

WaveGuide

2018



Welcome to Bunyan and the Mighty Monaro Wave

A Guide to Operations from Bunyan during Wave Conditions

WaveGuide



A Guide to Operations from Bunyan during Wave Conditions

Introduction:

This guide aims to assist local and visiting pilots, particularly newcomers, in operating from Bunyan airfield during wave conditions. Whilst wave can be experienced at any time of the year, wave is more common in the colder months. Accordingly, this guide has been developed to specifically address conditions during these months when the conditions can be a little more hostile and demanding on pilots.

Please note that this guide will not address the techniques of wave flying except for a brief introduction into getting established.

Club Facilities

The airfield is located about 15km north of Cooma town, on the western side of the Monaro Highway, and is owned by the club.



The clubhouse is a three bedroom house with bunk style accommodation for 12 people. Electrical power is provided by an on-site generator and water comes from on-site rainwater storage. The clubhouse has toilets, gas cooking, heating and hot water facilities. (No landline phone, no laundry facilities.)

Duty pilot mobile is 0428 523 994.

Url is <http://www.canberragliding.org>



Hangar space is pretty well taken up by local aircraft. Visiting aircraft will normally need to be tied down. Tie down areas will be available on the south side of 09/27, or near the clubhouse as per diagrams next page.

Bunyan Airfield.

Airfield is:

S 36:08:00 E 149:08:00,

Elev: 2500’.

‘Bunyan Base’ is: 122.7 MHz



Bunyan airfield

Green arrow marks position S36:08:00
E149:08:00 (If using Google Maps, type in
-36.1333, +149.1333)

Bunyan has two primary strips ¹09/27 and
15/33 plus two secondary strips the ‘hangar
strip’ 16/34 and 12/30

With wave being generated generally in
westerly and north-westerly winds, you can
anticipate that runway 27 will be the
primary operating strip for wave flights.

Ground Operations

During wave conditions surface wind
conditions vary from mild to extreme. At

¹ Actually 09/27 should really be 10/28 since the direction is
29/11 degrees true. It’s a historical thing!

the mild end it can be virtually calm at the
surface and at the extreme end 40kt is not
uncommon and 60kt gusts, whilst rare, have
been experienced!

Tie Downs Visiting gliders and trailers
should be tied down securely to sturdy,
deeply driven pegs. Do not rely on any of
the cables on the field – for fair weather only!
Glanders can be tied down in two areas, either
north of the clubhouse or adjacent the entry
road parallel to R/W 27. We have mown an
area to park trailers next to the entry road
closer to the hangar area for trailer parking.



It is preferable to tie down visiting trailers
pointing to the west, since if very strong
winds are experienced, the wind will have a
strong westerly component. (Some local
trailers are tied down cross wind for
convenience, but the western trailers are
securely tied down to concrete anchor blocks
in order to provide a wind break for the
remainder.)

Please make sure that both your glider and
your trailer are secure. Please consider
others who do not want your equipment
blown into theirs. If a glider or trailer comes
adrift, then collateral damage is highly likely!

Movement Areas The airfield surface suffers from adverse climatic conditions, the infestation of African Love Grass and erosion from propwash. It is quite bumpy in many areas.

Land on the areas inside the white markers only.

A dangerous rock hazard exists outside the runway markers.

Please note that, whilst there are areas mown outside the markers, these are suitable for ground towing only.

Ground Manoeuvring Particular care needs to be taken when manoeuvring gliders on the ground in windy conditions. Canopies need to be secured at all times and gliders must not be exposed to the risk of blow-over. Controls should be restrained and a rudder chock strongly recommended. Extra vigilance is required with light gliders such as the Libelle, Pilatus, Boomerang etc. Gliders such as the Puchacz need to be carefully managed so that when facing into a strong wind the nosewheel is kept on the ground. In extreme winds it may be necessary to tow with a pilot in the cockpit. (One glider has been blown over at Bunyan and at least one canopy has been destroyed!)

Flight Preparation Since you will need to dress warmly (which means bulky) for high altitude flight, please ensure that you have had a 'practice sit' in your glider before lining up for your first tow. You will need to be able to enjoy your flight in reasonable comfort, to have the physical freedom to handle a turbulent tow, and be able to release easily in the case of a launch emergency.

You will need to ensure that you can operate all controls to full deflection, that you can reach everything that you need, that you can see all necessary instrumentation, particularly your oxygen indicators and that all loose articles are securely stowed. In many cockpits this is not an easy task and requires careful organisation.

Make arrangements for urination – you will need to!. (NB. Pee tubes will freeze!)

When you are ready to fly, give yourself extra time to get the glider lined up and yourself established in the cockpit. Dry warm clothes are important, so if you have worked up a bit of a sweat, think about changing at least your socks to dry ones and add some talc inside your footwear to be sure.

Oxygen on, barograph/flight logger on, airspace chart, frequency list, etc....

Having a checklist will make things easier and less stressful.

The Launch

Tug Operation. The tug will normally be the limiting factor in launching during wave conditions. (It goes without saying that, due to the essentiality of the tug for flying operations, we do not take any unnecessary risks with the tug!) In stiff wind conditions, 25Kts and more, and gusty winds, the tug becomes increasingly tricky to handle on the ground with the risk of being blown onto its nose when turning downwind. The subsequent unavailability of the tug coupled with a very expensive engine repair bill would not be funny. No tug = no launch!

Glider pilots simply must respect the decision of the tug pilot to cancel launch operations. The option exists sometimes to move the take-off point further down the runway so the

tug does not have to be turned around. This is a combined tug and glider pilot decision.

Glider Pilots: **Never** pressure the tug pilot or duty pilot to continue, or to do 'just one more launch'. We cannot accept coercive behaviour or undue pressure on tug pilots, no matter how skilled or ambitious the glider pilot.

Tug Pilots: If you find yourself asking whether it is safe to continue - you already have the answer. Do not exceed your personal limit or your comfort level on the day. Don't succumb to pressure to continue, whether it be self induced, or external.

