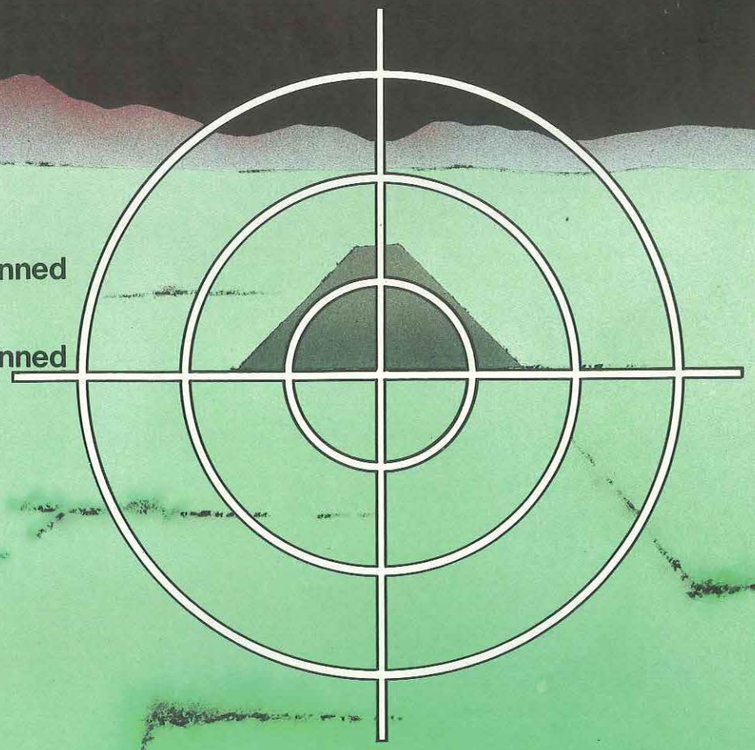
Make a final

DECISION

ASK YOURSELF :

- Am I sure I can achieve my planned threshold speed ?
- Am I sure I can achieve my planned touchdown point ?
- Am I sure I can cope with the conditions ?



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Unless otherwise noted, articles in this publication are based on Australian accidents, incidents or statistics.

Reader comments and contributions are welcome but the editor reserves the right to publish only those items which are assessed as being constructive towards flight safety.

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Editorial

Winter 1988

Winter is upon us — in fact it has been for some time. This issue includes the first of a series of articles kindly contributed by the Bureau of Meteorology on weather and its significant effect on flying. The articles will correspond to the seasons and will appear in each issue of the *Digest* over the next year. While they are not intended as a course in Met, I hope that they will serve to remind us of the more important aspects of the Australian climate and the effects of local weather.

In the other Australian aviation environment, the operational one, a significant change is taking place — with the formation of the Civil Aviation Authority. While it may appear to be a radical step, it is intended to make the operational side of the previous Department a more efficient and more responsive organisation and in the process, to enhance standards of aviation safety.

Safety promotion will be a very active part of the CAA and the *Digest*, seminars and video production will continue to have as much, if not more, support. The next *Digest* will include a major statement by the Chief Executive of the CAA.

You will notice that this issue includes a survey form in the centre section. So that the *Digest* can best serve the aviation community, would you all please provide some feedback. We need to know if we are going in the right direction.

You will see that the centre section of the *Digest* no longer includes the accident summaries. This change reflects the more independent status of BASI, the confidential nature of its accident investigations and its new confidential reporting system. The accident summary will continue to be published by BASI as a separate document.

Now is the time to double-check your aircraft's systems before encountering IMC, night, conditions of reduced visibility or turbulence. The little things that are a minor inconvenience during VFR flight can assume enormous significance when you're 'on the clocks' — for example; that slight left-wing down indication on the AH or the blown bulb over the airspeed indicator on the instrument coaming, or the intermittent OFF flag that occasionally appears on the turn-and-balance or VOR.

The time is right — the time is right now — to fix 'em.

The *Digest* will once again be running its very popular photographic competition in the coming months in conjunction with Maxwell Optical Industries who have kindly donated Nikon cameras as prizes. Full details and entry forms will be contained in the Bicentenary issue of the *Digest* to be distributed in September. Entry forms will also be available at photographic shops and at pilot briefing offices.

In the centre section of this issue you will find details of the Bicentennial Air Show and the associated safety activities. The next issue will include advice as to how to safely fly into and out of, the very high traffic density airspace around Sydney. Please prepare now by ensuring you have all the necessary paperwork and charts for the trip. There is a list of current A/L's in the centre.

David Robson

DAVID ROBSON
Editor

Covers

Front. There's nothing quite like a taildragger.
Cessna 185 at Bendigo, 1987.
Photo by David Robson.
NIKON F Fujicolor

Back. The last 'message' on landings — please make a final conscious decision whether to continue or to go round.
Poster design by Soussanith Nokham.

Editor: *David Robson*
Editorial Assistant: *Karen Hutchison*
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Photographs: *P 4* *BASI*
P 9 *SMEA*
P 13 *RAAF*
P 10, 11, 13, 17 *BUMET*
P 20 *Kevin Limon*
P 13 *unknown*
ANARE

Undercarriage — oops!

AT 40-50 KNOTS during the takeoff roll, the pilot heard a loud bang and felt the aircraft adopt a progressively lower nose attitude. As if in slow motion the nose dug into the surface of the strip and the aircraft turned over onto its back.

After evacuating the aircaft the pilot saw that the undercarriage was retracted — both nosewheel and mains.

The pilot could not positively recall the position of the undercarriage lever at the start of the takeoff roll but did not touch the lever during the takeoff — he maintained one hand on the throttle and one on the control column.

The strip was mostly smooth and hard with only minor undulations. However, about 200 metres from the eastern end there was a noticeable bump where a water pipe ran underneath.

There was no apparent fault with the U/C system.

[Apparently the gear lever was not in the fully down position and when the weight of the aircraft was lifted off the squat switch it allowed the retraction cycle to commence.]

The pilot of the Cessna 210 ferried his wife to the intermediate stop and then flew the last leg alone.

The circuit and landing at the destination were normal until late in the landing roll when the pilot carried out the after landing checks. He selected flaps up and then inadvertently selected the gear up instead of opening the cowl flaps as he had intended.

The warning horn sounded and the pilot realised his mistake. He immediately selected the gear down but sensed that the gear had already started to retract. As he felt the gear motor operating he pulled the mixture to idle/cut-off and turned off the fuel and electrics.

The aircraft settled onto the ground in the centre of the strip.

The strip had a hump in the middle and may not have met the criteria for an ALA.

It seems that the pilot was still travelling at a reasonable speed when he selected the gear up. This may have been to roll through to the end.

It is also likely that he held back stick to reduce the load on the nosewheel as he passed over the hump. This combination was sufficient to lift the weight from the squat switch which is fitted to the nosewheel on this aircraft. Hence the retraction sequence was allowed to commence even though the aircraft was on the ground.

The pilot of the Baron had completed a type endorsement only two days previously. During the endorsement the instructor would retract the flaps during each touch-and-go. Following the endorsement the instructor recommended that the pilot conduct a period of solo circuits to consolidate his training.

After the first circuit the pilot was lined up on final but was gaining on a preceding aircraft. To avoid a confliction, he was given approval to carry out a touch-and-go on the parallel runway.

The landing was normal. However, during the ground roll the pilot inadvertently retracted the gear instead of the flaps. The aircraft settled onto its belly.

The pilot admits to selecting the lever without visually confirming that it was the flaps. The aircraft was travelling at a speed such that there wouldn't have been sufficient weight on the wheels to activate the squat switch.

He had only 2.5 hours on this type of aircraft. All his previous experience was in aircraft which had the gear and flap lever in reverse locations.

After selecting the undercarriage down the indicators showed that the left main gear was unsafe. The pilot diverted to a more suitable airfield for an emergency landing and tried several times without success to get the gear down and locked.

He then selected the gear up and carried out a wheels-up landing.

The left gear had not been rigged or lubricated in accordance with maintenance instructions and the gear-up-lock roller had seized. The rollers on both main legs had apparently not been free to rotate for some time. The pilot may not have been aware of the need to check these rollers during the pre-flight inspection.

And one with a twist

As part of a refresher check on the aircraft type, a Mooney M20, the instructor required the pilot to use manual system for lowering the undercarriage. After turning the crank handle the recommended number of turns, the gear-down-and-safe light did not illuminate. The pilot continued to rotate the crank handle a few more turns and a loud bang was heard, after which there was little resistance to further rotation of the crank.

However, the gear down light still didn't illuminate although the visual gear position indicator in the cockpit did indicate that the gear was in the down position.

The gear actuator circuit breaker was reset and the gear was selected up. The gear did not retract but the gear unsafe light illuminated. All further attempts to obtain a gear down light were unsuccessful. Observations made from another aircraft and by people on the ground suggested that the gear was down and locked.

The aircraft was diverted to Bankstown. Unfortunately the gear collapsed immediately after touchdown.

It was found that a fault in the gear indicating system prevented illumination of the gear down light when the gear reached the down-and-locked position from a manual extension. When in this case the pilot continued to rotate the crank, an overload failure of the actuator housing occurred. The gear was unlocked when the up selection was made but the damaged actuator prevented either retraction or safe extension.

In this aircraft, the actuator plays a vital role in retaining the gear in the down and locked position as it pre-loads the landing gear braces in an overcentre position. Once the actuator was damaged, the collapse of the gear on touchdown was unavoidable □

Armchair theatre?

WE DISCUSSED previously the potential benefits of carrying out a post-flight inspection in the same way as we carry out a pre-flight, to detect changes or damage or leaks in time to have them rectified.

A similar benefit can be gained by post-flighting (and pre-flighting for that matter) — ourselves.

Consider the situation where we have just shut down. The flight was safe but there were traffic problems and the radio was hard to understand at one point. There were no incidents but the landing was a bit firm and the pre-takeoff checks were a bit rusty.

Instead of rushing to the bar to erase all memory of the flight with the thought, 'Thank goodness that's all over. I can relax now until the next time.' — *Stop and think.*

There were lessons from that flight that could help avoid a similar or worse situation in the future.

An armchair re-enactment or even a bedtime re-enactment can provide a relaxed self analysis that can only be of tremendous benefit.

From the time we gain our licence we rarely fly under the scrutiny of another pilot — thank goodness. But we do have the best judge in the world with us — ourselves. If we are absolutely honest with ourselves and thorough about our self analysis then we know exactly what we did correctly or incorrectly, what we were familiar with and what we had to guess or bluff our way through. We know whether the aircraft really is fully servicieable. We know whether we were at risk or whether we were fully prepared and competent in our handling of the flight.

