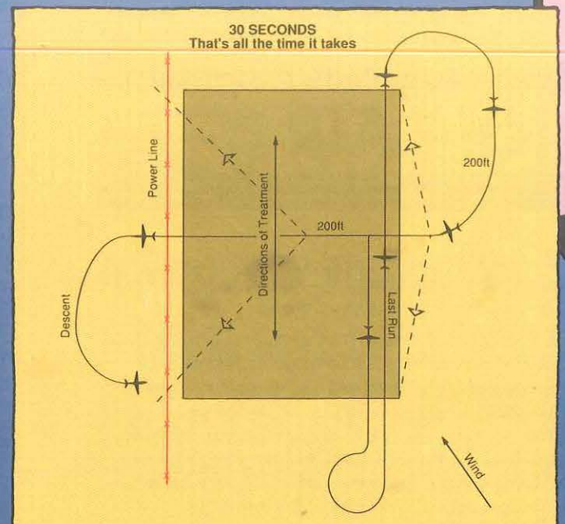


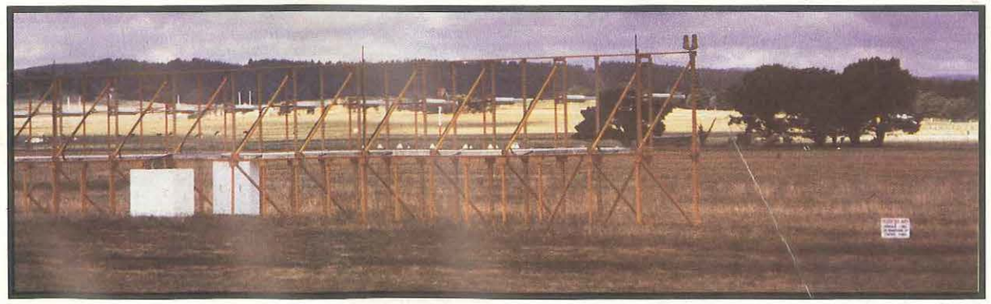
During the 200ft run across the paddock check letdown, pull up & clean up run itself for hazards at both ends of paddock.

THINK!

EXTRA HAZARD CHECK!

Wherever possible carry out clean up runs away from wires so that the problem has been dealt with and preferably into wind to reduce ground speed.

Aviation Safety Digest



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Reader contributions and correspondence should be addressed to:

The Editor,
Aviation Safety Digest
Civil Aviation Authority
G.P.O. Box 367,
Canberra, A.C.T. 2601, AUSTRALIA
Telephone (06) 268 4583

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Editorial

When you break out at DA/MDA it's good to see the runway lights where you expect them to be, and if you as a matter of course fly in all sorts of weather it's better still to be confident that the approach aids will *always* work as advertised (I'm assuming that you are assiduous in your callsign, warning flags, CDI and altitude/DME checks). Enroute, too, it's nice to know that your DME/VOR fix puts you where you really are. All these, plus NDBs, are in such constant use that I believe the article on navaid calibration will be of great interest, for the job is done by people who are pernickety in their standards of accuracy. Since we've introduced a Dickensian term, we'll now misquote him: the crews of the calibration aircraft *do* put too fine a point upon it, and we fly all the more safely as a result.

It seems you don't have to be flying your aircraft to incur great expense. There's a good message from the Bureau of Meteorology in the advice that moderately severe storms occur fairly frequently as you approach tropical Australia. Are you really happy that your tie-down procedures will protect your precious investment from a 50kt wind-squall? Perhaps it's a word to the wise, who will double check the security of their parked aircraft — to get caught out might spoil that idyllic weekend by the sea.

Once again we're pleased to run a photo competition. I want to emphasise that although artistic prowess bears heavily on the result of two categories, the main prize could be won with a mere snapshot — it's the aviation safety message that we're seeking and everyone is encouraged to have a go.

Concerning *Ground to air* in this edition: please be advised that as a result of a recent Aviation Regulatory Proposal, the whole question of operational control in Australian airspace is now under review.

Covers

Front: CAA F28 calibrating Canberra ILS
Photograph: Bluey Thompson, July 1990
Design: Sean Silvey

Back: 'Extra Hazard Check' by Andrew Rankine
CAA Graphic Design Studio

Editor: *Roger Marchant*
Editorial Assistant: *Lyn Coutts*

Diagrams: *P7* *Shirley Wheeler, Kathy Foldszin*

Photographs: *P4&5* *Lyn Coutts*
P6 *CAA Flying Unit*
P8 *Brenton Hollitt*
P11 *Harvey Turner*
P18&19 *Stuart Westmorland taken in Seattle*
P20 *BASI*

Keeping us on the straight and narrow...

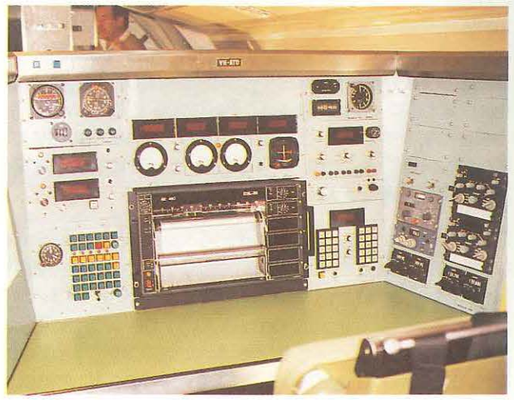
Every day in Australia tens of thousands of passengers fly safely and confidently by virtue, in part, of the precision, accuracy and reliability of the navigation aids that delineate our airways and provide approach paths to many aerodromes. However, these admirable characteristics are neither easily nor cheaply maintained. In the following article ***Leon Norsworthy****, Assistant General Manager of the CAA Flying Unit based at Essendon Airport, Victoria, explains the role of his organisation and sets out the reasons for the use of what some might see as possibly a too large and too high-tech aircraft, the F28.*

Navaid Calibration in Australia

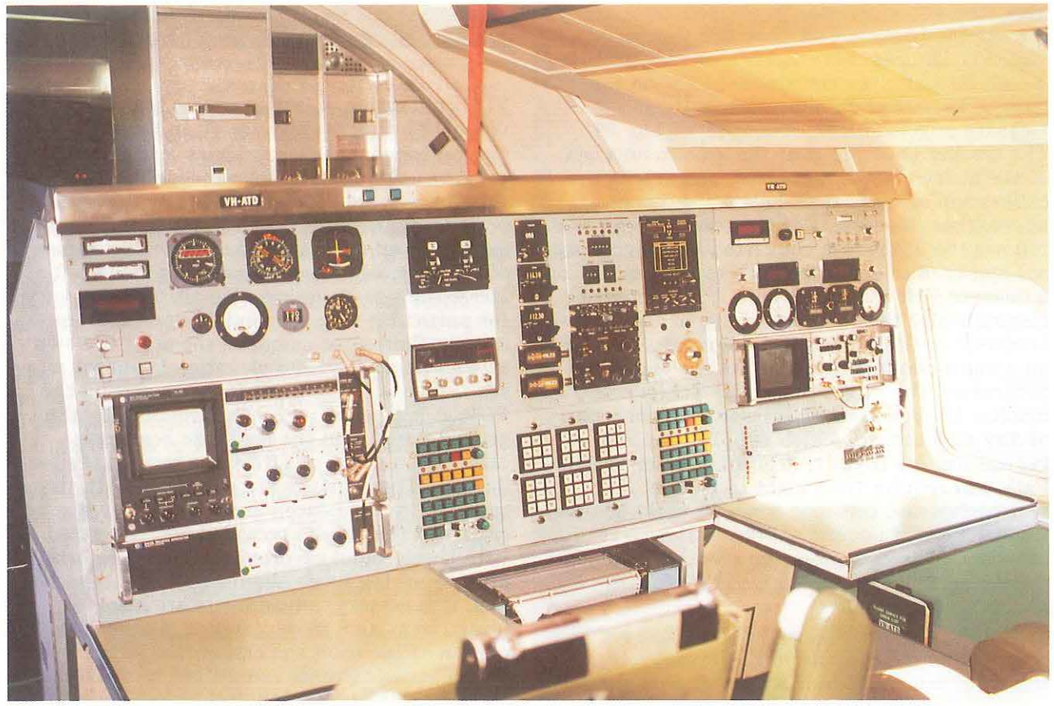
The blue and white aircraft of the CAA's fleet are a fairly familiar sight at many airfields around Australia, as they go about their tasks of route surveying, providing currency flying for CAA specialist pilots and transporting officials around the country on their various technical, operational, surveillance and examining duties. The most common CAA aircraft to be seen by the average General Aviation pilot is either the Beech 35 or 36, or the Gulfstream 1000 turboprop light twin. However, the other CAA type, although there are only two in the fleet, is much wider ranging and puts in regular appearances at many Australian airports. This is the Fokker F28 twin jet, which is primarily used for the calibration of Australia's civil and defence aeronautical radio-navigation aids.

The contract to purchase the F28s was signed in 1974 and the first aircraft was delivered during December 1976. The choice of F28 aircraft was influenced by the following factors:

(1) an equipment load of up to 3000 kg to calibrate all civil/military airways facilities;
(2) forward-facing consoles;
(3) fitment of up to 50 antennae;
(4) large underfloor cargo area to carry support equipment and ground tracking systems;
(5) low tyre pressure for the aircraft to operate from unsealed runways;
(6) aerodrome performance to access 1600 metre runways;
(7) high cruising speed in the order of Mach 0.7 (420 kt) and range sufficient to reach Perth (2871 km) or Darwin (3171¼ km) from Melbourne with only one refuelling stop;
(8) good low speed handling and go-around performance from very low altitude
(9) compliance with the noise standards; and
(10) program cost



In the 1970s, the F28 surpassed its competitors in complying most closely with the criteria and was a natural selection. In the intervening years, the criteria have changed little; for example, the equipment load is now about 2500 kg. The F28 has proved to be an excellent choice and since its introduction 13 years ago has been more than satisfactory in performing calibration and flying training tasks . Moreover, the economic predictions based on operating this highly reliable and utilitarian aircraft continue to be fulfilled through the achievement of major program cost reductions over the years. The F28, along with the rest of the fleet, give excellent value for money.