(Hint, hint, very early in the morning the wind strength and gustiness is normally at its lowest so launching may be possible even if later, by mid to late morning, the conditions prevent launching whilst landing remains OK. Pre-dawn preparations are recommended if wave is expected.)

The Tow. Normally tows will be no more turbulent than a normal strong thermic day with many tows being really quite benign. However, occasionally conditions can be quite rough and this will be discussed below in the next section. When towing off R/W 27 expect the tug pilot to make an early right turn to minimise exposure to turbulence caused by 'hangar hill'.

For the newcomer: During wave conditions the tuggie will tow you to a known wave entry location, which nine times out of ten will be by tracking north towards the 'round paddocks', and then turning into wind. Stay on tow until the tug pilot establishes you in wave. Feel

free to arrange for the tug pilot to give you advice on the radio. Take advice on the day, but be prepared for a 3-4,000 ft agl tow. (5,5-6,500 ft amsl)

Very rough towing conditions. We do not tow in very rough conditions, but sometimes short periods of unexpected strong turbulence can occur and so it's best to be knowledgeable on what to do. In rough conditions, gliders with a nose hook will be easier to handle than those being towed with a belly hook.

If you do find yourself in very rough conditions it can be easiest to simply stay behind the tug and ignore the slipstream. Likely you won't notice it anyway because the atmospheric turbulence will mask the wash. By keeping the tug in front of you and just above the horizon, keeping your wings parallel with the tug and using whatever control inputs are necessary to maintain station, you will have the least trouble. Sitting too low will allow any rope slack to hit the glider and sitting too high will risk loss of sight of the tug and possible tug upset.

Work real hard at staying reasonably accurately behind the tug, without bowing the towrope. Keep judiciously tight tolerances on your position, with positive and early corrections to prevent large excursions, using quick combined control inputs to prevent towrope slack from building, whilst getting back into station! Avoid over-controlling by anticipating that the turbulence causing tug movements now will be encountered by you in two or three seconds. Anticipate, focus, correct early but carefully, before it gets too hard to handle!

If rope slack becomes alarming, use airbrakes only to stop slack getting bigger. The moment that the rope slack stops getting bigger, (ie you are co-speed with the tug)

close the brakes and allow the rope to pull tight. If you delay brake closure you will exacerbate the deceleration and when the rope pulls tight the resulting rope stretch and catapult forward will just make things worse. If you are confident (and competent) that you can time dive brake application appropriately, open the brakes the moment the rope pulls tight to reduce the magnitude of the next lurch forward. Don't open the brakes if the rope slack is in the vicinity of the wing. You don't want the rope caught around an airbrake. It could be catastrophic.

Likely after a (unintended) particularly bad tow the tug pilot will stop future launches. Of course, if you believe conditions are unsuitable please take the initiative and advise Bunyan base yourself.

Establishing and Staying in the Wave

For the newcomer, a little advice in contacting and establishing in the wave.

Initial Contact. At least until you have some practical experience, or the wave entry is very high, it is best to have the tug pilot tow you into the wave. If there is cloud at the entry level, what you want to happen is for the tuggie to tow you up through the eastern (downwind) edge of the föhn gap. About the time you are level with the base of the cloud, the air will go



perfectly smooth and the rate of climb will stabilise above about 7-8 kts. After release

turn right about 20° to establish safe tug and tow rope separation. When clear, turn back into wind, (which is usually between west and north west). Don't allow yourself to drift downwind.

Getting Established. If there is cloud about it will usually be cumuliform in appearance, lined up across wind, and will be continually forming at the western edge and dissipating on the eastern side. You will notice that wisps will be forming a little ahead of the main body of the cloud and as they grow they become part of the main body of cloud. They will be forming continuously over the same position over the ground. This is where the tuggie should have taken you. Just above these wisps is where you will likely find the best lift. Initially the climb might be quite weak and the area quite small, but stick with it. Sometimes you will have to figure of eight in the only good bit for a while until you get better established. The best bits are where the wave is obviously pushing the main cloud face upwards.

Some tips:

Always, always maintain awareness of wind speed versus altitude and its effect on speed made good over the ground, and on the headings that should be flown to achieve a desired track. Loss of this awareness will invariably lead to excessive altitude loss.

When working the westerly wave, one seldom heads east. Generally your heading will need to be between south-west and north-west, always turning through west. Turning downwind through east will generally drift you rapidly out of the wave.

Wave with cloud at wave entry level.

Because the cloud is normally cumuliform in appearance with the elements continually building from the western side and visibly

drifting downwind, it is easy to be seduced by their downwind movement and drift back in the wave. Accordingly, pay attention to the position of the clear air gap between the clouds, and its corresponding position over the ground, and stay over the gap's downwind edge or in the position relative to the gap which gives the best climb. Also, note the position of the lift relative to ground features, and remaining conscious of your ground position, to help you in staying in the best part of the wave and to give you early warning of drifting out of position. (See section below on blue wave) This is particularly important if there are only a few wisps of cloud marking the wave and no main body of cloud. Whilst this sounds simple, it actually is quite easy to be seduced by the cloud, and is one of the classic beginner traps. Monitor the gap rather than the cloud. In other words "Mind-the-Gap".

As you climb higher you will have an improved perspective and maintaining position becomes a bit more obvious. Remember "Mind-the-Gap".

'Blue Wave' If there is no cloud about at the wave entry level, initial contact remains the same except that you will have to maintain position over the ground with reference to visual lookout. Establishing 'transit lanes' using near and far points to maintain alignment is particularly helpful. Again don't allow yourself to drift back, particularly if the area is quite small. The 'snail trail' tracking features that you might have in your on-board GPS navigation system is particularly useful in maintaining your position. But be careful and don't have your head in the cockpit too much. Keep your lookout going, keep track of your position with reference to external features, and lookout for other traffic which might be quite close.