What a terrifically valuable facility to have!

Perhaps the best basis for pre-flight planning is an honest post-flight analysis of the previous trip □

The Maintenance release — Flight Crew aspects

THESE NOTES have been prepared to give guidance to persons operating aircraft that are maintained to the requirements of ANO 100.5.1 and the Department of Transport and Communications form DA 741 Maintenance Release which is issued on completion of maintenance.

The issue period for a maintenance release is nominally 100 hours time in service or 12 months from its time of issue. By referring to the maintenance release document, it will be seen at the top of Part 1, that the date and total aircraft time in service when reached, will cause the maintenance release to no longer remain in force i.e. expire.

ANR 108(1) states in part that an aircraft shall not commence a flight unless it has a maintenance release in force covering the period of the flight and the flight is not in contravention of any condition set out or referred to on the maintenance release. Unless otherwise approved, the maintenance release must be carried on all flights (ANR 113 refers).

Daily inspections

Let us now consider Part 3 of the maintanence release. This is where certifications for the daily inspections are made and where time in service is to be recorded. Daily inspections are required to be performed prior to the first flight of each day (requirement is specified in para 3.1(5) of ANO 100.5.1). A daily inspection may be *performed* by the pilot-in-command (being other than a student pilot) in which case certification is not required. If the daily inspection is performed by other than the pilot in command, certification is required. The only persons authorised to *certify* for a daily inspection are:

- An appropriately licensed AME.
- The holder of an appropriate maintenance authority covering the maintenance.
- The holder of a valid commercial pilot licence (or higher) endorsed on the aircraft type or group (with sufficient knowledge and experience).
- Other persons as specified in the regulating document which is para 4.2(1) of ANO 100.5.1. It is of interest to note that the holder of a private pilot licence is not authorised to *certify* for a daily inspection.

Time in service

Time in service is defined in ANO 100.5.0 and is the time from wheels OFF to wheels ON. It is required to be entered on the maintenance release at least at the end of each days flying (para 8 of Appendix 5 to ANO 100.5.1). By referring to Part 3 of the maintenance release document, a space can be seen at the very top of the progressive total column to record the aircraft total time in service at the time the maintenance release is issued. It is then only a matter of recording an entry after each days (at least) flying and adding this time progressively in the second column (progressive total).

Endorsements : (Defects — permissible unserviceabilities)

A proper understanding of the use of Part 2 of the maintenance release is necessary and let it be clearly understood that THE ENTERING OF A DEFECT ON THE MAINTENANCE RELEASE DOES NOT AUTOMATICALLY GROUND AN AIRCRAFT.

It is important to understand the proper relationship to the appropriate pieces of legislation of defects, unserviceabilities and damage.

A defect by definition is a lack of something essential to completeness, a shortcoming. It does not mean something is necessarily unserviceable or damaged. Let us consider some defects in this context: — e.g.

— The engine primer is stiff and hard to operate, it can be used with some difficulty but is of little consequence — the engine can be started quite normally using the throttle operated accelerator pump.

— 'VHF COMM — squelch breaks through occasionally, but not affecting reception.'

— The parking brake handle will not always lock in the parked position on first attempt to park the brakes — after second or third attempt it locks in park.

ANR 49F requires the owner, the operator or flight crew member, once they become aware of the existence of a defect in an aircraft, to endorse the maintenance release with particulars of the defect and to sign the endorsement. The defect having been committed to paper, now provides a means for the next person who may wish to fly the aircraft with the necessary information to allow a proper judgement to be made against other requirements as to whether he can fly with the defect or have maintenance performed before he flies. It also provides a person likely to perform maintenance on an aircraft with the necessary information to decide on appropriate action.

Referring back to ANR 108(1)(c) one of the requirements before commencing a flight is that all defects and conditions are considered and that the flight will not be in contravention of any condition set out or referred to in the maintenance release.

The requirements of ANR 236 must be considered by the pilot-in-command before he commences takeoff. This Regulation requires him to establish satisfactory engine preformance, check instruments and perform such checks and tests required by the flight manual or operations manual. Para 8 of ANO 20.18 requires all instruments and equipment fitted to an aircraft to be serviceable prior to takeoff, subject to certain qualifying provisions.

Section 5 of an aircraft flight manual specifies mandatory instruments and indicators which must be fitted to an aircraft and be serviceable prior to takeoff.

As can be seen from the above, the pilot-in-command has requirements placed on him for determinations to be made before flight and if we consider those defects quoted as examples earlier in these notes, it would be found that those defects would not preclude further flight.

Let us now consider unserviceability. When a component can no longer render service and perform its design function it becomes unserviceable. Thinking back to our defective VHF Comm — our problem has degenerated to a situation where the squelch breakthrough is now continuous and VHF reception is unreadable — this unit is now unserviceable.

The last problem for consideration is damage, some form of physical defect such as impact dents or tears in the skin, control surface attachments cracked as a result of air loads, undercarriage members buckled resulting from ground-loops etc.

Remember — all unserviceabilities and damage are defects, but, all defects may not necessarily by unserviceabilities or damage. ANR 42 provides a means of having defects and damage approved as permissible unserviceabilities. For the general aviation sector such approval is granted by Department of Transport and Communications only. Permissible unserviceabilities are not usually approved for aircraft in current use for private, aerial work or charter operations with the exception of those that are approved through ANO 20.8 or ANO 20.18. Where a permissible unserviceability is approved by any of the above methods, ANR 49E requires that the permissible unserviceability is endorsed on the maintenance release along with any condition required to be observed when operating with the unservicibility. The responsibility for complying with the requirement of ANR 49E is imposed upon the owner, operator or flight crew member and he is required to sign the endorsement.

We now come to the final set of circumstances which, if encountered, provide the means for endorsing the maintenance release to declare an aircraft to be unairworthy and in so doing, legally ground the aircraft. ANR 49C requires an owner, operator or flight crew member who considers that:

(a) A maintenance requirement has not been complied with.

(b) The aircraft has suffered major damage or developed a major defect (major damage and major defect are defined in ANR 5).

(c) The aircraft has had abnormal flight or ground loads imposed on it;

and there is a likelihood that the aircraft may be flown before corrective maintenance can be performed, the maintenance release shall be endorsed setting out the facts of the situation and declaring the aircraft to be unairworthy. The maintenance *release* now *ceases* to be in force.

Once a maintenance release has been actioned under the provisions of ANR 49C it can only recommence to be in force under the provisions of ANR 49D. When appropriate corrective maintenance has been performed and certified, the authorised person after satisfying himself that the reason for the ANR 49C endorsement no longer exists, shall then make a further endorsement cancelling the ANR 49C endorsement and sign it. The pilot-in-command of an aircraft operating in any class of operation other than under an Airline Licence is a person who is authorised to make such a cancelling endorsement. (Refer to ANR 49D(2)).

In concluding these notes it must be clearly understood that where reference has been made to specified ANR's and ANO's only abridged versions of the texts have been quoted for easier reading. Please read the specified requirements fully to see and understand the legal requirements. The maintenance release is a legal document and failure to comply with the requirements can result in a breach of the Air Navigation Regulations.

Consider the following:

(a) When checking the maintenance release before flight, make sure it has been issued to cover the class of operation you are about to embark on. Remember ANR 108(1)(c)! Your class of operation should not have been deleted from the box in the right hand top corner of Part 1 of the maintenance release document. Also ensure all required maintenance has been completed and certified.

(b) If you are operating away from a fixed base carry the aircraft log books with you. A LAME cannot make a clearing certification against a defect entered on the maintenance release until he has made appropriate entries and certification in the aircraft log book. Read Appendix 5 to ANO 100.5.1.

(c) Para 6.9 of ANO 100.5.1 requires the owner (or operator) of an aircraft to retain an expired maintenance release for at least one year from the date it ceased to be in force □

Airframe Icing

Bill McIntyre is Chief Pilot with the Snowy Mountains Hydro-Electric Authority. He has been flying fixed and rotary wing aircraft out of Cooma for over five years and has personal experience with the various forms of icing that he mentions in his article.

PILOTS WHO operate IFR in the southern areas of Australia during winter will eventually find themselves in an icing situation. Unfortunately there is not a great deal of literature available to GA pilots to enable them to prepare themselves for their first encounter. It is not surprising, then, that most new pilots look forward to this event with considerable dread. The purpose of this article is to give some practical advice on what to expect.

If you fly an aircraft in cloud at temperatures around 0°C or below you can usually expect to accumulate some form of ice. The type of ice and the amount accreted depends on several factors, including temperature and size of the water particles. There are three basic types of ice that concern us.

Clear ice

This is a glassy transparent or whitish form of ice that adheres tenaciously to exposed surfaces. It accumulates most heavily on all forward facing surfaces including the leading edges of the wings, empennage and propellers. It often forms in successive smooth strong layers and is difficult to remove except by breaking the seal between it and the underlying surface or by melting.

Clear ice is formed when water accumulates faster than it freezes by collision with raindrops or cloud droplets, so that the outer surface is always wet with an excess of free water. It generally conforms to the shape of the structure to which it freezes and is slow to distort the form of the leading edge of the wing. Excess free water will flow back over the top and bottom of the wing and freeze there, roughening the surface.

Rime ice

This is a porous, white, usually granular form of ice which is not as dense as clear ice. Rime forms when water droplets freeze as fast as they accumulate. Since this freezing is almost instantaneous on striking the aircraft there is no excess of liquid so the rime freezes where the water droplets hit. This will usually be on the leading edges and on protruberances such as antennas, steps, thermometer probes etc. Rime is not as strong as clear ice and is usually removed more easily.

Mixed forms of ice

Not all ice encountered will be either clear or rime exclusively. As conditions vary between those forming clear and those forming rime, any intermediate forms of ice may result. If snow is encountered together with clear ice conditions, snowflakes may adhere and freeze to leading edges, producing a thick rough accumulation in a short time. It is even possible that wet sticky snow may pack on the leading edges. Dry snow or ice crystals will not adhere to an aircraft and so therefore *do not* present an icing hazard.

The rate at which ice accumulates is directly related to the amount of water particles that hit the aircraft. It follows, then, that cumuliform cloud will present more water to the aircraft and so therefore create a worse icing situation than stratiform cloud where the water particles are smaller. Cumulonimbus clouds, because of their high water content, cause some of the most severe icing conditions.

Many pilots think that the major problem with ice accretion is the increase in weight that the aircraft is required to carry, but this is just the tip of the iceberg. Other factors of vital importance are:

- decreased propeller efficiency,
- decreased lift caused by deformation of the aerofoil,
- increased drag.

