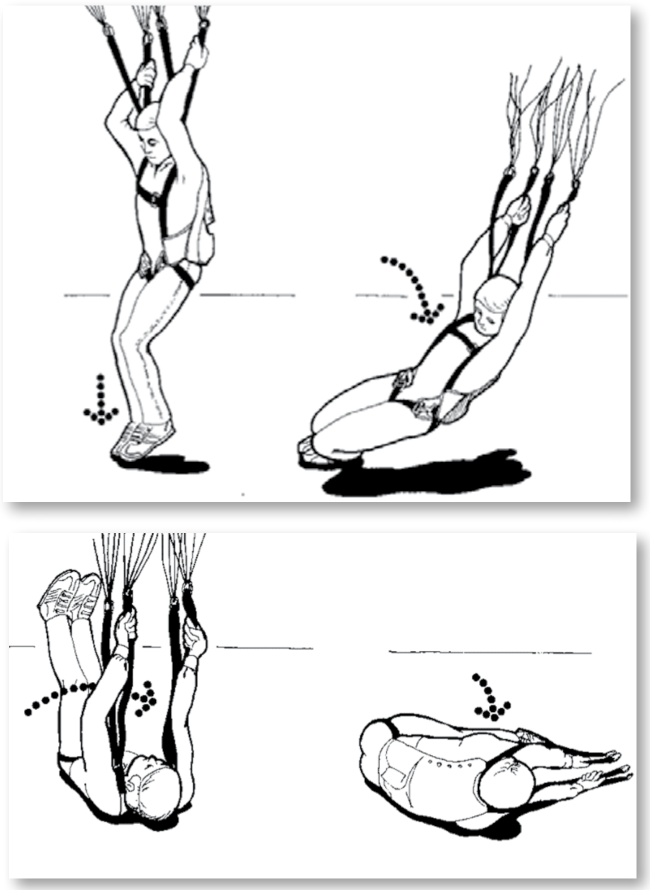
Look down to determine if you are drifting forward or backward. If you have the chance look for a landing spot, look for it downwind and turn back into the wind for your final approach.

Your landing spot will be somewhere between a 45° to 60° angle as you look forward and down. The landing spot should appear to remain stationary as you descend. Steer early to avoid turns at low altitude.

LANDING IN A PARACHUTE

Before landing, lock your legs together from thighs to ankles. Bend your knees slightly forward and...

Brace yourself as if you were to jump off a 2 metre high platform. As you hit the ground, turn your body slightly sideways and roll along your side to absorb the landing shock.



Keep your legs firmly together and, as you hit the ground, allow your legs to bend beneath you and roll your body to one side.

The parachute may remain inflated after landing, if winds are greater than 10 kt. If you are being dragged across the ground by high winds, roll onto your back. The parachute container will provide some protection from abrasion.

Reach up and grab one of the lower rigging lines of the parachute and pull down hand over hand until the canopy is distorted enough to collapse.

Practice looking relaxed while you pull the rip cord.

If you are going to land in water, release the chest strap as you descend under the parachute. This will save time in the water. Turn the parachute to face 'into wind' to land as you would for a normal landing. Facing into wind is absolutely necessary for all water landings.

Be aware that if you land in water facing into wind, you may be towed across the water on your back, face up, if the wind strength is high.

If you land facing down wind, you will enter the water face down and may be dragged under.

After landing in the water, release both leg strap snaps. Discard the parachute and swim away. Always head up wind and up current away from the parachute to avoid entanglement. Once it's water logged, the parachute will sink.

If there are any power lines in the vicinity, steer away from them downwind. If you are unable to avoid power lines, push your feet firmly together, turn your head to the side and try not to touch more than one line.

If you connect with live cables and find yourself suspended above the ground, make sure power has been disconnected before a rescue attempt is made. This may take hours.

There are several instances of rescuers being electrocuted trying to save someone from power lines while the person hanging from the power lines survives. Unless you are sure that the power has been disconnected, don't let anyone on the ground come near you.

Remember that most high voltage lines will have a circuit breaker that will automatically attempt to reconnect the power a number of times.

Always steer the parachute to avoid trees. If a tree landing is unavoidable, place your feet and knees firmly together, tuck your elbows into your stomach, protect your face with your hands. Place your chin on your chest and hold on. Once you are in the trees, you can either use your parachute lines to lower yourself to the ground or, better still, to tie yourself to the tree until help arrives.

Many hang glider and paraglider pilots carry a roll of dental floss in their harnesses which is strong enough to be used to raise a rope from the ground.

PARACHUTE OPTIONS

For most people, the options to improve your chances of a successful bailout are limited to rehearsals, but here are some other things to consider.

Static line parachutes. A static line parachute can be opened in two ways. One is using the rip cord as normal. The other way is to attach the static line on the parachute to a strong point on the glider. Most gliders have a strong point fitted, but it's fairly easy to install one or to connect to an existing structure.

Using a static line parachute should completely eliminate one part of the deployment procedure, and it should work even if you cannot get a hand on the rip cord. If the static line system fails for some reason, you will know pretty soon and can fall back on pulling the rip cord.

There are a few possible disadvantages. One is that the static line gets tangled around you as you leave the glider. Another is

The NOAH System is an airbag that inflates and pushes the pilot to level of the cockpit, enabling a roll rather than a climb out.

that the deployment sequence will start as soon as the end of the static line is reached.

If you have a static line, more thought is required when getting out of a glider after landing to avoid extending the static line but it's about six metres long and the Velcro enclosure makes a noise when the line is pulled out making this only an inconvenience.

NOAH

DG sailplanes invented the NOAH system and have made it available to other manufacturers. It can be fitted to any new sailplane and retrofitted to many existing ones.

Essentially, NOAH is an air-bag system which rapidly inflates, raising the pilot to the level of the cockpit side in about a second and allowing the pilot to just roll out instead of climb out.

On a glider fitted with a NOAH system, the pilot jettisons the canopy as normal, and then pulls on a toggle to activate the NOAH system. This not only inflates the bag but also releases the seat belt automatically. It is impossible to deploy the NOAH system until the canopy has been jettisoned.

Even though the NOAH system has interlocks to prevent the inadvertent deployment of the air-bag, tests have shown that even if the air-bag does inflate when the seat belt is still done up, all the pilot gets is a good squeeze for 2 seconds or so until the porosity of the air-bag lets the air escape and reduces the pressure.

In a glider fitted with NOAH and a static line parachute, the exit sequence is hopefully reduced to two actions. Jettison the canopy and pull on the NOAH operating toggle.

BALLISTIC PARACHUTES

A ballistic parachute system is normally used to parachute down an entire aircraft and pilot. The attraction is obvious. One pull on the actuating lever and a rocket or spring fires line out of the aircraft which deploys a drogue chute which pulls out a full size parachute. The pilot has the protection of the cockpit, perhaps a modern reinforced safety cockpit, to absorb the landing impact and hopefully both aircraft and pilot are saved.

The arguments against ballistic parachute systems are however considerable. Expense, size and weight and unwanted deployments and uncontrolled descents being the main ones.

A ballistic system, because it supports the entire glider and pilot, must withstand a much greater opening shock and be able to support at least four times the weight of a conventional personal parachute. This means that ballistic systems are large, heavy and quite expensive compared with a system like NOAH.

In fact, where they can be fitted to sailplanes, they normally fit into the space where a self launching or sustainer motor might be fitted, so you cannot fit a motor and a ballistic parachute.

Ballistic parachutes are much more expensive than a NOAH system.

The incidences of unwanted deployment are low. BRS have installed over 30,000 systems in sport and defence applications, which must be some testimonial.

Once a ballistic parachute system has been deployed, the pilot becomes a passenger and lands where luck and the weather take them. This is not an ideal situation by any means.

In Germany and possibly other EU countries, it is mandatory for aircraft such as ultralights to be fitted with a complete aircraft rescue system. The German regulations for maximum opening time at a specific speed and weight are such that the aircraft mass and structural complexity is significantly increased.

Because of the size, weight, operating speed and opening shock and opening time constraints are in opposition, it is virtually impossible to have a short opening distance and a low opening shock. In practice, the opening distance appears to be shifted upwards by 80 to 120m compared with a conventional human-operated parachute.

That is, a ballistic parachute takes longer to open, and therefore the minimum deployment height is higher.

We are not interested in the opening time of a parachute. We are interested in distance. If you are 50 metres above the ground, you don't care if your parachute opens in one or two or three seconds, you care that it opens in 45 metres or 55 metres. The opening distance, all things being equal, is a function of the size of the parachute. A small parachute will open in a shorter distance than a large one.

The opening distance is almost precisely a function of the opening time squared, that is, doubling the opening time requires basically four times the opening distance. A human operated parachute may open in 2.5 to 3 seconds, in Germany a ballistic parachute is required to operate in 4.5 seconds... although designers think that 5 seconds is more practical. So if you are ridge soaring or flying in the mountains, don't rely on your ballistic parachute!

The size of parachute you carry really should be a function of your age. How fast do you want to fall, and how quickly do you want the chute to open? We all want the fastest opening times possible, but fast opening means a small area chute.

While a 20 year old may be able to jump down from a 3 to 4m high wall without injury, a 50 year old cannot expect to do this without being hurt.

In fact, this is one reason why the idea of doing parachute practice jumps may not be so good for many pilots. The chances are that some injury is going to result in any case, so why bother?

GA

An installation of a Ballistic Recovery System (BRS) in a glider.

OPERATIONAL SAFETY UPDATE

Issues arising from the Southern Tablelands GC Accident and NSW Coroner Recommendations from the Inquest into the death of Andrew Ahern.

Whenever one of our gliding friends dies or is seriously injured in a gliding accident, we feel a mix of emotions: sorrow for the pilot, family, friends and club colleagues; sorrow for those affected by similar past accidents; curiosity about the particular circumstances; frustration about the realization of risks; and hope that the lessons from the accident might result in tangible changes and improvements.

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Here I will reflect upon the accident where Andrew Ahern, of Southern Tablelands Gliding Club, died on 27 April 2013 after a mid-air collision while flying an L-13 Blanik on a winch launch. His rear seat instructor was seriously injured in the crash. The launching Blanik and landing Mini-Nimbus collided at low level. The pilot of the Mini-Nimbus landed safely, but shaken.

Andrew Ahern was a safe, diligent, capable post-solo pilot, regarded as a popular, helpful, enthusiastic club member. His experience level was modest, and he was progressing into aerotow launches, soaring and cross-country. He was intelligent and careful. There was no suggestion of any wrongdoing on his part.

The NSW Police led the accident investigation. ATSB did not investigate; GFA was advised and I assisted NSW Police in their investigations and support to the NSW Coroner. I prepared a GFA Field Investigation Report into the accident, which was submitted to NSW Police, Coroner and ATSB. STGC members Christopher Thorpe (Executive Manager Operations) and myself provided further evidence and submissions to NSW Police and Counsel Assisting the NSW Coroner.

GFA also arranged independent L3 and safety officer support for Southern Tablelands GC members, to address immediate operations safety issues and procedures. Pilots from nearby clubs offered much support to club members.

The GFA Field Investigation Report was not widely circulated, due to Coronial confidentiality requirements. It was produced under ICAO Annex 13 provisions, which state, "the sole objective of the investigation of an accident or incident shall be the prevention of accidents and incidents. It is not the purpose of this activity to apportion blame or liability." That said, after a long investigation, equipment tests, interviews, reviews of statements, airfield visits etc, I was able to reach some clear conclusions supported by analysis of errors, failed defences and latent conditions (safety factors), and then make a number of safety recommendations, in advance of the Coroner's Inquest. These were an important part of GFA evidence provided to the Inquest.

WHAT HAPPENED?

There was a low-altitude mid-air collision between the descending Mini-Nimbus and ascending Blanik. At the moment of collision, the Blanik's tail control surfaces were destroyed; from then it was uncontrollable. The Blanik pitched up nose high, stalled and impacted the ground nose first near vertically, with fatal results. The collision geometry and damage profile to both gliders was unambiguous. No prior airworthiness problems were evident. The Mini-Nimbus landed safely ahead after the collision, with some wing and fuselage damage.

WHY DID THIS HAPPEN?

The cause was much more complex to analyse. There was no single error or cause-effect relationship, rather a complex combination of errors, latent conditions and failed defences. It was a classic, multilayered 'Swiss cheese' combination of factors. The Coroner's Inquest focused on many of these factors.

Towrang aerodrome, used by Southern Tablelands GC, is on a sheep property, 'Lockyersleigh', about 11nm NE of Goulburn AD, N of the Hume Highway and railway. STGC is a winch launch operation with grass runway 05/23 with a slight hill in the centre section. Normally an adjoining area 05R/23L is used for landings. A stand of gum trees was adjacent to the winch end. A windbreak line of pine trees was across the approach path of runway 23. Because of power lines east of runway 23, RH circuits were flown on 23. This placed gliders up-sun on downwind leg in late afternoon, and behind the line of pine trees on late downwind, base leg and final approach.

The launch point and operations van were sited close to the line of pine trees. The trees substantially obscured the view from the ground into the circuit area, and also the view of gliders at the launch point from the air.

Originally it was intended that just the Blanik be flown, after rigging and a Form 2 test flight. A single runway operation was chosen. The launch point was not displaced. The 23L/05R area was not used, as the tussock grass had grown long and the farmer requested it not be mown that day to avoid disturbing sheep and lambs. Later, after a successful check flight, the Mini-Nimbus pilot brought his glider out and completed a short soaring flight. He then launched for a second soaring flight, and was seen thermalling over high ground near the circuit joining area.

The Blanik was prepared for launch. The Mini-Nimbus pilot joined the circuit, but his radio calls were not heard. The Blanik launch commenced while the Mini-Nimbus began its approach over the treeline. The Mini-Nimbus was not seen but was heard on late approach, and the duty pilot called "Stop Stop Stop" to abort the launch. The collision occurred as the Blanik was rotating from separation and initial climb into full climb.

The Mini-Nimbus pilot, on approach, first saw the Blanik as it appeared beside him, an instant before impact. The underside of the Mini-Nimbus fuselage impacted the right elevator and tailplane of the Blanik, and the left wing impacted the Blanik's rudder, tailfin and left tailplane. Each glider was in the blind arcs of the other glider.

In terms of relative motion, lateral rates were low and vertical rates were high. The time available from a late visual detection of the threat to avoidance of a collision would have been miniscule. The collision would have been almost impossible to avoid once the winch launch had commenced below the landing glider.

Some radio calls were not heard on the day. Subsequent testing revealed that the Mini-Nimbus radio system had an intermittent fault. The operations van radio was also used to transmit and monitor two frequencies, the Goulburn CTAF and local gliding frequency. A separate CB radio was also used for launch commands. Different operators may have used different radio mode and frequency settings.

At the winch end, 1.5km distant from the launch point and 2 km from a glider in the circuit, Mini-Nimbus radio calls were not heard. There was some interference between VHF and HF CB radios. A headset was not used. CB radio volume was reduced to limit interference and breakthrough. Attention also was diverted to clearing sheep from the hazard zone around the winch rope.

Normal alerted see and avoid processes, and airspace clear for launch processes, failed in this case. The close proximity of the launch point to the treeline, and use of single runway for both launch and landing without a displaced threshold, contributed to failure of these processes.

During the Coroner's Inquest, much attention was therefore directed to radio systems, radio procedures, operational decisions, and associated human and organisational factors.

The GFA Field Investigation Report was not challenged. GFA Operational Regulations and Standard Procedures regarding primacy of pilot in command responsibility, operational safety responsibilities of key personnel, radio and FLARM use, operational safety audits and risk assessments received some attention. CASA's Director of Sporting Aviation also assisted on regulatory matters including mandated radio procedures and mandated equipment requirements.

IN HANDING DOWN HER FINDINGS, MAGISTRATE JERRAM MADE SOME IMPORTANT CONCLUDING STATEMENTS.

"As Mr Aitken said, this was a terrible, tragic accident, which has caused the loss of a good, much-loved husband and father. I dare to quote, however, from Mr McKinnie's statement at paragraph 27

"I accept that gliding, like other forms of sporting aviation, is a dangerous recreational activity, where potentially catastrophic consequences can arise if risks are realised. There are inherent risks, the challenge is to maintain awareness and mitigate them appropriately. From my experience in this accident investigation, I believe there are human factors and issues, organisational factors and operational lessons that should be applied to reducing future gliding operational risk exposure and in particular the probability of inherent risks being realised." How could any of us not agree?

"It is my view that this accident was the responsibility of all in general and of no one in particular. Time and again I heard evidence of confusion about ultimate responsibility. Surely when anything becomes the responsibility of all, it is in fact the responsibility of none. But no individual can be blamed for any specific failure or act leading to the collision. These club members were competent, experienced people with nothing but good intentions. I believe they truly cared for each other's welfare. No one was particularly sloppy or deliberately negligent.

"Nevertheless, perhaps they had become over-confident, complacent and reluctant to face the increasing technological changes in the world which mock an old sport based on the winds and silence. Meteorological conditions seem to have been ideal.

Southern Tablelands GC Blanik showing the the collision damage to tail surfaces and ground impact damage elsewhere.

"It is utterly clear that the launch site was too close to the hazardous pine trees, that visitors should not have been allowed onto the site, however competent, that some other decision could have been made about opening the second strip as several club members suggested that they could have landed on it if necessary, that neither the men at the winch site or in the Pye cart had sufficient visibility to see the Nimbus in the air, that the radios were not functioning properly or not used correctly.

"There were, after all, only two aircraft at the strip that day, and everyone knew that one of them was in the air, and most that it had been in the air for over 25 minutes. The likelihood of it landing soon must have been imminent. No one, other than Mr Brereton, seems to have given it a thought, and even he regrets that he did not follow up his concern. There was criticism of Mr Berry for not having scanned the sky sufficiently. We don't know that he did not. We do know that for a few seconds at least the Nimbus was obscured by the pine trees. The entire procedure depended on fairly amateur rules and traditions, which were subject to human error at any time."

THESE CONCLUSIONS PROVIDE THE CONTEXT FOR HER RECOMMENDATIONS FOR BOTH GFA AND STGC ACTION.

On the issue of operational safety responsibilities and lack of common understanding of these, she recommended:

"iii. That the GFA review the STGC's standard operating procedures and audits and satisfy itself of the appropriateness of operational safety arrangements at the STGC's airfield, Towrang, including but not limited to:

3. the responsibilities of those involved in operations, including wing tip runner and pilot in command ready for launch" and

"v. That the GFA by way of appropriate bulletin issue clarification of, and guidance about, the responsibilities of key operational personnel (including Pilot in Command and Duty Instructor)."

At face value this appears simple, yet it must be done carefully so as not to create ambiguity, nor to diminish the primacy of pilot-in-command responsibility, nor complicate responsibilities of the CFI and supporting duty instructors. Responsibilities of duty pilots, wing runners and other duty crew will also be reviewed.

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ON GFA OPERATIONAL SAFETY AUDITS, SHE RECOMMENDED AS FOLLOWS:

"ii. That the GFA, during audits of other similar winch-launch specific glider airfields, identify where launch sites are not visible on final approach and introduce appropriate measures to ensure that separation is maintained of landing and launching gliders."

"iii. That the GFA review the STGC's standard operating procedures and audits and satisfy itself of the appropriateness of operational safety arrangements at the STGC's airfield, Towrang, including but not limited to:

1. the clear visibility of gliders on runways 23 and 05 launch sites to gliders on final circuit, at all times including final approach, on an appropriately marked displaced threshold" and

"iv. That the GFA review its auditing procedures for operational audits of clubs, to ensure that all operational aspects of a club's flying operations are known and understood as part of the audit."