Entry from below the wave layer If you have not towed into the wave or have fallen out, entry from below via thermic and rotor lift is possible. Expect thermal lift to be rough. You will need patience and persistence. It may take some time, even hours, before you reconnect. Thermal tight, continuously correcting into wind. Work your way to cloudbase on the upwind side of the cloud and then push forward under the remaining cloud gaining speed in lift if possible, pulling up in front of the cloud when clear. You may need to continue forward of the cloud into the gap to find the laminar lift. Be aware that the wave lift does not extend much below the cloudbase, if at all, and whilst the lift is often just in front of the cloud it is worth moving forward up to 500m or even 1 km in order to make first contact.

Generally the wave stays remarkably fixed over the ground, with even small "sweet spots" remaining in the one position for hours. However, wave systems can move and wavelengths can change with changing wind speed. The clouds and lines of best lift can shift. Again, remember, "Mind-the-Gap".

Lookout, Lookout. These comments have all emphasised the need to establish yourself in wave by reference to monitoring the gaps, line features etc, and your onboard GPS – but this must not be allowed to diminish your lookout. Remember that there will be other gliders around, all wanting to use the good air, so the collision risk may be high. Your wave soaring task focus must never diminish your airmanship and safety focus. Ditto the euphoria and panorama at high altitudes must not erode your lookout.

True Airspeed At altitude, your true airspeed will be higher. Accordingly, your closure

rates will be higher and your turn circle greater. If in the vicinity of other aircraft allow an additional margin to ensure safe separation.

Navigation

There is nothing particularly difficult about navigating in the Bunyan area. Whilst the airfield itself does not stand out particularly well, Cooma town is very visible and is an excellent orientation point from which you can pick out the hangar ridge, with the airfield being abeam its northern end, which is usually referred to as Hangar Hill.

The large, circular, irrigation paddocks ("the round paddocks") 5 km north of the airfield are also a useful feature.

However, in wave conditions you could be flying above 2-6 eighths of cloud, with much of the ground obscured, and spending most of your time heading towards a sun low against the horizon. Under these circumstances, orientation can be quite tricky and particular attention must be paid to navigation to ensure both safety and avoidance of controlled airspace.

The fact that clouds associated with lee wave conditions remain relatively fixed over the ground will make things somewhat easier. Use of GPS and orientation of your position with respect to a map and visual features on the ground is important.

Be very careful that you do not lose track of your ground position at any stage. This point cannot be overestimated.

In strong wind conditions, if you do lose track, then you could find yourself a long way downwind of where you thought you were!! This has happened at wave camps before and lost pilots have outlanded a long way east of Bunyan.

A Monaro Region turnpoint list can be found on the Worldwide Soaring Turnpoint Exchange <http://soaringweb.org/TP/Bunyan> However, be warned that the outlanding points listed were determined from past knowledge and Google Earth. Current surface condition of these fields has not been established, nor the owners consulted.



Use On-Board Nav Systems

Modern GPS based sailplane navigation systems using commercial software (eg See-You or its derivatives) or free software (eg XC Soar) are very useful when wave flying, providing much useful position, wind and airspace information. If your system includes a moving map display, this is a great advantage in orientation above broken cloud when surface features are sometimes difficult to identify.

As mentioned earlier, the snail trail is a superb feature for assisting with remaining established in the wave.

Even a hand held receiver is very useful.

However, regardless of your system, be cautious in its use. In the high wind conditions (at altitude the wind can exceed 80 kts) there will often be very large differences between aircraft heading and track over the ground. Understand the specifics of your system and decide how to set it up for very high wind conditions before you take-off. Will you fly Track up or North Up? Does your system do the fancy calculations in order to make an estimation of the aircraft heading, or does it simply assume heading and track are the same thing? (Which of course they usually are not!)

If using a graphical display without a moving map, such as a hand held GPS, it is easy to get confused by the graphical track and bearing indications which will often not be pointing anywhere near their geographical waypoints and will regularly be 90-180 degrees in error. The alpha numerics will of course remain correct and coupled with your magnetic compass, with care, orientation should not be compromised.

Carry a map, marked with relevant airspace limits and with a range and bearing overlay from Bunyan.

When wave flying above clouds use the GPS to maximum advantage, but regularly confirm your position by reference to any visible ground features.

If using a hand held GPS, ensure the power supply will maintain GPS function at very low temperatures. Alkaline internal dry cell batteries when cold will likely not work. Lithium batteries should perform much better. Connection to a well insulated main avionics battery usually works well.

Program and display the wave area limits in your Nav system. If you are using a hand held without an airspace map, program a task around the wave boundaries to draw them on the map page.

In Flight Considerations

Altimetry. Climbing above 10,000 ft set your altimeter to standard pressure 1013Hp and when descending through FL110 set your altimeter to QNH. (Easiest way is to note QNH by setting altimeter to 2,500 on ground before takeoff and noting the subscale setting.) Also consider making a call to Bunyan to check for an updated QNH.

Communications. You will be briefed on comms procedures, but the two frequencies that will be used are 122.7 for gliding operations and 120.75 for communications in Class E airspace and with Melbourne Centre. Cooma-Snowy Mountains airfield is 12NM to the south-west, CTAF frequency 118.1

Airspace. You will be briefed separately on airspace boundaries, limitations and requirements when wave flying. (Just remember, if you stay below FL245 and south of a line through Michelago and the northern end of Lake Eucumbene you have complete freedom and don't have to talk to ATC. Luxury really!) If you wish to fly above FL245, ensure that you get a briefing and log book endorsement on airspace limits and procedures

Regular Public Transport (RPT). RPT **does** traverse our flying area. Typically out of Sydney enroute to and from Cooma Snowy Mountains airport (YCOM). Their flightpath is normally right through our wave area. The RNAV approach to RW18 is commonly used and for a northerly arrival the RPT passes 3NM to the West of Bunyan above 8,000' tracking south. For an easterly arrival the RPT can track about 3 – 4NM north on Bunyan, as low as 5,600' before turning south. They will normally announce their arrivals and departures on 122.7 with standard reporting. If you are a potential conflict to their flight path please advise them accordingly, using standard phraseology. Don't assume that the RPT pilots have any local geographical knowledge so if you are in potential conflict give your position accurately relative to Cooma Snowy Mountains airport. YCOM's position is S36:17:48, E148:58:24. Consider selecting YCOM as your target waypoint; this will facilitate giving range and bearing calls relative to it when advising RPT traffic.