All of these factors in concert cause a requirement for more power to maintain the desired airspeed and a higher stalling speed caused by the deformation of the aerofoil section. Aeroplanes with high wing loading can be very quickly affected by ice.

Preflight considerations

The first line of defence against an ice affected flight is to avoid icing conditions in the first place. Forecasts give ample information on cloud types and levels, temperatures and freezing levels and significant icing. Careful flight planning will often allow you to avoid icing regions even on the worst days.

If flight into known icing conditions is unavoidable it should be kept to an absolute minimum and even then it should only be undertaken in a properly equipped aircraft and after careful preflight checks. All de-icing equipment should be inspected for proper operation including a functional check of the anti-ice/de-ice on the propellers, airframe, windshield, engine intakes, fuel vents, stall warning vanes, pitot heat and the outside air temperature indicating system.

It should be appreciated that prolonged flight in known icing conditions is highly undesirable, even in aircraft that are certified for it. The best possible outcome will be longer time spent en route caused by a reduced airspeed. Use your de-icing equipment to enable you to fly clear of icing conditions.

In flight actions

On first entering an icing region the pilot needs to make an immediate decision about extricating himself from it. In order of priority, these are:

1. *Climb*. In many cases this will enable a cruise on top of cloud and clear of ice or at a level that is so cold that ice will no longer form. Limiting factors are lack of pressurisation or oxygen and the aircraft's maximum operating ceiling. Cloud of considerable vertical extent may be beyond your aircraft's capability.
2. *Descend*. Descending may enable a cruise at temperatures above the freezing level or clear of cloud. The only limiting factor is the lowest safe altitude in the icing region.
3. *Go back*. If climbing or descending is not an option then proceed back to where the icing conditions started and re-plan from there.

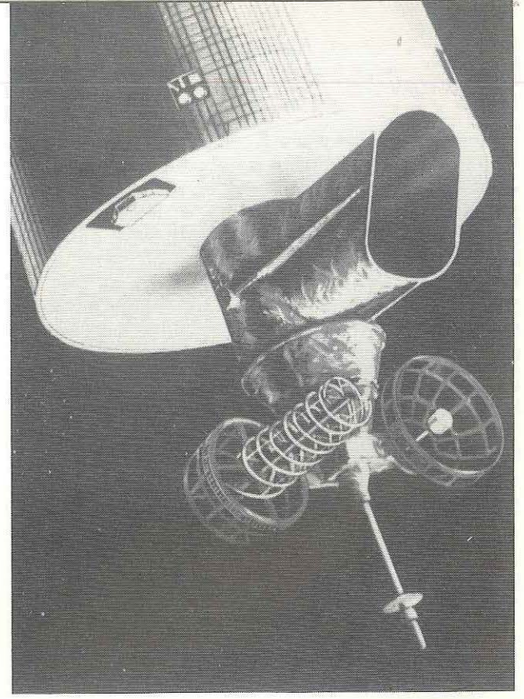
In short, before going in to an icing region, make sure you have an 'out'.

Some additional points to remember

- All electric de-ice or anti-ice equipment should be turned on well in advance to allow plenty of time for it to warm up.
- Follow the manufacturer's instructions carefully when using pneumatic de-icing boots. The amount of buildup before activiation is critical. Too much accumulation might be impossible to shed, too little might only crack and not break off cleanly. This allows a build up of more ice over the top, rendering the boots useless. Most systems require half a centimetre to function correctly.
- Clear ice will often break off in line with the rear of the de-icing boot creating a ridge which adversely effects the performance of the wing.
- Rime ice sometimes forms a thin bead along the leading edge of the wing. Although it looks innocent enough, it can create a dangerous situation on landing by increasing the stalling speed.
- Many manufacturers have warnings in their Pilot Operating Handbooks about the use of flap when there is an accumulation of ice on the wings. Make sure that your aircraft has no restrictions after a flight in icing conditions.
- Find out the handling characteristics of your aircraft and its de-icing system before you need to use it in an icing region. All aircraft behave differently, some are more badly affected than others.

In summary, encounters with ice are like everything else in aviation, they require preparation, planning and a clear rehearsed understanding of what to do when the going gets tough. If Jack Frost gets you in his clutches make sure you know what to do □

Satellite pictures



Contributed by the Bureau of Meteorology

IN A WEATHER Service Office there are usually displayed two types of satellite pictures, labelled VIS and IR. This article aims to provide pilots with some basic facts about these two types of satellite data in order to better understand briefings provided by Bureau of Meteorology staff, as was recommended at the Second Aviation Workshop in June 1986. It must be stressed that satellite data alone does not completely describe the state of the atmosphere; it combines with conventional and computer generated data to build up a comprehensive picture of the atmosphere.

Visual satellite pictures (VIS) show us in black and white the view we would see if we were located on the satellite. The image is based on reflected sunlight, and clouds are, in general, good reflectors. The best reflectors are cumulonimbus, large cumulus, and all thick clouds as they reflect most of the sunlight that strikes them, and they appear white. Thinner clouds are generally not so white because less light is reflected.

Unless cumuliform clouds spread out at higher levels into sheets (as often happens in the tropics) they appear on visual pictures as discrete clouds with spaces in between. When the sun angle is low, cumulus tops cast shadows resulting in a textured pattern. In general, cumuliform clouds are evident by their lumpy appearance, while stratiform clouds appear flatter.

In winter the illumination is poor and in general, clouds are not well represented on VIS pictures.

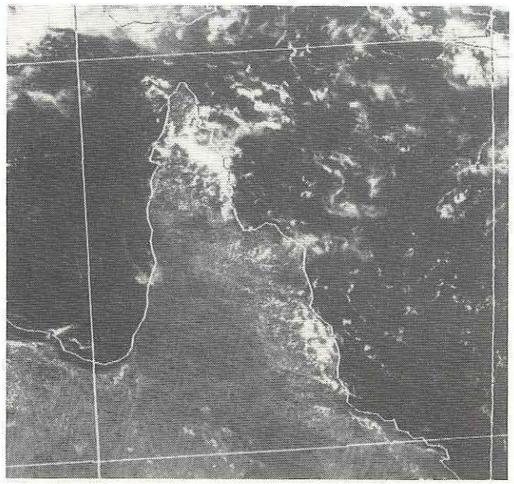
Infrared pictures (IR) display the relative temperatures of the cloud tops, or the earth's surface if the area is cloud-free. If there are several layers of cloud at a location then the temperature displayed is that of the highest cloud top. Cloud tops which are cold (of the order of –30°C or colder) — eg cirrostratus or cumulonimbus, appear white. The earth's surface itself on a hot day (of the order of 30°C or higher) appears black. Temperatures in between +30°C and –30°C are shown as varying shades of grey, with warmer temperatures being dark grey and temperatures approaching –30°C, light grey.

Because the temperature at the top of a fog or low cloud layer is usually fairly similar to the temperature of the adjacent fog-free earth's surface *it is very difficult and on most occasions impossible to discern fog/low cloud on IR imagery.* Clouds with the coldest temperatures are best represented on IR pictures.

Satellite imagery is normally available at approximately three hourly intervals, with visual pictures of course only available in daylight hours. IR imagery, with its availability at steady intervals, does enable the movement and development of clouds and cloud systems to be followed; some clouds do undergo their life cycles within three hours and do not necessarily appear on satellite pictures at all.

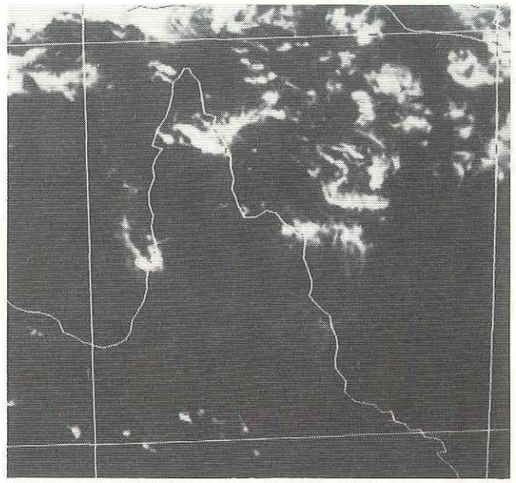
The best result is obtained when the two types of pictures can be used in conjunction. The satellite pictures (opposite) are sections of pictures taken at 0300 UTC 29 March 1987. They provide a 'snap-shot' of conditions at that time, and the commentary indicates how certain features become apparent when the VIS and IR pictures are considered together □

VISUAL (VIS)

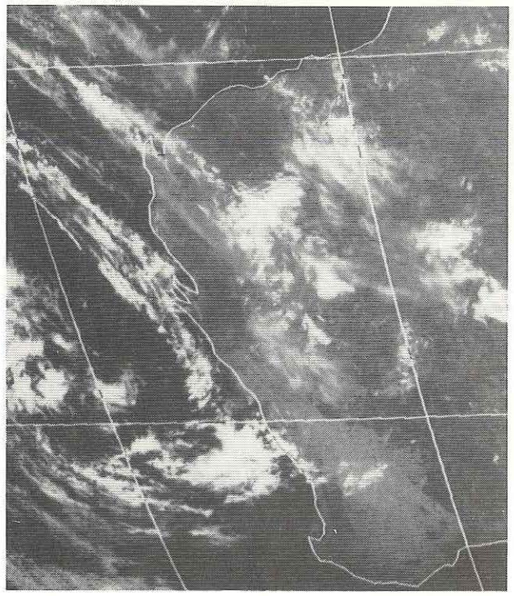


The VIS picture shows a generated area of scattered to broken cloud over parts of Cape York Peninsula.

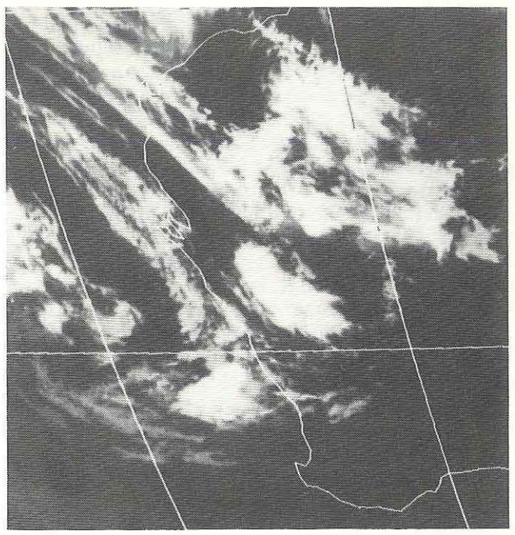
INFRA-RED (IR)



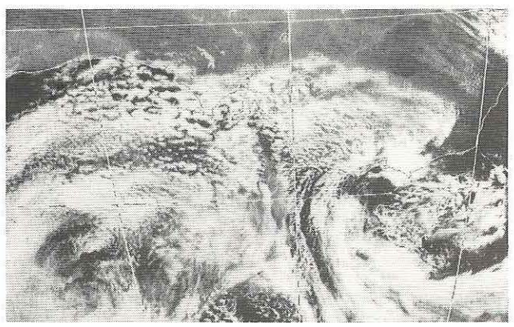
The IR picture highlights the areas of coldest and highest cloud top (thus strongest vertical development) as white.