There are over 800 navigation aids in Australia and PNG for which CAA holds in-flight calibration responsibility, including a few privately-owned facilities and those operated by the Department of Defence at the various RAAF and RAN bases around the country. Each facility has to be checked, not only on a routine basis with time intervals varying from six months to two years, but also to reinstate an aid following modification, primary component change or failure.

Each F28 is fitted out to enable it to fulfil its calibration role with equipment that is additional to that installed as part of the aircraft's normal avionics. The equipment is operated by specialist technical personnel seated at two consoles in the forward passenger cabin. The test equipment is itself subject to rigorous test and calibration sequences by the Flying Unit's Laboratory, as part of ensuring compliance with the national measuring standards.

As part of the current installation, there are a total of 39 dedicated flight inspection antennas fitted to the aircraft to inspect the performance of NDB, DMEA, DMEI, TACAN, LLZ, GP, VOR, MKR, SSR together with VHF and UHF communications facilities. In addition, the aircraft can be used to calibrate GCA/PAR and VASIS, although these facilities do not require any specialist electronic equipment apart from discrete VHF/UHF communications, and ground tracking equipment (eg. theodolite).

The F28s are operated by the CAA's Flying Unit, from its Headquarters at Essendon Airport in Victoria. Calibration missions can last up to ten days, covering the Australian FIRs from Cocos Island in the West to Norfolk Island in the East plus Papua New Guinea on a contract basis.

Routine calibration methods for NDB and DME do not call for any particular operational techniques — the aircraft is usually flight-planned to pass within range of the nominated facility and the various signal characteristics are recorded and compared against previous results to detect any change. If a fault is detected, the ground technical staff responsible for the aid are advised, and they rectify the defect. With some of the remote sites, the technical staff can be several hundred kilometres away by road, and in such cases, a repeat flight is arranged to coincide with their presence at the site to confirm that the defect has been corrected.

Calibration of those aids which provide precise track guidance, such as ILS, is more complex. With ILS, the Localiser and the Glide Path are calibrated as separate elements; the signal characteristics such as alignment and width, and the behaviour of the installation under the various alarm conditions are measured in comparison with a very accurate automatic tracking device which provides reference data on the aircraft's flight path.

This tracker, which was developed 'in-house' by the then Department of Civil Aviation, uses a vidicon (light-sensitive video receiver) to track a high-intensity, gyro-stabilised light on the nose of the calibration aircraft, and can measure angular displacement to within .01°. The tracker is set up near the ground antenna of the element to be measured, and tracks the calibration aircraft as it makes a series of approaches. Movement of the tracker head as it follows the aircraft is converted to a digital signal and then telemetered back to the aircraft on a discrete VHF channel where it is compared electronically to the incoming signal from the Localiser or Glide Path and the results recorded on a multi-channel recorder. As the flight test progresses, the Flight Surveyors at the consoles monitor the results and advise the ground party of any adjustments which may be required. A typical routine flight test of a Localiser or Glide Path will require from eight to twelve approaches and consume some 75 to 90 minutes flight time, with every alternate flight test (annual) being carried out in greater detail, measuring more parameters and requiring additional approaches.

The piloting and measuring tasks require a high degree of concentration and teamwork within the crew, not to mention a high degree of precision and skill on the part of the pilots. As can be appreciated, the presence of faults and delays caused by other traffic can extend the flight time. For one survey at a two-ILS major airport the requirement was to do a routine check on one installation and an annual check on the other; several adjustments were necessary in the navaids, which resulted in the crew performing no fewer than 73 ILS approaches in two and a half days.

In sixteen years with the Flying Unit, CAA pilot Brian Surtees has managed to average one ILS calibration run per F28 hour flown (he has some 6000 hours on type).

VOR calibration is less complex, but the technique still requires the use of an independent ground-based measuring device in the form of a very accurate pilot-balloon theodolite. The theodolite is set up at a previously surveyed position near the VOR and the calibration aircraft flies an orbit around the site at a radius of six nautical miles and an altitude 2000 ft above the site elevation. The altitude can vary for particular sites, depending upon local terrain; at Cairns for example, the orbit is flown at 4000 ft and the site elevation is almost at sea level. As the aircraft is flown around the VOR, it is tracked with the theodolite by the ground party, and the magnetic bearing is called, on a discrete VHF frequency, every ten degrees. The bearings are compared with those radiated by the beacon and received by the aircraft and the results recorded and compared with those found on previous tests. The orbit establishes the basic alignment of the beacon and, if necessary, adjustments are made to bring the system into tolerance. At the completion of the orbit the calibration aircraft then flies a series of route radials out to a distance of 12 to 15 nm, to check such parameters as course quality, bending, scalloping etc while being tracked with the theodolite. Bearings are again called by the ground party and compared with the data received in the aircraft. Up to twelve radials will be flown, selected from the published routes, to provide a representative picture of the facility through 360°.

From the test crew's point of view, ILS and VOR calibration work is the most intensive part of their duties, requiring considerable concentration for comparatively long periods of time. Calibration of TACAN and GCA is also demanding, as they are variations on the ILS/VOR theme.

All ILS installations in Australia are situated within controlled airspace, at least at those periods when they will be calibrated. With the willing co-operation of ATC, traffic separation is rarely a problem, and ATC will, where possible, fit the calibration aircraft into the traffic pattern to enable the task to be completed with the minimum delay and the maximum efficiency. The same situation applies with checking VORs within controlled airspace. However, many Australian VORs are sited outside controlled airspace, where the responsibility for traffic separation rests with the individual pilots.

Calibration operations OCTA place significant extra demands on the crew, as they not only have to concentrate on the calibration task, with its demands for precise flying, but they can be required to monitor up to three communications frequencies, as well as look out for, and keep mental track of other aircraft in the vicinity. Over the years, there have been occasions when separation standards have broken down. The message for all pilots flying OCTA is, of course, to keep your eyes open at all times, but to pay particular attention when operating in the vicinity of any navigation aid, which by its very nature, will act as a focal point for air traffic. Even if it is not required by the VFG/AIP, don't hesitate to broadcast your position and intentions if you think it may help some other airspace user. *The CAA's F28 flight inspection crews welcome early traffic notifications.*

The task of navigation aid calibration is important to all sections of the aviation industry, from the international Boeing 747 operator to the Aero Club or Flying School student pilot, yet it is probably fair to say that few pilots have ever given it much thought. The calibration crews perform a valuable quality assurance task, so that when you, the pilot, tune in a beacon and correctly identify it, you can be sure that it is feeding you the 'right stuff'.

A recent audit of the task recommended:

(a) A complete review of flight survey procedures and techniques of existing facilities and the introduction of procedures, techniques and standards for anticipated new facilities eg. MLS. This is expected to result in fewer hours being flown to obtain the same results as are achieved at present.

(b) Upgrading of flight inspection measuring systems to automatic systems with the following prospects:

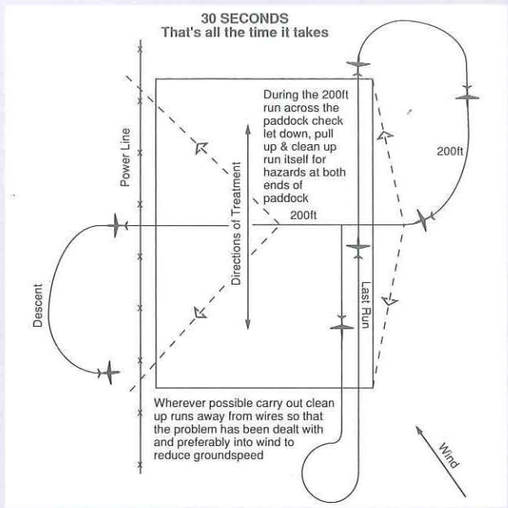
  (i) less payload requirement (a reduction in total payload from 3000 kg to 1560 kg)

  (ii) less space required for racks/consoles (decrease from 6 cu.meters to 2.7 cu.metres)

(c) automatic systems to analyse more data and give instantaneous results with less manpower requirements (one Flight Surveyor for enroute aid checks and two Flight Surveyors for ILS/MLS checks as against the present survey crew of three).

However, new systems are costly and range from $3.0M to $5.0M per system without spares, laboratory and introductory costs. Technical and operational evaluations are underway which, when complete, will lead to an economic and financial analysis of the best airborne system and aircraft combination to satisfy Australia's requirements into the next century.

A final word — any time you see one of the blue and white F28s on the ground at any airport, go up and introduce yourself to the crew. They'll make you feel at home, and will be happy to show you over their aircraft and explain their job. If you're lucky, you might even score a cup of CAA coffee! □



30 seconds to save your life!

John Freeman, our Examiner of Airmen (Agricultural) has asked once again that we publish a plea to all ag. pilots. In ASD 142 (Spring 1989), John wrote at length about wire survival, and a late entry in that edition (page x) referred to the sad death of yet another high-hour very experienced operator.

AG. OPERATIONS necessarily mean flying close to the limits — all the time: to retire from the game fit and well means extreme vigilance and self-discipline — all the time. It is not pleasant to have to record that over the last two years we have lost twelve pilots (seven to wire strikes), during agricultural operations.

John has identified the '**extra hazard check**' as being vital to continued safe ag. operations:

You've done a good job, and covered the area in an efficient and economical way. Now it's time for the clean up run. Is it just possible that your defences have slackened a little?

John thinks this might sometimes be the case, hence his plea for the extra check. The Ag. Pilots Manual carries a large segment on wires, their location and avoidance; don't be too proud to take its advice.

The check takes so little time — see the heading. The representation above and on the back cover is John's example of a method of rechecking hazards affecting clean-up runs.

Oh yes, one more point. The human short-term memory is a fragile thing, so if you depart the treatment area for an hour or so, *please* do a quick extra hazard check upon your return, before you restart operations □

The heat of the moment

Pilot contribution by P J Little

THE FORECAST was not good for my trip from Bankstown to Glen Innes but not bad either. Some low cloud was forecast for Armidale, where I needed to refuel on the return trip, and isolated thunderstorms thereafter with a 20% possibility of isolated thunderstorms forecast for Bankstown on our return. Glen Innes had an amended TAF which was good. It was hot everywhere.