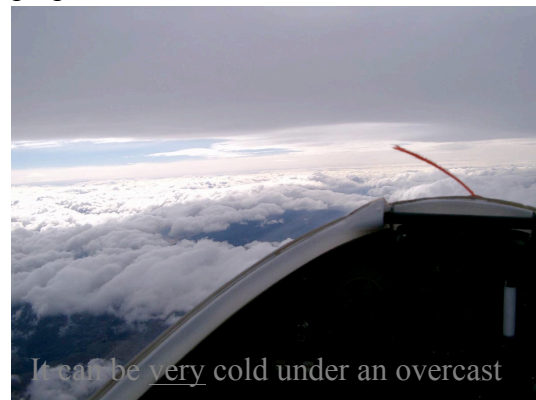
Oxygen It is your life support system. There is simply no substitute! Know your system's operating procedures and emergency procedures. Monitor contents and flow regularly throughout the flight. If in doubt about any aspect of the system, do not hesitate, commence

immediate descent to 10,000ft and stay there. Fault find on the ground, not in the air. There is a case for carrying emergency backup oxygen systems, too.

The Cold. How cold you will become in the cockpit depends on two factors – the outside air temperature and solar heating into the cockpit. At 25,000ft the outside air temperature will be below -30 degrees. If you are flying in full sun, until about 4PM you will be

remarkably warm in the cockpit. (Maybe your feet will be cold but the rest of you will likely be OK.) After about 4PM as the sun sinks it starts to cool down quite quickly.

If you are flying under an overcast, without the benefit of solar heating in the cockpit, prepare to be cold.

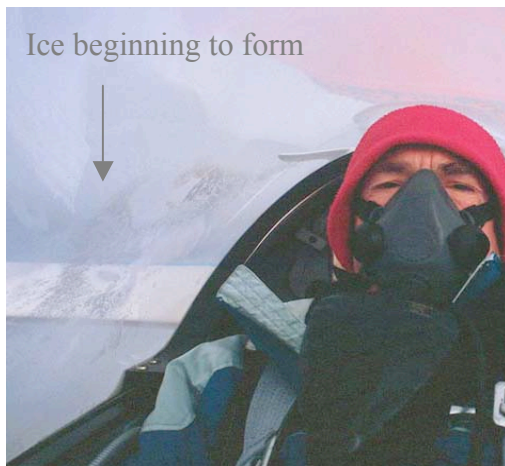


If you get very cold, or if your feet go numb with cold, then call the flight off and descend all the way to landing.

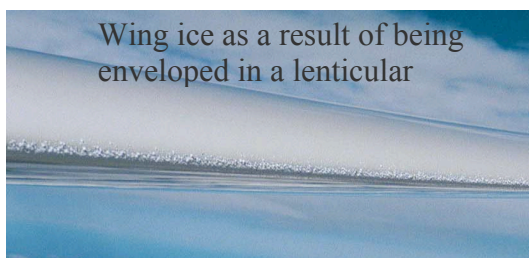
Canopy Icing. You will need to fly with your forward canopy vent open for the entire flight. This allows the airflow to carry some of your exhaled, water vapour laden air, away



from the cockpit. Notwithstanding, you can still get a slow build up of ice on the inside of the canopy which starts at the back of the canopy and slowly inches forward during the flight. The airflow is not too unpleasant if you cover your head, neck and face well to stay out of the direct airflow.



Airframe Icing. Doesn't happen often but if at altitude you are in the vicinity of a lenticular, and due to your inattention or reforming of the cloud you end up in its leading edge, expect icing. So stay clear of the lenticular and be aware that the lenticular can shift quite quickly.



The Sun, Sunglasses and Masks.

Much of the time you will be looking into the sun, so sunglasses are necessary. Also incorporating a sunshade into your headgear really helps by keeping the direct sun out your eyes. Wearing glasses with a cannula is straightforward, but with a facemask a few problems can arise. Any

leaks from around the mask in the vicinity of your glasses will cause them to fog up, on the inside, which is a real pain. Firstly make sure that the bridge of the glasses fit over the mask (some modification to the glasses might be needed) and secondly make sure that there is a good seal between your face around the nose and under the eyes. Leaks and fogging will occur if you allow your sunglasses to get under the mask in the vicinity of the bridge of the nose.

Reading Cockpit Displays. Because of the lighting conditions, particularly later in the day, it might be difficult to read certain electronic displays with sunglasses, such as PDA screens. So, for those of us that have a few years under our belt, and it's a bit harder to see in low light, and particular if we need corrective lenses, there are a number of options. Apart from wearing clear corrective lenses, one option is to alternate between clear and tinted. It works, but in practice is too much of a nuisance. A second option is to wear clear lenses with the tinted clip-on 'flip-ups' that are relatively inexpensive. When needing to read instrument displays simply flick up the sunnies and look through the corrective lenses. Not a fashion statement by any stretch of the imagination, but it provides a workable if not particularly elegant solution. A third option is to use graduated tint lenses. Multifocal, wrap round, graduated tint corrective lenses can work well. They also work successfully in the glare of summer flying. Ah for the joys of youth!!!!

End of Flight

Wave conditions normally continue after sunset. Accordingly it is a common occurrence that you will have to decide when to initiate descend in order to land before the end of daylight. A bit of pre-flight planning

is necessary to determine your top of descent time.