These require amendments to our Operational Safety Audit checklists and updated guidance to RMOs and L3 instructors conducting these audits. These actions are consistent with recent feedback from CASA on improved process guidance for operational safety audits.

ALSO RECOMMENDED:

"viii. An independent auditor, which could include CASA, be engaged to re-examine with the GFA gliding operations at STGC."

Here the key word is "independent" i.e. external to GFA. We may do this in collaboration with the GFA Sporting Aviation Department. Another option is an overseas gliding auditor, e.g. from NZ.

Radio technology and radio procedural issues were the subject of several recommendations. In the context of STGC's Towrang operations, these included:

"iii. That the GFA review the STGC's standard operating procedures and audits and satisfy itself of the appropriateness of operational safety arrangements at the STGC's airfield, Towrang, including but not limited to:

2. the use of headsets in the winch (to ensure there is no interference between VHF and CB radio broadcasts and that both are audible);"

"That the GFA and the STGC consider the use of a common VHF frequency at Towrang (using the Goulburn CTAF frequency in lieu of the gliding frequency), in consultation with CASA." and to STGC

"i. That the STGC adopt and continue with its policies of:

1. separate VHF and CTAF radios for the Duty Pilot unless and until proposed recommendation vi above is implemented;

2. portable VHF radio for the duty pilot;

and mandate those policies in the club Operations Manual."

iii. That the club's operations manual, unless and until recommendation vi above is introduced, clearly identify that the primary frequency for glider to glider and glider to ground communication is 122.7."

GFA policy on use of headsets in winches is the subject of Operations Safety Bulletin 02/13 dated 26 April 2013 Wearing of Headsets – Pilots of Self Launching Gliders and Winch Drivers, and also highlighted in the revised GFA Winch Launching Manual, Issue 2, April 2014.

GFA and STGC should work through Goulburn AD operators, RAPAC and Air Services Australia to amend frequency usage.

During the inquest, we highlighted the current regulatory requirements for radio use in uncontrolled airspace and at non-towered, non-controlled aerodromes, and of the current gliding exemptions for radio use in CAO 95.4 and CAO 95.4.1. The Inquest was advised of broad consultations necessary to review the impacts of any changes to mandated minimum equipment levels. The Coroner recommended:

"i. That the GFA give consideration to all gliders being required to be equipped with appropriate dual band VHF radio." and

"vii. That the GFA consider entering into a dialogue with its members re the suitability and economics of FLARM being installed in gliders."

This is the subject of a "national conversation" that GFA must have with all gliding members, in operational, airworthiness, sports, airspace access and regulatory risk contexts. These issues, along with possible alternate surveillance technologies, were already being considered at the time of the accident and inquest. Further consultations are also required with CASA and other sporting aviation communities, as the radio usage issues affect all aviation. In another article we seek constructive debate and comments on "what if..." questions about the impacts of future glider equipment policy options.

THE CORONER ALSO RECOMMENDED TO STGC:

"That the Club have a preference for landings to be on runway 23L whenever launches are being conducted from runway 23, and on 05R when launching from runway 05, unless emergency and/or immediate pilot safety considerations apply."

This addresses one aspect of spatial separation of launching and landing operations. We had highlighted that many clubs conduct safe combined launch and landing operations from a single runway, where there is a suitably displaced launch threshold, with good visibility of the circuit area.

Here I should add that in addition to the Coroner's recommendations, GFA has acted on the Field Investigation Report recommendations.

The revised GFA Winch Launching Manual, Issue 2, April 2014, strengthens procedural guidance on separation of circuit operations from the winch area and launch point.

Improved human factors training is included in the revised GPC syllabus, plus the new GFA Flight Instructor Refresher Course being rolled out for instructors. GFA Safety Seminars have been provided across Australia, with midair collisions and human factors lessons highlighted, generating lively discussions on implications for all clubs and pilots.

Operational Safety Bulletin 02/06(1) Airspace Clear for Launch, Revision 1, was reissued April 2014 with substantial changes drawing upon the lessons of this accident. Explicit reference to CAAP 166-2 Pilots' responsibility for collision avoidance in the vicinity of non-towered (non-controlled) aerodromes using 'see-and-avoid' was included.

You will also have noted more emphasis on situational awareness, alerted scanning and radio communication issues in the new Operational Safety Bulletin 02/14 See and avoid for glider pilots dated 18 August 2014. Operational Safety Bulletin 01/14 Circuit and landing advice dated 31 July 2014 also highlighted situational awareness, workload management, lookout in the circuit and checking landing area for obstructions.

We cannot reverse the events that led to Andrew Ahern's death at STGC. We will respond to these recommendations, and continue to review our procedures and standards, education and training, audits and preventive safeguards to reduce the risks of similar events recurring. GFA members are encouraged to consider these issues through their clubs and regional managers. Constructive dialogue on implementing improvements, and possible changes to glider equipment requirements, will be welcomed.

GA

SAFETY PAYS

This is the first of our GFA Members' Safety Stories.

Recognising that education is more important than documentation, the Safety Committe is offering a cash prize of $50 for the best safety story submitted to the magazine. On top of this, there is a $300 cash prize for the best story of the year.

Sharing information of incidents and occurrences is a great way to raise awareness of safety issues so please help your fellow pilots learn from your experiences.

Details of how to write and submit your stories are on the Safety home page of the GFA website. www.glidingaustralia.org/GFA-Ops/Safety

DON'T DO WHAT I DID

I've always thought of myself as a safe pilot, as I'm sure many of us do - always doing a thorough DI, always doing the appropriate checks, etc. In the past I read the accident and incident reports with a sort of guilty but smug satisfaction that I would never do such a thing. Events have made me a much humbler pilot. I am now much more aware of human frailty and weakness in spite of good intent. So please read on and don't do what I did.

A string of gliders were lined up on the grid and a TV camera team had arrived to film the event. A pretty girl holding a mic walked across to the grid followed by her cameraman. I remarked to the cameraman that I preferred her looks and he muttered some unintelligible response that I think meant he didn't share my view.

In any event, when the gliders in front of me began launching, he didn't seem to want to talk to me anymore as he wanted to get a low-level shot of a glider taking off with a camera angle from below and behind the tail. Manoeuvring the camera to to get the proper angle, he tried kneeling down on a few hard stones. This didn't work for him, however, and I stuck my neck out and offered some advice - but I'm not sure that was appreciated either.

Nevertheless, the glider took off and I needed to hop into my own glider to avoid holding up the launch. On with chute, buckle in, water tube and a quick check – Controls, Harness, Airbrakes and Flaps, Options Outside Obstacles, Trim, Instruments, Canopy Controls, Carriage – all sweet, ready to go.

The tug lined up and away we went. Strange .... as the ground roll started the glider slewed around a bit, almost as though I had a flat tyre, but as we picked up a bit of speed and the tailwheel lifted up, it steadied and felt quite normal, so I dismissed that thought and lifted off.

Then the call came on the radio – "Your tail dolly still attached, dolly still attached."

Well – what do you do? I knew that the glider was still safe, and probably still inside weight limits, as I fly with a few kilograms short of maximum tail ballast. I also knew that as long as I maintained a safe speed above stall there should be no problem. I just needed to get back down again.

I radioed the tuggie and requested he fly me immediately around to the approach of the landing runway, which he did, and I made an uneventful straight-in landing.

Unfortunately, the locals were not prepared to alert the TV crew to the fact that they'd witnessed an 'incident', lest this be publicised and made into an issue. So the TV crew thought the landing was normal and chose footage of my landing to feature on TV news that night with the dolly wheel waggling across the centre of the TV screen. The end of the ground roll looked awful.

And the lesson is? It is easy to be distracted from your prime purpose to do all the checks. Because of the distraction of the TV crew, I omitted to walk around the glider in my hurry to get going, missed my D for dolly check, and got in unprepared.

I'm not particularly proud of this incident, and quite humiliated by making such a fundamental error. So I'm signing this, 'Anonymous' and I guess I'll just have to forgo the GFA offer of $50 for publication of a pilot safety story in GA. But hopefully this story may help prevent someone else making the same mistake.

OBSERVATIONS FROM THE EM/O

The reporter is not the first person to take-off with the tail dolly attached and will not be the last.

This incident highlights the importance of pilots performing their pre-boarding checks diligently, and without interruption or distraction. Launch point discipline and hygiene is vital - distractions must be avoided and onlookers kept out of the way. There are a number of hazards associated with taking off with the tail dolly attached:

1. A castering wheel may make the glider laterally unstable during the initial part of the launch. This will be exacerbated if using the belly release, such as when winch launching.

2. The weight of the tail dolly will move the centre of gravity (CG) aft, possibly to a dangerous extent and increasing the risk of stalling and spinning.

3. Spin characteristics will be affected, and recovery may be impeded or impossible with a tail dolly fitted.

4. An aft CG could lead to uncontrolled pitch-up and loss of control during a winch launch.

5. Directional stability during landing may be compromised at low speeds.

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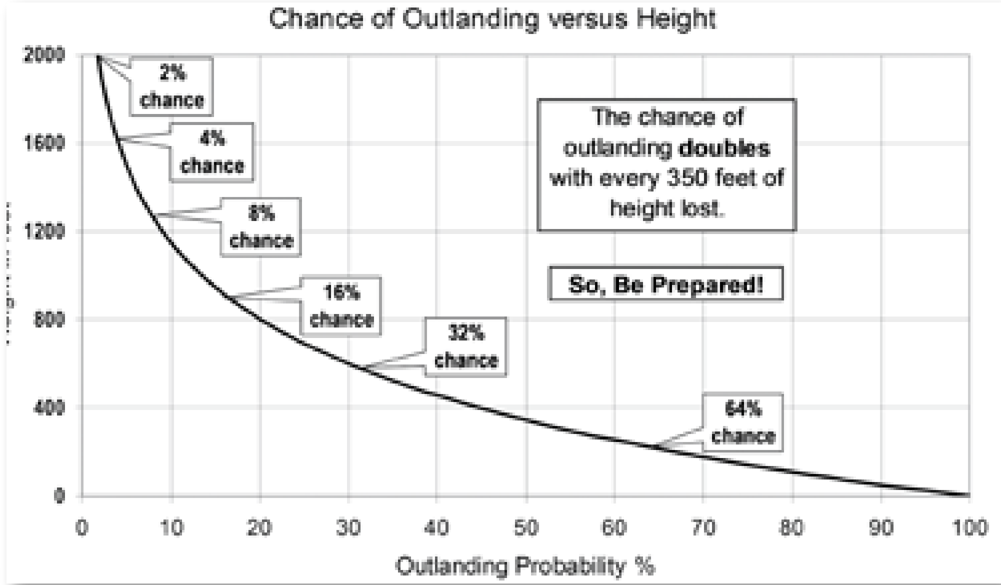
OUTLANDING, NOT OUT-CRASHING

THE CHANCE OF OUTLANDING

On a cross country soaring flight, there is always a chance of outlanding. During a competition task, the chance is small, so long as the pilot is flying several thousand feet above the ground. I have suggested that a pilot, by sensible selection of thermals, can keep the chance of outlanding down to about one chance in 200, that is, 0.5%. Very cautious pilots may keep the chance even lower, while very bold pilots may habitually accept a chance of around 5%.



When any pilot flies down through 2,000ft above the ground, the odds are different. The chance of outlanding must increase, because there will be few thermals left within range, or perhaps none!

My first graph shows this increasing likelihood of outlanding. It has nothing to do with how the pilot should cope with the situation, which I come to later. At ground level, an outlanding is guaranteed, 100%, and at 2000ft, I have plotted the chance as 2%.

The chance of outlanding increases very rapidly. According to this graph, the chance doubles with each 350 feet of height lost, and that happens every three minutes! Since landing is more hazardous than soaring, it is prudent to give serious attention to landing before the likelihood of outlanding gets much above 10%.

A pilot who has not already thoroughly planned how best to make a safe landing by this stage is in danger. Under the pressure of each new un-noticed hazard, the pilot's errors grow like an avalanche. Often, the result is a crash.

Competent pilots prepare for outlandings in good time, and act in a calm, methodical way that makes crashing very unlikely.

MAKING OUTLANDINGS SAFE

USE STANDARD PROCEDURES

One can imagine landing situations that have very different risks of a crash. At 2,000ft above an aerodrome such as Gunnedah in fine weather, the risk of crashing is very, very small, perhaps 1 in 10,000. If that aerodrome

BY GARRY SPEIGHT

THIS ARTICLE FIRST APPEARED IN THE NEWSLETTER OF LAKE KEEPIT SOARING CLUB, 'KEEP SOARING'.

became covered in fog, the risk of crashing could be close to 9,999 in 10,000.

Generally, however, a pilot who is soaring cross-country can keep the risk of crashing on outlanding very small, well below 1%, by following the standard procedures that are in the GFA training syllabus. Each cross-country pilot will have been checked out as competent in these procedures. However, they must be practiced frequently and seriously to ensure that they will help when they are needed. That is really up to the pilot.

PROCEDURES FOR SAFE OUTLANDINGS

THE SEQUENCE

The second graph shows the sequence, height and timing of the procedures that must be followed to ensure the safest possible outlanding:

(1) Select a safe field;
(2) Plan the circuit for landing;
(3) Fly a standard circuit.

PROCEDURE (1): SELECT A SAFE FIELD

During a soaring cross-country flight, you must have a safe place to land at all times. So long as you are above 2,000ft above ground, it is safe enough to simply keep aerodromes, airstrips and cropping country, not cotton, within range. When you are below 2,000ft above ground, things get serious! You must not fail to notice when that happens. You must then identify at least one safe landing place before you get much lower.

Scan fields that are one or 2km from you, near enough to see details, but not hidden under the glider. Given the choice, look at fields ahead on track, so as not to have wasted time if you can continue. A suitable field must meet all the safety requirements, WSSSSS - Wind, Size, Surface, Slope, Stock and Surroundings. Get this procedure completed by 1,500 or 1,600ft above ground if you can.

PROCEDURE (2): PLAN THE CIRCUIT FOR LANDING

As soon as you have decided on a safe landing place, plan the circuit that you will do, just as you would at your home airfield. If circuits to the left or to the right are equally suitable, you can leave that undecided. Identify, and keep in mind, the position of each circuit joining area. You may need them. Get this procedure over by 1,500ft above ground.

PROCEDURE (3): FLY A STANDARD CIRCUIT

Arrive at the chosen circuit joining area at the height that you usually do. A height of 800ft above ground is safe, though competition pilots in current practice may be safe a little lower. Prepare the glider for landing using the standard pre-landing check, FUST. Fly a normal GFA circuit, ignoring any signs of lift. Attempting to thermal away after joining the circuit is very unwise - thermals below circuit-joining height are treacherous.

CATCHING THERMALS BELOW 2,000FT ABOVE GROUND

The three procedures above are essential, and must be given top priority. That does not mean that you can't thermal. If, by chance, you meet strong, workable lift while doing Procedure (1) or Procedure (2), take it! It will soon lift you back above 2,000ft, and you can move on.

Once you have completed Procedure (1) and Procedure (2) by 1,500 feet, thereby shedding a load of worry, you now have 700ft left to look for a thermal before getting down to circuit height. Sinking at 140ft per minute, you have five minutes to spare. At 50kts, you can explore nearly 8km, or 4.17 nautical miles.

Use your height wisely. Plan a systematic search pattern through likely thermal sources. This pattern should end at a chosen circuit joining area.

Your thermal search can have four possible outcomes:

(1) No lift at all. You must enter the circuit for a landing.

(2) One or more very weak thermals, each drifting away. At some point you must give up while still able to enter the circuit.

(3) As in No (2), but finally you find a good thermal and climb away.

(4) A first thermal that is good. You climb away.

MENTAL DISCIPLINE

DISCIPLINE IS VITAL

It takes mental discipline to learn, practice and adhere to these outlanding procedures. But, in any case, mental discipline is essential for success in cross-country soaring. Safe outlanding is just one of many skills to be perfected.

CIRCUIT DISCIPLINE

Instructors require students to show discipline in planning and flying circuits before letting them go solo. I believe that it is GFA dogma to treat each circuit as a practice for a cross-country outlanding. However, few instructors or students take this as seriously as they should. I find that some students do their pre-landing FUST check well before entering the circuit. When facing an outlanding, putting the wheel down when you still hope to thermal is almost bound to result in the wheel being down when it should be up, and vice versa.

I practice and teach that the pre-landing FUST check marks a decision point. It signals the end of soaring flight, and I will not soar after I have done the check. Because I have this rule, I never do the FUST check any earlier than is necessary for a safe circuit.

Circuit discipline remains vital as a pilot progesses. As a pilot advances to higher performance gliders, s/he should practice doing circuits at heights and angles that are appropriate to a glider of that performance, both at the home field and in outlandings.

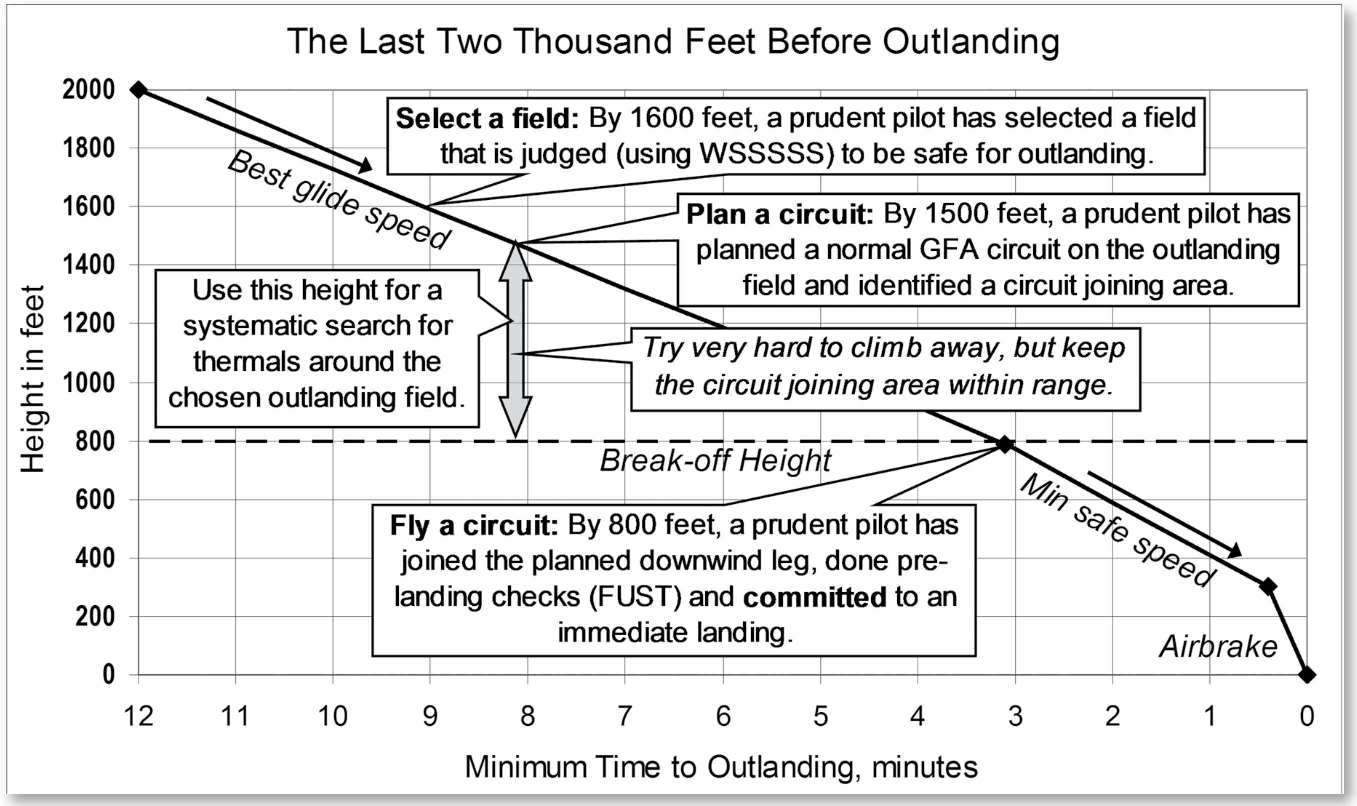
DISCIPLINE IN FIELD SELECTION

The main point is to be alert, and not miss things that indicate that you are less than 2,000ft above a landing place. As the first graph shows, you are at risk if you leave outlanding planning until you are lower.