With the exception of a 30 minute delay in taking off, when they lost my flight plan, the trip to Glen Innes with my three passengers was uneventful. Having completed our business, we were delivered back to the airport in fine weather and good time, our host departing before we boarded the aircraft.

A check of the tanks and oil and a quick check of the aircraft then we were strapped in ready to start. The engine turned over a couple of times and then nothing, just a clicking sound. The starter motor had gone dead and nothing I did would induce it into life again. We deplaned and I removed the covers, checked the battery terminals and ascertained that the clicking was coming from the solenoid. If stuck, several sharp knocks should have freed it up but no such luck. What to do?

Whilst I am quite happy to tinker with my car or other mechanical devices, I hate even removing the covers off my aeroplane, as to me this is the realm of experts. Just then the sole other person at the airport, who was mowing the grass, came past and I asked him if there were any engineers in the area. He informed me the closest was at Inverell. Fortunately the phone worked and I rang my Bankstown service organisation who could not suggest any quick remedies other than those I had already tried and informed me there were thunderstorms in the Sydney area so there was no chance of them mounting a rescue operation. (I later learned one of them was prepared to drive — a nine hour trip.)

So in desperation I rang Inverell only to be told the boss was out and would not be back for 20 minutes. Half an hour later when I came to ring back I realised I had run out of coins and nothing would induce Telecom to connect me except as reverse charge. Fortunately they accepted the charges and listened to my story. Well I could try shorting out the solenoid or I could hand swing it. In any case if I paid for the aircraft he could be there in 50 minutes but he had sold his last 24 volt solenoid yesterday.

I would not swing a prop unless my life depended on it, particularly a three bladed one, and I'd been told you could not start my aircraft by hand swinging the prop anyway. In any case, none of my passengers knew anything about aircraft so who was to sit at the controls? — not entirely necessary but a comfort if I'm to do the swinging. So I told him to come over and whilst I was waiting I got a screwdriver and shorted out the solenoid terminals. One large spark convinced me that I was right not wanting to take the covers off!

Exactly 50 minutes later he arrived in a smart looking tail dragger and apologised for not telling me to switch the terminals over. He very quickly narrowed the fault to the starter motor. What was I to do? Put my passengers on a commercial or drive them back to Sydney and bring an engineer and a spare starter motor back with me? Leave the aircraft where it was until someone could fix it? Burn the aircraft and collect the insurance?! All very costly and time consuming and really no joke.

At this point he offered to hand swing the prop but my spirits were at a low ebb and I pointed out to him that I had to refuel at Armidale and how would I get started again. To my surprise he suggested that I fly to Inverell where he would organise some fuel for me and then he would start me again. Do such nice people exist? It appears they do in Inverell. In any case my spirits leapt and I immediately accepted his offer. I was conscious of the thunderstorms at Bankstown and that they could come in later in the afternoon so without further ado I loaded my passengers and he swung the prop for me.

The 300 HP motor does not turn over easily and just when it looked like a waste of time it sprang into life amidst cheers from the passengers, who had waited patiently for the two hours all this had taken.

I was about to taxi when it struck me, what about my checks!! For a pilot who is meticulous about his checks on the ground and in the air I was about to taxi out and take off. I radioed my friend who had started his tail dragger and told him to go ahead and then forced myself to quieten down. The anxiety of the situation together with the excitement of the moment had been enough to negate the years of training discipline that I had built up. Having reminded myself I was a pilot first I settled down to do my checks and departed shortly thereafter for Inverell. I must confess I had expected more trouble from Coffs Harbour when I informed them that I had revised my flight plan via Inverell due to mechanical problems but other than ask for a time interval and whether I would have any problems landing, they did not worry me at all.

He was as good as his word and on landing at Inverell he had the fuel ready. We refuelled and discussed starting techniques with hot engines — I decided to try the starter motor just in case and believe it or not the gremlins had left and it worked normally.

As we departed Inverell I felt my old self having recovered from my lapse at Glen Innes, but the day wasn't over. At Mount Sandon, Sydney advised us of severe turbulence to the south and west of Sydney then a little later that Sydney was closed with thunderstorms and then that Bankstown was closed but would reopen soon. As we were still half an hour away I decided that it would probably have all passed by the time we got there. At Mount McQuoid we were given a radar heading which was to take us west of the thunderstorm but my weather radar showed one directly in front of me so large that almost the entire centre of the screen was red. I asked for and was granted a further detour to the west wondering if the controller was aware he had given me a heading towards the middle of the storm. They brought me into Bankstown from the south and although the airport was clear the storm was passing it on its northern boundary.

Bankstown Tower informed me that as there was no other traffic and that I could do a left hand circuit for Runway 29. But half way along the downwind leg he informed me of a sudden wind shift and that I should do a 180 degrees for a right hand circuit to Runway 11. That was the last straw for the passengers. They had been glued to the weather radar watching the storm and could not believe their eyes. Now a sudden turn-around in the circuit and a landing into a 15 knot crosswind just capped off the day. As darkness fell they all headed for the bar and one for the telephone to relate how lucky he was to be alive. The thunderstorm did considerable damage in Sydney and particularly in the Bankstown area, cutting power supplies and unroofing buildings □

Christmas comes but once a year....

from a letter by Harvey Turner

ON CHRISTMAS EVE, December 24th 1989, a severe thunderstorm struck the Brisbane region between 1600 and 1700 hours — particularly causing significant damage at both Archerfield and Redcliffe aerodromes. I attended at Archerfield shortly after the storm had passed to check my Flying Group's aircraft and again the next day at Redcliffe after receiving word of the severe damage to aircraft that occurred there. There were some obvious reasons why damage was so severe, and the reason I am writing is to promote awareness and discussion amongst the aviation community.

At Archerfield (where our Grumman Tiger was found unharmed and still chained securely to good galvanised wire tie-downs) the following was noted:

(1) Major damage caused by a parked DC-3 being pushed by the wind some 400 yards through the general aviation aircraft parking area where aircraft were secured to the standard wires pegged across the grass area in front of the Royal Queensland Aero Club. The DC-3 clipped the tails of two aircraft before picking up a Cessna 182, breaking the wire tie-downs it was secured to, and then demolishing that aircraft as both became entangled in the next tier of tie-down wires. The force of their progress was sufficient to pull out of the ground the large concrete block at the end of the tie-down wire and drag it some 10 feet horizontally before the aircraft came to rest. Just as well as it saved damage to more aircraft parked in the line of travel.

    What I considered significant was that the DC-3 was not tied down and this certainly seems to be normal procedure with any aircraft bigger in size than a Beechcraft Baron. So there is a lesson to be learnt there and noted by the likes of FAC who control the major airports — ensure all aircraft are properly tied down, big and small.

(2) The wire tie-downs pegged across the grass at Archerfield have been there many years and a lot of them are rusty and rotten. The Cessna 182 mentioned above had good rope tie-downs to the wire and it was the wire that parted! So there is another lesson for all airport operators — ensure your tie-down wires are galvanised, in good condition and properly anchored.

(3) A Cessna 185 aircraft parked adjacent to our Grumman Tiger had broken all three of its rope tie-downs and very fortunately had not run or been blown into other aircraft. The ropes were of a substantial diameter and synthetic, however they were powdery and rotten from age and exposure to sunlight. That shows a degree of irresponsibility on the part of the owner - for the sake of about $15 cost for new tie-down ropes, he endangered his own and every other nearby aircraft.

At Redcliffe, the storm destruction was more concentrated and severe. Four aircraft were up-ended and destroyed, and virtually every aircraft on the field suffered damage to some degree. There were unconfirmed reports that vessels moored in the nearby Newport Marina recorded wind gusts up to 180 km/hr on digital recording equipment.

What was significant at Redcliffe was that it was high wing Cessnas that were up-ended, — the low wing aircraft that were securely tied down surviving with varying lesser damage caused by flying debris or Cessna aircraft that had come adrift, colliding with the low wing aircraft. In one case a Cessna 172 had pulled the star picket stakes it was secured to clean out of the ground and then been up-ended on top of the Grumman Tiger next to it that was securely tied down. Both aircraft appeared to be writeoffs.

So it would appear that extra care must be taken with high wing aircraft, and possibly the use of screw in tie-down stakes in soft ground encouraged. The standard star picket type stake appears to be unsatisfactory in soft ground, especially when subject to vertical forces.

Aircraft secured to common wire tie-downs had all been pushed sideways by the wind, sliding their individual tie-downs along the wire until all the aircraft were in contact with each other bunched at the end of the wires. More damage! So maybe another lesson to be learnt — some means of securing an aircraft's tie-down ropes (or ideally chains) to the wires to that they cannot slide sideways.

The final cause of damage at Redcliffe was the destruction of one hangar in a row of four similar hangars. The doors were of the folding type that are pegged top and bottom at each fold. The pegs were old and bent (or missing) and the hangar doors just imploded and this inrush of wind ripped off every sheet of iron from the roof and end wall — some carried about 250 yards and one 20' length actually speared right through a parked Musketeer. So the condition of hangars or buildings can also be the cause of significant damage in these circumstances.

In summary it is apparent that most damage is caused in these situations by aircraft (or debris) that break loose, running into, or flying into other aircraft that may be very securely and responsibly tied down. Screw in anchor type stakes are very common in U.S.A. for use by General Aviation aircraft and would probably be very useful here in soft ground situations. Would it be appropriate for CAA or some similar body to conduct comparative tests on the different types available and report through the Aviation Safety Digest?

The Bureau of Meteorology, Queensland Regional Office, kindly sent us the following comments:

'The maximum gust recorded at the Archerfield Weather Service Office was 57 kt. At that point the autographic recorder failed and it is possible that stronger squalls may have occurred shortly afterwards. No observations were available from Redcliffe aerodrome but, following the storm, investigations in that area revealed a reading of 100 kt had been observed on an anemometer on a yacht moored about 2 km east of the aerodrome.

Although very severe storms are, in any given location, relatively infrequent, less severe activity does occur more regularly during summer months, producing wind-squalls of the order of 40-50 kt. In a recent survey, an average of more than four such storms per year was noted in the Greater Brisbane area. The prime characteristics of the squalls is the rapid increase in wind speed in a short time. At Archerfield on Christmas Eve 1989 the mean speed between 3 pm and 3.50 pm was 12-18 kt; in the following few minutes it increased rapidly to 57 kt.

While thunderstorms are less frequent over southern Australia, strong squally winds may occur with the passage of troughs or fronts and sustained strong to gale force winds may be experienced in association with intense pressure systems.'

Authority involvement in these matters is:

- *requiring that any tie-down points fitted to aircraft be properly stressed. Note: tie-downs are not a certification requirement and the CAA does not necessarily check the relevant stress analyses.*
- *informing aerodrome operators of the need to provide light aircraft tie-down facilities.*
- *including recommended tie-down procedures as a subject in the 'Syllabus of Training for Private Pilots'.*

The CAA does not offer public comparison between commercial products; this might be conducted more properly by your particular Association or flying organisation. It is deemed the owner/operator's responsibility to secure the aircraft and any damage resulting from storms etc is then catered for by the insurance company or, at worst, common law □

Unauthorised descent — Hobart

from ASD 2

TASMANIAN weather on the 14th of February was generally poor, and as no early improvement was expected, one DC4 enroute Hobart and one CV.240 holding over that city returned to Launceston. After the Convair had set course for Launceston, Hobart ATC suggested to Launceston Operations that a DC3 at Launceston remain there instead of proceeding to Hobart, as it was unlikely that HB weather would improve in the near future.

However, the captain of the DC3 elected to proceed to Hobart, and at 0100Z reported over Ross Homer at 5000 ft, giving his Hobart ETA as 0123Z. Hobart weather was passed to the aircraft and the captain was advised that the aerodrome was closed to landings. A few minutes later, he was further advised that no clearance to descend below 4000 ft would be given because of the prevailing weather conditions. The aircraft arrived over Campania Homer at 0123Z and was cleared to descend to 4000 ft.

At 0127Z, the aircraft reported its position over the Inner Marker at 4000 ft and was instructed to hold at that altitude on the standard holding flight path. However, some nine minutes later the captain reported contact through a break in the cloud and requested a clearance to make a VFR approach. This was not granted, but at 0138Z the aircraft was sighted about eight miles SE of the field below an overcast layer, the base of which was estimated to be about 1000 ft. The day minimum for Hobart is 1730 ft.

The captain advised that he intended to land and landing instructions were then provided. The landing was completed at 0141Z under fluctuating conditions that were still below the landing minima.

The main point of this incident is that the captain of the DC3 deliberately disobeyed a valid ATC instruction by making the unauthorised descent.

As a result of the investigation into the occurrence, the captain's First Class Airline Transport Licence was suspended for a period of four months. The suspension did not affect his capacity to hold a Third Class ATL.

Aggrieved by the decision, the captain applied for an independent Appeal Board to be constituted to consider the suspension.

The Appeal Board [having considered the evidence] gave its decision to confirm the four-month suspension.

...a blast from the past indeed. Captains were captains in those days, and some of them knew far more than any old Air Traffic Controller □

Quiz Quiz Quiz

Q1 As the pilot-in command of a Cessna 182, you are requested to carry a parachutist in the RH control seat position. Two relatives of the parachutist wish to travel as pax, to observe the jump. The aircraft has an in-flight paradrop door which is approved with a supplement included in the Flight Manual. The passengers are properly restrained in the rear seat. Can this operation be conducted in accordance with Civil Aviation Orders?

Q2 You are flying along in a Cessna 172 and see on the ground beneath you another aircraft that you identify as a Cessna 206. It is parked near a shed on a cattle station. There appears to be a well-cared-for airstrip with short grass, white-painted tyres, windsock, and fresh tyre marks from the runway to the parked aircraft. On the roof of the nearby homestead is painted in bold letters the name *CABRAMATTA HOMESTEAD*. You look in your ERSA, but the aerodrome is not listed.

Can you legally land your aircraft at this aerodrome?

(Captain R C Winckel, Airways Surveyor (GA)

Q3 In a General Aviation Control Zone (GAAP), what is the missed approach (go-round) procedure?

(N Holden, Senior Tower Controller, Jandakot)

Q4 Where would you look to ascertain the empty weight and empty weight CG position of your light aircraft?

(a) Pilots Operating Handbook;
(b) Operations Manual;
(c) Approved Flight Manual; or
(d) Maintenance Release.

(Roy Scaife, AGM Safety Regulation, WA)

Q5 May an IFR flight be legally conducted at night to a destination not served by a radio navigation aid?

(Answers page 23)

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
G.P.O. Box 367
CANBERRA A.C.T. 2601
Australia

Nikon

Entry Form for the Aviation Safety Digest Photographic Competition

Dear Sir,

Enclosed is an entry for the Aviation Safety Digest Photographic Competition. Details are as follows:

Category of Entry: _____ *Film Size and Type:* _____

Camera Type: _____ *Caption or Title:* _____

Description of the Photograph and Theme (please identify any aircraft type): _____

_____

_____

Name of Entrant: _____

Address: _____

Phone and/or Fax no. _____

I agree to be bound by the conditions of entry as described in the advertisement

Signature: _____ *Date:* _____

TO: *Photographic Competition*
Aviation Safety Digest
Civil Aviation Authority
GPO Box 367
Canberra ACT 2601

ENTRIES CLOSE: *Last Mail*
Friday, 4 April 1991
Results will be published in the Spring edition of the Digest

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A plea from a Flight Service Officer working in inland Australia:

"Despite the clear intention of the B050 procedure, I am constantly amazed by the number of pilots who believe a B050 notification includes 5000ft (A050). We also find the occasional smart-Alec who, when asked for present altitude B050 for traffic, advises '4999 ft'. Not in the spirit of B050...?"

ARP	SUBJECT	CURRENT STATUS
89/1	Amendments to CAO 20.7.1B Aeroplane weight and performance limitations	Advice to AAAC on future progress at July meeting
89/3	Amendments to CAR 157 and CAO 20.7.4 - single engine	Complete
89/8	Follow on Review Reg 206	Letter to industry on classification and licensing 28 June
90/2	Operational Control- Implementation of Terrell Report	ARP responses assessed. Further action delayed pending discussion with Civil Air.

Noise isolating headsets

Cockpit noise can reduce the effectiveness of aircraft communications, can cause noise related fatigue and in some cases can damage the pilot's hearing. In recent times, manufacturers of aircraft headsets have been improving the noise isolation of their products. These headsets are very effective in protecting the pilot's hearing from the aircraft noise in the cockpit and this is a desirable result.

There is, however, a possible down side to this protection.

Aircraft manufacturers are required by the aircraft certification rules to provide warnings for such things as stall, undercarriage position, aircraft configuration etc. for your protection.

Noise attenuating and noise cancelling headsets can in some circumstances reduce the effectiveness of the cockpit aural warnings and other aural cues such as abnormal noises, which might give some warning of unusual operations. This is particularly so at times of high stress, when aural cues need to be very obvious in order to gain the pilot's attention.

Staff in the Head Office Avionics Section of Continuing Airworthiness in the CAA feel that pilots who use these headsets should be aware of these possible drawbacks and have some care in the way they use the headsets.

No regulatory action to limit the use of such headsets is being considered. The responsibility for adequate communications in the cockpit and for responding to the aural warnings remains with the pilot. However, owners or operators whose pilots use this type of headset should, where practicable, give consideration to wiring the aural warnings through the aircraft audio system.

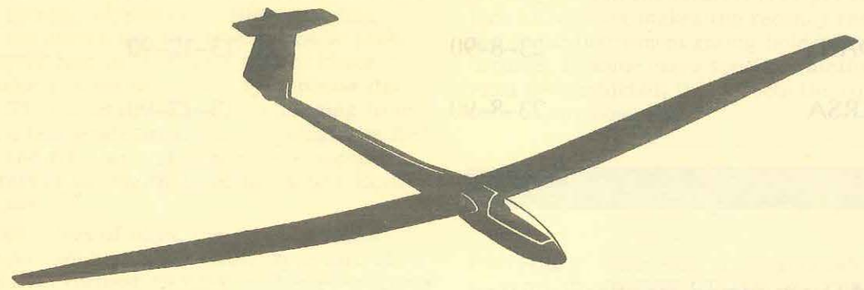
Meteorological information via Telecom's *Discovery* system

Telecom's *Discovery* system (formerly known as *Viatel*) now offers a range of meteorological products, including:

- low-level area forecasts over SE Australia;
- relevant weather warnings; and
- a selection of TAFs and METARs within that area.

It is hoped to extend the system Australia-wide within twelve months. Further information is available from:

Discovery Telemarketing
(*METEX INFORMATION*)
Freepost 20
GPO Box 188C
Melbourne 3001 phone 008 033 342



The Australian Sport Aviation Confederation is offering a prize of $500 for a new logo design. More info from:

PO Box 144
CURTIN ACT 2605

AERONAUTICAL INFORMATION SERVICE AUSTRALIA

NOTICE

CURRENT DOCUMENTATION AND PLANNED NEXT ISSUE

Document	Current Issue #	Planned Next Issue #
DAP(E)	23–8–90	18–10–90
DAP(W)	26–7–90	20–9–90
INTERNATIONAL AGA 0 – 1 – 2	31–5–90	30–5–91
AIP (book)	23–8–90	13–12–90
VFG (book)	23–8–90	13–12–90
AIP/MAP	23–8–90	13–12–90
VFG/MAP	23–8–90	13–12–90
DAH	23–8–90	13–12–90
ERSA	23–8–90	13–12–90

Dates quoted are effective dates

NOTE : NOTAM CLASS I AND CLASS II ARE TO BE READ IN CONJUNCTION WITH THE ABOVE DOCUMENTS

ISSUE : 11
DATE : 23 AUG 1990

Field Office Forum

Anatomy of Safety Regulation SA/NT

Thomas Charles Russell, Examiner of Airmen, GA

AS USUAL, when someone asks what do you do and what are the problems associated with the job one tends to exaggerate slightly. When, on the other hand, there is a request that it be put it into an article for all to see, most examiners find pressing business elsewhere.

When the editor of this publication asked my Leader of Men, Barry Lodge (Assistant General Manager, Safety Regulation, SA/NT) to write about what we do, *I was slower than my peers.* Then came the problem — what to write about?, nothing long, you understand, something simple, five or six thousand words, *Bloggs — we have faith in you!*

After much soul searching, the odd bit of bribery etc, it became fairly obvious that a major difference in our Region compared to the others is 'The tyranny of distance'. High sounding words, but they truly describe our basic problem. SA/NT has an enormous area to cover, with major centres separated by immense distances. The variety of life styles, ranging from southern temperate areas, then through the Red Centre and right up to the northern tropical areas, reflect the enormity of the Safety Regulation task.

In any short set of days, the range of tasks could cover sophisticated airline-type aircraft checks, then through to Alice with scenic flights to the Olgas, and possibly on to Darwin with its companies servicing the far-flung and isolated Aboriginal and mining communities. During this small space of time, our decisions and judgements must reflect the safety standards required as well as displaying and using our knowledge of that particular area.

Adelaide, as an example, would have a range of tasks checking several large Supplementary airline companies whose aircraft vary from light twins to sophisticated jets. In the same area a host of flying schools and charter organisations also exist, again with a myriad aircraft types. All these companies exist in a relatively up to date area, with availability of latest technology, and instant access to specialist CAA staff.

As we continue northwards, not only does the scenery change, but also the type of operation. With floods throughout the region, aviation is a lifeline. These activities range from outback mailing runs to tour operators and the ever-ready Flying Doctor. Each operation has its own special problems inherent in the harsh and unforgiving terrain . The simple lack of ready access to parts, technology and social amenities give rise to problems that Safety Regulation staff must understand, cope with and be able to advise on in a practical and safe manner. According to some people, the CAA is not always right; however, the main objective is to understand problems peculiar to the remote areas and come up with decisions that in reality we can justify and live with.

Last but not least, the tropics. Surprising how many staff decide that Darwin needs a visit or four during the cold and bleak months of a southern winter. *Operational necessity*, I believe is the term used most often. The tropics introduces its own special problems for companies and the workforce. The remoteness of Darwin from the main centres of the south and the sense of isolation can play havoc with the idea of keeping staff in the long term. Some people just plain hate sun 365 days a year with little or no temperature variation. Aircraft parts, particularly radios, do not like humidity and tend to collapse, rest, give up etc usually when you need the aircraft (ie right now). The lack of weather makes the recency requirements for instrument rating holders difficult to arrange. In some cases special training flights must be conducted; this affects the cost structure of any company.

Everything considered, the region offers a challenge to all of us. The distances involved, the different types of people, the different problems, both social and professional, combine to make life really interesting. It is a compliment to all SA/NT Field Office staff that on the whole we cope and have good rapport with other sections of our diverse industry. The compliment is enhanced when it is realised that for our organisation 'safety' is a byword, not a short-lived economic gain for some. Frankly, we all realise that the lessons of the past were gained through exposure to the harsh reality of aircraft accidents. The CAA (as a Government Business Enterprise) and aircraft operators are now all in the same industry, and it is to our collective credit that things work so well for us in SA/NT □

Accident response

Embraer EMB-110, 22 November 1989

The flight from Mount Isa had been conducted in rain and cloud. At 5000 ft during the descent, the pilot became visual with the runway lights and the nearby goldmine. The runway was overflown, and it was noted that the windsock was showing no significant wind. During the circuit for landing on runway 21, increasing rain and cloud as noticed on downwind, and on left base the pilot experienced heavy rain and strong wind gusts. The pilot turned the windscreen wipers on but they were not clearing the windscreen effectively. Forward visibility was significantly reduced, and on final approach the pilot was having difficulty keeping the aircraft aligned with the runway due to the turbulence and wind gusts. He elected to go around and carry out another circuit. During the next circuit the conditions had not improved, and the pilot again decided to go around, as it had become increasingly difficult to maintain runway alignment. As the go-around was commenced the pilot heard a loud bang and realised the aircraft had struck trees. The aircraft was climbed and the Kidston NDB approach procedure was carried out. The pilot became visual at 2900 ft and carried a circuit and landing on runway 03. (Kidston is 1620 ft above sea level).

After shutdown the aircraft was inspected and was found to have sustained tree impact damage to the left inboard leading edge, the left propeller, and the left horizontal stabiliser. The pilot believes the tree strike occurred as a result of downdraft associated with the storms in the immediate area.

The Kidston aerodrome is established according to the provisions of AIP AGA-6 and although approved for the night operation being conducted, it does not have an approach guidance lighting system.

The aerodrome does not have any other ground lighting in the immediate vicinity other than the runway lights, and this may lead to the pilot having a false perception of height and runway perspective. It is considered that the lack of approach guidance, combined with the prevailing weather conditions, contributed significantly to the cause of this accident. There is rising terrain on the approaches to runway 21.

The pilot reported that he was having difficulty with forward visibility due to ineffective windscreen wipers. The effect of the heavy rain on aircraft windshields may lead to a number of visual errors. One effect is to make objects appear to be lower in relation to the aircraft than they actually are. Whilst it is difficult to estimate the magnitude of the error, the elements were present in this accident, and may have given the pilot a false impression of his height in relation to the runway lights.

The following factors were considered relevant to the development of the accident:

1. Weather associated with thunderstorms in the local area.
2. The aerodrome is not equipped with a serviceable runway approach lighting system.
3. During a visual approach the pilot encountered excessive crosswind, reduced visibility and turbulence.
4. The aircraft struck a tree on the approach to runway 21, due to the inability of the pilot to appreciate the proximity of the aircraft to the terrain on final approach.
5. The aircraft windscreen wipers were not working efficiently.
6. Excessive rain on the windscreen may have caused a visual error and contributed to the pilot flying the aircraft into an undershoot situation.

BASI recommendation

The Civil Aviation Authority should immediately review the suitability of Kidston aerodrome for night operations. The aerodrome was surveyed in February 1989 preparatory to the installation of approach lighting. The system was installed but was not commissioned due to problems with excessive light intensity.

The Civil Aviation Authority should assess the need to make approach guidance lighting a requirement for night operations at Kidston.

Socata MSTB20, 10 October 1989

The aircraft was being flown on an air test after a previous flight incurred a defect with the emergency gear extension system. The test was conducted in the Bankstown training area and all gear extensions both normal and emergency worked correctly. On return to Bankstown for landing on runway 29 Right, the landing gear was lowered on downwind in the circuit and the normal three green indication was noted. The approach and landing was normal until just as the nosewheel touched the runway the right maingear collapsed and the aircraft skidded to a halt to the right of the centreline.

Subsequent investigation revealed the right maingear jury strut pin had separated from the attach bracket on the rear spar. The strut pin retaining circlip has been incorrectly fitted during the last installation.

Improper maintenance was considered relevant to the development of the incident:

BASI recommendation

The jury strut spar bracket P/N TB20.43.013.000 L/H or .001 R/H is supplied as an assembly ex-factory consisting of the bracket and two bushes. Unless the bushes are fully inserted in the bracket the locking characteristics of the circlip on the pin may be compromised.

The jury strut pin retaining circlip cannot be inspected in situ on MSTB20 aircraft.

It is therefore recommended that the Civil Aviation Authority consider notification to owners and operators of MSTB20 aircraft that a defect may exist and detail procedures to check the integrity of the circlip and jury strut pin.

Mooney M20J, 18 June 1989

The pilot had recently been endorsed to fly retractable undercarriage and constant speed propeller aircraft, and had accumulated six hours on this aircraft type. When the aircraft arrived in the circuit area the wind was westerly at 10-15 kt gusting to 20 kt. The pilot elected to conduct an approach to runway 23, although an into wind runway was available. The reason for this decision was not established. The pilot carried out a go-round from his initial approach. Following the second approach to the same runway the aircraft touched down very heavily. Structural damage to the aircraft was sustained, with the left main landing gear door and retraction rod-end bearing being detached from the aircraft. After bouncing on the runway the aircraft became airborne again, and with the landing gear down and hanging free, it was observed to commence another left hand circuit. At an estimated height of 200-300 ft, the aircraft turned on to a low level downwind leg with an increasing nose high attitude. It then was observed to roll into a spiral dive manoeuvre from which it failed to recover.

The on-site investigation revealed that the aircraft had impacted soft waterlogged ground, outside the aerodrome boundary, in a near vertical attitude. Rear fuselage distortion was consistent with the aircraft having been rolling about the longitudinal axis at the time of impact. Ground impact had reduced the cockpit area to non-survivable dimensions. The engine and propeller, which were buried in the soft ground beneath the cockpit area showed no evidence to indicate that the propeller had struck the ground during the heavy landing on the runway. Inspection of the aircraft failed to find any pre-existing defects or abnormalities which were contributory to this accident.

Flight test evaluation of the stall characteristics of this model aircraft had indicated that it only marginally achieves the certification requirements, and is difficult to control in all but ideal stall conditions.

It is considered probable that the attention of the pilot was diverted from the operation of the aircraft due to the failure of the landing gear to retract and the cockpit workload and associated anxiety following the heavy landing. Medical evidence indicated that both occupants had been holding their respective control columns at the time of impact. What effect this may have had on the development of the accident was not established.

The reason why the aircraft entered an abnormal flight manoeuvre at an altitude from which the pilot was unable to recover could not be determined.

Significant factors.

The following factors were considered relevant to the development of the accident:

1. The pilot elected to carry out an approach in gusty crosswind conditions when a more suitable runway was available.
2. The pilot did not maintain a stabilized approach to land, possibly because of the turbulent conditions and/or his lack of familiarity with the aircraft.
3. Heavy landing.
4. Following the heavy landing the pilot encountered unforeseen circumstances beyond his capability.
5. The pilot's attention was probably distracted from the operation of the aircraft.
6. Loss of control with insufficient height to effect a recovery.
7. Possible inadequate training on the specific aircraft type, particularly with regard to slow speed handling and stalling characteristics.

BASI recommendations

That the Civil Aviation Authority consider removing this model of aircraft from the group endorsement for single engine, retractable undercarriage and constant speed aircraft in favour of a specific endorsement which requires additional flying training in stall and spin recovery techniques.

That the Civil Aviation Authority provide the industry with advisory information concerning stall warning strips and switches, their positioning, flight testing and procedures for setting and adjusting.