Aircraft Considerations. When descending from high altitudes local practice is minimise thermal and mechanical loads on the structure by keeping all manoeuvring gentle, judicious and slow deployments of airbrakes at modest speeds, say below 60 knots, and by moderating our rate of descent to about 500 feet per minute to reduce the thermal stresses on the structure. Whether these measures achieve anything is really unknown, but we have found that by doing so we have not experienced any known surface finish damage from thermal stress. We operate gliders with a range of finishes including Polyurethane, Ferro/Huntsman and the German factory finishes including the early Schwabbellack all of which have been to at least 20,000 ft

Circuit Area Considerations. If there are a number of gliders airborne late in the day, with visibility being poor, reasonable spacing between approaches is prudent. Three to five minutes is quite comfortable. Allowing around 15 minutes to land five gliders works well, provided pilots get their gliders off the strip promptly – push off downhill to the runway edge. This is not to say that it is not possible to land gliders in quick succession, rather extra spacing makes the landing sequence much more comfortable and gives the opportunity for a small crew to assist the arrivals.

Descent Time. OK, now back to calculating our descent time:

For example – a descent from 20,000 ft on 1st September:

- Sep 1 - End of Daylight is ~ 1810

- 40 mins for descent (500' per minute for 20,000ft.)
 - With Bunyan being at 2,500', making the calculation to sea level gives you the necessary 5 minutes allowance for approach and landing.
- 15 minutes allowance for bad light or other circuit traffic.
- Total = 55 minutes

Therefore on September 1, from 20K – commence descent no later than 1715. (You would need to be passing 15,000' at 1725hrs, 10,000' at 1735 etc.) (For Sep 15th add 10 minutes.)

- August 1 – End of daylight is 1745, so you will need to commence your descent from 20,000' at 1650.

Note that it will be still well before sunset at 20,000 ft and the sun will appear quite high. At 25,000 ft it will even more so. Do not be fooled.



A beautiful vista and the sun is still quite high, but it's **Time to Descend.**

This picture was taken at 14,000ft; 1649 hrs EST 9 Jul 06. End of daylight 1731. (28 minutes for descent and landing gave a 13 minute circuit area allowance.) From say 24,000ft the sun would be much higher.

The Descent. You can modulate your rate of descent by judicious positioning in the downside of the wave to give you a smooth descent down to the turbulence level. Careful use of small amounts of airbrake can help in maintaining a steady descent rate. If there's cloud about, the base of any lower cumuliform cloud will mark the transition between the smooth and turbulent layers.

Turbulence. Be mentally prepared to transition from the idyllic smooth laminar layer back into the turbulent lower levels. After the glorious smooth laminar air the turbulence can actually be quite unpleasant. You will normally be landing on R/W 27. Plan on a right hand circuit since a left hand circuit will put you in the lee of the 'hangar ridge' which can provide some unpleasant turbulence.

Visibility. During the winter months, the sun is quite low and this creates considerable glare through the canopy, particularly later in the day.

Descent Visibility. During a descent late in the day, with cloud obscuration and canopy glare, visibility and definition of ground features can be particularly poor. Be prepared for it and maintain awareness of your position relative to Bunyan. Cloud cover exacerbates the problem, due to the low light conditions below. Sometimes Bunyan can be extraordinarily difficult to see, so maintain orientation. Visibility of other aircraft is similarly difficult.

If you can see any wispy layers, stay clear of them to avoid fogging of the canopy. (See discussion in Emergencies section)

The following picture is pretty representative of what it can look like late

in the day. This picture was taken on descent near the end of daylight with the sun shining through the gap in the clouds. Whilst there is a bit of lens flare in this picture it is pretty representative of how much you will be able to see looking in the direction of the sun. (Not much! Bunyan is in the lower centre of the picture!) Recognising ground features can be especially difficult, even with good local knowledge. Visibility looking down-sun is vastly superior.



Landing Visibility. Normal landing direction is runway 27 which is directly into a setting sun. Forward visibility can be zero on finals if the sun is just above the horizon. Seriously - zero! It is scary. But there is an answer. Firstly, if there is cloud to the west, and often there is, the low sun angle means that the cloud obscures the sun and the visibility is fine. If there is no cloud, or it's insufficient, then the options are to land well before the sun approaches the horizon or wait until the hills immediately west of the field obscure the sun. If landing late, the technique is to maintain adequate altitude and watch the shadow slowly move across the airfield. Wait until the shadow reaches the eastern boundary, and then initiate your circuit entry. Finals will initially be in the full glare of the sun where you will be unable to see forward, but when descending into the

shadow, which should be before reaching flare altitude, forward visibility will be dramatically improved and a normal landing can be carried out.

Kangaroos. Kangaroos can be a landing hazard. They are simply impossible to see from the air until too late. Prior to landing late in the day or near last light, have a car run along 27 and 16 to move any 'roos that might be on the strip.

Circuit. If the wind strength is moderate or higher, the procedure at Bunyan is to carry very significant height margins in the circuit. As previously mentioned right hand circuit onto 27 is recommended. Do not allow yourself to drift behind the Monaro highway. Do not feel silly if you are turning base at 1,000 ft agl over the Monaro highway. (You'd feel sillier strung up in the power wires just to the east of the highway!!).

Landing. Experience has shown that the best place to land in windy SW-NW conditions is in the bottom of the depression approaching the half way point of 27. There appears to be an area of protected air in this depression. Under no circumstances try to land on, or be floating over, the high point of the runway, immediately following the hollow in order to land closer to the hangar. Wind velocity increases at this point and glider can be ballooned airborne and then be left 'high and dry' followed by being dumped hard on the ground a moment later. Landing after the crest can work OK, but you must be able to stop before the end of the strip!

Always, please move your glider outside the markers promptly after landing to make room for both launching and for those who are wanting to land.

Note: Towing vehicles must be brought to the edge of the runway, and the glider pushed off the runway, NOT driven onto the runway to the glider.