Getting this low happens quite frequently during cross country flights. That gives priceless opportunities to practice the field selection procedure.

Practice it as a drill!

Usually, there is no-one watching you to see how prudent or careless you are. I realise that I have an advantage there. As I have so often had to demonstrate this procedure to trainees, I have had to keep current in my procedures. That is how it must be for others too. GA



NOT OUTLANDING IN A MOTORGLIDER

If you fly a self launching glider or a glider fitted with a sustainer, the chances are that you are unlikely to have to make an outlanding. Unlikely... but not impossible.

ABOVE: Schempp-Hirth Nimbus 4 D-KHXX by Juergen Lehle.

The problem is that the motors fitted to gliders are far from 100% reliable. It's claimed that self launchers are more reliable, or rather less unreliable than sustainers, because the motor is commonly used for self launching so in most cases, when it is required to prevent an outlanding, it's already been run that day.

Pilots who self launch get used to engine starting procedures and although starting in-flight, especially low-down, is considerably more exciting than self-launching, the procedure is very much the same which makes things a bit less stressful.

SUSTAINERS

Sustainers, especially two stroke sustainers are not built the same way as the motors used in self launchers. They may only be run a few times a year. Motors can get cold soaked while airborne so that when you want to use them, they're at their most temperamental. There's no starter motor, so the pilot has to dive to increase speed until the motor windmills and hopefully starts. Increasing speed while aiming at the ground when faced with an imminent outlanding may be too exciting for most pilots.

This is not just my negative appraisal of the situation. Here's what it says in the manual:

With a motorglider never rely completely on the engine extending and starting. Plan your flight path so that you are always able to carry out a safe outlanding if necessary. Be aware that with the engine extended but not running the rate of sink increases remarkably. This means that with a motorglider you have to decide earlier for an outlanding than with a pure sailplane.

BY JOHN CLARK

THIS ARTICLE FIRST APPEARED IN THE NEWSLETTER OF LAKE KEEPIT SOARING CLUB, 'KEEP SOARING'.

PLAN YOUR OUTLANDING

So what this means is that to fly safely, you need to cease gliding and start landing at closer to 1,200ft than the 800ft suggested by Garry Speight. [See 'Outlanding not Outcrashing' GA issue 23.] Just as with an un-powered glider, you should always have an outlanding site picked out below 2,000ft. You should also have decided on an engine starting height.

Normally, you can tell what sort of day it is and should know well in advance what the chances are of outlanding or starting the motor are. This means to some extent that your engine-starting height will be based on the overall chances of finding a thermal, remembering of course tha on a 10,000ft boomer of a day, the thermals are a lot further apart than on a 4,000ft day! Nevertheless, the air has a feel and if it feels lifeless, then start the engine early.

In my limited experience, there are two ends to the spectrum when facing an outlanding in a self launcher. At one end, you are in catastrophic sink. The sink-o-meter is off the dial and you are falling out of the sky. At the other end, perhaps at the close of an otherwise good day, the air may still be buoyant but there's just not enough lift to get you home.

When you're in sink city, you don't have a lot of time to do anything so you must prepare well in advance and most likely, have a landing field picked out at 3,000 or 4,000 AGL. Sink city normally extends well higher than this!

IN THE SINK

Let me give you two examples of big sink and how it shortens your decision time.

1. Once, when caught a the end of the range near Manilla, I was in sink of over 1,000 ft per minute, which had lasted for some time. I was being drilled and although I snaked and sped away from where I thought the sink was, it was plain that I was going to be on the ground very shortly.

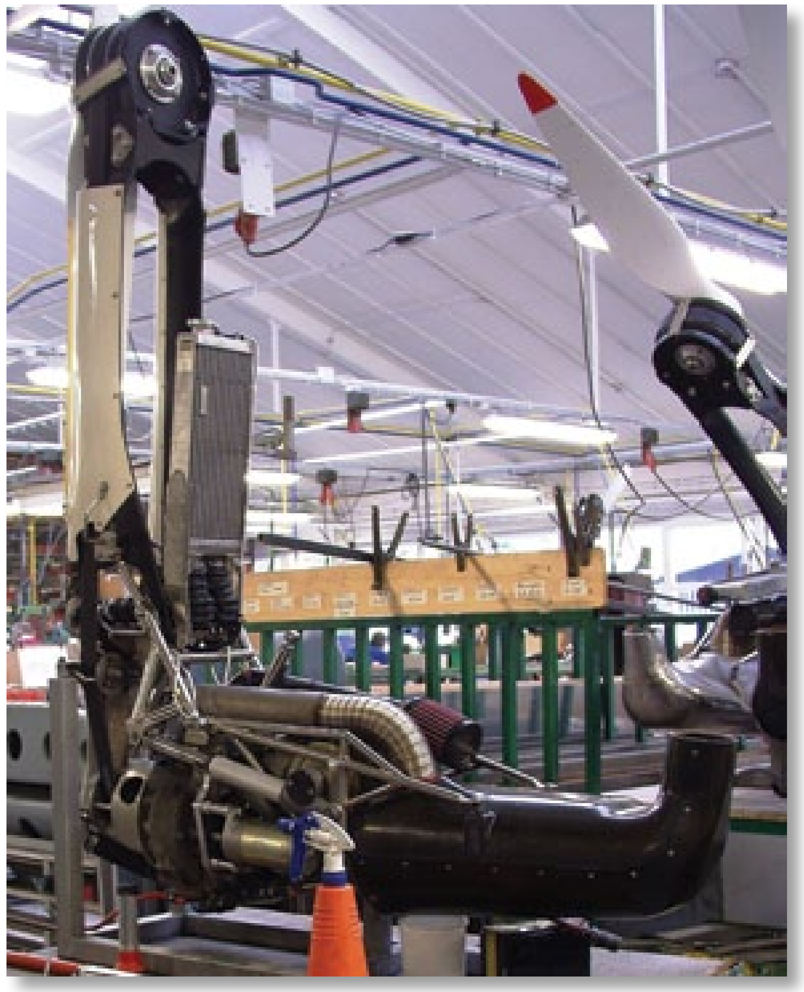
I set up on the Manilla strip and started the motor. For several minutes I had a climb rate of zero instead of the normal 800ft per minute.

2. On a safari, a group of us were flying at 13,500ft towards Coonabarrabran, into a 24 knot headwind when we suddenly encountered widespread sink, off the dial. Of course, the headwind should have been telling us loud and clear that wave was likely, especially when flying towards a range like the Warrumbungles... but if it did say anything, none of us took much notice!

Within 15 minutes, I had lost 9,000ft and was heading sideways towards the Pilliga with no sign of lift. Well, this time I got away, but only just.

The point here is that an outlanding may be only a few minutes away, whatever your height.

If it is late and the day has ended - at least for you! - or if it's plain that soaring conditions are over, then don't piss about. Start the engine early, at a safe height. Why risk anything else?



LEFT: WankelPP by Dhaluza.

BEFORE YOU START

There are several things you do before starting the engine while you are continuing to search for lift. One of the most important is to turn the fuel on. Countless people have outlanded with self launchers and sustainers with the fuel turned off... so many in fact that most pilots leave the fuel turned on in flight.

Engines are noisy, so wearing a headset or earplugs is common because it's hard to think with a lot of noise going on. I prefer to wear a headset because it is quick to put on and quiet. Mine is stowed on the headrest so it is a second's work to put it on.

I make a point of putting the headset on, well in advance so I have time to think. I may wind the vario up a notch and concentrate on searching low down but I have climbed away countless times with the headset on.

As you get lower, all the time searching for lift, you can go over your engine starting check-list. Many pilots have a check list on top of the instrument binnacle which can be flipped down when required. For most of us, flying while feeling for thermals is instinctive so giving some time to preparing to start the engine is easy enough

There's normally a maximum speed at which you can raise the engine and flaps may have to be lowered too. Often, when searching, you'll be close to this speed, but if you are in big sink the chances are that you'll be flying fast and have to pull the stick back, otherwise you may strain the engine raising mechanism.

Some pilots recommend lowering the undercarriage at an early stage so that if the motor does not start, it is one less thing to think about. I prefer not to, because I hope I will remember to complete a FUST check at the normal time.

By the time you are near your decision height and ready to abandon soaring, you must be very close to your chosen outlanding field. Because of the unreliability of glider engines, Plan A is that you make a normal and safe outlanding. Plan B is that the engine starts and you climb away.

In fact, it may not be quite that simple. Sustainers, though they might fire, may not run or reach sufficient revs to allow you to climb away. For that reason, for sustainers, Plan B may be to circle the landing site until you are confident that the engine is running well.

For that reason, the outlanding plan procedure for sustainer powered gliders may not be identical to self launchers.

In a self launcher, you would normally attempt to start the engine on the downwind leg. Some pilots recommend

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ABOVE: Pik20E NASA by NASA Dryden Flight Research Centre.

that with sustainers, where the starting procedure involves diving the glider fast enough to windmill the propellor, you attempt to start the engine on finals. This way, the height you lose while trying to start the engine takes the place of airbrakes and if the motor does not start, you land straight ahead.

The drawback with this procedure is if the engine does not get up to revs properly and soon, you'll run out of airstrip ahead of you… so choose a long strip!

RAISING THE MOTOR

With most modern self launchers, the process of raising the engine is a very quick procedure. Slow the glider, pull the right amount of flaps, flick up the ignition which raises the motor, flick from TE to static and hold down the starter button.

When the engine is fully up, the starter motor will kick over and when the engine is running, you increase revs and climb away. With older self launchers, there may be half a dozen more procedures to perform and all this takes time and increases the stress level… remember, you're about to outland!

When the engine is raised, it acts like an airbrake. With a modern self launcher, "in a normal restarting situation the loss of altitude from starting the extension procedure until the engine is running is only about 70ft". So says the manual, but many things can conspire to make the height loss considerably more.

If the battery is a bit low, the engine lifting mechanism is slow or tired or you are flying a little faster than you ought to, extending the engine can take a lot longer… perhaps enough to lose 300ft.

With the engine extended but not running, the rate of sink at 50 knots increases to 400 ft/min, almost four times the sink rate with the motor not extended. With a glider with a fully exposed motor, the sink rate may be more than this, akin to the sink rate of a hang glider. Of course, this means that you really need to be fairly close to your selected outlanding site when you decide to pop the motor.

Most importantly, because the sink rate is much as if you were using half airbrakes, you must have additional height to raise the motor, attempt to start it and if not, lower it again and attempt to fly a normal circuit, albeit one with half airbrakes pulled.

There's a significant risk, especially with older designs which may be 30 years old, that the engine raising mechanism may fail and leave the engine half way or fully out.

This could be due to anything from a flat battery to a popped circuit breaker to a winding burned out on the basic Bosch windscreen wiper motor used on the screw-jack which, allows it to run but stop intermittently.

In this situation, you might be doing a circuit and landing with the equivalent of half airbrakes. It's essential that you plan for this, fly a shorter than normal circuit and be prepared to use no airbrakes when flaring.

While the engine-less glider can continue searching down to 800ft, a self launcher or sustainer glider should not and your agreed decision to cease soaring should be considerably higher.

This is especially true when you are learning to fly a self launcher. Your stress level rises at the same rate as the motor comes up. Even after hundreds of hours this is still true. It's recommended that when you are learning, engine starting should be at 2,000ft When you're more confident, you can go down to 1,500ft.

Only if your selected outlanding site is an airstrip should you consider starting the engine much lower than this.

Keep Soaring March 2014 page 19: The manual states, "Should a flight be conducted over a wide expanse of unlandable terrain, the engine should then be restarted at 3,300ft above ground level, so that if the engine does not start, all the emergency starting procedures can be followed unhurriedly including retraction of the engine if necessary". The manual does not suggest what you do next.

There are pilots of self launching gliders who choose to have a normal outlanding and then, after doing standard checks, self-launch from the paddock. I confess that I am more confident than this and so far have always successfully started the engine in the air.

I have never met a pilot of a self-launcher who enjoys flying with the motor running and few enjoy in-flight starting, especially in sink conditions where things can happen very quickly and the workload is high.

Nevertheless, climbing out under motor after pressing the button of shame normally beats an outlanding hands down and is one of the things which makes the additional complexity of a self launcher worthwhile.

You might need more friends when you fly a conventional glider compared with a self-launcher but there are those who say that people who fly self launchers have less friends anyway! **GA**

SAFETY PAYS

This is the first of our GFA Members' Safety Stories.

Recognising that education is more important than documentation, the Safety Committe is offering a cash prize of $50 for the best safety story submitted to the magazine. On top of this, there is a $300 cash prize for the best story of the year.

Sharing information of incidents and occurrences is a great way to raise awareness of safety issues so please help your fellow pilots learn from your experiences.

Details of how to write and submit your stories are on the Safety home page of the GFA website. www.glidingaustralia.org/GFA-Ops/Safety

DON'T DO WHAT I DID

I had a bit of a chuckle when I read in the last magazine the tale of the poor unfortunate pilot who took off with his tail dolly still attached, and then…

Following the completion of a Form 2, I intended to take a test flight. I DI'd the aircraft. However, due to weather we did not fly the aircraft on that day.

The following day the weather gods were smiling, and I DI'd the aircraft again.

I did have it in my head to perform an ASI check but, for some reason that I still cannot explain, I simply failed to follow through.

As we were rolling on an aerotow, I decided to check the ASI in both cockpits - probably because of my earlier thought process about the ASIs.

At about lift-off speed, the front ASI was starting to read, while the rear had no apparent reading.

I called, "No airspeed" three times. The pilot in command responded with, "Continuing launch." I concurred with that decision. As PIC explained, we had a tug up front which was giving us sufficient airspeed, no need to panic.

During the launch we discussed what had happened and what we would do after release. One item was that the front ASI was reading approximately 80% of the expected airspeed on tow.

After release, the aircraft was stalled with a straight and level attitude. The ASI read approximately 32kts. This also confirmed our estimate of an 80% reading.

The circuit was flown with a reasonable nose-down attitude, while PIC did at one point think he was too fast, a normal approach and landing was conducted.

Examination of the flight trace showed that the downwind, base and final, allowing for wind, was flown at approximately 70kts, with a peak of 80kts for about 10 seconds. Post-flight, we discovered the pneumatic had been disconnected for the Form 2 and had not been reconnected.

I had DI'd the aircraft TWICE before we flew. Why did I not follow through on my thought to check the ASI? I had ASSUMED something! I learnt something that day. I will NEVER assume and I will ALWAYS check.

OBSERVATIONS FROM THE EM/O

Many pilots are in the habit of completing the Daily Inspection from memory and it is very easy to become distracted and miss something, or to simply forget. The chance of missing part of the Daily Inspection can be minimised if pilots use the 'Daily Inspection Schedule' near the middle pages of the aircraft's maintenance release as an aide memoire.

CREW RESOURCE MANAGEMENT

On a positive note, this incident serves as a good example of Crew Resource Management in practice, where communication, problem solving and decision making in the cockpit led to a successful outcome. In this case a problem was identified, solutions were stated, and agreement was reached between the pilots on how they would proceed. Once decided, the pilots used their flight skills and experience to safely complete the flight. **GA**

ACCIDENTS & INCIDENTS

All clubs and all GFA members are urged to report all accidents and incidents promptly using the using the GFA's occurrence reporting portal at glidingaustralia.org/Log-In/log-in-soar.html as and when they occur.
This is always best done while all details are fresh in everyone's mind.

2/12/2014 QSA AIRCRAFT CONTROL SZD 48 JANTAR STANDARD 2

The aircraft landed in a rough paddock with the undercarriage retracted. After releasing from the tow for a cross country flight the pilot elected to keep the undercarriage down until the first climb was encountered. The pilot then forgot about the undercarriage and embarked on a cross country flight. Eventually conditions dictated an outlanding was necessary and the pilot selected what was thought to be a suitable paddock. The undercarriage was retracted as part of the pre landing check and, despite the pilot periodically checking the lever to the placard, the fact that the undercarriage was retracted went unnoticed. The final approach was made with sufficient clearance over power lines but the pilot failed to arrest the rate of descent and landed heavily on the fuselage. The paddock surface was rougher than anticipated and the aircraft suffered minor damage. The pilot noted that he spent time selecting an appropriate paddock but did not pick the unsatisfactory surface condition from the air. The pilot also advised that he may have misused the airbrakes as he was not in recent practice using conventional airbrakes because he usually flew an aircraft with trailing edge airbrakes. Causal factors include high workload, omitting to complete a post release check, not noticing the undercarriage was retracted, inexperience on type, and a mishandled flare.

3/12/2014 QSA AIRCRAFT CONTROL ASTIR CS JEANS

The aircraft was subjected to pilot induced oscillations during the pilot's first takeoff in a single seat glider. The pilot released from tow at about 300ft AGL and positioned for landing. During a downwind final approach, the glider pilot did not maintain adequate airspeed and landed heavily. The wind direction had been variable and the pilot was launched into a 7 to 10 knot crosswind. The tow pilot had to use full control deflections to maintain directional control. As the combination became airborne it flew through a thermal and the glider commenced a series of oscillations in pitch, probably due to inappropriate and course control inputs by the pilot. When the glider pilot released he performed a 'tear drop' manoeuvre to land back on the runway but failed to maintain adequate speed control and landed heavily but without damage or injury. Gliding operations were suspended until the wind stabilised. This incident highlights the importance of conducting 'conversion flights' in benign conditions. Causal factors include inexperience on type and a high workload caused by adverse weather conditions and mishandling of the controls.

4/12/2014 QSA AIRCRAFT CONTROL DISCUS 2B

This experienced pilot released from aerotow in a ballasted glider but did not contact lift. The pilot

DON'T DO WHAT I DID

SAFETY PAYS Recognising that education is more important than documentation, the Safety Committee is offering a cash prize of $50 for the best safety story submitted to the magazine. On top of this, a $300 cash prize will go to the best story of the year. Sharing information of incidents and occurrences is a great way to raise awareness of safety issues so please help your fellow pilots learn from your experiences. Details of how to write and submit your stories are on the Safety home page of the GFA **glidingaustralia.org/GFA-Ops/Safety**

This story ended well, but it could have been very different. It shows how quickly you can run out of options close to the ground. I know that this experienced competition pilot was very shaken by how quickly everything changed leaving him with no options.

It was the last day of the Nationals and I was lying 3rd, just a few points off first place. I knew I hadn't had a great day, but also knew that my adversaries at the top of the table had also struggled. It would be critical to get good speed points to maintain or improve my position.