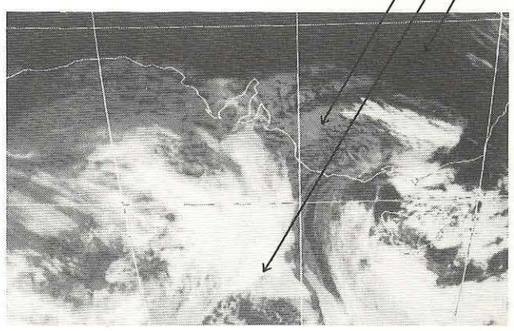
The VIS picture shows scattered cloud over inland WA.



There appears to be more cloud over inland WA on the IR picture. Cirroform cloud is more easy to recognise on IR pictures.



The VIS picture shows clouds associated with major synoptic patterns over SE Australia and The Great Australian Bight.



The IR picture gives a better idea of the cloud tops (see captions). However low cloud may be masked by higher cloud.

Mountain wave activity and its effect on aviation

Bureau of Meteorology

MOUNTAINOUS or hilly country acts as an impediment to any low level air flow, with the air forced to rise up the windward side of the mountain barrier. If the atmospheric conditions are favourable then the air, once it has passed over the barrier, begins to sink down the lee side of the mountain and then forms a series of standing waves downstream from the barrier. In ideal conditions these waves can continue downstream from the mountain range for many hundreds of kilometres and be felt high into the troposphere. For wave formation the wind must be blowing more or less perpendicularly to the ridge, with wind direction remaining fairly constant with height. The wind speed at ridge level must exceed a certain minimum, dependent on the height of the ridge, but generally this minimum figure is regarded as about 20 to 25 knots.

In Australia mountain wave activity is most likely to be encountered over and to the lee of the mountain systems of southeastern Australia, south from approximately latitude 26°30′.

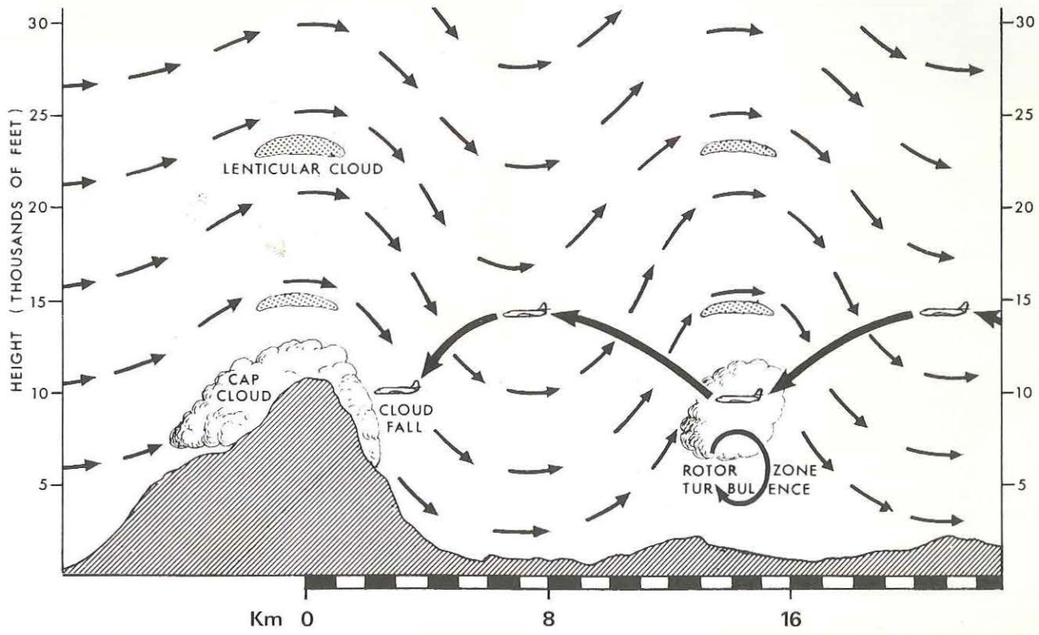
The dangers of mountain waves

(i) Vertical currents

The most usual danger is the large sink rates on the 'downside' of mountain waves. An aircraft flying along the lee side of a lengthy mountain range might remain in a downcurrent continuously until the whole length of the mountain range has been traversed. In such circumstances a catastrophic loss of height could occur.

The extent to which an aircraft's flight path will be affected by mountain waves is dependent not only on the severity of the waves and the speed of the airflow, but also on the type of aircraft and its track and ground speed. *Crossing a ridge of high ground into the wind when winds are strong and mountain waves are likely can be much more hazardous than doing so with the wind.* There are two reasons for this — firstly, when flying into the wind the aircraft's ground speed is reduced and it will therefore remain in downcurrents longer; secondly, where no attempt is made to counteract height changes, the aircraft's height variations when flying into the wind are out of phase with the standing waves, so the aircraft is at its lowest height when it is actually flying over the highest ground (see diagram).

For downwind flight the reverse is true, ie the aircraft's involuntary height fluctuations will be in phase with the airstream waves and, provided that adequate terrain clearance is maintained, there is less likelihood of the aircraft being forced dangerously close to the ground by downdrafts.



If you are not eligible for a free issue, or if you would like additional copies of the Digest:—

SUBSCRIBE TO

Aviation Safety Digest

Five issues $A16.00 *(including surface postage)*

For over thirty years, the *Aviation Safety Digest* has been an integral part of Australian aviation.

In July 1986, responsibility for the *Digest* was transferred from the Bureau of Air Safety Investigation to the Flight Standards Division of the Australian Department of Transport and Communications. This move reflected the perception that civil aviation may have reached the limit of accident prevention through regulation and that the way forward is through increased emphasis on safety education in general, and the 'human factor' in particular. Rather than just draw lessons from accident investigations, the *Digest* will increasingly seek to influence pilot behaviour by positive reinforcement of sound techniques. It will examine all aspects of piloting and publish formal results as well as 'the tricks of the trade'. The 'crash comic' will become a 'how not to crash' comic.

Anyone with an interest in aviation will benefit from tapping into this unique source of the accumulated wisdom of the profession and the latest research into aviation safety in Australia. Indeed, anyone with an interest in high technology and the roles and limitations of the human operator will find this publication enlightening.

AIRFLOW

Feeling a little query?

The AIRFLOW column is intended to promote discussion on topics relating to aviation safety. Input from student pilots and flying instructors is particularly welcome.

Anonymity will be respected if requested. 'Immunity' applies with respect to any self-confessed infringements that are highlighted for the benefit of others.

Write to: AIRFLOW
Aviation Safety Digest
P.O. Box 367
CANBERRA A.C.T. 2601
Australia

Australian Bicentennial Air Show

The Australian Bicentennial Air Show, to be held at RAAF Richmond, near Sydney, between 12-16 October, will be the largest aviation event ever held in the Southern Hemisphere, and the aviation centrepiece of Australia's Bicentenary.

Combining an international Aerospace Expo, an Australian General Aviation Trade Fair, extensive flying displays, and static displays featuring the history of civil and military aviation in Australia, and the use of aviation in the community today, the Air Show is expected to be one of the largest single events of the Bicentenary year.

In addition to attracting a large number of civil and military aircraft from overseas, it is anticipated that large numbers of Australian General Aviation pilots will want to fly-in to the event.

Because of the large number of static and display aircraft that will be on the ground, parking space at RAAF Richmond will be severely limited, and only display aircraft and a limited number of approved charter flights will be able to operate into the RAAF Base.

Schofields Aerodrome

All other General Aviation aircraft will be catered for at Schofields, 9nm southeast of Richmond, where full-scale aircraft reception and refuelling facilities will be provided by the Australian Bicentennial Air Show Organisation and the Schofields Flying Club.

Schofields will be open to visiting aircraft between Monday, 10 October and Wednesday, 19 October. Because of the likely traffic volumes, pilots are encouraged to plan their visit to the Australian Bicentennial Air Show over several days.

Using tarmac and grassed areas at Schofields and the adjoining HMAS Nirimba, parking for up to 800 General Aviation aircraft will be provided. In wet weather, a minimum of 400 aircraft can be catered for.

The Air Show Organisation will provide parking, ground transport, aircraft refueling, crew reception, domestic facilities and airfield security at Schofields.

All visiting aircraft will be met by Air Show representatives, and transport will be provided to the Aircraft Reception Centre in the Schofields Flying Club building.

This facility will include information services, refreshments, comfort stations, car hire, accommodation information, transport to and from Richmond, entry ticket sales, telephones, fax and telex.

Public transport will be provided for pilots and their passengers between Schofields and Richmond, and will include train and bus services, rental cars and charter helicopters.

Crews will not be permitted to camp at Schofields, and all pilots will be issued with airfield passes to ensure control of access to aircraft and tarmac areas. At night, a professional security firm will be employed to ensure the security of visiting aircraft. Aircraft refuelling will be by way of mobile tankers, which will meet arriving aircraft in the parking area. Both Avgas and Avtur will be available.

An aviation maintenance organisation will have staff available at Schofields to perform minor aircraft maintenance.

Accommodation

Visiting pilots can arrange accommodation through the Hawkesbury Regional Tourism Centre (045) 77 5915, the Penrith Tourist Information Centre (047) 32 2330, or the Blue Mountains Tourist Accommodation and Tour Booking Service (047) 39 6318, 24-hour Information Hotline (047) 39 1177.

Alternatively, fly-in pilots may elect to use camping facilities being made available in the grounds of the Hawkesbury Race Club, adjacent to the RAAF Base. Enquiries to the Race Club Secretary-Manager, Mr Stewart Allsop on (045) 77 2263.

The Australian Bicentennial Air Show Organisation is planning a number of social functions for fly-in pilots and display participants on the Friday, Saturday and Sunday nights of the show; details will be available at the Aircraft Reception Centre at Schofields.