Outlanding

We are indeed blessed in that Bunyan is near the back of the wave system, with good wave conditions existing in the immediate vicinity of field. 20,000ft is regularly achieved within a few km of Bunyan, so there is no need to venture outside of comfortable gliding distance of the field if you don't want to. But you don't have to stay tied to the field! There is much fun to be had exploring the wave systems. When venturing further afield, and this generally means upwind, there are suitable airfields covering much of the wave area:

Good diversion airfields are:

- Adaminaby
- Cooma Polo Flat
- Cooma Snowy Mountains²
- Jindabyne

Details of each of these airfields are a little further on in this guide.

Strong advice is to plan on these diversionary airfields as being your only outlanding options. However if it becomes necessary to land in a field, normal field selection criteria apply. Notwithstanding, a couple of bits of advice. Whilst there are outlanding opportunities, there is much unlandable ground. In the high areas and on the ridges there is quite a bit of rock and in the valleys there are quite a few wires. Select a field that has been cultivated in some form (to reduce rock potential) and be very alert for wires. If the surface wind is strong, make appropriate allowances for drift and turbulence.

² Cooma Snowy Mountains has RPT and is a Security Controlled Airfield, so an ASIC card would be required for access.

Extreme Wind Condition Operations.

Operating in extreme surface wind conditions is a rare event since we avoid operating when they appear likely.

Most likely you will experience high wind operations, if, after launching early in the day the wind increases markedly whilst you are airborne. This normally occurs in unstable conditions where once convection starts, mixing of the lower levels takes place and the wind plus rotor effects are dragged down to the surface. This can make for quite difficult conditions. With high winds significant turbulence can be experienced.

Should you experience high or extreme wind conditions, then the following will be of help.

First thing is to ensure that you land back at Bunyan where ground assistance will be immediately at hand. (We have recovered gliders in 40-50kt winds – not a pleasant experience and one we strongly wish to avoid.)

If you are advised of very strong surface winds your first decision is whether the wind is likely to get even stronger or whether it might be preferable to wait until the end of the day. Once the energy from the sun wanes, after about 4PM, and the mixing due to heating reduces, the gustiness of the wind will often reduce. If no other factors exist it is worth waiting to see what the wind does rather than land early.

Once you have decided to land ensure ground crew help is available. (Don't worry, if conditions turn bad everyone will (should) stay at the airfield to help in glider

recoveries.) Expect strong turbulence in the circuit area. Fly a high close right hand circuit. (Right hand to reduce the effects of the turbulence behind hangar hill.)

Don't go behind the Monaro highway. – Turning base over the highway at 1,000'-1,500' is not silly. Fly an approach speed commensurate with conditions. Don't be alarmed if you get fluctuations up to +/- 10 to 20 kts! Aim to touch down at around the bottom of the hollow in R/W27. You will find that once you get near the surface, the air will become a little steadier and the landing will generally be quite straight forward. Avoid attempting to touch down on, or 'floating' over, the rise about 2/3 way down the strip because it is possible to get caught ballooning high and slow with a subsequent heavy landing.

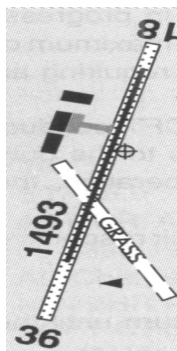
Your ground crew pals will then descend upon the glider to make sure that all remains well. Be careful when you open your canopy and be very careful when manoeuvring the glider whilst moving to your parking area.



Airfield Data Sheets

Cooma **POLO FLAT** YPFT
S 36:13 :48 E 149:09:00 Elev: 2701 ft

Unlicensed
R/W Orientation



RH Circuits R/W 30 and 36

Land on grass east of 18/36
tarmac encouraged & preferred

WARNING: 300ft mast to SE,
inside the circuit area.

CTAF 118.1
10NM

Area: (ML CENT)120.75

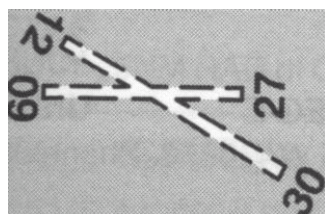
Notes:

When NO OPS - Gates locked and Cattle graze on
airfield

Operator - Mike and Elizabeth Apps
0412 435 198

JINDABYNE YJIN
S 36:25:36 E 148:36:06
Elev: 3400 ft

Unlicensed
R/W Orientation



Right Hand Circuits R/W 27 & 30

Caution - Severe TURB in W winds
Caution - TWR southern side of airfield
Animal hazard exists.

CTAF 126.7

Area: (ML CENT) 120.75

Notes:

Jindabyne AeroClub

(02) 6456 2237

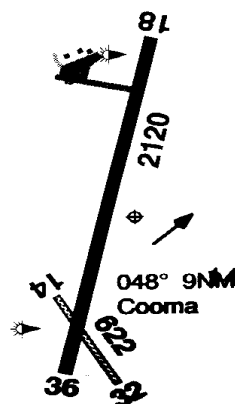
Info 0400 196 115 : 0429 406 129

Cooma **SNOWY MTS** YCOM

S 36:18:00 E 148:58:24

Elev: 3106 ft

R/W Orientation



CTAF-AFRU*: 118.1 Mhz
10NM

Area: (ML Centre)120.75

PAL: 122.3 Mhz

(3 x 3 sec pulses @ 1 sec spacing)

Notes:

Security Controlled Airfield

*AFRU = Automatic Frequency Response Unit

Gen Manager (02) 6452 5999

ARO 0415 582 069 (Air Traffic Services Reporting Office)

ADAMINABY

S 33:59:54 E 148:47:48

Elev: 3350 ft

Unlicensed

R/W Orientation

09 **27**

CTAF 126.7

Area: (ML CENT) 120.75

Notes:

Entry Gate from Road kept locked.

OPR Snowy River Aviators 0428 409 107

Landing donations appreciated

Emergency Procedures

This section deals with situations that require calm and considered action to avoid a catastrophe.

Remember in any emergency “aviate, navigate, communicate.”

What this means is keep your aircraft under control, managing the situation as necessary: keeping track of where you are, and once you have achieved these things: advise others of your intentions or, if needed, seek their advice.