The day died earlier than forecast and I was low over the Warby range and struggling to find final glide back to Benalla. The clock ticked and the sun sank lower. Finally I got a climb but it petered out 300ft short of final glide. I saw a glider out ahead, maybe 5km away, thermalling between me and the airfield. I immediately struck out towards it, prompting it to immediately leave on its own final glide attempt. I located the abandoned thermal, but it was weak and the westerly headwind means I didn't gain any security height in my two turns. I saw the glider ahead start to turn again over Winton so I headed out again, finding a good into-wind line of reduced sink.

By the time I got to Winton, I had managed to improve my glide to 250ft above final glide, but I would have liked at least 400ft to be safe. The thermal was gone. I knew I had good landing options to my right, and the airfield itself was just within reach. But only just, and with no good land-out options before it. Plus, there was a headwind. So much was at stake, and making the finish line could have gained first place in the comp. I struck out again, committed to making the airfield. Within a few seconds I sensed sink, and felt the glider drifting to the right. I had dropped into a cooler, southerly layer close to the ground. I still had 220ft safety margin to the airfield and the finish line was only 1km away. As I pushed on, I found a little lift and turned left into wind to milk it. Suddenly strong sink dropped my margin to 120, 80, 30. I could no longer see the airfield and I realised I also could no longer make it back to the landing options I had checked out just a couple of minutes earlier.

Suddenly my focus switched from points to survival. The trees rushed up - there was a gap with some rough grass beyond. I eased the stick back to clear the final treetop, pushed forward over it, lowered the wheel and dropped into ground-effect, swerving around smaller bushes. Seeing an obstruction ahead - a small dam wall - I applied full airbrake and pushed the glider down onto the rough clearing. Applying full wheel-brake, I was ready to drop a wing if a ground-loop was needed. It wasn't and I came to a halt in a cloud of dust as my PDA chimes that I have crossed the finish line.

OBSERVATIONS FROM THE EM/O

This is an all too familiar story that does not always end in a safe arrival, as the article titled 'Wire Strike' in the April/May 2015 issue of this magazine attests. It shows how the desire to win in competition flying can adversely influence our decision making processes and allow us to accept lower safety margins than we would otherwise tolerate.

If the terrain over which the final glide has to be flown, especially the last few kilometres, is unlandable, then this should be an incentive for NOT risking a marginal final glide but to allow a generous safety height margin. Things usually get worse, much quicker, into headwinds!

Being aware of the dangers of continuing into marginal circumstances, setting boundaries, having a sound knowledge of rules and procedures, disciplined adherence to minima and performance requirements, prioritisation of options, and planning to deal with potential situations will act as defences against unsafe conditions.

If you are not prepared to crash and possibly kill yourself on the final glide, then fly with a good safety margin above your final glide!

Being a winner is fleeting. However, if you break your glider in a hurried landing just short of the airfield, people will remember you for years to come.

CHRISTOPHER THORPE
emo@glidingaustralia.org

ACCIDENTS & INCIDENTS JUNE - JULY 2015

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6 JUNE 2015 QSA
BIRDSTRIKE
SZD-48-1 JANTAR STANDARD 2

While thermalling on a cross-country flight, one of two eagles in the thermal suddenly changed direction in flight and struck the starboard wingtip of the glider. After determining his aircraft was controllable, the pilot elected to continue the flight and later landed at the home airfield without further incident. Inspection of the airframe revealed 3 small impressions underneath the starboard wing tip.

7 JUNE 2015 QSA
ENGINE FAILURE OR MALFUNCTION PIPER PA25

At about 100ft AGL with a glider on tow, the tow plane's engine stopped. The glider pilot released and both aircraft completed a safe landing straight ahead on the runway available. A post-flight inspection did not reveal any faults with the engine and the aircraft was returned to service without further event. A maintenance engineer subsequently cleaned and tightened critical earth points, replaced the fuel pump circuit breakers, and renewed the crankshaft position sensor. The aircraft was certified safe for flight and no furher issues have been reported.

8 JUNE 2015 QSA
WHEELS UP LANDING LS-1D

The pilot is an experienced power pilot who started gliding 18 months ago. This was the pilot's first flight on type. During the latter part of the flight the pilot advised the duty instructor by radio that he could not lower the undercarriage and was told to conduct a 'wheel-up' landing. The pilot flew a good circuit and landed well down the strip so as not to block the runway. The aircraft suffered only minor scratches to the lower fuselage. Subsequent inspection of the glider revealed the undercarriage had been raised with such

ATTENTION, VIGILANCE AND DISTRACTION

DREW MCKINNIEE
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THEIR IMPACTS UPON PILOT SITUATIONAL AWARENESS AND WORKLOAD MANAGEMENT

This article provides insights for glider pilots into some human factors that affect gliding safety:

- Attention and how we manage information in the cockpit
- Vigilance or sustained attention
- Distraction and loss of focu
- Situational awareness through perception, understanding and thinking ahead
- Workload management, our ability to manage the flow of tasks and information in the cockpit to achieve a safe flight.

Some of these cognitive human factors have not been covered in depth in our GFA Human Factors materials. ATSB has been putting greater emphasis on understanding these issues in transport safety investigations, and I acknowledge their expertise and training resources. Analysis of GFA SOAR operations occurrence reports has highlighted how these factors have contributed to many incidents and accidents.

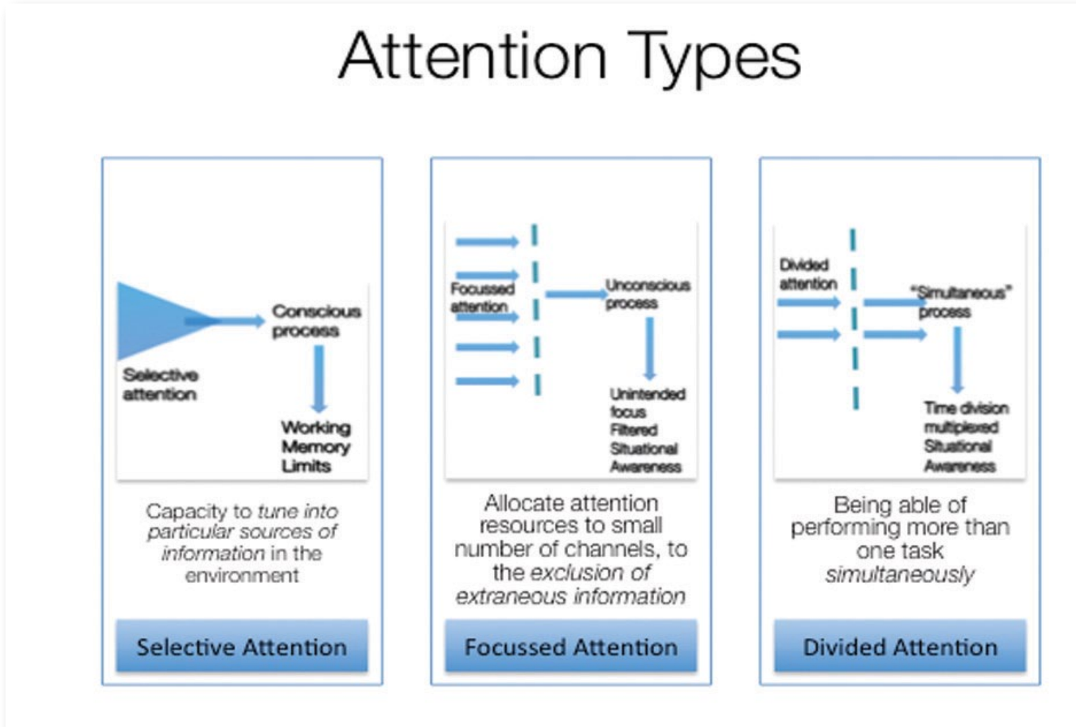
I believe that improved training methods and awareness of these factors may improve our safety. I have particular concerns about poor practices involving In-Flight Distraction Devices (IFDDs) that can markedly degrade situational awareness and safety when used incorrectly, or at the wrong time.

ATTENTION

What do we mean by attention? Most of us think of it as a conscious process of focusing on something important. Yet how often do we find ourselves unconsciously monitoring many inputs, discerning important aspects from a barrage of sensory information?

Attention may be described as the capacity for our minds to acquire information in a sequence or form that allows it to be interpreted. Attention may be both conscious (deliberate) and unconscious (intuitive).

Attention may be thought of as a continuous manager of information that allows you to make sense of the sensory environment. When working properly, this information manager also helps to prevent overload, and ensure mental resources are available to respond to particular stimuli.



THERE ARE THREE KEY TYPES OF ATTENTION:

- Selective attention, our conscious capacity to tune into particular information sources in the environment;
- Focussed attention, our unconscious allocation of attention resources to limited channels, to the exclusion of extraneous information;
- Divided attention, unconsciously dealing with multiple tasks and information sources simultaneously, with limited capacity, simple inputs.

Selective attention, consciously applied, can be improved through training, repetition, procedures and checks, and by conscious prioritisation. For example, we train pilots on safe speed near the ground and emergency procedures, pre-landing checks, monitoring of attitude and energy, and to prioritise via 'aviate, navigate and communicate'. We consciously apply these to direct our attention to the most important aspects of managing information and workload after a rope break, or in a low modified circuit.

Focussed attention, by definition, is where we unconsciously filter inputs, and this may degrade our situational awareness. All the sensory inputs are competing for attention and some may be discarded or ignored. A high workload will increase this processing pressure and the chances of important inputs not being seen, heard or felt. Radio calls or undercarriage alarms may go unheard until too late.

Divided attention allows us to multiplex or perform simultaneous tasks, but this also requires some time division of attention. With a minimal number of information sources, low difficulty level and dissimilar tasks, we can unconsciously juggle multiple activities. For example, we might monitor

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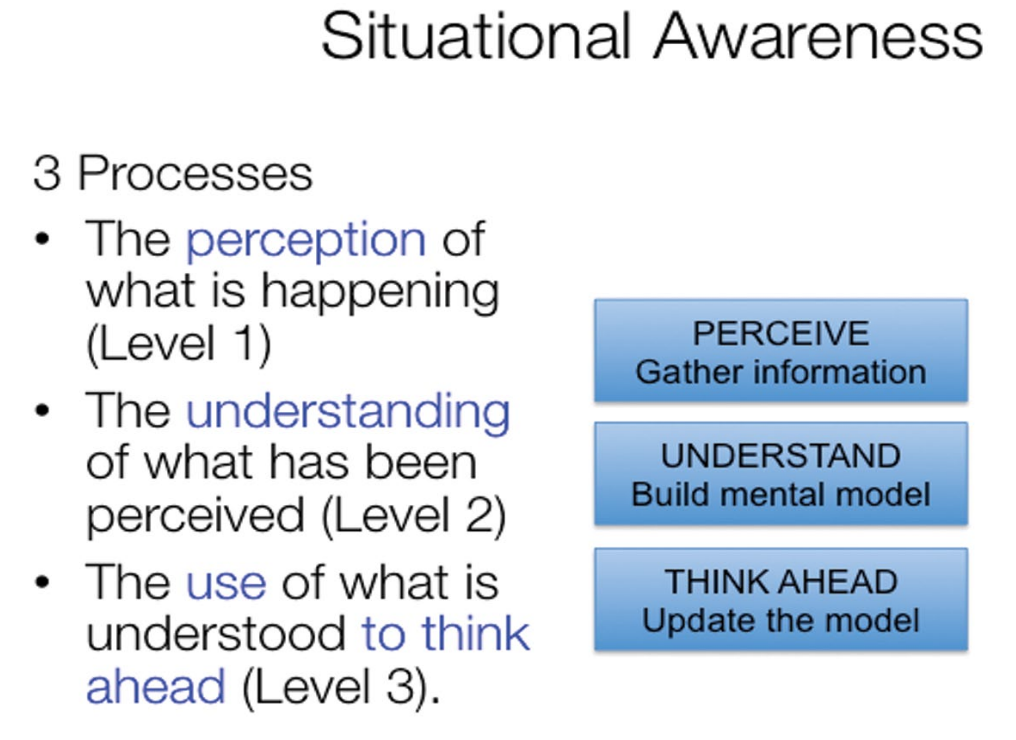


position of another glider and reply to a radio call, while rolling out of a thermal. Done well, it can assist in situational awareness. Again, training, experience and prioritization can improve our skill in doing this unconsciously.

How do we apply these types of attention? That depends in part on your motivation and experience. Your goal at a given time, your motivation to complete something, will primarily affect your selective attention.

Your experience will be a major factor in how you unconsciously apply focused or divided attention, particularly in high workload situations or when fatigued. High awareness of the effects of fatigue, and critical actions at various phases of flight, will help you to consciously elevate inputs and tasks to selective attention.

So, you're a competent, well-trained, experienced glider pilot. You're current in the type and familiar with flying in a certain environment. You're well rested and in good health. How hard can it be to apply appropriate attention to the right things, at the right time?

VIGILANCE

Being attentive to the right things at the right time takes work. You know this from your experience. It might be much harder to give things required attention after a long period of time, when you are fatigued, lose concentration, or allow your mind to wander. You have done this kind of flight a thousand times before, and everything will be all right! Complacency can cause you to drop your guard.

Vigilance is the capacity to sustain attention to a particular task. Fatigue, complacency, boredom, task monotony, poor workload management or poor foresight can erode vigilance.

Vigilance may be improved through training of conditioned responses, checklists, deliberate regular changes in tasking, refreshment and rehydration, self-discipline, improved planning and foresight.

Cockpit design, layout, clutter, instrument design, placard design and position, data displays, pilot self-organisation, audio alerts and so on, may all affect their effectiveness for pilot momentary attention and sustained vigilance over a period.

Improved vigilance may be achieved from prioritising tasks at different phases of flight, a deliberate discipline to reduce or limit the enemy of attention - distraction.

DISTRACTION

Distraction is the reduction of capacity to provide required attention to tasks through diversion by extraneous inputs, saturation by excessive sensory inputs, or loss of cognitive focus.

Like attention, you might be consciously and deliberately distracted, or unconsciously distracted or saturated in your attentive capacity. It might arise from doing certain tasks at inappropriate times.

For example, distraction might arise from anxiety about a full bladder late in a flight, or your mind wandering on work worries or social commitments, or by messing around with entering navigation data into your cockpit devices inflight.

Battery failure inflight might cause both distraction and a higher workload, detracting from your capacity to manage other priority tasks.

Heightened self-awareness about your susceptibility to distraction is important. Coaches and instructors can provide valuable feedback here. Honest post-flight analysis might also focus on how you can better manage workloads, maintain attention and vigilance, set aside distractions at key phases of the flight.

Later, in another article I will discuss some specific operations, airworthiness, training and self-discipline issues associated with In-Flight Distraction Devices (IFDDs). IFDDs can detract from gliding safety!

First, we should look at how attention, vigilance and distraction are interrelated with pilot workload management and situational awareness.

SITUATIONAL AWARENESS

Many definitions of situational awareness exist; for example, "a means of monitoring information at a level sufficient to ensure that threats to the system are identified", which in pilot's English means "what is happening now, what has happened previously, and what is expected to occur in the future".

Situational awareness is not just about perception! It is also about how we process information, build a mental model, and foresee the implications of sensory inputs.

Imagine you are in the cockpit of your glider, airborne and soaring cross-country to a destination. There is other air traffic, some visible, some heard on a busy radio. Weather conditions are changing ahead. You have to make judgments as to what you must do next, decide what priorities should apply.

Situational awareness actually involves three processes:

- The perception of what is happening. Level 1 – gather information.
- The understanding of what has been perceived. Level 2 – build mental model.
- The use of what is understood to think ahead. Level 3 – update the model, prioritise, decide, adapt.

This 3 level model is also described as perception, comprehension, projection.

So in this situation you might use targeted scan to visually search for an unseen glider you have heard on radio, make a radio call to alert others of your intentions, look at the approaching overdeveloping clouds, set off on track without delay to beat the incoming weather, and set your final glide display mode on your computer. Your mental model includes other traffic, weather, time, speed and distance.

You decide to head home, and then attune yourself to thinking about factors that might affect your final glide and safe arrival home. This means not just focusing on looking into the distance for your home airfield. It also requires building an awareness of other traffic and hazards. Poor situational awareness may arise from:

- task underload, boredom
- task overload, saturation
- uncertainty
- fatigue and stress
- frustration
- macho attitudes
- cognitive tunneling, fixation
- ambiguous information
- poor procedures

IMPROVING SITUATIONAL AWARENESS MIGHT INVOLVE DELIBERATE STRATEGIES

- Regular changes in cockpit tasks to keep up attention and arousal
- Active workload management, get tasks done early to reduce future workload
- Inflight planning and self-briefing
- Regular shifts from cruising scan to full scan or targeted scan
- Declutter the cockpit, turn off or stow unnecessary distractions
- Refresh and rehydrate before high workload phases of flight
- If in doubt about others' intentions, use radio to resolve ambiguity, advise intentions
- Avoid fixation and preoccupation with single issues
- Learn and use simplest modes in cockpit displays
- Use checklists and standard procedures, call actions and then checks out loud.

Many of these strategies for improving situational awareness are based upon effective workload management.

WORKLOAD MANAGEMENT

In any flight, there will be peaks and troughs in tasks and sensory inputs. There will be a limited time budget for you to manage all these inputs, make sense of them and carry out all tasks to achieve a safe flight outcome.

Effective workload management should be applied to avoid underload and overload. It sounds simple, doesn't it? It's harder in practice. Why? Why do good pilots get overwhelmed or fixated and 'lose the bubble'?

To understand this, it is important to realize how we are individually affected by the combination of physical workload and mental workload. A hot, tired pilot suffering acute discomfort from a full bladder, for example, will have less capacity for high mental workload.

Now consider the different types of workload - qualitative workload, the complexity of the work, versus quantitative workload, the amount of work. Consider also how these workloads change with different phases of flight or emergency.

Now think about the element of time, or duration. Consider how you might react to momentary workload, perhaps of very high magnitude, and then react to cumulative workload over a long flight. How high a workload can you sustain over a long period without overload?

Every pilot is different, has different levels and reactions to workload, and these may change day to day, or during a day.

Strategies that are commonly applied to reducing overload and managing workload include chunking and segmentation. Chunking may involve grouping pieces of information together to aid recall and understanding, or performing a planned sequence of tasks using a checklist. Segmentation may involve deliberately setting aside some tasks or data.

Let's think in more practical terms. How might we improve a pilot's workload management practices and situational awareness performance?

First, reflect post-flight on your experience. Experience is of limited use if you do not reflect on it. Post flight analysis and debriefs should include assessing when, why and how the pilot was no longer ahead of the glider, unaware, rushing or overloaded. Then the key question is, what might we do differently next time?

Second is to train for, and practice, efficient and effective cockpit procedures. Rather than meandering along, purposeful actions done at the right time make a better and safer pilot. Instructors and coaches can help here, cultivating a more

continued over page

disciplined, less hasty and less haphazard approach.

Third, develop a deliberate focus on foresight and anticipation, along with an awareness of your limited time budget. This mindset also helps you to adapt better to changing circumstances, to reprioritise tasks. In anticipation of high workload later, you might get low or medium priority tasks done early.

An effective fourth approach is to deliberately simplify, declutter and focus. Professional pilots set up a sterile cockpit at key flight phases. We can do similarly, for example, prior to joining circuit put away oxygen gear, water bottles and paper charts. Turn down audio vario volume, turn off or disregard navigation displays, check for other traffic, check radio settings, confirm glider is configured correctly for landing. This is a deliberate process to minimise distractions and focus on the right things at the right time.

INSTRUCTING AND TRAINING IMPLICATIONS

Instructors and coaches should be attuned to some training and airmanship implications. These include:

- Primacy of pre-flight preparation and pre-flight configuration of data-intensive equipment
- Use and learn the manuals!
- In early training, turning unnecessary devices off, introducing later
- No cameras during training flights
- Emphasise scanning techniques, verbalise lookout, verbalise occasional reference to other data
- Cultivating self-discipline and prioritisation of tasks
- Deliberate interventions when situational awareness degraded
- Reflective post flight debriefing, including situational awareness and workload management aspects, focussing on what the pilot should do differently next time!

I hope these insights are useful for pilots, coaches and instructors. ATSB Human Factors resources have been drawn upon in this article. I am grateful for their assistance. A future article will assess the challenges of In-Flight Distraction Devices (IFDDs). GA

ANNUAL FLIGHT REVIEWS

In the July/August 2014 edition of Gliding Australia magazine was an article titled 'Flight Reviews Minimise Mid-Air Surprise and its Costly Consequences'. At the foreword to this article I mentioned that GFA Operational Regulations (paragraph 3.3.5) requires all solo pilots to undergo an annual competency check, or Annual Flight Review (AFR). I explained that this meant a pilot must not fly a sailplane in-command if the pilot has not, within the period of 12 months immediately before the day of the proposed flight, satisfactorily completed an AFR.

I have since had a number of pilots ask me to clarify this requirement.

GFA adopts the same philosophy as CASA for how long an AFR remains valid. To this end, an AFR is valid to the end of the month in which it is done, 12 months later. For example, if you had your Annual Flight Review in January 2015, it will remain valid until the end of January 2016. However, if you complete a flight review any time in the three months before it is due, your original renewal month remains unchanged. This means your review remains valid, even if you do it early. For example, if your AFR is due to expire at the end of August 2015 but you undertake it in June 2015, your next AFR will be due at the end of August 2016.

A pilot can defer their review beyond the 12 month period but cannot exercise command privileges until they have completed their AFR.

Current guidance on the AFR is in Operations Advice Notice 02/12:

www.glidingaustralia.org/documents/all-documents/documents/operations-1/operations-advice-notices/481-oan-02-12-annual-flight-reviews

CHRISTOPHER THORPE
Executive Manager, Operations
emo@glidingaustralia.org

AIRWORTHINESS DIRECTIVE

AD No.: 2015-0116
24 June 2015

GROB sailplanes

Flight Controls – Speed Brake Control System – Inspection / Replacement

TWIN ASTIR, TWIN ASTIR TRAINER, GROB G 103 TWIN II and GROB G 103 A TWIN II ACRO sailplanes, all manufacturer serial numbers.

A report was received concerning a broken bell-crank, installed in the air brake control circuit approximately 1.4 m outside the wing root rib of a GROB G 103 Twin II sailplane. Preliminary investigation results revealed additional cases of cracks on the same part, installed in the air brake control systems of the early Twin II type design.

The same bell-cranks are also installed at the same location in the control systems of other models belonging to the same type design. See list of affected models under Applicability.

This condition, if not detected and corrected, could lead to failure of the air brake system, possibly resulting in reduced control of the sailplane.

Required as indicated, unless accomplished previously:

(1) Within 30 days after the effective date of this AD and, thereafter, during each annual inspection, check the locking forces of the air brake control unit and, if any discrepancy is found, before next flight, correct the locking forces in accordance with the instructions of Fiberglas-Technik TM-G08/SB-G08 and A/I-G08.

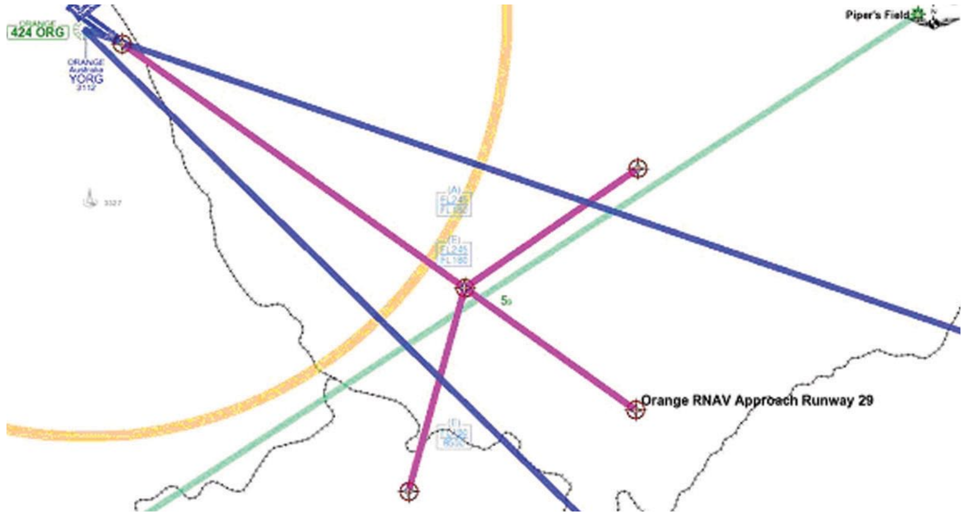
(2) Within 2 months after the effective date of this AD, inspect the bell crank installed in the air brake control circuit and, if any cracks are found, before next flight, replace the bell crank with a serviceable part in accordance with the instructions of Fiberglas-Technik TM-G08/SB-G08 and A/I-G08.

(3) Within 30 days after replacing a bell crank as required by paragraph (2) of this AD, report the inspection results of the removed bell crank to Fiberglas-Technik.

http://ad.easa.europa.eu.
ADs@easa.europa.eu.

CONFLICTS WITH NON GLIDER TRAFFIC

GRAHAM BROWN
Airspace, Airfields and Avionics Officer



We fly our gliders under the Visual Flight Rules (VFR) and most Clubs have a copy of CASA's Visual Flight Rules Guide (VFRG) in the clubhouse. A good knowledge of this document will not only tell you the rules you must fly by in a glider, but will also give you insight into the rules other aircraft are operating under.

See and avoid is the basis of our separation from other aircraft and besides our eyeballs we now use radio and FLARM to assist in this. We all know about lookout and indeed cannot go solo until we have demonstrated good lookout. We talk on the radio to find out where the other gliders are and FLARM indicates the ones that sneak up on us. This is appropriate as glider to glider risk of collision is our greatest in air risk. But what do we do about other aircraft such as the regional airlines, GA aircraft, business jets, air ambulance, bank planes and the 5,000 or so RAAus aircraft also operating in Class G airspace?

Over the years the regional airlines have been very worried about the risk of a collision with gliders. This is why they pushed us to have transponders. They now know it is impractical for us to carry the existing technology and to their credit they have worked with us to develop procedures to improve safety. During this consultation it became apparent that a working knowledge of how each one operates allows insight and guidance to develop procedures to mitigate some of the risk. Knowing the routes, altitudes, aircraft profiles, waypoints, schedules and the like of RPT aircraft helps us avoid each other.

REGIONAL AIRLINES NOW:

- Check our significant Gliding Activity email. So make sure your gliding event is included in it.
- Check NOTAMS for gliding activity.
- Know that gliders thermal under cumulus clouds.
- Route away from some known gliding airfields.
- Brief their pilots accordingly.
- Sometimes call on 122.7 at the top of decent or taxing for take off if they know gliders are around.
- Provide us their routes, RNAV waypoints and schedules.

GLIDERS NOW:

- Use standard CTAF procedures within 10nm of and overflying airfields.
- Stay away from the airlines' likely paths.
- Monitor the frequency the airline will be on if they are in an area of possible conflict. This is usually the CTAF. Most radios can monitor both the gliding frequency and the CTAF simultaneously.
- Alert glider pilots of the schedules and routes of known airline flights.

To take advantage of these procedures you need to be aware of how airlines operate and have situational awareness of their calls in the air.

- **Regional airlines typically cruise at 9,000ft to 17,000ft and start their decent 30nm out. This is outside the CTAF and about 6 or 7 minutes before they land. The decend at 1,500 ft/min to an RNAV (GPS) waypoint at 10/5nm for a straight in approach. They are typically doing 200knots. So be aware if you are in a CTAF or if you are aligned with a runway or a route outside the CTAF as they may be transitioning to/from cruise. On take off they climb at 1100 ft/min at 176 knots. So if you are in this position listen out on the CTAF or better still scan the gliding frequency and the CTAF until you are clear.**

WHAT ABOUT OTHER POWERED AIRCRAFT?

This is where a working knowledge of the VFRG comes in. It helps if you know the calls VFR aircraft will make in the CTAF. Understand the inbound calls of distance, direction, height and time of arrival. Understand the circuits and heights powered aircraft fly.

You should develop your situational awareness to the point where you can decide if a conflict is possible. Understand the circuit calls and the departure calls and again, decide if a conflict is possible. On route, powered traffic will usually obey the hemisphere rule for cruising. That is, headings from 0 to 179 degrees will be odd thousands plus 500ft and headings from 180 to 359 even thousands plus 500ft. They don't change their altitude much and don't suddenly pull up into thermals.

Your greatest in-air risk is another glider, so lookout and communication with other gliders is paramount. Regional airlines have surprised a few glider pilots, usually in the transition to/from their cruise. Be aware these transitions are made just outside the CTAF and they descend and close distance very quickly. GA

SO, YOU WANT TO BE A GLIDING INSTRUCTOR?

DREW MCKINNIE
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Sometimes I am asked about this on the flight line by solo pilots looking to extend their skills and contribution to the club. I am often asked about prerequisites and instructor training opportunities. Recent member feedback to GFA via the members' survey highlighted that some members were confused about the instructor development path. This article addresses these issues, from the perspective of a prospective instructor.

So, you want to be a gliding instructor. The key question is – why? The CFI or Chair of Training Panel will need to understand your motivations and potential, not just your current experience, skill and knowledge. Why do you want to instruct? What will you bring to this role? What strengths and weaknesses do you have? You need to have thought about these factors, and have authentic motivations and realistic expectations. ***Being an instructor is NOT a badge of rank.***

An essential first step is – demonstrate self-improvement. You are a post solo pilot. What sort of airmanship example do you demonstrate to others? How have you demonstrated thorough critiquing of your own flying, and applying lessons learned to improving your flying?

You have a Private Passenger rating. What have your passengers' reactions been like? What good judgments have you applied to look after their safety and comfort? You have a GPC. How well do you react to feedback on the need for improvement? Demonstrably assessing and improving your own flying is a strong indicator of ability to train and develop others.

Your CFI and Training Panel will need to assess (1) what sort of pilot you are, (2) what sort of instructor will you become and (3) what further development is needed - when and with whom?

Your airmanship, judgment, self-discipline and receptiveness to constructive feedback will be important indicators. Your motivations will be crucial. Other characteristics beyond your flying skills and knowledge will be important, like your temperament, your ability to communicate, motivate and persuade, and your listening skills. Instructing requires much more than just flying well.

NEXT FIRST STEP

Study the manuals. The Gliding Australia website glidingaustralia.org , via '**Docs/Forms > Document and Form Library > Operations > Manuals',** will lead you to the GFA Instructors Handbook, Parts 1 and 2**.** Part 1 is very important to a prospective instructor. It describes the instructor training system, the process of training, communications and so on. Its focus is the question of 'How we Train'. Part 2 is also important, in its description of the Content and detail of training particular sequences.

Following the website path to 'Documents > **Manual of Standard Procedures > MOSP Part 2 Operations'** will lead you to a folder with some very important documents. GFA Operational Regulations (OPS 0001) is the overarching regulatory GFA document approved by CASA, which includes the syllabus and assessment criteria for instructors (Annexes 7-9).

Operational Regulations Section 3.4 describes the prerequisites for various instructor ratings, including Air Experience Instructor (AEI) as well as Levels 1, 2 and 3. Medical standards are at Section 3.2. Check these out. We in GFA have to manage an instructor training system that complies with these requirements. Instructors have to meet prescribed requirements and standards.

MOSP Part 2 Operations is the document that describes how we implement the Operational Regulations and manage detailed aspects of operations. It is the go-to manual for running operations. It contains material derived from hard-won experience, including accidents and incidents, good and bad lessons from GFA clubs. MOSP Part 2 Section 11 describes requirements for training instructors at AEI, L1, L2 and L3, plus revalidation and recency requirements. Safe instructing requires safe operations and compliance with standards.

These documents may seem daunting yet they provide deep insights into the instructor development path, responsibilities and accountabilities. Re-reading BGK and questionnaires from the instructor's perspective is also a useful exercise. So, you still want to be a gliding instructor?

AIR EXPERIENCE INSTRUCTOR (AEI)

So, you have a GPC, over 50 hours gliding, C Certificate or better, and your airmanship and flight skills have been checked, with a Panel recommendation for AEI training. You have done well in preparation and are showing your potential.

As far as CASA and GFA are concerned, an AEI is an instructor. The AEI can be trained locally, by the CFI or L3 instructors or approved delegates, or they can participate in initial stages of an ab-initio training course run by the club. An AEI has to be trained to the syllabus in Part 2 of the Instructors Handbook.

The AEI rating gives limited instructing privileges, with constraints on what sequences can be instructed, yet it is a vitally important role. Given that, for many people, their first gliding experience may be with an AEI, it is important that proper foundations of control, lookout and airmanship are instilled from the outset. This in turn requires high standards in training the AEI, developing interpersonal and flight management skills, beyond basic flying skills.

Some clubs consciously train AEIs with a view to having them becoming L1 instructors after a short period of consolidation and training by L3s. In other clubs, AEIs may hold this rating for many months or even years before further progression.

Air Experience Flights (AEFs) are training and instructional flights. MOSP Part 2 Operations Section 11.1 defines an Air Experience Flight as carriage of a person who is a member of the GFA ... for the purpose of experiencing the sport of gliding. AEIs are entrusted to fly with persons other than private passengers for initial experience flights including instruction above 800ft AGL on the fundamentals of control, lookout and airmanship.

Selected AEIs who are also coaches may also provide instruction on specified crosscountry soaring sequences.

GFA supports the introduction of AEIs to attending club Training Panels, along with coaches, tugmasters and instructors, subject to Panel Chair approval. Exposure to Panel discussions reinforces the responsibilities, considerations and challenges of dealing with students, and meeting safety and duty of care obligations for both individuals and clubs. The peer learning environment of the Panel is very important in building future judgment as an instructor.

LEVEL 1 INSTRUCTOR

You've gained an AEI rating and consolidate in your club with Air Experience Flights and more training from your CFI or L3 instructor. This AEI experience normally brings an increased awareness of traps and pitfalls, challenges and positives, many of which are associated with managing the AEF student and managing the flight, but you yearn to do more. So you work on getting the higher prerequisites, work on your self-improvement and airmanship, and draw insights from your AEI experiences.

The next step requires much more study and attention to the GFA Instructors Handbook, Parts 1 and 2, plus some intensive training with your CFI and L3 instructors. MOSP Part 2 Section 11.2.1 and Operational Regulations 3.4.7 describe the preparation required by the club, the training itself, assessment and L1 prerequisites. Some people take a mentored path with club instructors, while many prefer to take the L1 Instructor Course path. GFA supports regions and groups of clubs collaborating to provide training activities for L1 and L2 instructors. Learning from peers and seniors in this environment is challenging, fun and exhilarating!

INSTRUCTOR'S HANDBOOK

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11 INSTRUCTOR TRAINING AND RATINGS

Training of Levels 1 and 2 instructors is carried out by persons who hold Level 3 Instructor authority. Such training may be carried out on a decentralised basis within clubs or, courses may be convened if there are enough candidates to warrant it, the required personnel are available and the necessary number of gliders and tugs can be organised to satisfactorily cover the syllabus.

Training of Air Experience Instructors (AEIs) is carried out at club level by the club CFI or suitable delegate in accordance with the GFA Instructor Handbook.

11.1 AIR EXPERIENCE INSTRUCTOR (AEI)

An Air Experience Flight (AEF) is defined as carriage of a person who is a member of the GFA (which may be short-term or introductory membership, as defined from time to time by the GFA Board) for the purpose of experiencing the sport of gliding. Pilots conducting AEFs must hold an AEI endorsement.

11.1.1 Requirements

- Minimum age 16 years.
- 200 launches or 50 hours total gliding experience. Power pilots may count 10% of their power flying hours towards this total after 10 hours or 50 launches have been gained.
- "C" Certificate.
- Trained within the club by a Level 2 Instructor (or above) in accordance with the syllabus in Part 2 of the GFA Instructor's Handbook.

11.1.2 Privileges and Limitations.

The pilot may demonstrate the glider's controls to the person undertaking the AEF and may hand over control to that person, subject to the following conditions:

- The AEI must carry out all launches, circuits, approaches and landings.
- The AEI is not authorised to allow the other person on the controls below 800ft AGL.
- A pilot holding an AEI rating and a GFA Sport Coach Accreditation may carry out in-flight coaching as defined in Section 12.

11.2 LEVELS 1 AND 2 INSTRUCTORS

The AEI rating is the highest instructor authority which can be obtained within a club. For the Levels 1 and 2 ratings, more formal involvement by GFA Operations is required.

The coordinator of instructor training in a region is the RM/O. No instructor training may take place without the RM/O's approval. When a rating test has been successfully completed, the Level 3 Instructor who carried out the test should endorse the candidate's logbook at the appropriate level. This will serve as interim authority for the candidate to serve as an instructor, pending receipt of the logbook sticker from the RM/O.

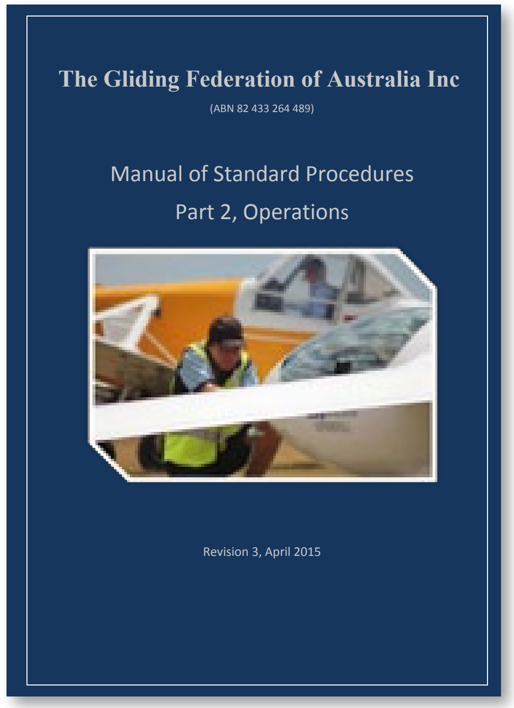
11.2.1 Level 1 Instructor

There are two methods of Level 1 instructor training in place; the common method is by formal training course run over several days within a region, the other is by mentoring. In either case, the preference is for a maximum of two trainees to be assigned to each Level 3 instructor.

Level 1 Instructor training is carried out in three stages, viz:

1. ***Preparation by club***. This is carried out in accordance with the "Club Preparation" section in Part 1 of the GFA Instructor's Handbook. Club

GA


The Gliding Federation of Australia Inc
(ABN 82 433 264 489)

Manual of Standard Procedures
Part 2, Operations

Revision 3, April 2015

Think back to your early training days, pre solo, when 'I learned to fly', then post-solo and crosscountry when 'I really began to learn to fly'. The L1 rating equips you to train others in these sequences, under supervision of a L2 duty instructor. Here you need to 'learn to fly again', managing the environment in which your students learn to fly. Briefings, demonstrations, guided training, feedback and debriefing, overlaid on flight management and student management, add to the instructor's workload and challenge. You learn different ways you might intervene in flight to keep students learning safely and effectively.

The richness of instructing duties is really cemented when you gain the L1 rating and start taking a wider variety of students through a broader range of training sequences. Invariably we have successes and failures, and you gain insights into how instructors and Panels have to work as a team. There are great rewards from making leaps in student performance and progress. Your own learning curve is also enhanced by this experience. Some L1 instructors also move into the coaching program, which has its own advanced skills set.

LEVEL 2 INSTRUCTOR

After some L1 instructing experience, you seek an upgrade to gain the approvals necessary to send people solo and supervise operations. These require the exercise of the L2 instructor rating.

Here, your ability to correctly conduct the training sequences is assessed, but there is greater emphasis on critical judgments that have to be made in assessing student progress, their readiness for solo, their standards in check flights, and their post-solo development.

The bar is set higher for your own flying standards, lookout, airmanship, risk awareness and judgment, plus handover-takeover and student management. The L2 assessment form at GFA Operational Regulations Appendix 9 also highlights L2 roles in operational safety management, operations supervision, discipline, member protection, accidents and incidents, and flight reviews.

Lesson planning, concise communication, mentoring and leadership skills must come to the fore. Your thresholds of intervention in handling situations where students do not respond properly must be developed and checked by L3 instructors. This is about keeping safety standards high.

Transition from L1 to L2 again involves a steep learning curve, 'learning to manage groups of pilots learning to fly'. The pilot assessment process for someone nearing solo also requires you to design flight profiles to test the essential pass-fail criteria, to manage the flight scenarios testing their ability to safely, autonomously conduct solo flights. Here, there is a massive benefit from learning from peer experiences.

Developing L2 candidates requires considerable personal application, help from CFIs and senior instructors, and in most cases working with L3 instructors in L2 upgrade courses.

Level 2 instructors have expanded responsibilities and privileges. Some also take on coaching duties and more post-solo pilot development. Some go on to become Panel chairs and CFIs. All have to deal with the rich tapestry of operational, safety, crew management, student management, interpersonal issues, airfield and ground issues unique to their site and members. There is more to learn!

LEVEL 3 INSTRUCTOR

Here the 'train the trainer' challenge emerges. One of the L3 roles is training and assessing instructors. You learn to fly yet again, this time in the context of learning how to provide the environment in which prospective instructors can acquire and develop their instructing, flight management and student management skills, plus operations supervision and interpersonal skills. There is much emphasis on the content of training and also the process of training. This requires a very different mindset.

There are increased risks in training instructors, so safety and training sortie design and execution are particularly important. Command ambiguity must be avoided, so L3 transitions between instructing and role playing, as students must be carefully managed.

Leadership, motivation and human relations skills are also important. All manner of people issues arise in gliding. Many require discretion and adept handling. For example, managing the behaviour of others, dealing with conflict and potential disciplinary issues, all require effort by L3s to develop requisite interpersonal skills in L1 and L2 instructors.

There is a high bar on experience and ability. Selected L2 Instructors are trained by Regional Managers Operations and nominated by their regional peers. Other L3 roles include accident and incident investigation, often a less than pleasant task, plus conduct of Operational Safety Audits against GFA standards. Participation in Regional Operations Panels also requires collaboration with peers on operations and training systems improvement, managing standards and dealing with emerging operational problems. Level 3 instructor ratings are not a badge of rank. Instructors may move between L2 and L3 roles. Operational Regulations Section 3.4.9 and MOSP Part 2 Section 11.4 also refers.

WHAT ELSE?

Lots! As we move through various Instructor levels, we gain opportunities to support clubs, regions and GFA nationally in various roles. We have found that really energetic people can make a great difference at all levels, and I commend these operations management and support roles to such people. Coaching also provides a complementary framework for pilots to advance their flying skills and performance. We have to remain proficient in our own flying, and take opportunities to enjoy the sport and motivate others! Great instructors are vital to the future of our sport and the growth and development of our members, beyond 3000.

GA

AEROTOWING

AEROTOW LAUNCH TRAINING AND SAFETY – TRANSITION TO LOW TOW POSITION

Recent instructor training and flight instructor refresher courses have highlighted some issues about how we train pilots in aerotow launches, in particular the transition from ground separation to the low tow position.

INITIAL CLIMB

What does the Instructors' Handbook say?

Whether intending to carry out an aerotow in the high or the low tow position, the separation and climb-away stages are identical. The glider will lift off before the tug and should be held at a height of six to ten feet above the ground (about the height of the tug's fin) until the tug also separates. In this situation the glider will be above the tug's slipstream.

If intending to carry out a high tow, this position above the slipstream is maintained as the combination climbs away. Remember that high tow is, by definition, just above the slipstream, not above the tug. The slipstream is the primary reference, not one of the fixtures on the tug.

If intending to carry out a low tow, maintain station above the slipstream as the tug leaves the ground. When the tug is positively established in a climb, move the glider gently but positively down through the turbulence behind the tug until once again in smooth air. The glider is now in the low-tow position. Once again the slipstream is the primary reference. Do not go too low in relation to the slipstream - it is not necessary.

I am aware that some clubs have a standard practice of maintaining the high tow, above slipstream position until a designated height, sometimes 120 or 200 or even 300ft AGL. Various logical reasons are offered, sometimes obstacle clearance or improving the glider pilot's options if a low-level launch failure occurs. Other clubs allow pilots to transition into low tow much lower. Sometimes we see pilots separate from the ground, maintain position just above the grass and let the towplane climb until the low tow position is reached.

So, what is safest? What is correct practice? How would you feel if like many things, the answer is "it depends..."

I prefer to de-emphasise a particular numerical height for this transition from above the slipstream into low tow, as there are many variables:

- towplane type and performance
- glider type and performance, particularly all-up weight (AUW) and towed airspeed
- airfield layout, runway surface condition, slope and climb-out path obstacles
- wind, turbulence and, very importantly, wind gradient

I prefer to instruct, "Transition at a safe altitude above ground, mindful of wind and turbulence, wind gradient close to the ground, obstacles, effective climb rate, glider AUW and ballast, towplane performance and pilot experience."

Regardless of the presence or absence of obstacles on climb, it is important that pilots not allow the tug to climb to the low tow position then follow up, particularly if there is a strong wind gradient and the glider is heavily laden. The tow plane may climb into air moving with higher wind speed, increasing tug IAS, thus increasing lift and tug rate of climb. Meanwhile, the heavily laden glider, lower down, is in air moving with lower wind speed, with a lower glider IAS, lower rate of climb and reduced ability to keep in station just below the slipstream.

We tug pilots have a strong aversion to glider pilots getting too low and pulling our tail down, nose up. You do not want the 'Jesus handle', operated by the tug pilot, to release the tow at the tug end!

There are many variables affecting towplane performance, rate of acceleration and rate of climb. On high density altitude days, hot and high, the effects can be worse. Climbing uphill or towards obstacles usually means a higher transition to low tow, relative to the launch point.

A safe transition height normally seems to me to be in the range 120-200ft, sometimes lower in calm, benign conditions, sometimes even higher in wind gradient, even higher again in rotor and strong wind gradient. The number is really not critical - it simply has to be safe, look right and feel right.

When the glider climbs in high tow, there may be a short transitional period when the combined climb energy is reduced as the glider gains potential energy, and the effect of the glider being in high tow may also affect towplane trim and therefore achieved rate of climb. Yes, climb performance is often better in low tow, BUT being too low in tow will drag the tug tail lower. Energy may then be lost if the towplane pitches the nose lower to reduce drag and regain airspeed and rate of climb. Some towing aircraft are more sensitive to changes in glider position affecting the towplane pitch.

If flying with more ballast or two-up in a heavy glider, get into high tow just above the slipstream and stay there for a while, then transition slowly at a safe altitude, even if there is minimal wind gradient.

With a steady takeoff into wind, minimal wind gradient and an experienced pilot, then the glider pilot may be comfortable transitioning sooner and lower, but the golden rule is 'there is no rush, transition gradually to low tow when safe and when you have an exit route'.

The CFI, Duty Instructor and the Duty Tug Pilot are absolutely entitled to insist on local safety and operational procedures being applied - visiting pilots take note! Happy launches and happy landings!

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LEARNING STYLES IN PILOT TRAINING

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EXECUTIVE OFICER
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The term 'learning styles' recognises that every student learns differently. Technically, an individual's learning style refers to the preferential way in which the student absorbs, processes, comprehends and retains information. In practice all of us use all of the different styles but we have a preferred style which makes the learning easier and more effective. It is important for instructors to understand the differences in their students' learning styles, so that they can implement best practice approaches.

It is generally accepted that there are four core styles [Reference Neil Fleming's VARK model of Student Learning] - Reading/Writing learners, Visual Learners, Auditory Learners and Kinesthetic Learners.

The ideal approach is to change your training method to suit each individual student, but given that instructors don't always know who will getting into the glider next, this is not very practical.

The alternative then is to make sure you include each learning style as a normal part of your instructing technique.

READ & WRITE STYLE

Encourage your students to read the relevant text book or notes. Ideally they should review Basic Gliding Knowledge before they come flying with you, and certainly afterwards. Those who prefer this style will know their checks very early. If the training record refers them to specific sections of the book they will keenly study before their next visit. Don't be surprised when those whose preferred method is not 'read/write' have not done this reading.

VISUAL LEARNERS

Visual learners like to see drawings, photographs, maps, models and so on. Using a model glider to demonstrate effects of controls, a diagram of the circuit drawn in the dirt at the launch point, or a map of the airspace boundaries are all useful tools. Some will really engage with this, others will be staring into space while you do this. But do it anyway.

AURAL LEARNERS

Aural learners are the ones who will be listening keenly, asking lots of questions and discussing topics with other students. When you explain the theory behind the next topic and ask them questions to check their understanding, they will be strong participants. Getting them to explain the circuit, the stall or other subject, to you or to other students, will engage them quite well.

KINESTHETIC LEARNERS

Kinesthetic learners learn best by just doing it - a hands-on approach. They really enjoy getting in the glider and having a go, watching you demonstrate and then trying themselves. They believe in the approach 'when all else fails, read the instructions'. They are more prone to just have a go even if they don't have the skill, which comes with commensurate risk, and could feel frustrated when they have to do the study first.

PROBLEMS

On a busy weekend with a number of students, many instructors only have time' to quickly brief the student and then get into the sky. The aural and kinesthetic learners do fairly well with this procedure and will progress relatively easily. The other learners just won't get it as quickly and may struggle. If this happens each time they go flying, they may feel that gliding is just too hard to learn.

In practice, all learners benefit from all teaching styles, and so instructors do need to include all four in their normal instructing approach so that a full understanding is achieved. This may mean structuring the flight line to enable training time prior to flight.

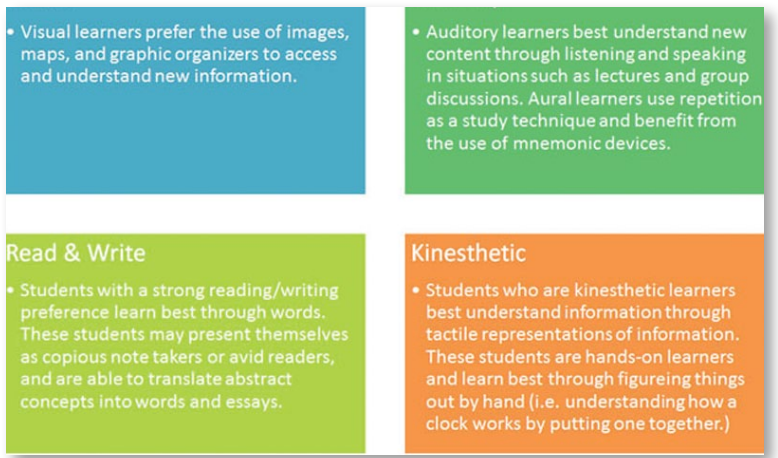
Consider each training syllabus item, such as introduction to stalls.

Read & Write Refer them to BGK pages 55-58

Visual Refer to diagrams from BGK above. Show angle of attack on an aircraft on the ground so they can see what this means. Draw a picture of a stalling wing, and ask them to draw a picture.

Aural Describe the feelings and noise associated with stalling - low noise, buffet, nose attitude may be slightly higher but not overly so. Describe how moving the stick forward removes the problem. Ask them to explain it back to you

Kinesthetic Demonstration in the air. Explain the feeling and the noise and nose attitude signals. Get them to follow you through and move the stick forward for recovery and the impact this has. Get them to practice two or three stalls – let them try and experiment.



DIFFICULT CONVERSATIONS

DREW MCKINNIE
Chair of Operations
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We are all getting older. None of us are getting younger. Yet we still feel young at heart, gliding keeps us young and, for many of us, we put effort into maintaining our fitness to fly. We glider pilots are often self aware, wilful, focussed, achievement oriented and individualistic characters, with a disposition to explore what we can do, rather than what we cannot.

When we analyse accidents and incidents, or conduct an accident investigation, one of the key questions to be answered is pilot fitness to fly and medical status. In assessing the human factors, we also have to assess the possible contributions of fatigue, dehydration, heat stress, overload, distraction, nutrition or other factors eroding pilot wellbeing or ability to maintain situational awareness, airmanship and make safe flying decisions. We have often found that human factors contribute to serious accidents. Therefore, I invite you to look at the GFA accident and incident summaries online and in Gliding Australia, and see for yourself.

Sometimes we are asked about managing the challenges of ageing pilots. Sometimes advice is sought about having difficult conversations with ageing pilots whose safety and airmanship might be falling below levels for safe cross-country or solo flight.

The responsibility for dealing with this comes down to two sets of decisions:

- the individual pilot making responsible decisions about themselves, mindful of their responsibilities to family, friends and other pilots; and
- the training and operations panel, or club operations manager, mindful of their collective responsibility to all pilots, and their families and friends.

Most pilots can self-declare fitness, and some have GP or Aeromedical certification of fitness. Regardless of this regime, it is incumbent upon every pilot to be aware of disqualifying conditions or temporary conditions requiring a pause in flying, or flight with a safety pilot.

I recall a close gliding friend who declared his intention to give up solo gliding when he reached a significant birthday. He enjoyed good health yet was aware of his ageing, and wanted to go out of gliding on a high, with positive achievements and an excellent safety record, not on a low. We had some great cross country flights just before the date of his voluntary exit from solo gliding. He had a big celebration, too. Now he occasionally enjoys a dual flight as a guest. To this date, I admire his clarity of thought and decision process.

Other gliding friends are still flying solo in good health, yet conscious of their limited timespan of solo flying, and are looking at dual seater glider options. Many pilots are finding dual XC flying a particularly satisfying experience and prospect for safe mutual flying. I have heard several pilots discussing the strategy of a graceful exit, mutual flying with a syndicate partner as a safety pilot, doubling the lookout and the enjoyment.

So, how might we have those difficult conversations? I offer these comments as a professional negotiation specialist as well as in my operations role.

- First, focus on the desired outcomes. Mutual safety, enjoyment in a safe environment, positive reputation, positive impacts on self and club members, families and friends if managed properly.
- Second, do not neglect disclosure of risks and discussing possible negatives, particularly if other club members and pilots have raised concerns about a pilot's health, declining skills and situational awareness. In fact, it is your concern for the pilot's well-being that makes this necessary.
- Third, build on common ground, based on graceful exit strategies, to draw the pilot to agree with your preferred options. Mutual flying with colleagues and safety pilots should be on the cards if a two-seater option is available. Emphasise the willingness of colleagues to assist and share flying. If cessation of flying is needed, then emphasise the support and social network still available from other members, through other activities.
- Fourth, be mindful of the collective responsibilities that each pilot has to other pilots, and to families, friends and colleagues. It is not just about the pilot but rather, the community of pilots and the pilot's nearest and dearest. This reminder is sometimes needed to re-frame the outcomes or objectives of this difficult negotiation with the pilot.
- Fifth, be careful about your choice of language and style. Pilot reactions may be strong and emotional. A supportive and collaborative tone is more likely to achieve the desired outcomes than an accusatory tone or ultimatum.
- Sixth, respect confidences and sensitivities. Trust is crucial to successful negotiation of good options. Trust is hard earned and easily lost. Discretion and tact, non-disclosure of confidential information, respect for the needs of the pilot are important.
- Finally, this requires good leadership and a positive club culture. These sorts of difficult conversations should be respectful and the people involved respected, not denigrated. Respect goes to our most fundamental human needs.

Note that this might be a continuing conversation over many encounters, not just a single, difficult encounter. Conversations with other people in the pilot's trusted network can help to influence their decision, to shape the environment in which the pilot has to make difficult decisions about their future in gliding.

I offer a final thought. We will all have to stop gliding one day. We might all reflect on how we would like to do this, on what terms. We need to be mindful of the thresholds that we might apply to ourselves to cease solo flying, fly dual only, or cease flying altogether. Good luck, stay safe and enjoy the best flying you can, while you can!

AIRWORTHINESS ALERT

2015-4

Arcus M Inflight failure of an Arcus M propeller brake system.

The pilot first became aware after engine shut down as the propeller did not automatically stop in the vertical position. The manual brake was also found not to be functional. A landing with engine extended was then carried out without further mishap. It was subsequently found on inspection that the propeller drum brake had catastrophically failed, the remains of the brake drum lying in the bottom of the engine bay. No secondary or further damage was identified.

'Preliminary results show fatigue occurred near the hub and progressed either side towards the rim, with final rupture starting relatively close to the rim. Minor corrosion was found on the fatigue fracture surfaces, indicating more than a short time from crack initiation to final failure'.

The Type Certificate holder has been advised and is in receipt of the preliminary report.

Recommendation

No other failures of this kind have been reported through the GFA reporting system. It is however highly recommended that the brake system of an Arcus M be.

THE RELATIONSHIP BETWEEN THE CLUB COMMITTEE AND THE INSTRUCTORS' PANEL

Club committee members have ultimate responsibility for viability of their club, ensuring appropriate resources are applied, and meeting members' needs. Every management committee provides leadership to the Club by:

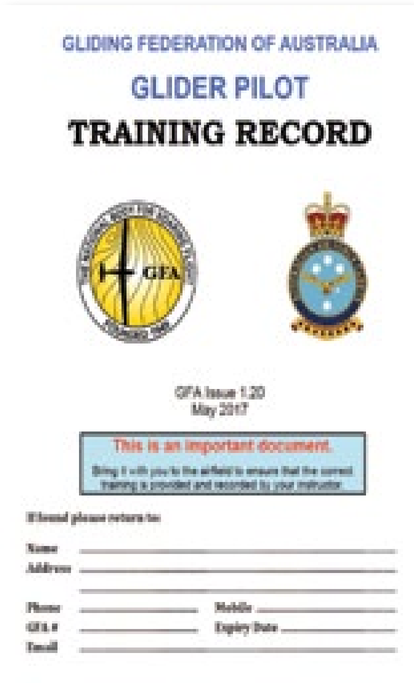
- Setting the strategic direction to guide and direct the activities of the Club;
- Ensuring the effective governance and management of the Club and its activities; and
- Monitoring the activities of the Club to ensure they are in keeping with the founding principles, objectives and values.

The Committee also has responsibility for ensuring compliance with all relevant legal and regulatory requirements, and everything the Committee and the Club does must also be in line with its constitution or other governing document.

However, the Committee's role is not necessarily about doing - it is about ensuring things are done. Usually the day-to-day management of the organisation will be delegated to other volunteers, such as instructors and airworthiness inspectors, although the Committees of smaller Clubs are often much more actively involved.