The first three days of the Air Show (Wed-Fri 12-14 October) will be trade days, entry to which will be restricted to those with a professional or commercial involvement in the aviation or aerospace industries, student and private pilots (on production of their licence), attendees at the various conferences and symposia being held in conjunction with the Air Show, or those aviators who have purchased membership in any of the various Air Show clubs being offered.

Persons under the age of 18 will not be permitted to the trade days, except where they are holders of a current flight crew or aviation engineering licence.

To assist planning for the reception of aircraft flying in to Schofields, and so that information can be sent to fly-in participants, pilots are urged to register in advance with the Air Show Organisation.

Names and addresses, with details of aircraft type and registration and likely number of persons on board, should be sent to:

Bicentennial Fly-in Co-ordinator
Australian Bicentennial Air Show
PO Box 338
RIVERSTONE NSW 2765

Telephone: (02) 626 6211

EXAMINATIONS AVAILABLE DURING THE BICENTENARY AIR SHOW

PPL FLIGHT RULES AND PROCEDURES
CPL SUBJECTS FOR FIXED AND ROTARY WING
CPL FINAL EXAM
THE INSTRUMENT RATING EXAMINATION
BASIC GAS TURBINES

The PPL FR&P will be of particular interest to visiting pilots from overseas who wish to fly in Australia. Licences can be validated on the spot.

Of special note is an opportunity for feedback during the course of the examination schedule. There will be presentations and an opportunity for discussion before the Instrument Rating Exam and the BGT so that pilots can gain a better understanding of such thing as PANSOPS. Similarly there will be feedback after the marking of the CPL Finals for those pilots who would like to know specifically how they went.

Normal exam rules apply. Please refer to AIC C01/1988 and new AIC's to be issued in July for complete requirements. Obviously entrants for the CPL final must have first passed the individual subjects, including those attempted during the show. Exam marking will be such as to allow this.

All of the exams will be available without prior request but since there is expected to be a considerable demand for these exams you are requested to complete the enclosed notice of intent. Those who have notified us will receive priority for sittings.

The proposed schedule is as follows:

WEDNESDAY	0900 — 1200 CPL individual subjects and CPL Final
	1300 — 1500 Instrument Rating Briefing
	1530 — 1830 Exams as requested (except Instrument Rating)
	1900 — 2100 PPL FR&P briefing for overseas pilots
THURSDAY	0900 — 1200 Exams as requested including CPL Final
	1330 — 1500 BGT briefing
	1600 — 1900 Exams as requested
FRIDAY	1500 FEEDBACK on CPL Final

Fees can be paid on-site and all reference material will be on sale at the Departmental shop adjacent to the examination centre.

To: Flight Crew Examinations Section
Flight Standards Division
PO Box 367
CANBERRA ACT 2601

NAME OF CANDIDATE:_____ LICENCE NO.:_____

SUBJECTS:_____

_____

_____

BICENTENNIAL AIR SHOW 1988

URGENT NOTICE TO PILOTS

CIVIL AVIATION AUTHORITY

AIR SHOW INVOLVEMENT

The Civil Aviation Authority will have a significant presence at the Bicentennial Air Show in October. Details will be included in the Spring Issue of the Aviation Safety Digest.

Activities include:

- Mounting of a corporate CAA static display with special industry briefings conducted on the trade days.
- Mounting of a separate CAA Safety Promotion display.
- On-site exams up to CPL Final with special briefings and de-briefings.
- Sale of operational publications and reference material; and
- A major Aviation Safety Seminar on Friday 16 October.

WHAT DO YOU RECKON? ---------- ABOUT THE *DIGEST*?

Since Flight Standards Division assumed responsibility for the *Digest*, we have experimented with a new look and with new columns — and we felt it was about time we checked to see if you think we're heading in the right direction. Please complete the enclosed form so that we can deliver the magazine that you think would make the most positive contribution towards safer flying.

1. The Format.
Is it the best size, shape and presentation for the material it contains?

2. The Style.
Is the style appropriate to the content and nature of the material?

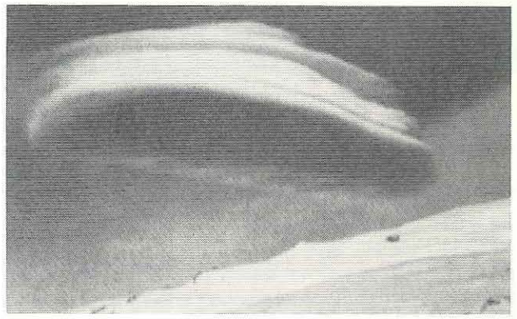
3. The Timing.
Is the frequency and the lead time responsive enough to the needs of the aviation community?

4. The Content.
Is the content appropriate and correctly targeted?

5. The Emphasis.
Is the right emphasis given to the areas most needing of attention?

6. The Future.
How should the Digest be changed to better contribute to aviation safety?

Your Tuppence-Worth_____



(ii) Turbulence

Although flights through mountain waves are often very smooth, turbulence can be encountered at any level in mountain wave systems and may, on occasions, be as violent as that encountered in severe thunderstorms. The worst turbulence encountered over mountainous terrain is usually found in rotors. Generally speaking, when conditions are favourable for the formation of mountain waves, the only sure way of avoiding flight through a turbulent rotor zone is to allow an adequate margin of safety height above the high ground. *All evidence indicates that this margin should be at least the height from the surface to the ridge again above the actual ridge top.* On occasions rotors have been encountered at higher altitudes, and this has usually occurred at the base of strong temperature inversions or at levels at which there is a sudden change of wind speed or direction.

A pilot must bear these factors in mind when mountain wave activity is forecast, and assess the situation before deciding on his route. In extreme cases it may be necessary, and certainly preferable, to plan a diversion rather than risk flight over mountainous terrain □

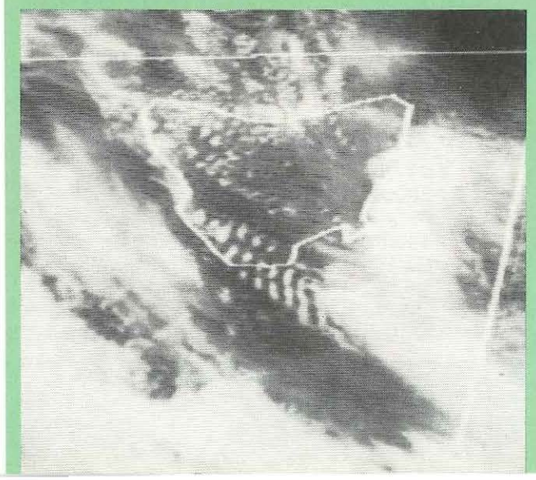
Visual detection of mountain waves

Bureau of Meteorology

MOUNTAIN WAVES can often be detected by the presence of characteristic lenticular (lens-shaped) clouds which may form in the wave crests, if there is enough moisture available. The ascending air produces condensation, and the descending air evaporation. The lenticular or wave cloud remains more or less stationary in the crests of the waves. The turbulent nature of the airflow is apparent if the clouds display rotational characteristics. In these circumstances rotors must be suspected. *Frequently there may be no visible warning of the existence of waves or rotors when they form in dry air and therefore have no accompanying cloud. This will be hazardous for the unwary pilot.*

Evidence from satellite pictures

Satellite pictures may reveal mountain wave activity as a series of regularly spaced cloud bands in the lee of the mountain chain. The spacing between clouds indicates the wavelength of the mountain waves. However, mountain waves may be present without evidence on satellite pictures because the atmosphere may be too dry to produce cloud, or a layer of higher cloud may mask the lower level clouds indicative of mountain waves.



The New Area Forecast

THE BUREAU of Meteorology and the Department recently undertook a review of the presentation of the area forecast — the ARFOR. As a result, a new format was introduced last December and many of you will be familiar with the new plain language layout.

The main objective for the new format was simplicity — in presentation and interpretation.

Only certain abbreviations were to be used and headings and indentation were adopted to aid legibility.

Additionally, guidelines for combining areas were agreed; areas may be combined when the weather in these areas is substantially similar. Areas may be subdivided when specific, identifiable, operationally significant weather can be localised.

These changes are designed to make the forecast more 'user friendly'. When you have had a chance to use the new format we would appreciate your constructive comment and suggestions □

AMENDED ARFOR Area 21/22 Valid 051700 to 060700

OVERVIEW: A moist onshore coastal stream, bringing low cloud to eastern ranges and coastal areas.

SUBDIVISIONS

A: Eastern ranges/coastal areas
B. Western ranges and inland

WIND:

	2000	5000	7000	10000	14000	18500
A:	140/10	160/10	230/15	230/15 PS06	270/20 MS02	270/30 MS11
B:	240/10	240/10	240/15	240/20 PS05	260/20 PS01	270/30 MS11

CLOUD AMD

A: BKN St 1000-4000
BKN Cu/Sc 2500-8000
B: SCT Cu 5000-10000

WEATHER

A: Areas drizzle
SCT showers
B: Nil

VISIBILITY

A: 3000M in showers
5000M in drizzle
B: Good

FREEZING LEVEL

12000

TURBULENCE

Moderate in Cu

ICING

Nil

CRITICAL LOCATIONS

Mt Victoria
2000M drizzle, BKN St 3700 above MSL
Bowral
4000M drizzle, BKN St 3000 above MSL
GRADU 0102 10 km, BKN Cu/Sc 4000

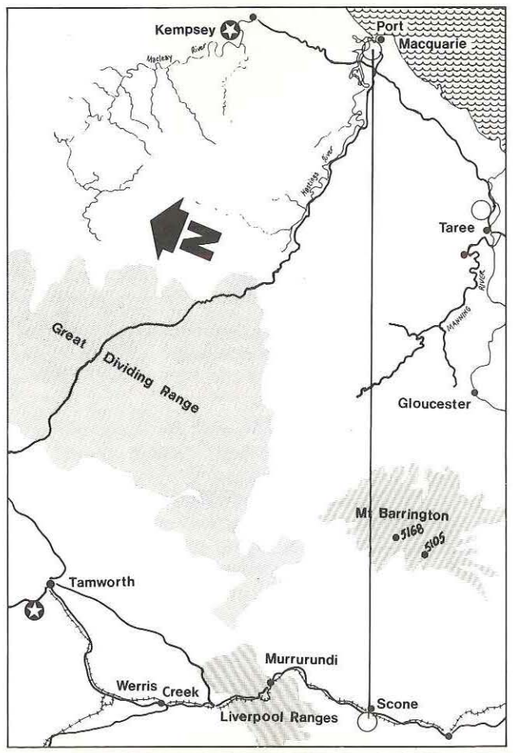
A hole in one

WE PLANNED to fly from Port Macquarie to Scone in a Cessna 172.