Low Altitude Launch Failure

Take time to familiarise yourself with the ground around Bunyan. Farming activities regularly change the nature of the paddocks around the airfield and that which might be valid one day may be different the next.

Walk the paddocks!

Hidden Rocks and fences are a problem with off field landings.

If taking off on 27 and the tuggie makes an early right turn, in the event of very early launch failure be prepared to turn left and then back right at low altitude to realign with 27 and land ahead.

If you want to squeeze onto the end of 34 be aware that it is downhill and that there is a creek and fence at the end of the strip.

(See next picture.) If you cannot land ahead there are two broad options and this will depend on position and altitude of the launch failure. Land in a paddock or turn to land back on the airfield.

As of Aug 2018: The following photograph depicts two potential paddock landing areas, marked in green. One is in the paddock on the extension of Rwy 34, once past the creek and fence. This area can be

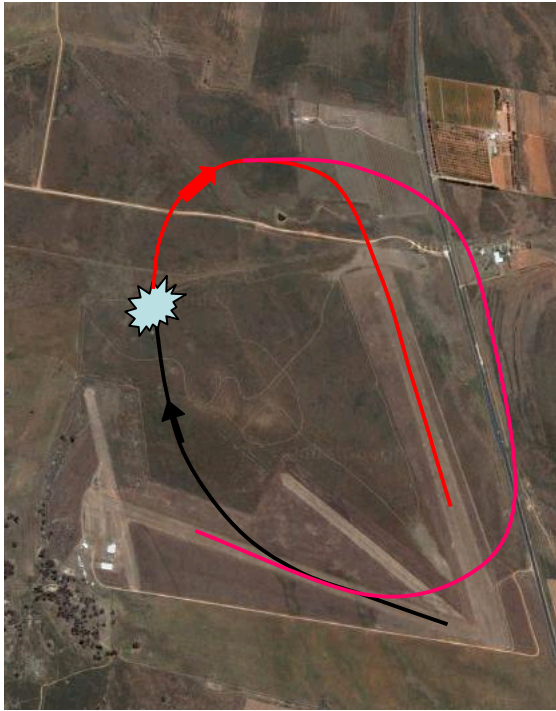
very rough and could result in aircraft damage. Landing **must** be made on the extended centreline, past the creek and fence, since dangerous rocks exist off the centreline, two of which are marked by red circles. The red circle at the end of the club's strip is the creek and fence.

The second area is parallel and close to the E/W fence-line, landing on the Northern side. This area is much better for landing. Whilst this area is right next to the fence, there is a reduced rock hazard in this specific area. However, due to the general rock hazard walk the paddocks first so you get an understanding of what is there.



If you are high enough to return to the airfield, you may wish to consider landing cross wind on 15. Challenging in a strong crosswind/quartering tailwind but it might be the best option. Landing diagonally 'across' 15 might marginally reduce the crosswind.

If high enough, then back onto 27. Remember the wind will be blowing you rapidly and whilst this could be a hindrance when lining up on 15, it will help in carrying you downwind if you elect to land on 27.



Please note that the above is provided to stimulate your thoughts in the event of a low altitude launch failure. Every circumstance will be different and each will have to be treated on its own merits, with perhaps none of the above options applying. When all else fails, always maintain a safe speed all the way to the ground, and never strain yourself through a fence or wash off airspeed energy to stretch the glide.



Cloud closure. It is not uncommon to be operating high (10-15,000ft) above cloud base which might be around 4-6 8ths coverage. Typically this cloud will be in the form cumuliform wave bars with associated foën gaps. If airstream moisture increases, such as an approaching front, then these gaps can close up. Foën gaps closure is a common occurrence, particularly later in the day. The closure normally occurs at the base of the cloud first. Keep a good lookout at the upwind gaps and if they are closing then expect the gap below you to begin to close. Remember, it takes 15 minutes to descend 15,000ft at 1,000 ft per minute descent rate. Generally the closure occurs somewhere in the 6-10,000ft amsl band. If in doubt, start your descent early. You can always hang round level with the cloud tops and if closure continues, slip below before the gaps disappear. At Bunyan the gaps to the south tend to stay open longer than those immediately over and upwind of Bunyan. If you have left things late, and there are openings to the south, consider Polo Flat as a landing option. Whilst not always the case, cloudbase is often above 7,500amsl so you can have 4-5,000 ft ground clearance, depending on terrain, when clearing cloud in the vicinity of Bunyan. **Warning – cloudbase can be much lower and reports from other pilots or competent ground observers are necessary to make the correct in-flight decisions.**

Caught above Cloud.

Firstly - DON'T.

This can be frightening, and is potentially a very dangerous situation.



However, if you are, and there are absolutely no clear areas through which you can safely descend, you will have to make some decisions.

Firstly, stay calm. Is the closure cyclical or is it permanent? Is it better to wait and allow for the opportunity for gaps to reappear or do you need to descend now? Are there gaps in the distance over landable terrain? If you do need to descend through cloud will you conduct a blind descent through cloud or will you resort to the parachute?

If considering the parachute option, then consider your ability as a parachutist. Can you manage the chute in sometimes very turbulent air, and accept the risks associated with being dragged across ground by strong surface winds, over rocks, trees, fences etc, in a sparsely populated area?

If electing the blind descent through cloud option, have you practiced this in clear air in the sailplane that you are currently flying? If so and you elect to do so, then

navigation and clearance below cloud are essential considerations. With GPS properly set up, and cross referring to a map for orientation, a pilot should be able to orient himself at all times. If you 'lose the plot' you will likely end up further east than you expected. (Reminds me of the story of an English pilot who, after a cloud climb, was admiring the glimpses of the beautiful rolling fields through the wispy gaps below until he saw a bloody great tanker steaming right through the middle of them. He was out over the North Sea!!)

If you know where you are, the best option might be to track towards, or slightly upwind (say 5km), of Bunyan, or your preferred landing field, and ascertain/confirm adequate clearance between cloudbase and the terrain. Further, if you are conducting any form of controlled descent through cloud, listen out for traffic and ensure that all is clear before you enter.