Due to the specialist nature of flying operations management, the Committee will delegate responsibility for operational standards, safety and training to its subject matter experts - the Club's Operations and Training Panels acting under the leadership of the Chief Flying Instructor, or the Operations Manager of a non-training club.

Although the Club Operations and Training Panels have overall authority, the Committee still remains responsible for the activities of the Panels, and so must be kept appraised of important matters. The Panels should also refer to the Committee for ratification of those matters where it is obliged to make operational decisions, but which border on the rights and responsibilities of the Committee. This is detailed more fully in the GFA Manual of Standard Procedures, Part 2 (Operations) at section 9.1.


GLIDING FEDERATION OF AUSTRALIA
GLIDER PILOT
TRAINING RECORD
GFA Issue 1.20
May 2017
This is an important document.
If found please return to:
Name
Address
Phone Mobile
GFA # Expiry Date
Email

For further reading on Governance and legal duties of office holders, go to this link: https://www.nfplaw.org.au/governance

TERMS OF OFFICE FOR CFIS

I have had a number of members ask about whether it should be mandatory to include term limits for the position of CFI. Those who argue for term limits typically cite the need to bring new blood to the role. A new CFI will bring freshness of insight and changes in the operating climate may require new skill sets. Systematic rotation within the Panel lessens the likelihood that the role of CFI becomes tired and loses vitality.

Those who argue against term limits cite the need for institutional memory and worry about the loss of dedicated volunteers who have a proven track record of participation.

Regardless of where you sit on the issue, experience suggests that Clubs should adopt specific terms in office for all key personnel — of two, three or five years, for example. The fact that there are specified terms allows a Committee to cull out those who have proven to fall short of expectations on leadership, productivity, cooperation, competence, or time and energy. Removal can be accomplished by simply not re-electing the person to another term. The volunteer can be thanked for their service and sent on. Competent and committed key personnel can be re-elected indefinitely, through deliberate decisions. Best practice also allows for development of successors in support roles prior to election into key positions. Excessive churn is not good for a club, nor is stagnation. A healthy position is to strive for regular renewal of office holders and development of new talent.

CHECK FLIGHTS

The amount of flying required in any period of time in order for a pilot to retain a safe level of handling skill and perception, commonly called pilot proficiency, will vary according to many factors such as total gliding time, total flying time in other forms of aviation, the type of gliding being done and of course the pilot himself. A pilot may be current at flying locally but may easily not be current on winching, stalling, spinning, launch failures or outlanding – all the things that hurt people in gliding. For this reason, when on currency requirements for pilots, not only should total hours and launches be considered but also recency in respect of launch failure. Instructors should also consider stall reinforcement and spin recognition/ recovery recency.

It is important to remember that pilots learn and subsequently forget at different rates. Therefore, the length of time a pilot can go without flying a glider or launch type will vary enormously. To fly safely will, to a large degree, depend on the total hours and launches of that pilot, the prevailing conditions in which they operated, and whether the pilot was even current prior to their break from flying. Some of the key factors that may influence the pilot's continuing ability to fly are:

- Pilot experience:
- Hours, launches, number of types flown, number of sites, etc.
- Experience on launch type
- Site factors
- Weather and turbulence
- Purpose of flight
- The individual pilot's well-being, both physical and mental

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Target ZERO
Culture of Safety begins with you
Zero accidents
Zero harm to people

It is also appreciated that many glider pilots engage in other types of flying. However great care should be taken when allowing 'credit' for other types of flying. Some of the skills do carry over, but it is currency in flying gliders that needs to be specifically addressed.

CARRIAGE OF PASSENGERS

There has been some recent discussion on the GFA forum in respect to passenger flying where certain individuals have implied that they, or their club, have been flying passengers in contravention of the Regulations. Clearly many members, including some CFIs and Club Committees, do not fully understand the consequences of conducting passenger flights outside the Regulations. The following points should be noted:

- The carriage of passengers for Hire & Reward is a prescribed commercial operation under Civil Aviation Regulation (CAR) 206(1)(b). Commercial operations in gliders can only be conducted with CASA approval via the issue of an Air Operator Certificate (CAO 95.4, paragraph 4.1). A breach of the Civil Aviation Regulations under CAR 207(1) 'Using an Australian Aircraft in a class of operation not approved by CASA', is 50 Penalty units.
- For private passenger carrying and Charter flying, a breach of CAR 228 'Unauthorised persons not to manipulate controls' is 50 Penalty units.
- A Commonwealth penalty unit is currently $180.

Flying passengers for 'Hire and Reward' without complying with the Civil Aviation (Carriers' Liability) Act is much more serious. This Act states at paragraph 41E(1) that a person "must not engage in, or propose to engage in, a passenger-carrying operation, unless an acceptable contract of insurance in relation to the operation is in force." A person who intentionally contravenes paragraph 41E(1) commits an offence punishable on conviction by imprisonment for a period of not more than 2 years.

To avoid falling foul of the law, Clubs, CFIs and individual members must ensure their operations are conducted strictly in accordance with the Rules and Regulations.

A simple document to explain the correct procedures can be downloaded from the GFA Documents Library at this link: http://tinyurl.com/mxtbrzk. The document is A3 size and suitable for printing as a poster. An Operations Advice Notice is also available from the GFA Documents Library at this link: http://tinyurl.com/n3jkygd

CHARITY FUNDRAISING FLYING

Under certain circumstances, CASA allows private pilots to carry paying passengers during charity fundraising events. This is a departure from the normal rules. In most situations where passengers are paying for a flight, Civil Aviation Legislation requires the pilot to hold an Air Operator's Certificate. In the case of charity fundraising flights, however, CASA feels that the public benefits justify extending the privilege to private pilots subject to certain rules. The circumstances and rules relating to the conduct of charity passenger flights are explained in Operations Advice Notice (OAN) 01/17 that can be downloaded from the GFA Documents Library at this link: http://tinyurl.com/kle94rx

AIRPROX EVENTS IN CLASS E & G AIRSPACE

We continue to get reports of air proximity events (sometimes described as near collisions) between gliders and the Regional Airlines, and these predominantly involve operations where the glider is not flying in the company of another glider. The following is a reminder to pilots.

The Airservices Australia Aeronautical Information Publication (AIP) notes that glider pilots are encouraged, but not required, to monitor the area VHF when operating above 5,000ft in Class G airspace. The AIP further states: "Except for operations in controlled airspace, gliding operations may be conducted no-radio, or may be on frequencies 122.5MHZ, 122.7MHZ or 122.9MHZ, which have been allocated for use by gliders. ... Except when operationally required to maintain communications on a discrete frequency listed above, glider pilots are expected to listen out on the area VHF and announce if in potential conflict." The GFA Airways and Radio Procedures manual states: "Gliders are encouraged, but not required, to monitor the area frequency when operating in Class E Airspace."

This exemption from the Rule exists to allow glider pilots to communicate on one of the discreet safety frequencies when flying in the company of other gliders to enhance situational awareness. However, where a pilot is flying alone, they should monitor the Area Frequency as an aid to collision avoidance. Pilots must also be fully competent in utilising and dual channel monitoring and scanning capabilities of their radios, and use placards or checklists of appropriate frequencies for their area of operations.

For further information, refer to OSB 02/14 'See-and-Avoid for Glider Pilots' at this link:

tinyurl.com/k6k7mwk

Annual Flight Review Reminder system

The Annual Flight Review reminder system is now up and running but in order for it to work, members need to advise GFA of the date of their next review. This data will be collected at annual renewal time, so please ensure you record the 'Next Annual Flight Review' date in the space provided on the online renewal form. For further details, refer to MOSP 2, paragraph 10.4.1 'Annual Flight Review Validation Period'.

AIRCRAFT FLIGHT MANUALS

GFA has an exemption to CAR 139 (1)(e), which requires the aircraft flight manual to be carried on board at all times, providing cockpit placards are fitted detailing

continued over page

AREA FORECASTS GO GRAPHICAL

CHANGES TO LOW-LEVEL AREA FORECASTS COMING NOVEMBER 2017

The Bureau of Meteorology (BoM) will be changing the format of Area Forecasts from text based to graphical on 9 November 2017. The new format Graphical Area Forecasts will provide more useful and user-friendly data for glider pilots.

Over the last two years, GFA has worked with other sporting aviation groups, the aviation industry and BoM to transition from current Area Forecasts (ARFORs) to Graphical Area Forecasts (GAFs).

Many aviation users had requested that BoM transition to more intuitive graphical products, with less reliance on interpreting abbreviations and locations in long text strings. No, this does not mean plain language forecasts, but combining graphics with clearer text describing variations in conditions with location will be more user-friendly. These changes will also ensure GAFs comply with International Civil Aviation Organization's (ICAO) Annex 3 specifications.

The Bureau of Meteorology currently produces ARFORs for 28 areas across Australia. ARFORs are in a text format, with an overview detailing the general meteorological situation followed by sections giving more detailed forecasts of various meteorological parameters. ARFORs often have to describe zones where different conditions are expected, using text such as 'N or S of line joining YSWG-YSCB-YSNW'.

THE CURRENT ARFORS WILL BE REPLACED WITH TWO NEW PRODUCTS FROM 9 NOVEMBER

GRAPHICAL AREA FORECASTS (GAFS); AND GRID POINT WIND AND TEMPERATURE FORECASTS (GPWTS).

Graphical Area Forecasts - GAFs. First, GAFs will provide information on weather, cloud, visibility, icing, turbulence and freezing level in a graphical layout with supporting text in a tabular format.

The GAFs will not only be quicker and easier to interpret but will also allow greater flexibility when distinguishing between weather boundaries, allowing more detailed forecasts to be produced. For example, if a pilot was planning a route below FL100, a check of the image will give a visual indication of conditions expected. For more details on these conditions, the pilot would then obtain this from the relevant section in the associated table. Examples of GAFs are shown below.

GAFs will be produced for 10 areas across Australia. GAF areas will be NSW-E, NSW-W, NT, QLD-N, QLD-S , SA, TAS, VIC, WA-S, WA-N, instead of the area numbering format currently used. The vertical extent of GAFs will remain the same as the current ARFORs (surface to 10,000ft).

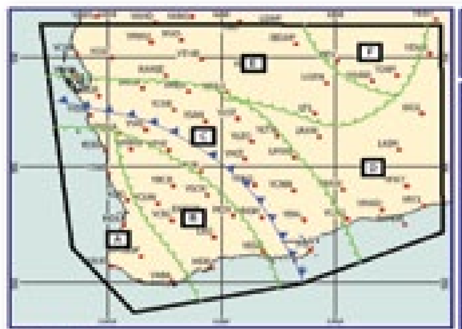
Grid Point Wind and Temperature Forecasts – GPWTs. Secondly, GPWTs will include wind speed and direction and temperature forecasts at specified heights above mean sea level presented in a gridded format. Low level GPWTs are now online in Aviation Forecasts – Aviation Charts at http://www.bom.gov.au/aviation/charts/grid-point-forecasts/

Low level GPWT charts will be at higher resolution, 1.5 degrees, with wind and temperature data for 1,000ft, 2,000ft, 5,000ft, 7,000ft and 10,000ft. They will be useful to glider pilots for flight planning purposes, such as selecting the best altitude for a particular flight. Pilots can interpolate data to determine winds and temperatures at any location between grid points, or at other levels and times than those charted.

For example, at Canberra Gliding Club at Bunyan, near the Snowy Mountains, the GPWT provides more accurate and relevant wind and temperature data than the data currently in ARFORs, developed for a much larger area of NSW. GPWT data is provided down to ground level AMSL, so high ground may have blank data at 1,000ft and 2,000ft.

Glider pilots will notice the following changes from 9 November 2017:

GAFs produced for NSW-E, NSW-W, NT, QLD-N, QLD-S , SA, TAS, VIC, WA-S, WA-N, from surface to 10,000ft.



All heights AMSL
TS / CB / TCU implies SEV ICE and SEV TURB
CU / SC / AC implies MOD TURB
CLD ABV FZLVL implies MOD ICE
Speed of movement in KT
→ refers to Limit of Forecast
≡ refers to Critical Locations
Check AIRMETs, SIGMETs and NOTAMs

REMARKS:

For more information contact (08) 9263 2256

Graphical Area Forecast SFC - 10000FT WA-S
Issued at 170308041S - Valid 080500 to 081100
Weather Features valid at 080500
Australian Government Bureau of Meteorology

AREA	SURFACE VIS AND WX	CLOUD, ICING AND TURB	FZLVL
A	>10KM NIL	BKN CU/SC 3000/ABV10000FT	6000FT
	3000M SCT SHRA	ISOL TCU 2000/ABV10000FT BKN ST 0800/2000FT BKN CU 2000/ABV10000FT	
B	>10KM NIL	BKN CU/SC 2000/ABV10000FT	6000FT
	3000M SCT SHRA	ISOL TCU 2000/ABV10000FT BKN ST 0800/2000FT BKN CU 2000/ABV10000FT	
	2000M ISOL TSRA	ISOL CB 2000/ABV10000FT BKN ST 0800/2000FT	
C	>10KM NIL	BKN CU/SC 2000/ABV10000FT	5000FT S OF 32S, 7000FT N OF 32S
	2000M WDSPR SHRA	ISOL TCU 2000/ABV10000FT BKN ST 0800/2000FT OVC CU/SC 2000/ABV10000FT	
	2000M ISOL TSRA S OF YNSM	ISOL CB 2000/ABV10000FT BKN ST 0800/2000FT	
D	>10KM NIL		9000FT
E	>10KM NIL	SCT CU 4000/9000FT	ABV 10000FT
	5000M ISOL SHRA	ISOL TCU 4000/ABV10000FT BKN ST 2000/4000FT BKN CU 4000/9000FT	
F	>10KM NIL		ABV 10000FT
	3000M SCT RA	BKN ST 2000/4000FT BKN AC/AS 9000/ABV10000FT	
	2000 ISOL TSRA	ISOL CB 5000/ABV10000FT BKN ST 2000/4000FT	

Instead of the ARFOR 'Overview' text, GAFs will contain an image of the forecast area, divided into smaller areas with common characteristics of weather, visibility or cloud that change in a similar fashion during the period of the forecast.

Significant weather features such as troughs, fronts, tropical lows and tropical cyclones will be shown on GAF images, with their direction and speed of motion.

Detailed information about the conditions experienced within areas displayed in the image will be provided in a tabular format.

Validity periods will be standardised across Australia. GAFs will be valid for 6 hours, with two consecutive products issued at time of issue, providing a forecast for 12 hours.

GAFs will not be amended. Advice of an amendment for deteriorating conditions in a GAF will be solely in the form of an AIRMET and/or SIGMET.

Corrections will be made to GAFs for improvements in conditions, and typographical errors.

Low-level winds and temperatures will be provided in Grid Point Wind and Temperature (GPWT) forecasts for nine areas across Australia covering the domains of the GAF products.

Area QNH boundaries will be modified to align with the GAF boundaries.

These changes to ARFORs are part of a larger project at the BoM, with changes to SIGMETs and AIRMETs already implemented in 2016 to comply with ICAO Annex 3 specifications. These changes have led to the production of SIGMETs and AIRMETs with fewer typographical errors in a more standardised format, issued in a more timely manner.

These changed products and improvements will come into effect on 9 November 2017.

Further information can be found on the Bureau's aviation 'Knowledge Centre' web page at www.bom.gov.au/aviation/knowledge-centre/. A detailed GAF User Education Guide and A3 Summary Poster are available. Please send questions, comments or requests for further information to: webav@bom.gov.au and cop@glidingaustralia.org as appropriate. Electronic Flight Bag vendors including OzRunways and AvPlan are expected to soon issue updates to include GAF and GPWT data.

Many thanks to Amber Raman and Ashwin Naidu at BoM for their assistance with this article and graphics.

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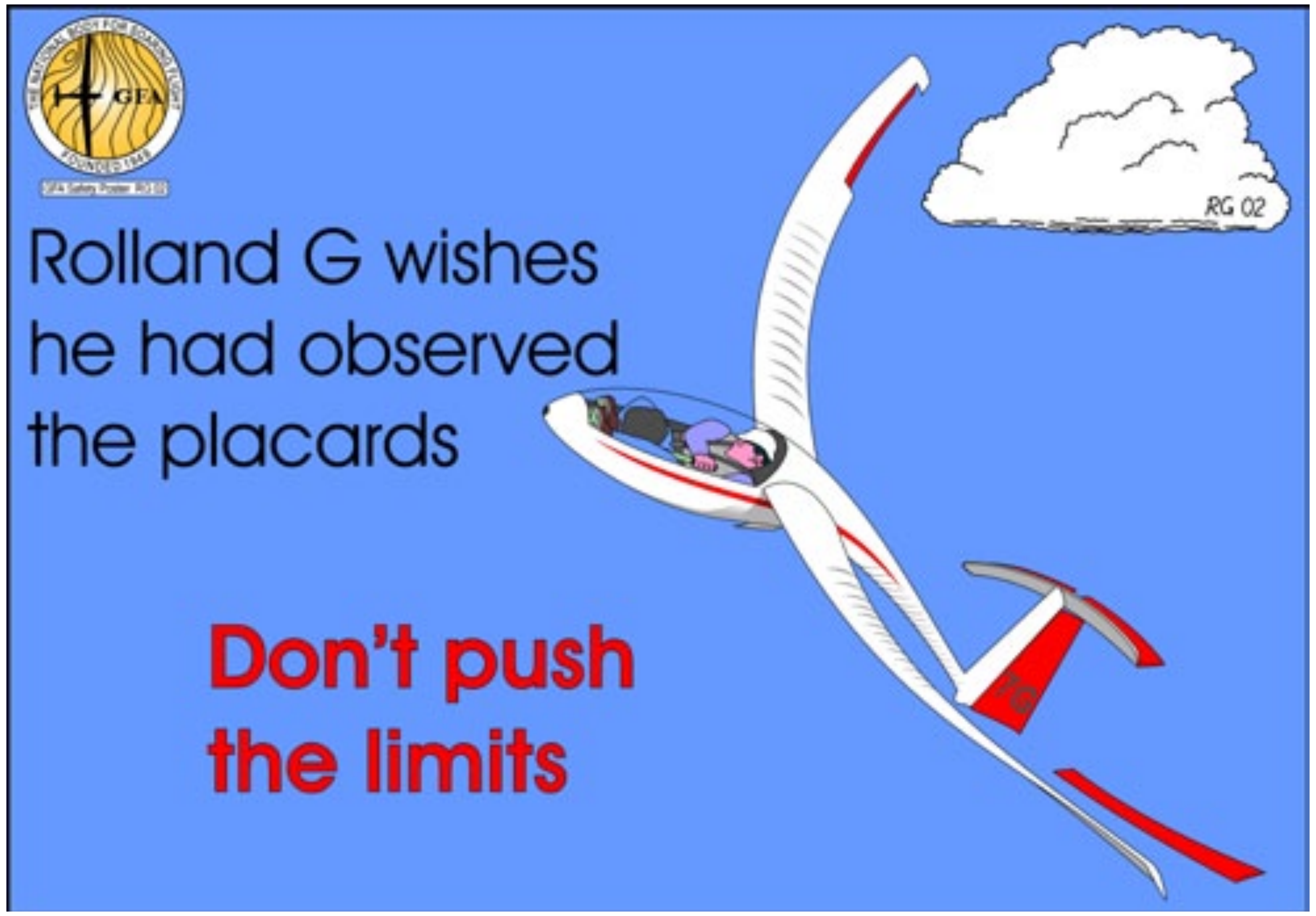

This article has been published with the kind permission of the author who works in the firm's Sydney office. While written for a broader aviation audience, the thrust of the article is relevant to all of us who fly sailplanes.