Response to these BASI recommendations is still under consideration by the Authority □

AIRFLOW

A LAST-MINUTE RUSH

I hold an Unrestricted private licence, day VFR only, with 200 hours, a third of which are in command. Whilst on holiday in my home town of Albany, I flew to Bunbury to pick up a friend and return home via the southwest coast, armed with a video camera.

I planned to fly a Cessna 172 directly to Bunbury — a one and a half hour trip. The return trip was to be three legs: via the coast to Margaret River; direct to a hamlet on the coast west of Albany, then coastal to Albany.

I planned for nil wind, partly for ease of flight-planning and partly to ensure that I got some practice in nav techniques. The forecast for the day was fine and beaut, with a light south-easterly, which meant a tailwind to Bunbury.

The trip to Bunbury was near-perfect, and was followed by a couple of hours in enjoyable company. I obtained an updated forecast, which indicated that the SE wind would be about 20 knots on the way home. No drama, I thought, I've planned to arrive home by 1930, and last light isn't until 1954. Plenty of fudge factor in that. Mistake #1!

At the airfield, I allowed goodbyes and a guided tour of the aircraft to delay our departure by 15 minutes. Mistake #2.

We got airborne at 1720, with 5 hours endurance and a (nil wind) ETA of 1930. We headed for the coast for that Mecca of WA surfing, Marg River. The beaches along the way were captured on film then we were at our first turning-point, 5 minutes later than my initial estimate. The first touch of concern entered my mind. Our next fix caused me to add another 5 minutes to our next estimate: sure enough, we were 5 min behind schedule at the second turn.

I'd come to my senses by this time and realised we wouldn't be home by last light unless I did something constructive. We descended from 3500 to 1500 to reduce the headwind component, accelerated to 110 kt and diverted directly to home base. Navigation was easy — keep the coast on the right and follow the ADF.

My friend remarked that he couldn't wait for the sun to set, so that he could catch it on film. He was informed that there was no hurry at all for that big orange ball of fire to disappear! We maintained 110 kt IAS — as fast as the little beast would go — and were advised by FS that last light was 1954: a fact of which I was already acutely aware. The PAL was activated, we were overhead Albany by 1944 and were on the ground a couple of minutes later, having cut it as fine as ever I would want.

In retrospect, I should have taken charge a bit more forcefully at the airport and told my passenger that I'd be airborne at 1700, with or without him. More important, I should have dug out the nav computer and calculated some new ETIs based on the forecast wind. It's all well and good to plan for nil wind, but it's still vitally important to have a good look at the forecast, work out as accurately as possible the effect the weather and wind is likely to have on your flight, and fly accordingly. It was only a minor drama, but one which could easily have been avoided by more careful preparation.

Kevin Lathbury

There is not a lot to add to this cautionary tale; perhaps only to say that to ignore the headwind component is to guarantee yourself extra workload in the air — one of the very things that 'flight-planning' is supposed to relieve.

Dear Sir,

In ASD 139 pages 8 and 9, the question was again raised of overwater flight and the use of lifejackets.

Leaving aside the problems of exiting the aircraft and avoiding hypothermia, the plain fact is that most available lifejackets are unsuitable for the prescribed use in light aircraft. They are uncomfortable, they get in the way and are prone to damage from repeated packing, wearing and subsequent repacking.

I believe the CAA should look into this problem with a view to recommending a jacket along the lines of the military pattern, ie a fabric vest with an enclosed and protected inflatable collar. Such vests can be comfortably worn by pilots, and they have the bonus of pockets for pens and other impedimenta (particularly the VSB).

When I was in UK and involved in regular cross-channel flying I had the use of one of these 'Mae Wests' and found it by far the best solution available.

Gordon R.W.Davies

We asked Martin Aubury, *our Principal Engineer (Structures) for comment here. He said that while the Authority whole-heartedly supports the thrust of Gordon's letter, we are charged with the setting of standards and cannot recommend particular configurations.*

Martin added that readers may also be interested to know that lifejackets from overseas meeting the ***current*** *US FAA and UK CAA standards are now automatically acceptable in Australia (CAO 103.13, Issue 6 contains details).*

AIRFLOW

Dear Sir,

Although I have held a CPL and IR for more than twenty years, all my flying is of a business and private nature, and most has been in the South-East.

The aeroplanes I fly (mostly my own Cessna 210) are usually not fitted with de-icing equipment and so the 'freezing-level' line in the forecast often receives a second glance. If it is at a critical level related to the lowest safe altitudes I make further enquiries. Sunday 16 July and Monday 17 July were typical examples of such conditions, and many other similar occasions.

Sunday 16 July I had been in Sydney for the night and needed to get back to a property near Rugby before lunch. A morning call to Bankstown elicited a forecast of low cloud and a freezing level of 4000 — 6000. Since the lowest safe was 4700 (via Shelleys), I asked further questions, but the only information I received had been garnered from balloon flights over Nowra at 3.30 am, and there were no 'actual' reports available for the freezing level or icing conditions.

I proceeded with the flight on the basis that if the freezing level was 4000 I could get back into Bankstown or Sydney; I would find this out on initial climb, before reaching the high country. In practice, the freezing level was around 6500 and there were no problems.

Monday 17 July I had to get back to Sydney , and on a cloudy, rainy morning rang Bankstown, told the Met. officer I was IFR to Bankstown and asked for the forecast. The answer included information on the wind and the assertion that there was 'no problem this side of the ranges'. Since ceiling and visibility were at minimums where I was, I asked for the freezing level. The answer was 3000 — 4000 (well below lowest safe), but if I hadn't specifically asked I wouldn't have been told!

After a great deal of further enquiry the only hard information available was from the balloons at Nowra and Wagga (again at 0330); there were no 'actuals' for freezing level or icing. A look at the thermometer on the front verandah suggested the freezing level would be above 5000, and I was able to satisfy myself that a low level escape route to Cowra was available: this was essential, since I would be in the murk by 3500 ft. In the event, there was no icing at 5000 — the freezing level would have been about 5500.

The reason for this letter and its summary of two recent flights is that the system could easily be changed to IMPROVE INFORMATION ON FREEZING LEVELS AND ICING CONDITIONS.

On both of these mornings perhaps fifty or more aircraft would have landed and taken off in Area 21 (forecast area). The majority of these would have operated through the critical altitudes at speeds which would not give rise to significant friction heating effect, and the pilots could have supplied icing information, even if their OAT gauges were not particularly accurate. On both these mornings there was not a single 'actual' available from either Sydney or Bankstown.

In my experience, freezing levels don't change very quickly except in well-defined situations. Surely the FIS system could obtain actual reports of levels when forecasts indicate they are below most of the Lowest Safe Altitudes.

Light aircraft IFR flights must still cope with two weather situations that are 'no go': embedded thunderstorms and icing. The former are hard to forecast and situations change rapidly, so 'actuals' may not necessarily be of much assistance, but freezing level and icing actuals would be of great value.

Please, on behalf of many GA IFR operations, could we have some 'actual' freezing level and icing reports, perhaps tacked on to the 'critical locations' part of the forecast?

Geoffrey F J Ashton

This long letter is printed in full because it not only addresses an area of general concern, but it contains pointers to the solution, or amelioration, of the pilot's problem. Two main arguments apply:

First, if you are going to fly single-engine IFR regularly, with neither radar nor de-icing capability, survival depends upon an approach to aviation as professional and intelligent as is demonstrated by this correspondent. It's your life: if you don't know, ask. That's why you have undergone meticulous training — in order to equip you to cope in such an unforgiving environment. This is pointed up by the peculiarity of Australian climate — we have nine or ten months of (it seems) 8/8 blue, with freezing levels > 8000 ft. When the 'weather' finally arrives, we'd better be ready for it.

Second, have a look again at AIP MET-0-9, para 6.5.2, or RAC/OPS-1-83 para 3.5, or even VFG 40.8. It's there, in black and white. Basic airmanship, not to mention mere good manners, should ensure that you let others know about significant weather (or indeed anything unusual that might affect flight safety). Is it really true that none of us ever send SHORT AIREPS? On the other hand, how often have you heard such a message being broadcast? Perhaps the solution is in our own hands and, rather than expecting 'Big Brother' to arrange it all, we really should be diligent in helping each other.

Just a thought...

Flash!

Sublime on the towers of my skiey bowers,
Lightning my pilot sits;
In a cavern under is fettered the thunder,
It struggles and howls at fits

Perc. Shelley
(who wrote quite a lot about IMC)

Here is an article on an often-present hazard to aviation by John Griffiths MBE who, as a past editor of the RAAF Flight Safety magazine and currently a loss-adjuster for Airclaims (Australia) Pty Ltd, has seen his fair share of weather-associated aircraft damage:

AFTER RECENTLY examining several popular turbo-prop engines that have received damage as a result of lightning strikes, I believe that it is time to review the possibility of such an occurrence, and to discuss pilot actions necessary to mitigate any adverse effects.

My concern was first raised when I was asked to examine engines that had been pulled apart for routine maintenance. During several of these inspections I noted classic signs of lightning strikes: pitting of bearings, of gears and the presence of metal in the oil. Only the skill of the engine overhaulers, I believe, prevented results that could have been catastrophic for any subsequent pilot or passenger.

Our rather benign Australian climate can at times lead us into a false sense of security, and we may pay insufficient heed to good old met. book advice on flight in the vicinity of thunderstorms.

So read on, and you will see that some of the conditions that are generally a prerequisite to lightning strikes are not necessarily associated with flying into a CB.

During a 15 year period in the US, nine aircraft were lost as a result of lightning strikes and thousands of others sustained damage, from minor pitting to twenty-centimetre holes in the skin.

Aircraft incidents resulting from inflight lightning strikes can range from inconsequential to major. Aircraft wings have been blown off in flight when a charge has entered the fuel tank by way of fuel capacitance probes. Even negligible incidents can be alarming until it is determined that no damage resulted from the strike.

Lightning strikes to aircraft occur over a wide range of atmospheric and flight conditions and produce a variety of effects on all types of aircraft. Therefore care must be taken to ensure that the flying hazard is well understood and accounted for in the operation of all aircraft.