I think it was about 7:30 am when I called the Coffs Harbour briefing office. They didn't have a TAF for Scone so as a rough guide, I asked for Tamworth's.

When I submitted the flight plan, Scone's TAF came through and I noted it. The forecasts looked reasonably good so I decided to go to Scone.

We departed Port Macquarie 27 minutes after ETD and the forecast looked as accurate as they usually are — for this time of the year. There was hardly any cloud at Port Macquarie and the sun was shining brightly. Scone was an hour's flight away with only two oktas at 1000 feet and two oktas at 2500 feet.



I couldn't see any cloud at all on our track as we departed PMQ.

From visual fixes, I kept a log of groundspeed and time intervals. At 1045 (local) the cloud had developed to four oktas with tops to 4000 feet. The wind for 5000 feet was VAR/10 knots and at 7000 feet, it was 150/10 knots. I felt that the wind was stronger than forecast and that the cloud was orographic. A groundspeed check confirmed that we were getting an extra five knots so I concluded it would be clear on the other side of Barrington Tops. I looked behind me and the cloud dissipated to nothing on the coast.

My last visual fix was only about five minutes later. I just couldn't believe it! I was on top of eight oktas. We were cruising at 8000 feet and there was about three thousand feet between us and the cloud.

I called Sydney on 124.8 and for an 'actual' for Scone. They replied, 'Scone TAF update, are you ready to copy?'

He said something about an INTER and then a TEMPO and I copied down the worst of it. It didn't look so good so I advised my passengers that I might have to divert to Tamworth. They were disappointed and so was I — for not looking as professional as I should — for not getting them where they wanted to go.

From Scone we headed to Tamworth via Werris Creek (NDB) and the cloud tops were far below. We could see Willow Tree through a very big hole in the cloud and I was able to do a slow rate, descending turn and amend the flight plan again for Scone.

We were just on VMC minima all the way towards Scone but there was a break in the heavy rain and I could see a town which I believed was Scone. (It turned out to be Murrurundi.) Still not accepting the fact that it may not be Scone, I turned toward the lower country to the West to maintain VMC. A quick check of my map confirmed that I still had about 15 miles to run and that I was on the north-western side of the Liverpool Ranges. I didn't accept this. I still don't know why. It seems obvious now.

I quickly checked behind to see if there was a way out and I found to my dismay that cloud was completely blocking the valley that we had come through. The cloud hadn't rolled in from any particular direction — it had just formed!

I looked around in front of me and the valley came to an abrupt end behind which was a hillside enshrouded in cloud!

I quickly got onto the 'clocks' and saw that I was in a 30 degree banked turn to the left. I levelled the wings on the Artificial Horizon, applied full power and climbed. I transmitted some sort of garbled PAN call and noticed trees flashing past less than fifty feet below the aircraft. I thought I had killed us all.

Back on the panel, I saw that the aircraft was climbing at an amazing 1500 fpm. My aircraft is fitted with a coarse pitch prop and rarely climbs at more than 500 fpm. Our weight was about 1900 lb. The airspeed was 55 knots, so I lowered the nose slightly and settled on 65 knots only to see an average climb rate of just under 500 fpm.

My passenger in the right seat screamed out, 'Hang in there, get us out of here!'

Sydney FS said something about control of the aircraft and I replied, 'Affirmative!'

We had climbed from 2800 feet to 4300 feet by this stage. I thought we would be visual by 5000 feet but we weren't until 6500 feet. We continued to climb to 8000 feet.

The tops were building up so rapidly I just could not believe it. It was like time-lapse photography — and more cloud was appearing as if from nowhere.

I climbed to 9000 feet and the tops were at eight. I climbed to 10000 feet and the tops approached nine. I finally cruised at 10300 and still there was less than 500 feet separation. I was told that we were 68 miles from Port Macquarie.

I remember forgetting all my radio procedures. I said to Sydney FS, 'There's a hell of a lot of cloud up here, you know. I don't see how I'll ever get down visually.'

They asked me to check the wings for damage and to see that the doors weren't popping. Now don't you think I would have noticed that? I could only presume that they thought the aircraft had spiralled. I explained that I made the PAN call because I had entered cloud, well below lowest safe altitude, as a non-instrument rated pilot and that I had not lost control altogether.

They then persisted by saying that I should not make any steep turns and that I should make a flapless landing at my destination. I asked where that was to be and there was a long silence before being told either Port Macquarie or Coffs Harbour.

I was given radar headings for PMQ and was told that if I saw a hole large enough to let down through it and land at PMQ. I thought there would be no chance of that. Then other traffic was saying that I didn't have enough fuel to get to Coffs! Yet I had 160 minutes remaining.

The first hole that I saw in the cloud all the way from Scone was right over the top of Port Macquarie — not the township, just the aerodrome — and as we descended the hole closed over again. Another aircraft noticed this as well.

We landed safely at PMQ.

The reason for the FS concern about possible structural damage to the aircraft, was because in the PAN call, the pilot said that he was out of control and that he had been in cloud. Talk about the lucky country □

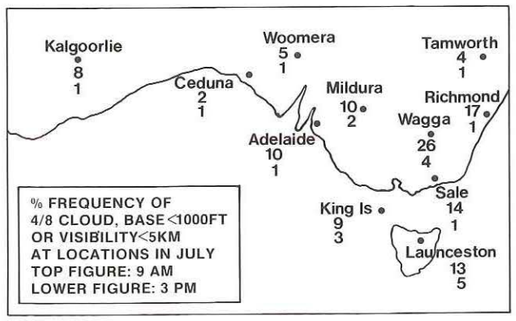
Aviation winter weather

Bureau of Meteorology

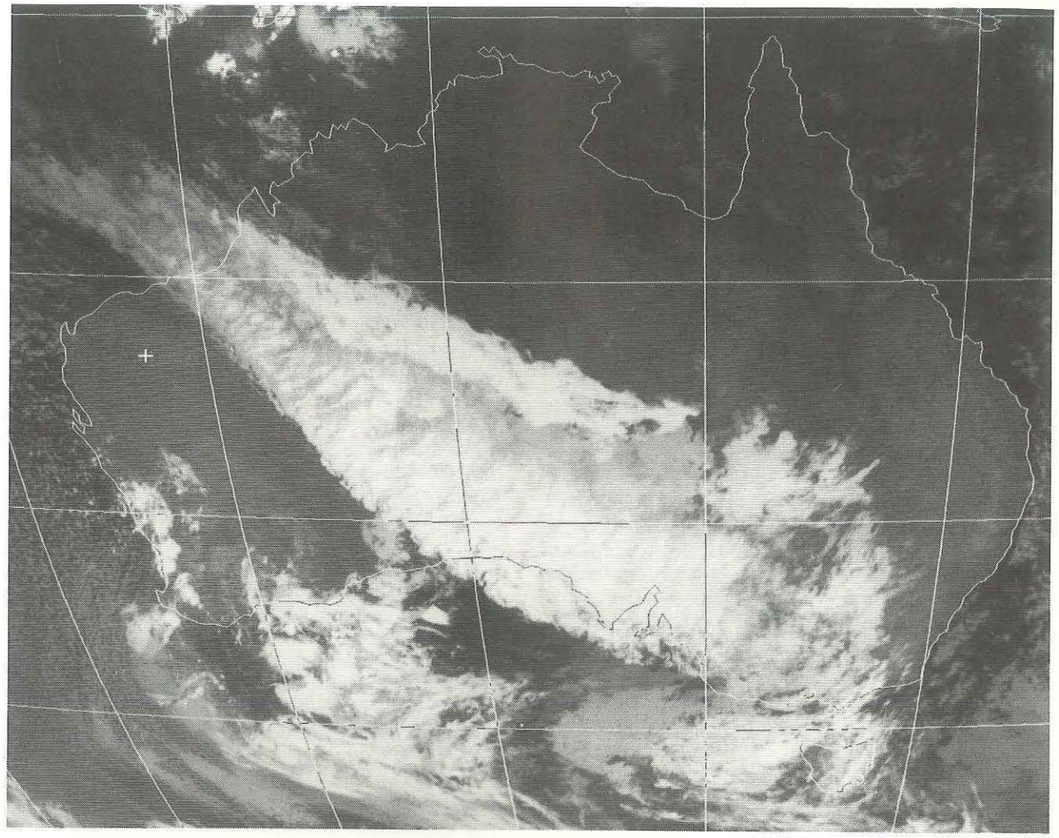
WINTER FLYING requires a special 'weather eye', even in the tropics where there are traps for the unwary pilot. This article discusses separately winter weather conditions in southern Australia, and northern Australia, with additional comments on northern Queensland. It provides a broad overview only and does not take into account 'local weather', which is usually strongly influenced by small scale topography.

Southern Australia

At this time of year southern Australia is usually under the influence of the westerlies and their associated cold fronts, or a stabilising airmass which often forms after the cold front. Adverse conditions are relatively frequent on winter mornings in the highlands and valleys of southeastern Australia and the WA Goldfields area. They are also prevalent at locations fairly close to the coast (eg Richmond NSW, Sale, Mt Gambier).



The typical westerly flows often create mountain waves, but the incidence in any location is dependent on the orientation of the mountain range and the wind direction. These can occur in higher latitudes in any month, but are more likely over SE Queensland in late winter and early spring.



The cold fronts usually bring with them reduced visibility in precipitation and lowered cloud bases. Over the southwest corner of WA a particularly vigorous cold front may produce thunderstorm activity either along the cold front or in the cold southerly air that follows the frontal passage. In the wake of the frontal passage, clearing skies and moderating winds lead to favourable conditions for fog. Inland, these fogs may begin the early evening and in particularly dense cases, can last until midday.

Over the highlands and slopes of south-eastern Australia, and locations relatively close to the coast, areas of radiation fog frequently form overnight in any calm cloudless conditions, without the prior passage of a cold front.

The typical winter flow patterns may be interrupted at times by intense low pressure systems forming off the east coast of Australia. Adverse conditions occur where the onshore stream crosses the coast and on the windward side of the ranges. Deep layered cloud with a very low base and moderate to heavy rain may persist for up to several days, clearing when the 'low' moves out to sea.

One particularly bad weather system is often referred to as the 'northwest cloud band'. This is frequently first apparent to the northwest of the continent and extends for several thousand kilometres, typically towards the east-southeast. The cloud appears to form when warm, moist tropical air moves poleward and rises rapidly. Usually light rain falls initially and as the intensity increases, the cloud base lowers, and the visibility deteriorates. This system represents very bad flying conditions because:

- The cloud cover extends for thousands of square kilometres.
- The cloud is often unbroken from the surface to 20,000 ft. Once in the cloud in a light aircraft there is little opportunity for escape.
- Below minima conditions may persist for many hours or even days. This is in contrast to most other weather systems where the minima generally improve or at least fluctuate.

The northwest cloud band may occur in any month, but is most evident in winter.

Northern Australia

Flying conditions in northern Australia in winter are usually good. However there are a few aspects which must be taken into consideration when planning a flight.

- Poor visibility

  Smoke and haze frequently create navigational difficulties for VFR pilots, particularly if they are unfamiliar with the area. Fires are prevalent at this time and their smoke is widespread below the level of the temperature inversion, which generally varies in height from approximately 6-8000 ft in the north to about 10 000 ft at the latitude of Alice Springs. The inversion traps the smoke below its level by acting as a convective 'lid' on air rising from below. Horizontal and angular visibility in areas of smoke is commonly less than 10 km and quite often as low as 2 km.

  Navigation in remote areas becomes difficult when normally well defined landmarks may not be recognised if visibility is poor, and careful attention is not given to maintenance of the planned track. Quite often an aircraft may be out of range of radio navigation aids, so track keeping and time keeping between known points assumes great importance when flying in smoky conditions. Flying below the inversion level is sometimes uncomfortable due to thermal and mechanical turbulence. During the dry season in the tropics, the prevailing easterly wind regime at lower levels can be quite strong and will cause mechanical turbulence in areas, as well as being a hindrance to accurate track-keeping. The cumulative pressures of long distance flights under such conditions can seriously affect a pilot's judgment.

  The alternative is to fly above the inversion where horizontal visibility is good and, quite often, the wind is lighter, or from a different direction. Flying above the inversion is much more comfortable, and gives greater effective range to navigation aids, but vertical and angular visibility through smoke may be worse.

- Low level 'jet'

  A strong low level jet frequently forms in the tropical inland in the early morning in winter. While surface winds may be calm, winds of up to 50 knots (although more usually in the order 25 knots) can be experienced in the lowest 3 000 ft. The associated strong windshears are particularly hazardous for low level operations.

- Cloud and weather conditions in north Queensland

  In winter the southeast trade winds blowing onto the north Queensland coast have traversed a large body of water and contain considerable moisture. Resultant cumulus cloud is limited in vertical extent by the trade wind inversion and shower activity is usually confined to maritime areas (with a maximum activity pre-dawn) and exposed coastal areas on the windward side of the Great Dividing Range. Cloud and showers may persist throughout the day on the higher peaks, but maximum activity occurs before midday and generally earlier. The cloud and showers may, on occasions, be organised in lines or 'streets' inclined at a slight angle to the flow. On occasions a 'surge' of increasing SE wind progresses northwards with enhanced shower activity in the surge region. In general, the stronger the wind, the further inland shower activity will be found.

  The proximity of north Queensland to the sea and usual onshore winds results in the reasonably common occurrence of coastal fog. The chances of fog are enhanced if precipitation has occurred in the previous 36 hours. Most fogs develop in the early morning, and generally clear by 8 am in Cape York Peninsula and 9 am further south. Longer lasting sea fog occasionally occurs, particularly in the Whitsunday/Mackay area.

  Mechanical turbulence may be induced as a strong SE stream crosses the coastal and highlands region of north Queensland □

FINAL APPROACH ?

Fences are cheap

Rob Black is the National Secretary of the Sport Aircraft Association of Australia and has kindly agreed to allow me to reproduce this article which appeared in their magazine, 'AIRSPORT'.

I WAS ONCE informed by a grey haired member of the Ancient Order of Aviators that there are two kind of pilots: those who have bent an aeroplane and those who are going to.

That being the case, you should have reason to believe that if you were unfortunate enough to suffer the ignominy of bending your favourite aeroplane then you could expect to be secure from further embarassment for at least a decade or so. After all 'Murphy', whose laws are well known, states 'You should believe in something.' I believe I'll have another drink.

Yes it was all true, not one broken aircraft but two, and all in the space of 17 days, not quite a National record but close.

Barry Coutts, one of those fortunate enthusiasts whose assets include a home complete with airstrip, had organised a fly-in, fun type day and had threatened physical violence if I failed to attend with the Midget Mustang. A free sausage from the proposed barbeque was also promised, so the decision was taken to attend. Also, the navigation skills required for the 25 mile trip were not considered overly demanding, regardless of the fact that the Murray River fails to flow past the property.

I arrived at Barry's to find a reasonable crowd had gathered and were awaiting all types of aircraft. The landing strip was east-west with 2400 ft between the fences, a gap cut through massive Cypress trees at the eastern end and power lines at the western — and just to add to the confusion, there was a really vicious windshear accompanied by an equally savage crosswind. However, a satisfyingly smooth landing was negotiated, accompanied by a straight roll-out in front of the crowd. Maybe things weren't so bad after all.

I set up camp with other pilots amidst lots of laughter as we cheered later arriving pilots, desperate for survival as they negotiated their way through the tiny gap in the Cypress, meeting the windshear, applying big heaps of power and lots of control input — all to the plaudits of the growing crowd most of whose critical assessment was honed by a 'tinnie' or two. All great fun!!

A variety of aircraft were in attendance, ultralights, homebuilts, antiques and Barry had even hired a helicopter for the day. Plus of course, there was the usual array of Cessnas and Pipers. The vintage car brigade also attended to provide further interest.

However, time, unlike the wind, quickly passed and my good lady had warned that I must be home by 6.30 pm as we were dining-out with relatives. Fearful of the wind which had now become a southerly of 15 knots or so, I delayed my departure for as long as possible — being ever mindful of the orders issued by She-who-must-be-obeyed. 'Don't be late as we are going out to tea.' (To the 'in-laws', of course.)

Most of the taildraggers, or at least those with engines rotating in a direction other than that of a Gypsy Major, elected to take off with the crosswind from the right. This certainly makes the task of keeping the little Mustang straight, that much easier — something to do with the 'P' factor — although there was some possibility of having to cop a slight downwind component.

Preflight done and departure imminent, engine run-up gives a drop of 150 rpm on the right magneto. I run it up to 1900, lean to minimum and recheck. Everything now appears normal. I check all clear and away we go, concentrating on staying straight. Everything is in the green and we are airborne slightly prematurely. Surprise! The little bird settles back on the turf and immediately drifts to the left of the runway. I pull back the stick and force the machine into the air, thinking dark thoughts about windshear and possible downwind gusts. About two thirds of the way down the strip the penny is starting to drop that the acceleration is remarkable by its absence. The engine appears smooth enough but it's down on power.

A quick check. Did I leave off one of the mag switches? No. Hell! there's not much strip left and I have those Cypress nicely lined up — what a predicament!! Even I know that to safely keep an aircraft flying, you must have at least two of the following commodities: Airspeed, Altitude, Brains. All three are in perilously short supply, plus I have the trees to contend with. By pedalling furiously I manage to slip by the trees, thinking, 'the worst is over, I should be right from here'. Wrong! An altitude of 20 feet and an airspeed a shade over stalling, combined with with an ailing engine and a pilot short on grey matter, gets us back to the aforementioned rules of aerodynamics, not to mention Mr Murphy's.

Both airframe and engine decide enough aviating has been done for the day, and both, largely unassisted by the ashen-faced pilot, make a nice landing in the paddock — 150 metres past the end of the runway, but only 15 metres short of a robust four-strand electric fence. My world is encompassed by showers of splintering posts and propeller, tearing metal, twanging wires and tortured fibreglass. A cacaphony of sound, then silence.

I realise all is not well with the world and I would be better placed outside the confines of the cockpit. So I calmly switch off the fuel and electrics and vacate the scene. (If you believe this you must still believe in the Tooth Fairy).

Three seconds later, I am clear. A further two seconds and Barry is 15 metres away in the hovering Bell 47, having witnessed the whole disaster.

The accident investigation the next day, reveals little wrong. However, an engine strip shows a faulty RH magneto, which just stops magneting or whatever magnetos are supposed to do. A throwaway Slick which should have been thrown away earlier, is the diagnosis.

However, life must go on. Sure, my little Mustang is badly damaged but at least it is repairable. My ego is dented but I can live with that. Look on the bright side. I have escaped a serious accident without a scratch and I have avoided dinner with the in-laws. Yeah, I really am lucky and the insurance will more than cover the cost of repairs.

Although I am so lucky, I am shortly afterwards struck down by some evil virus. I feel absolutely rotten and to make matters worse, have to return to work early. Work is full of urgent unplanned requirements, but things are on the up. A customer from Morwell has a new job and I decide a short flight is in order to discuss his needs — although I am still suffering the effects of the virus.

Home for a quick cup of tea, over to the airstrip, fire-up the Seneca and up to the 'Valley'. At Tyabb, it is blowing a westerly of about five knots max. The smoke-stacks at the Loy Yang power station show little apparent wind and it seems as if 03 is the runway to use. I fly over the top of the airfield for a confirming look at the primary windsock. There it is, etched forever in my memory, situated on a bitumen circle with a freshly-painted white line around the perimeter, but as to the sock, I cannot see it at all. Has it been dismantled or is it just lying limp? I determine that it's playing dead and I fail to pick up the secondary sock. I broadcast my intentions to join crosswind for 03 and join the circuit, failing to even consider another look at the windsock. Downwind checks completed, I turn onto base.

'PUF' checks out of the way, what a dreadful approach. In a last-second flurry of cockpit activity, the runway is lined-up and airspeed is back to 82 knots. The aircraft is waffling around a little and I am still a little higher than anticipated. Is that wind playing tricks like everything else at LTV?

Still, there's 3050 feet of bitumen. You could almost land a Jumbo here compared to Tyabb. I use up about one third of the available runway before getting the wheels planted, consider going round and dismiss the idea as absurd. I raise the flaps and apply the brakes. By golly, we are eating up the strip! It might be a bit tight, maximum braking and we are slowing rapidly but the once adequate runway is now much shorter and the brakes appear to be fading. I leave the bitumen, pass onto the grass overrun and am still doing about 15 mph. I elect to turn rapidly to the right rather than take on the fence. Just when I reckon I have gotten away with things, the left undercarriage retracts and I am again enveloped in the sounds of tortured metal as the aircraft sinks to the grass.

On vacating the aircraft I can't believe it. The wind is howling down the strip at 12-15 knots. The aircraft appears superficially at least, to have suffered no damage other than to the ADF aerials and amazingly, the LH propeller had stopped in the horizontal position and not struck the ground.

The airfield appears deserted as I make the short trip to the clubhouse. 'How could I be so stupid' — there is no excuse. I am not unduly shaken — just unbelievably angry and full of self-doubt. I contemplate my future in what had been an all encompassing passion for the last 13 years. 'What an unbelievably stupid thing to do!', keeps running through my mind. How can a lunatic like this be let loose on the population?

After arriving at the deserted clubhouse, I ring the Department and inform them of my misdemeanour. Surprisingly, they are most sympathetic. They are not such a bad mob after all. John Brown and John Williss arrive and efficiently organise all that is required.

I am given a ride home with a relative to find a shocked wife. She knows everything already. John Sonneveld, my personal accident investigator, has already been on the phone. I ring John back and arrange to return to LTV the following day. It really is the last place on the face of the earth that I wish to visit. John is marvellous and I am back home at noon, but how can I ring Jeff Butler of the Aviation Pool Insurance? It takes an hour to pluck up the courage. He is incredulous at first but sympathetic and helpful, before threatening to disclose the facts of my folly to aviation partners and close friends. However, on reflection he realises that I just might commit suicide or more likely, some equally violent act upon him and remains silent.

I am totally depressed and refuse to answer the phone or see my friends. My wife, for the first time in 25 years, really feels for me — for which I am eternally grateful. I feel mentally scarred and ashamed. The once joyous sound of an aircraft engine brings mental pain. It is obvious that I shall never go near another aeroplane and the SAAA will have to find another Secretary.

However, time passes. A few days away from it all works wonders and I realise members and friends are genuinely concerned about my misfortune. I eventually find myself picking-up an old aviation magazine from force of habit and even watching Peter Bernardi on climb-out from Tyabb in his magnificent old Ryan.

Friends materialise with all sorts of odd pretentions. Could I accompany them on a short trip to Coolangatta? — and they somehow contrive situations where I just have no option but to ferry a Seneca on a short trip. Before I know it, I am once again ensnared in the sometimes-wonderful, world of aviation.

I doubt if anyone has ever checked the landing charts of their aircraft to ascertain how much extra distance is required — should you land as I did, with 12 knots of downwind component. In the case of the Seneca, it is an additional 130 percent. A rough rule of thumb is an extra 10 percent distance for each knot of downwind.

So please check that you are landing upwind even if it is only a couple of knots, particularly if your strip is marginal. Just because the wind was from a certain direction on takeoff, does not mean it will still be the same 15 minutes later.

Oh yes, the title, 'Fences are cheap'. I had to pay for the damage — four posts and about 100 metres of wire — a total cost of $47.00 and I paid it personally. Who would have had the nerve to claim it on the Pool?

[*When Rob agreed to the publication of this article in the Digest, he asked me to re-iterate two points:*

- *It was not traumatic to put in a report to BASI — in fact the positive, supportive treatment that Rob received went a long way to getting him back into the air. He said he almost gave the game away.*
- *If you feel for any reason that perhaps you shouldn't be going flying that day, then don't go. Stay at home and wait for a better time.*] □

AIRFLOW

Dear Sir,

With reference to ASD 135, I was interested in Steve Tizzard's article on ALA's.

I concur with everything that Steve said and would like to add one other point, if I may.

As a tug pilot I am often called upon to retrieve gliders that have landed in some paddock which in some cases may not even comply with even the broadest interpretation of what constitutes an 'ALA'.

Apart from all the other points that Steve made, the length of the strip is of prime importance.

The selection run can be indeed done at the normal approach speed. However, if safety is not compromised, another selection run can be made at 60 knots. At 60 knots you are travelling at about 100 ft/sec. By counting 'one thousand, two thousand' etc. as you pass along the length of the landing areas you can obtain a fairly accurate idea of the length of the strip. If 60 knots is not possible (eg a fully loaded C-210) then the speed can be 120 knots and the number of seconds is multiplied by two to give you the length.

Naturally, the faster you go the less accurate the measurement becomes. I feel, however, that most two and four seat, single-engine aircraft could fly at 60 knots fully loaded without any problem.

I hope that some pilots will find this hint helpful. It is at least better than a guess and it also helps you verify the length that may have been conveyed to you by a farmer or anyone else.

It seems to have worked in the gliding fraternity for quite some time.

Yours faithfully,

William Comerford

Thanks Bill,

Your technique is a useful one. I think 60 knots is a little slow for some aircraft especially near the ground in windy conditions. What can be done in these instances is to work out for your particular aircraft type, the minimum elapsed time for a run which represents a safe landing and take-off distance at a speed that is comfortable for you. For example in a Warrior PA28-161 you may choose to fly the run at 80 knots — in which case an elapsed time of say 20 seconds corresponds to a strip length of about 2700 feet, which is reasonable for this aircraft.

Don't forget, too, that we are metricated — the Australian Supplement to the flight manual gives performance criteria in metres. Using your example, at 60 knots the aircraft travels 100 feet each second and that is close enough for all practical purposes, to 30 metres per second. A 20 second run at 60 knots therefore corresponds to a distance of 600 metres, or 2000 feet.

An important point though — the timed run principle applies to a 'groundspeed' of 60 or 80 knots or whatever. It is invalidated in any sort of strong wind. In this case you should do two timed runs in opposite directions and average the two figures — this will compensate for the effect of the wind.

Also I would caution against relying on counting the time unless you have practised the technique — ask any skydiver about the differing length of 'seconds'. Perhaps it would be better to use a stopwatch or the second hand of your wristwatch, taking care not to stare at it to the detriment of flying the aircraft.

Dear Sir,

I note in the 'AIRFLOW' column in ASD136, a letter concerning the use of a cellular telephone in an aircraft. The use of such devices in aircraft has been banned by Telecom and they have asked that we advise pilots of the reasons for this ban. The gist of their concerns are as follows:

'Telecom has a policy that mobile phones are not now permitted to be installed or used within aircraft. There are two main reasons for this policy.

Firstly, Telecom is concerned about the possible inteference from RF emission to aircraft navigation systems and other aids essential to safe flight. This is also a major concern overseas where the FAA and the US Federal Communications Commisssion have banned the use of mobile phones in aircraft because of the risk of interference to comms and nav equipment.

Another major problem is the significant interference to the mobile telephone network itself from airborne mobile phone users. Telecom's latest mobile telephone network (MobileNet) which has been specifically designed for land-based mobile use only, utilises the cellular radio concept where identical frequencies are re-used in non-adjacent cells within the same geographic area. The extended propagation path available from an airborne phone results in significant interference to the network as multiple channels can be simultaneously selected. This interference includes the disconnection of established calls, crossed lines and numerous other problems.

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The term mobile phone includes not only the traditional car phone but transportable and hand-held models which are available from Telecom and other suppliers.'

As well as endorsing the Telecom policy, the Department has been liaising with aircraft operators for the control of electonic devices in aircraft. Of particular note is the fact that it is the responsibility of the pilot-in-command to supervise the carriage of such items by their passengers.

Peter Routledge

Department of Transport and Communications

Dear Sir,

My son flies BN-2 Islanders in Vanuatu. He recently experienced an emergency on a flight from Sara which has a 450 metre grass strip with a 500 foot cliff at each end.

I thought the enclosed account may be of value to your readers.

'Dear Dad,

Thanks for your letter of the 25th which I received this morning. Amazing!

I am presently a quarter of the way to Fiji having departed Vila at 1.07 pm. Yes, risking my life again! I'm at 10 000 feet and it's 10 degrees celsius. I have a life raft on the seat beside me and the engine that failed last week is in the back. The engine will be overhauled and the aircraft will have a major inspection.

You asked me for the details of the emergency so here they are. Last Tuesday, (last week) Tom, the new pilot (who went to Churchie) and I were flying the normal scheduled route from Santo to the islands. Tom had almost got his endorsement on the aircraft so I let him do most of the flying. However, I did the flying in and out of Sara — the 450 m strip you may remember. I did a lovely landing and didn't even need to use the brakes. We took off with a full load — ten passengers — so 12 persons on board, at a weight of 2730 kg, nearly 270 kg under the maximum. We got airborne okay and normally you turn left into wind to increase the angle of climb and to avoid the hills. I had just done that and hadn't touched the throttles when the propellers started going out of synch and the right engine manifold pressure dropped rapidly, followed by the rpm. I looked at the oil pressure gauge and there was no pressure. We were only 200 feet above the runway which is at 500 feet elevation. Over the water we had 700 feet altitude and we managed to reach 800 feet before I feathered the propeller. We had lost oil but we couldn't see any on the engine cowling. I purposely ran the engine until it almost stopped before I feathered it so I knew it had had it. The aircraft maintained height fairly well for about two minutes with the left engine at maximum continuous power but the left engine has always been a dog and it began to overheat. Then its performance deteriorated and we started going down.

By now I had the aircraft well set up and trimmed at the correct speed, angle of bank etc. We were heading to Longana which is about 16 miles away over water. I couldn't risk landing with one engine at Sara — it's hard enough with two engines and if I got a downdraught on final, I could have flown into the cliff at the threshold. So we were descending at 50-100 feet per minute and only doing 65 knots. At that rate we wouldn't make it so I went to full power on the left engine. It was really hot and I just hoped that it would keep going. We were at 200 feet over the water with about a mile to go to the island and I thought we may have to ditch. That meant Tom and I probably would have been killed straight away. With fixed undercarriage and a high wing this is a very bad aeroplane to have to ditch.

Anyway Tom got all of the passengers to put on their life jackets so now they really knew something was wrong. Now we were at 150 feet and I thought we might make it to the strip. Both Tom and I were really worried. I was going to send him down to the rear of the plane to throw out some of the cargo but I then realized that we were flying right on the stall. I pushed the stall warning circuit breaker in (I normally leave it pulled out because it annoys me and the passengers when it goes off on landing) and the warning blared. If he had gone to the back, the CG would have changed and we would probably have stalled.

We strapped ourselves in tightly in case we hit the trees and I did a very wide circuit to the runway which I couldn't see anyway because we were so low. Tom almost had a fit when he saw where the runway was. We were a long way out so all that I could do was very gentle turns so as not to lose any more height. We skimmed the tree-tops and maintained height probably because of the heat rising from the surface. We landed safely and I was shaking like a leaf when I got out of the aircraft. I thought we were going to die. I've often thought about how I would react to that kind of situation. I was determined to get the aircraft to the runway. We flew so close to the stall that the aircraft buffetted a couple of times.'

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