The GFA regulation in respect of flight reviews is contained in the GFA Operational Regulations at paragraph 3.3.5, which states: "A solo pilot shall undergo an annual competency check (Annual Flight Review) in accordance with the GFA Instructors Handbook." This means a pilot must not fly a sailplane in command if the pilot has not, within the period of 12 months immediately before the day of the proposed flight, satisfactorily completed an annual flight review.

OPERATIONS
If you have any questions
or feedback please contact me

CHRISTOPHER THORPE
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Further guidance material on the conduct of Annual Flight Reviews is contained in Operations Advice Notice (OAN) 02/12 that is available on the GFA website.

Flight Reviews Minimise Mid-Air Surprise and its Costly Consequences

BY KRISTIN HIBBARD, ASSOCIATE, HWL EBSWORTH LAWYERS

Many people believe that flying is a much safer form of travel than driving. In particular, the safety of Australian airlines and aviation agencies are highly regarded internationally. Nevertheless, the consequences of an aviation incident can be devastating and ongoing vigilance is necessary to ensure high standards of safety endure.

Pilot competency is a significant factor in the safety of our aviation industry. The stringent training of pilots ensures they are able to get themselves and their passengers back on the ground safely. This training becomes particularly important when disaster strikes. The remarkable talents of pilots have regularly averted, or minimised, disaster in a range of scenarios, including when engines have failed mid-air, fires have ignited on board and during adverse aerodynamic situations. Pilots are trained to remain calm and confident when an emergency strikes. Most recently, a pilot on the NSW north coast made an exceptional emergency landing after his light aircraft lost power above a caravan park.(1) It is therefore essential that pilots maintain their proficiency with regular training and checks.

The Civil Aviation Regulations 1998 provide that both private and commercial pilots must not fly an aircraft as pilot in command if the pilot has not, within the period of two years immediately before the day of the proposed flight, satisfactorily completed an aircraft flight review. Aircraft flight reviews were an initiative of the US Federal Aviation Administration, and they provide pilots the opportunity to restore degraded skills and gain new knowledge. A recent investigation by the Australian Transport and Safety Bureau (ATSB) highlighted the importance of pilots taking every opportunity to refresh their knowledge and skills, at a minimum by undertaking a flight review every two years. In April 2012, the owner-pilot of a Cessna 150 aircraft was manoeuvring his aircraft at low level when the aircraft aerodynamically stalled. The aircraft subsequently crashed and the pilot sustained fatal injuries. A subsequent investigation by the ATSB revealed the pilot had not completed a flight review for a number of years, which increased the risks of flying the aircraft.(2)

The number of flight hours accumulated by a pilot does not alleviate the need to conduct regular flight reviews. Even pilots who fly regularly can lose proficiency in non-routine procedures and in the recognition and avoidance of risks, which may be restored by completing light reviews. Notably, a recent report by the ATSB examined pilot experience and competence and found that the overall performance of low-hour pilots matched that of higher hour pilots, with the only difference being how many exceeded the required standard.(3) It remains essential for all pilots to undergo regular flight reviews.

Compliance with the Civil Aviation Regulations, and in particular the satisfactory completion of an aircraft flight review, can also affect insurance coverage. In Johnson v Triple C Furniture and Electrical P/L [2010] QCA 282 the Queensland Court of Appeal considered the insurance coverage of a pilot who had failed to complete an aircraft flight review within the period of two years immediately before the day of subject flight. There, the aircraft owner's insurance policy contained an exclusion clause which provided that the policy did not apply while the aircraft was operated in breach of communications issued by the Civil Aviation Safety Authority (CASA) from time to time.

CASA communications were defined as "recommendations, regulations, orders or bylaws, which would be regarded as an appropriate authority by aviators … in relation to airworthiness, air navigation and the legal operation of the aircraft …" Such communications included the Civil Aviation Regulations, with which the pilot had failed to comply. The Court ultimately concluded that the insurer was entitled to decline indemnity on the basis the pilot had not completed his aircraft flight review. Consequently, a failure to complete an aircraft flight review may leave an aircraft operator exposed to significant losses and/or claims for which they are not insured.

Flight reviews are just one important way in which the continuing proficiency of pilots is ensured, and consequently the safety of flight.

As safety is always a key priority for the aviation industry, it remains important that all industry participants continue to comply with relevant laws and industry standards.

1 http://www.abc.net.au/news/2013-07-07/light-aircraft-narrowly-misses-crash-landing-near-casino/4804458
2 Australian Transport Safety Bureau, Collision with terrain involving Cessna 150, VH-UWR, AO-2012-059, Final – 18 June 2013
3 Australian Transport Safety Bureau, Pilot experience and performance in an airline environment, AR-2012-023, 17 July 2013procedures.

GA

SAFETY PAYS **Recognising that education is more important than documentation, the Safety Committe is offering a cash prize of $50 for the best safety story submitted to the magazine. On top of this, there is a $300 cash prize for the best story of the year.**

Sharing information of incidents and occurrences is a great way to raise awareness of safety issues so please help your fellow pilots learn from your experiences. Details of how to write and submit your stories are on the Safety home page of the GFA website. www.glidingaustralia.org/GFA-Ops/Safety

DON'T DO WHAT I DID

It is amazing how many things can and do go wrong on airfields every day and every week. Let's try to learn from the experiences of others. The following tale describes an issue that is high on our list of Occurrence reporting and one that accounts for almost 10% of reported incidents.

It was a fine day, with light NE winds swinging to ESE. We were using runway 34 and a club regatta was in progress. Two tugs were operating - a Pawnee and an Auster, the latter of which was also being used to train tow pilots.

I had finished the tow pilot training and had to taxy the Auster down runway 34 to refuel. I was asked if a small boy could occupy the right hand seat for the taxy back. No problem, so I strapped him in and gave him a headset so that he could feel like a real pilot. I checked that there was no launching in progress and that the base and approach for runway 34 was clear of traffic. I fired up the Auster and gave a taxy call before entering the runway. The small boy was having trouble seeing where we were going so I put on a little extra power to raise the tail so that he had a better view. At this point I noticed that the radio master switch was in the 'off' position and I turned it on. No sooner had I switched on the radio that I heard a circuit call and at the same time saw a glider turning finals for runway 16 on a reciprocal heading! By this time the Auster had just lifted off the ground, much to the delight of the small boy but to the embarrassment of the pilot. I closed the throttle, landed somewhat firmly and exited the strip hastily, weaving through some newly installed solar powered flare-path lights to avoid them. The glider landed normally. Whew!

LESSONS

- On light and variable wind days consider the distinct possibility that pilots may elect to use a different runway.
- Double check radio is properly selected before entering runway.
- Don't try to impress small boys, or anyone else for that matter, with your prowess. It can so easily come unstuck.
- Stupidity will override experience at any level.
- Aviate, Navigate, Communicate

OBSERVATIONS FROM THE EM/O

This incident highlights the importance of completing cockpit checks, even when only taxying around the aerodrome. Since good radio discipline is the key to preventing runway incursions at uncontrolled airports, it is important to ensure the radio is switched on and operating before starting to taxi.

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ACCIDENTS & INCIDENTS FEBRUARY / MARCH 2015

All clubs and all GFA members are urged to report all accidents and incidents promptly using the using the GFA's occurrence reporting portal at glidingaustralia.org/Log-In/log-in-soar.html as and when they occur.
This is always best done while all details are fresh in everyone's mind.

1/02/2015 GQ
AIRCRAFT CONTROL LS7
An experienced and current pilot was undertaking his first flight in a new type. During landing, the pilot misjudged the flare and touched down heavily.

2/02/2015 VSA
LOW CIRCUIT DG-300 ELAN
The pilot was competing in a local competition. Conditions on the day were weak and the pilot was the first of the competitors to launch. The pilot released in weak lift but failed to centre it and so headed off in search of better air. Despite making a number of attempts to climb in weak lift, the pilot found himself at low height on the dead side of the circuit. The pilot commenced a right-hand circuit but flew too far downwind for the conditions and completed a very low base and final turn onto the runway. The pilot recognised after the event that he could have safely conducted an outlanding or modified his circuit to land on another runway. Potential causal factors include fatigue due to lack of sleep the previous night, poor pre-flight preparation due to interruptions, and task fixation leading to a failure to break-off the flight at a safe height. The pilot later advised that he will develop personal minima for breaking off the flight and focus on planning his circuit to ensure the final turn can always be completed at a safe height.

2/02/2015 NSWGA
AIRCRAFT CONTROL ASK21
Returning from a local training flight, the Air Traffic Controller informed the pilots that wind speed had picked up to 20kts and suggested a crosswind landing be conducted on another runway. A circuit was flown appropriate to the conditions and a crabbed approach was conducted due to the crosswind. Just as the trainee rounded out, the glider flew into a wind shadow area caused by the hangars and dropped to the ground heavily, yawing to the right. Neither occupant was injured but the aircraft suffered minor damage to the left wingtip and the tail wheel tyre rolled off the wheel rim. When flying in strong wind conditions pilots should take into account the effect of curlover or wind shadow when setting their aiming point.

3/02/2015 WAGA
WEATHER GROB G 109B
The pilot was keen to return to his home airstrip and self-launched into a storm front. The glider experienced strong lift to 10,000ft. The pilot tried but was unable to outrun the fast moving front and was engulfed in a violent sandstorm. The pilot successfully landed at the home airstrip in the rain. Pressing on into adverse weather is one of the major causes of accidents in general aviation. Pilots who fail to plan for the weather conditions, who do not properly assess the weather during flight, or who decide to continue to fly in marginal conditions are exposing themselves to unnecessary risk of an accident.

9/02/2015 VSA
TERRAIN COLLISIONS ASW 20
The glider was being launched from the winch release by a low powered RA-Aus tow plane, in cross-wind conditions and on a grass runway. The pilot had set full negative flap and a small amount of airbrake to assist with aileron control, and trimmed full forward. The initial roll was normal. During acceleration at about 20kts, the airbrake was retracted and the flap was moved to negative 2, when the right wing dropped rapidly and the glider became quickly out of station 20°. The pilot released, at which point the trajectory headed towards a wire fence. Maximum braking was applied and the pilot deliberately ground-looped. As the glider decelerated it impacted a shallow drain and stopped parallel to and up against the fence. The aircraft suffered substantial damage, including distortion to undercarriage assembly from side loads, and de-lamination of one lower attachment point. There were also extensive wire scoring and scratches to port wing lower and flap under surfaces, and a wire scratch to left-hand side of canopy. Aerotowing off the belly

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SAFETY CULTURE : REPCON

WHAT IS REPCON?

REPCON is a voluntary and confidential reporting scheme. REPCON allows any person who has an aviation safety concern to report it to the ATSB confidentially. Protection of the reporter's identity and any individual referred to in the report is a primary element of the scheme.

www.atsb.gov.au/voluntary/repcon-aviation

During WGC Benalla a REPCON was made to the ATSB relating to the safety culture at the championships. Below is the detailse responce made by the GFA to the report

REPORTER'S CONCERN

The reporter expressed a safety concern related to the safety culture which was encouraged and allowed to continue at the recent World Gliding Competition held at Benalla in January 2017.

The reporter advised that there was known risk taking and aggressive flying from competitors which has resulted in at least two mid-air collisions during the competition.

There are videos posted on the competition YouTube channel taken by pilots holding hand held cameras in the cockpit of a single seat glider while flying in a thermal with multiple gliders in the area. These 'gaggles' require full pilot attention to the actual flying in the thermal, but also to maintain separation from the multiple gliders flying in close proximity. These videos are an example of the known behaviours, which were allowed to continue during the competition – being rewarded by posting on the competition channel – rather than the pilot being educated on the safety implications.

REGULATOR'S RESPONSE (REGULATOR 1)

The Gliding Federation of Australia Inc (GFA), the organisation responsible for the administration of sport and recreational gliding and sailplane activities in Australia, was supplied with the report. The following is a version of the GFA's investigation report:

The Gliding Federation of Australia Inc. has investigated the reported concerns, namely that:

- the competition organisers 'encouraged and allowed to continue at the recent World Gliding Competition held at Benalla in January 2017' a negative safety culture.
- 'there was known risk taking and aggressive flying from competitors which has resulted in at least two mid-air collisions during the competition.'
- there were 'videos posted on the competition YouTube channel taken by pilots holding hand held cameras in the cockpit of a single seat glider while flying in a thermal with multiple gliders in the area.'
- 'these 'videos are an example of the known behaviours, which were allowed to continue during the competition – being rewarded by posting on the competition channel – rather than the pilot being educated on the safety implications.'

AGREED ISSUES

The Gliding Federation of Australia Inc (GFA) agrees that there were two mid-air collisions between gliders during the 2017 World Gliding Championships (WGC2017). These are the subject of investigation by GFA, and were reported to ATSB and CASA in accordance with our agreements and obligations.

The first accident resulted in minor air-to-air contact, with both gliders landing safely and pilots uninjured. The second accident resulted in loss of both gliders, bail-out action by both pilots and some consequential injuries. These facts are not disputed.

GFA agrees that there are YouTube videos taken by pilots flying single-seater gliders while flying in thermal gaggles with multiple other gliders in the area, including on the WGC2017 YouTube channel. The presence of gliding inflight videos and related comments on social media is not disputed.

DISAGREED ISSUES

GFA specifically disagrees with allegations that the World Gliding Championships 2017 organisers have either:

- encouraged or allowed to continue an unsafe safety culture
- encouraged or allowed to continue unsafe airmanship standards and operational practices
- encouraged risk taking and aggressive flying practices
- rewarded pilots for unsafe behaviours, rather than pilots being educated on safety implications.

This response provides context on:

- how safety and operations in the 2017 World Gliding Championships were managed
- specific pilot safety briefing topics and presentations, addressing risks in gaggle flying and flying in close proximity to other gliders in competition, and pilot behaviour and risk appetite
- task setting arrangements and other responses to reduce the risks of large gaggles forming or collisions with other aircraft
- the primacy of Pilot In-Command responsibility for in-flight actions and decisions.

OVERVIEW

Sensationalised reports, although very good at generating public attention, are seldom balanced or objective and this report is believed to be no exception.

Our investigation did not reveal any evidence to support the allegation that the organisers were fostering a negative safety culture. To the contrary, investigations revealed that the organisers had a strong focus on risk management during the competition period as we will elaborate further.

During the course of the competition, there were two mid-air collisions and two near misses.

Each of these are being investigated, and analysis suggests the limitations of both single pilot operations and 'see-and-avoid', coupled with blind arcs and field of view limitations contributed to these events. While the reporter was correct that there were videos posted on social media by pilots using hand-held cameras, the use of hand-held cameras was the exception rather than the rule. When it was brought to the attention of the organisers, pilots were briefed not to use them and, to the organiser's knowledge, all pilots complied.

DANGEROUS RECREATIONAL ACTIVITY

Gliding is a 'dangerous recreational activity' because it involves the significant risk of physical harm and a risk will be 'significant' if there is a real chance that it will materialise.

Some level of physical risk is implicit to any sport and recreation. Like many sports and recreational activities, gliding involves high-speed, extreme effort, exposure to height, close proximity to other aircraft and environmental factors such as the weather.

To the outside observer, such risks may be considered unacceptable. However, participants accept that risk is involved when participating in these activities. At the same time, the organisers are aware of their responsibility and take steps to support the safety of participants, spectators, volunteers and the general public.

COMPETITION STATISTICS

The competition commenced on 5 January 2017 with the first of three practice days. These practice days allowed the organisers to fine tune their operations and identify risks that were not previously foreseen.

The competition commenced in earnest on 10 January 2017 and over the course of the next ten days, pilots flew tasks on eight days, although some classes flew more task days than others due to poor weather conditions precluding the launch of the entire fleet.

During the course of the event, the organisers were launching, from a single runway strip, up to 115 gliders each day in under 90 minutes. Over the course of the event, the thirteen tow planes conducted 1,019 glider launches, and self-launching sailplanes flew 105 launches.

There were a total of 3,267 movements at Benalla airfield, Victoria (Vic.), over the 17 days of the competition. The glider pilots flew tasks of up to 750 kilometres in distance and covered over 450,000 kilometres during the period; flying as far afield as Rankin Springs and West Wyalong, NSW to the North, Mount Beauty, Vic. to the East, Thornton, Vic. to the South and St Arnaud, Vic. to the West.

COMPETITION RISK MANAGEMENT

The organisation

Planning for the 2017 World Championship spanned more than two years and a robust Risk Management Plan was developed and tested during the January 2016 'pre-world' championship event that was also run from Benalla, Vic. The organisers applied a clear process to identify risks, set an acceptable level for risks and took steps to keep risks at that level. Risks were managed by assessing potential consequences and likelihood, working out clear actions and designing a response plan. The organisers also met with emergency service personnel, CASA staff and the aerodrome operator to assist in the development of the risk management plan.

Key responsibilities were assigned to specific people in areas such as operations management, task setting, marshalling gliders and launch operations. Risk review processes were implemented, registers of occurrences and complaints were maintained and monitored, risks were reviewed, communication and consultation processes were implemented, and all team members were trained on risk management. In fact, all of the organisation team, contractors, volunteers, and participants involved in the event were informed and aware of the risk management process.

On each flying day the organisers sent an email advisory to all major airspace users in the task area. The advisory provided details of the task area, operational altitudes expected for the day, the direction gliders would be heading, and estimated arrival times at nominated 'choke points' on the return to Benalla.

RULES AND GOVERNANCE

The organisation, rules and governance arrangements for the 2017 World Gliding Championships (WGC) at Benalla are provided at the competition website.

The championships were conducted in accordance with Fédération Aéronautique Internationale (FAI) Rules, as managed by the International Gliding Commission (IGC).

These rules include task setting, starting, finishing, scoring and operational requirements.

The rules also mandated use of FLARM (FLARM is an EASA-approved electronic system used to selectively alert pilots to potential collisions between aircraft. It is not formally an implementation of ADS-B, as it is optimized for the specific needs of light aircraft, not for long-range communication or ATC interaction) to aid in collision avoidance, and the wearing of parachutes in competition flights. Note that these rules did not exclude flying in gaggles in thermals, nor team flying practices to provide competitive advantage. The FAI Competition Rules were supplemented by Benalla Local Procedures. This document also summarises the competition organisation and names of officers in various roles.

Pilots also had access to the GFA Competition Safety Pack dated October 2013, which contained detailed operational safety guidance for competitors, including lookout and collision avoidance issues. This was a reference document for the Mandatory Pilots Safety Briefing conducted on Thursday 5th January.

THE ORGANISING TEAM

The WGC Contest Director was, an experienced world competition pilot and GFA Executive member. While he had overall responsibility for the safe and effective conduct of a viable competition activity, he was assisted by a large team of officers and operational staff, each contributing to safety outcomes.

Another experienced international competition pilot, was the competition Task Setter, responsible each day for designing and setting cross-country soaring tasks for three separate classes of gliders, cognizant of meteorological conditions and available soaring time.

An experienced pilot and instructor, was the appointed Safety Officer, representing the GFA Operations Department in the competition organisation. He conducted and arranged daily safety briefings during the competition. He also advised the Competition Director on safety issues, liaised with GFA Executive Manager Operations on accidents and incidents, and worked with both Team Captains and the Pilots Safety Committee on issues of concern. He assisted in investigation of the collision accidents. He also worked with the Contest Director and Task Setter on spatial and temporal aspects of task design to reduce the probability of large thermal gaggles and conflicts between gliders.

THE PILOTS

Pilots are responsible for managing their own risk and displaying sound airmanship.

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