The vulnerability of aircraft to lightning hazards depends on several factors. Although aircraft are sometimes struck while inadvertently penetrating active thunderclouds, most reported strikes occur to aircraft flying through inactive clouds, in light rain and in light turbulence. Also, aircraft have reported strikes as far as 25nm from the nearest cloud. Truly a *Bolt from the Blue*.

Temperature distribution most suitable for lightning strikes is between +8 degrees and –8 degrees C. The freezing zone in a non stormy rain cloud is a particularly electrically volatile region. Some combinations of the following weather phenomena are factors consistently present when a lightning strike occurs.

- unstable air, stationary front, cold front or squall line
- within a cloud
- air temperature near zero degrees C
- St Elmo's fire
- turbulence

Dissipated thunderstorms can still produce damaging lightning strikes, even though they no longer produce radar returns indicative of a thunderstorm, and so pilots should be aware of conditions conducive to lightning other than the classic Mature Thunderstorm.

To reduce the potential for a strike pilots should study all available forecasts and pilot reports during flight planning and flight. Routes should be planned to avoid specific areas of thunderstorms or towering build-ups. Pilots should use every available means to avoid flying into thunderstorms, including aircraft radar, because once you are inside that cloud it's too late to pick your way through the lumpy bits.

You are best off looking at the situation from afar; the signal from your weather radar can be diffused by precipitation once you are in the stratus that often surrounds CB, and you could be in the cell before you know it.

Think about it: weather radar keeps you out of trouble, while you are outside. To rely on the radar to get you out of trouble once you are in it can be very counterproductive

Non-radar-equipped aircraft or aircraft with inoperable radar should not be flown into known or forecast areas of thunderstorms unless weather conditions will allow visual separation from cloud.

In today's tight Air Traffic Control environment, the options for alteration of track may be diminished, and it takes special effort to avoid the risk of a lightning strike. Although aircraft design and construction have led to reduced potential for lightning damage, the most effective approach to lightning is to avoid areas of atmospheric electrical activity if at all possible.

The bottom line is that we have no requirement for flying into thunderstorms or to fly for extended periods in areas of high potential for lightning strike at or near freezing level.

It is particularly important, if you have flown in conditions of ambient electrical activity (i.e. in or near CB), to carry out an even more meticulous after-flight inspection, looking in particular for small burn-holes in radomes, propeller trailing edges and extremities of the wings and empennage. Don't forget that lightning affects not only the 'obvious' parts of an aircraft — compass system, radios and airframe — but also the propeller and engine, which can be key areas for subsequent failure **if they are not inspected**. A collapsed bearing in a turbo prop propeller or reduction gearbox could have disastrous results, or at the very least an extremely expensive engine overhaul after the metal goes through the oil system.

Editor's note: although an additional and serious hazard in these days of glass cockpits might be thought to be the danger of a catastrophic loss of the instrument display following a severe strike, the most recent FARs (applicable to Australian aircraft) stipulate that Electronic Flight Instrument systems (EFIS) shall be protected from the effects of lightning and high energy radiated electromagnetic fields (Federal Register, 13/2/90). It had been recognised that lightning protection requirements, although sufficient for the 'traditional' mechanical or electromechanical displays, may not provide an equivalent level of safety to EFIS.

*The **USAF Flying Safety Magazine** of March 1990 relates what could happen after a lightning strike. A 'Well done Award' has been presented to Captain Curtis L. Cook, of the 388th Tactical Fighter Wing, Hill AFB, Utah, for this bit of airmanship and determination:*

Captain Cook was leading a two-ship flight of F-16s RTB from a surface attack tactics training mission. During the recovery, both aircraft entered IMC in close formation. Approximately 20 miles from the field, both F-16s were simultaneously struck by lightning bolts. The wingman's aircraft was rendered uncontrollable, and he ejected moments after the lightning strike.

Captain Cook's F-16 was severely damaged. Both external fuel tanks exploded, the left one catastrophically, damaging the left wing, the left side of the fuselage, and the tail section of the aircraft. In addition, all of his primary flight control and navigation instruments failed including his airspeed, attitude, heading indicators, and his head-up display.

As a result, Captain Cook found himself flying in clouds in an F-16 with significant structural damage and with only a standby attitude indicator and the altimeter to use for instrument references. Despite the dangerous situation in which he found himself, Captain Cook maintained aircraft control and informed the arrival ground controller of the emergency and his downed wingman.

He skillfully descended until he was below the clouds and could use visual references to maintain attitude control. Next, he coordinated for another aircraft to join him, and using airspeed references from the chase aircraft, performed a controllability check to determine if he could safely land his crippled jet.

Flying higher-than-normal airspeeds because of the damaged left wing, Captain Cook manoeuvred his aircraft to a safe landing, avoiding further incident. His quick and accurate position call regarding his wingman's bailout also aided in the rapid and successful recovery of the downed airman.

The professional skill and airmanship displayed by Captain Cook saved the loss of a valuable combat aircraft and assisted in the quick recovery of an irreplaceable wingman. WELL DONE!

Trial by fire

Pilot contribution by David Lyons

MOST PILOTS do, at some time, think about the possibility of a fire in flight, and they wonder how they would react, how well their training would sustain them, and if their luck would hold.

On the l3th of August last year I found myself the pilot-in-command of an aircraft which had lost half its power and the cabin of which was rapidly filling with smoke. The terrain was less than 2000 feet below and our rate of descent was close to 1700 feet per minute. I had very little time to make some critical decisions.

I had decided to take my young son on a skiing holiday, and as the forecast was acceptable I elected to fly to Cooma in our plane where an elder son would meet us and drive us to a ski-resort.

Our aircraft was a Cessna 336, just one hour out of an extensive and expensive major inspection. For those who are not familiar with this type I shall briefly expand upon its details. The 336 was the first of the Cessna centre-line thrust series of aircraft. It has two 210 hp engines, one at the front of the cabin and one at the rear. Unlike its off-shoot the 337, its wheels do not retract. With one engine out, it behaves well and has a rate of climb far exceeding its rivals. It is a simple aircraft to fly. I had deliberately chosen this aircraft because of this. I'm getting older and very conscious of the possible effects of aging on my flying performance. I didn't want to have to rely on fast reflexes or a complex knowledge of aircraft systems or performance in an emergency. As most of my flying is out of bush strips I wanted rugged gear and I was willing to sacrifice speed for the certainty of a set of wheels down and locked. The 336 is a twin for mug pilots. I didn't want to be tested by a more difficult aircraft in case my skills would not cope. In near a quarter of a century of flying I've flown a bit over two thousand hours, pottering about the country, the inland and the islands, keeping myself out of trouble. So I'm an average pilot, no hot shot.

On the day we departed for the snow I had obtained a weather forecast for the route and spent the morning packing and preparing the aircraft. Having flown many hours cross-country on single-engined aircraft I still gave a lot of thought to survival gear, consciously thinking of the terrain we were to fly over. I ensured we had water, first aid, food and sleeping bags. As I put new matches into the tool box my young son asked why. Not wishing to alarm him I merely replied they were there if we ever needed to make a fire. Similarly I secured the skis and cases, making sure there was soft luggage on top for my passenger to pack around himself in the case of a forced landing. Why would anyone contemplate a forced landing in a twin?

We departed our coastal property after lunch. Cooma was two hours away. The trip was uneventful after we skirted some coastal weather and the hazards of the busy Bankstown training area. The cloud cleared by Mittagong and at Lake Bathurst I received a clearance at 5000 feet to Captain's Flat. I was aware that this level gave us minimal terrain clearance at some points but the winds were most favourable and we had two engines anyway.

Abeam Canberra I thought I smelt a whiff of something hot, then it was gone. I automatically checked temperatures and pressures, there was nothing amiss there, and I moved on to the fuel quantities, and noted we had used less than half our tankage. Cooma was about 20 minutes away.

Suddenly the aircraft lost power. I firewalled the six levers without thinking, as much in hope of recovery as to ensure that we would lose no precious altitude, and headed towards the sun, to where the ADFs indicated Canberra to be.

At this point I became aware of TWO different aspects of myself. There was Body who flew reflexively, who only made decisions on the basis of instinct and experience, who could do little thinking and could barely read a number. Then there was Mind, who liked to think a problem through, using all he could remember from study and training. And somewhere between was me, watching this pair of clowns.

It was Body who had firewalled the levers and had headed the aircraft into the sun. Mind started to protest, debating the inconvenience if we didn't land at Cooma. It was then my son pointed to the expanding billow of smoke slowly filling the cabin.

Suddenly the nature of the problem changed from an expensive inconvenience to that of a life-threatening emergency. Body knew the rear engine had the problem and proceeded to close it down, feather and secure. Mind warned that we must go through the proper procedure and identify and confirm before closing down. Mind directed Body to look at the fuel flow meters, to look at the tachometer and establish the failed engine from the data provided. Body looked. Where was the fuel flow gauge? Which needle was which? Mind started to explain, but Body had the smoke to guide him and the funny little fish-tailing effect that happens on a 336 when the air is fighting the rear prop; he feathered and secured the rear engine anyway. The fish-tailing ceased.

I called Canberra and announced our problem. Canberra quickly replied giving a heading to fly and a distance to go for Canberra. That was great, no silly questions, just the basic help that Body needed. My next observation was that we were losing height rapidly and I knew this shouldn't be so, Clive Cessna didn't lie. We could fly on one. But Body had decided before Mind that we had to get down and vacate the aircraft and had already reduced the power.

Mind was absolutely furious about this and proceeded to mention some of the things that Body should have done first but Body pointed out that it didn't matter very much and that if that fire was still going (smoke was still there) we should land very quickly in the nearest paddock and then vacate the aircraft. Although the fire was away from the tanks and spars I concurred. I radioed my changed intention to Canberra and again appreciated their simple acceptance of my change.

At this point the clowns united and I took over again. Down below was a valley but there were some paddocks which looked possible, but coming up very quickly. The 336 glides like a cast-iron bath tub so I selected a field which was close and had its length into wind. I crabbed an angling base and turned onto a short final. Then I noticed the cattle. Base again. The next field was similar but a bit wet looking. The last was okay and rather up hill, maybe it was a thousand feet long. As we were very close in I rolled out all the flap and watched completely confident, as the plane stood on its nose and sank down at about 70 knots. I KNEW we'd make a decent landing.

With fully ten seconds to go Mind mentioned the smoke had cleared and we should continue on with the front engine to Canberra. Experimentally I moved the throttle and the front engine roared into life and we climbed up from the paddock. I announced to Canberra that we had changed our plans again and now intended to fly on to Canberra. Again they gave me a heading and a distance to fly. That was most comforting. But again I had a problem, the aircraft had stopped climbing. It was mushing along at 50 knots and I had to plan terrain avoidance, giving due consideration to wind direction in the turn. Suddenly it struck me, I hadn't cleaned up the flap. Flaps up, the plane climbed at over 300 feet per minute and cruised at around 95 knots. It was only a matter of finding Canberra. The tower gave me a heading to steer to intercept the runway, but because of the nose up attitude and the fact I was flying directly into the sun I still couldn't see the field.

They kept vectoring me until eventually I could see the runway, just a mile or so away. A military helicopter tailed us in and confirmed that the fire was out. Three fire engines waited as we landed.

The seriousness of the damage to the aircraft was not apparent to me from within. Only when the firemen requested that I allow them to inspect the holes burnt in the cowling and lower fuselage, did I become aware of the extent and fierceness of the fire. An examination indicated that the exhaust pipe had had a piece separated from it. The ducted air had converted this into a blow torch which had melted aluminium, buckled the steel firewall, and burnt out much electrical wiring and the fuel line.

I learnt rather a lot from that experience and I'd made a few mistakes. The Hot Shots will learn nothing from my experience but others might.

My mistakes:

1. Maybe I should have planned at a higher altitude to give my aging mind and body a greater chance to do the right things in an emergency.
2. I didn't send out a Mayday call. (It proved unnecessary but procedure should be followed.)
3. Despite the preflight planning I didn't give a preflight briefing to my small passenger, nor did I attempt this during the emergency. This I will always do in future: time was very very short up there.
4. Not cleaning up the flap on the go-around was inexcusable, even for the few seconds involved. In my last biennial flight review (completed only a few weeks before this incident) I had elected to go through all 'the hoops' at night. The one thing I didn't do was a single engined go-around and I don't normally take off with flaps as I know then I don't have to clean up to achieve the best single engined rate of climb in the event of an engine failure.

I learnt a few other things too, that day:

1. Quite simply, I was too busy solving problems to panic or dwell on the outcome. Generally my training did stand up quite well, although I was slow to clean up on the go-around.
2. My experience in landing aircraft in confined areas and from unusually steep attitudes gave me great confidence for the forced landing. Forget the 3% gradient stuff!
3. The time my first instructor spent flying me around a tree in a paddock to demonstrate the effect of wind on a turn was appreciated once again.
4. I appreciated the controller's response very much. There were no silly questions to answer, just the helpful information. The practice of telling a mug pilot which heading to fly is far better than giving the relation of the pilot's position to the field.
5. I had difficulty sleeping that night, I kept thinking how lucky I was that I had chosen an aircraft so docile in default with engines distant from both fuel and main spars, for fire burns through aluminium like tissue paper □

GROUND TO AIR

Why didn't you call?

Bob Livingstone
ATC Bankstown Tower

DESPITE the wide variety of accidents and incidents in General Aviation VFR flying, there is one cause which stands out in the statistics year after year — weather-related accidents; they occur again and again. How many times have you read at the end of a report : 'Probable Cause: the pilot, who was not rated for flight in IMC, continued flight into non VMC.'?

We in Air Traffic Services (ATS) often think that a contributing factor is the reluctance of pilots to advise us of their problem by radio in sufficient time for us to be able to help. The Air Traffic Controllers and Flight Service Officers who guard the frequencies are not the police, watching for infractions of the regulations and waiting to pounce on an offender. We are there to provide assistance as an integral part of the Search and Rescue service provided by the Authority.

As currently outlined in CARs 98(1) and 110(1), the functions of Air Traffic Control and Flight Service are:

Air Traffic Control

(a) prevention of collisions between aircraft, and, on the manoeuvring area, between aircraft and obstructions;

(b) expediting and maintaining an orderly flow of air traffic;

(c) the provision of such advice and information as may be useful for the safe and efficient conduct of flights;

(d) the control of the initiation, continuation, diversion or termination of flight in order to ensure the safety of aircraft operations; and

(e) notifying appropriate organisations regarding aircraft known to be or believed to be in need of search and rescue aid, co-ordinating search and rescue aid and otherwise assisting those organisations, as required.

Flight Service

(a) the provision of such advice and information as may be required for the safe and efficient conduct of flight; and

(b) notifying organisations regarding aircraft known or believed to be in need of search and rescue aid and assisting those organisations as required.

If you as pilot do not tell ATS of your problem, we are unable to help. The later you leave it the harder it usually is to provide that help — the conditions have deteriorated, fuel expiry is looming or daylight is running out.

Those of you who have experienced such a trauma will know that there is nothing worse than finding yourself in the dark or out of fuel or on top of cloud uncertain of your position (or worse, a combination of these predicaments). Many years ago I lost a friend in these circumstances — he attempted a forced landing in the dark straight into a clump of trees.

Some of the flying fraternity consider ATS staff to be *WOFTAMs* — a Waste of Flaming Time and Money — and, to a degree, I can see their point. The only time I *really* feel that I have earned my salary is when I have helped someone avoid a collision, helped another out of a sticky situation or assisted a pilot in handling an aircraft malfunction.

Many of the ATS officers whom you know only as voices have years of experience in their jobs, and lots of us are pilots too; not only private pilots, but some high time commercial flyers who continue to hold command. They have seen it all before, have helped many others before you and will put your safety ahead of any other task expected of them.

What *is* your situation? Caught on top of cloud or underneath it with a lowering base and increasing rain?

- Am I absolutely certain of my position?
- Just what is the terrain around here like?
- Where's the nearest suitable aerodrome?
- What heading should I fly to find it?
- When is last light?
- Am I going to have enough fuel?
- Is there a hole in the cloud somewhere where I can descend safely?

A lot of questions! Why, when help is as close as a radio call, should you on your own be trying to answer all these (and more)? Just flying the aeroplane, keeping out of trouble and away from controlled airspace is work enough for one.

If the aircraft you fly is equipped with a transponder, find out how to use it. Within radar coverage your exact position can probably be found within seconds and any terrain problems avoided immediately. ATS has instant communication with associated units, Met. offices, and other aircraft able to give a rapid picture of the weather situation. Many times I have been asked if the conditions in the area I can see from Bankstown Tower are such that an aircraft caught on top would be able to get down.

GROUND TO AIR

Many times I have been able to solve the pilot's dilemma in just a couple of seconds.

Imagine the relief of knowing that you have been directed to an area where shortly you will see the ground and can descend safely for a landing, instead of blundering on 'in the hope'! I once had a student pilot, still on runway heading and just two miles from take off in poor visibility, call that he was lost. Of course he wasn't, but he realised his limitations and reacted quickly. With binoculars I sighted him instantly and directed him to a safe landing in no time at all.

Did this pilot get into trouble because he called? Of course not; had he waited even another few seconds he would have been out of sight and getting him back to the field would have been a much involved process. I would, however, question the competence of the instructor who authorised his flight in such conditions and I cannot guarantee that there would be no further CAA involvement for the pilot in command in circumstances such as these.

All ATS officers involved in incidents are duty-bound to submit an Air Safety Incident Report (ASIR) on the situation after it is over. The ASIR system is designed to highlight trends in aviation safety so that general remedial action can be taken to arrest that trend.

In an incident of the type described above, a Bureau of Air Safety Investigator, should he think that any further action were required, might interview the pilot in an attempt to determine why the situation occurred and to ensure that it was understood by the pilot so that it would not happen again. If any lack of understanding of the necessary elements for safe flight were found, I am sure a recommendation would be made for the further education of the pilot. But I repeat — get into trouble? No! We are speaking of education and understanding, not punishment. It is better to discover one's shortcomings and rectify them than die denying them.

ATS officers can be your best friends. Avcharges pay for their salaries — use their services!

(I feel the writer undersells himself — ATS officers earn their money all right: the daily smooth handling of all types of traffic bears witness to that. Sorting out emergencies is merely an extension of normal services — ed)

A1 Yes, provided the RH control column has been removed and the family members are qualified, current parachutists.
(CAO 29.1.0.4.2, 4.5, and 4.6)

A2 The answer is maybe, as not enough information has been provided for a definite yes or no.

Firstly, the aerodrome must be at least an ALA (since it is not listed in ERSA, it cannot be a licensed aerodrome). AIP AGA-6 and VFG Section 8 detail the physical requirements for an ALA: if the strip fails to meet these stipulations you may not legally land there.

Secondly, although the strip be an ALA, its dimensions must be sufficient for the requirements of the C172. Strip width details for aircraft under 5700 kg are to be found in AGA-6 and the aircraft flight manual sets out the length needed.

Thirdly, if you just pop in on someone's airstrip without an invitation you could be in for a big surprise! Civil Aviation Regulation 93 (Protection of Certain Rights) contains a warning that needs to be understood. You could be charged with trespass, and in the event of damage to your aircraft caused by some deficiency in the ALA you may have no claim against the owner; indeed, legal action could be taken against you for damages to the owner's property.

Finally, a word of warning. Many insurance companies these days can be quite reluctant to pay out claims if the pilot is seen to be in breach of regulations. For example, if the strip on which you landed had, say, something of a ditch across the middle (so therefore could not be an ALA), it is quite possible that any repair bill may have to be paid out of your pocket.

(note: the CAA video 'Going Bush', plus Steve Tizzard's exhaustive article concerning ALAs in Digest number 135 will refresh your knowledge about this aspect of General Aviation).

A3. (a) commence a climb to circuit altitude
(b) position the aircraft on the active side and parallel to the nominated runway, whilst maintaining separation from other traffic.
(c) follow ATC instructions where issued, otherwise re-enter the circuit from upwind
(AIP/RAC-OPS 1.63 and 1.64)

A4 In the Flight Manual.

A5 No
(AIP/IAL-2-18 para 4.4.1)