If you are a competent instrument pilot and flying a glider with blind flying instrumentation then simply apply the basics to fly clear of cloud over Bunyan. If, like many pilots, you are neither practiced nor equipped to fly blind then you will need to take a different approach. Many, but not all, sailplanes can achieve a steady state spiral, sometimes called a benign spiral, if set up correctly. The glider should be set up at about 40 degrees bank, with full airbrake, positive flap setting, wheel down and trimmed for about 60 kts. Then take hands and feet off the controls and let the glider fly itself. Keep your head steady until clear of cloud to minimise vertigo effects. Using this technique it is possible to descend through cloud in reasonable safety. Pilots must resist the temptation to fly the aircraft whilst in cloud and must keep his hands and feet clear until breaking clear of cloud. It is too easy to introduce control inputs which may upset the stability of the spiral. Importantly, however,

you must have tried this in clear air to ascertain the particular characteristics of your sailplane before trying it in anger. Some simply will not settle in a steady state spiral and the benign spiral option may not be achievable. Once clear of cloud, swiftly visually ascertain your position and consider your landing options.

None of the above is pleasant, so, in other words:

DON'T GET CAUGHT ABOVE 8/8ths CLOUD

Much better being down here wishing you were up there, than being up there wishing you were down here!!!



Lost

This should only happen if you are above significant amounts of cloud. If lost Aviate, Navigate, Communicate.

Aviate: Stay airborne in the wave, maintain altitude and stay calm.

Navigate: Maintain position over the ground and don't allow yourself to be blown back. Use your GPS. If no GPS then be careful not to drift too far

downwind and do not track too far north because of controlled airspace.

If possible move forward in the wave system. You may see new features which will help establish your position.

Use your map. Use your eyes. Use your brain.

Look for major features such as Lake Eucumbene or Jindabyne. If you see extensive snow you are likely near the Main Range in the Perisher/Thredbo area. If you see sparse snow and rough terrain you might be in the high country North West of Bunyan and perhaps in the air routes. If you see wooded hills with north south valleys without snow you might be East (downwind) of Bunyan. If you see the coast (!) consider Moruya, Bega/Frogs Hollow or Merimbula. There is some rough country between the coast and Bunyan.

Communicate: Advise Bunyan base of your circumstances and if you can clearly describe ground features they might be able to assist. Be cautious with the advice provided, because it is very easy to take that advice as authoritative, but it might be wrong! Simply use that advice to assist you, the pilot in command, in making the decision as to where you are. Of course if you see another glider communicate with the pilot and he will tell you where you are, unless he is also lost! Heaven forbid!



Remote Area Outlanding

Much of the area that you will be flying over is remote, with the western part of the wave area being a 'Designated Remote Area'. Strong advice is to be carrying an EPIRB, a '3/4G' telephone (ideally TELSTRA), a SPOT Messenger (or similar eg Garmin Explorer) and a torch. A satellite phone would be ideal. Where carrying a tracking device, the Club will need to know how to access your tracking details so that your position can be found. If carrying a SPOT, you may should set up your message set accordingly with appropriate telephone numbers for your crew as well as the club's mobile.³ If outlanding becomes a possibility broadcast your intentions to other glider pilots in the area with a geographical reference as well as GPS coordinates. If giving GPS coordinates give receiving pilots time to get out a pencil and piece of paper to write down the figures and then give only degrees and whole minutes. (EG 34 27 south and 147 28 East) Easier to remember and copy down. After landing it will be cold and possibly windy. Tie your glider down securely. If still in contact with other pilots, they'll look after you and arrange relay to base for a retrieve.

If you have landed in a remote area, habitation is not close by and you have not/cannot communicate with other pilots by radio then try your mobile phone. If carrying a SPOT messenger, or similar device, send the SMS to your crew at Bunyan so at least they know where you are. If not carrying a SPOT (or similar device) and/or you wish feedback that

³ As technology develops tracking devices become more capable and a number on the market now allow two way SMS via satellite. This is a great capability compared with the one way of SPOT.

Bunyan folk know where you are, the remaining option is to try a relay via aircraft on Melbourne Centre 120.75 and failing that trying Emergency Frequency 121.5. If contact is made ask for the appropriate message to be telephoned to Bunyan

If all the above fails, and habitation is not close, your only option remaining is to activate your EPIRB.

(By the way do you carry your EPIRB and Mobile Phones on your person such as attached to your parachute harness or in secure pockets ? Think about it because if you ever have to resort to a chute, no good having that stuff left behind in the cockpit! While we're at it - what about your wallet and spare corrective glasses as well!!)

Once you have activated your EPIRB, make sure that you find somewhere to stay warm and dry and await rescue.

Consider making position calls on 'Bunyan Base' 122.7, 'Melbourne Centre' 120.75 and 'Guard' 121.5 at say hourly intervals even if you are not receiving a reply. Remember when using 121.5 to deactivate your EPIRB temporarily to avoid jamming.

Canopy Fogging

A rare occurrence but it has happened. On this occasion, as the glider descended through a hitherto not seen very thin layer of mist at about 4,000 ft agl and the canopy instantly fogged over on the outside. (Likely caused by the very cold canopy coming in contact with a high humidity layer. Descent had been mostly in shadow and therefore little solar heating to provide some warmth to the Perspex.) Pilot was unable to see except for through the side vent. Pilot was able to clear a small area of canopy with the yawstring by

yawing the glider. Fogging remained for an extended (alarming!) period of time. Canopy eventually defogged but period of fogging was uncomfortably long. Lesson here is to stay clear of any sort of moisture in the descent.

A case has occurred at a Western Australian wave camp where canopies fogged over shortly after take-off. Caused by entering a moist layer just above the surface. Likely if there is any wind, the mixing will reduce the likelihood of this event.



Final Word

“The more I prepare for emergencies the less I seem to have!”

NOTES: