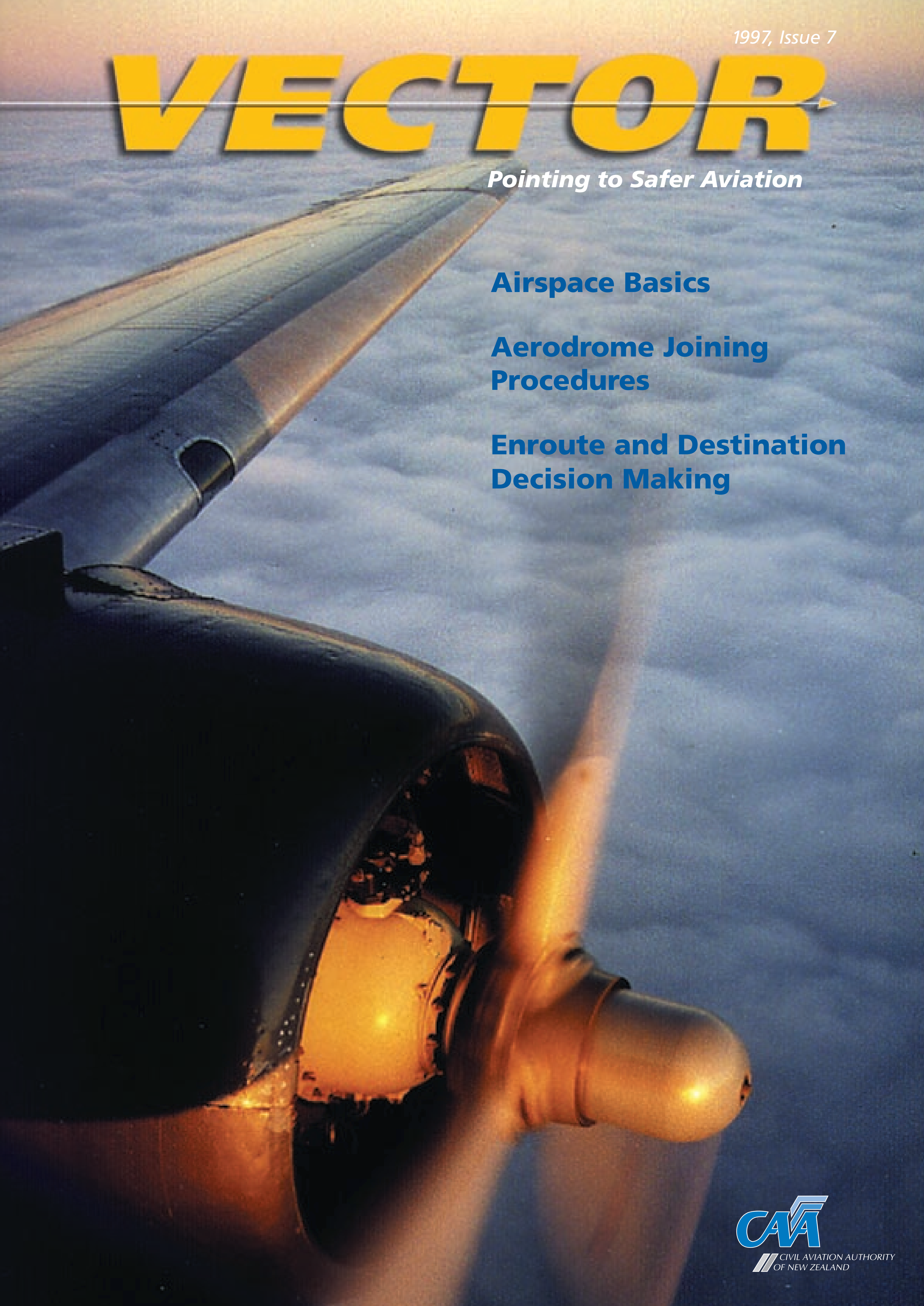
1997, Issue 7

VECTOR

Pointing to Safer Aviation



Airspace Basics

Aerodrome Joining Procedures

Enroute and Destination Decision Making

CAA
CIVIL AVIATION AUTHORITY
OF NEW ZEALAND

VECTOR

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Cover Photographs
DC-3 photographs, on front cover, courtesy of Vincent Aviation.

Letters to the Editor

CO and H_2O

I refer to *Vector* 1997, Issue 5, and comment:

Carbon Monoxide

Thank you for the article "Shroud Control", and I accept the oblique acknowledgment of the validity of my last letter [*Vector*, 1997, Issue 4, p 8 –Ed]. However, I would be interested in how you justify recommending a deviation from a type certificate by the disconnection of a system which, in most cases, provides windscreen or bubble demisting?

Water

Could you please define the risk difference (once in the water) between a passenger from a boating accident and a passenger from a (successfully) ditched light aircraft?

Once again the rule-makers have ignored reality. Human nature will ensure that the EAM-GA12s will be removed from the aircraft to escape detection, will never again be tested, and will most likely be forgotten until well into the next flight across Cook Strait.

The effective approach to TSO-C13/C72 would have been (and still would be) replacement by attrition.

In the interests of practical safe aviation

Vic Alborn
Reefton, November 1997

CO

Carbon monoxide is certainly getting an airing in our pages. Apparently one supplier of CO detectors has had to re-stock – maybe our series of items has had something to do with that. You raise a separate issue, however, and that is whether it is acceptable practice or not to disconnect the cabin heating system.

Disconnecting the shroud heater is not necessarily a variance to the type certificate. If it was a mandatory item for flight, the Flight Manual would reflect this.

New Zealand Civil Aviation Rule Part 91.537 allows an item of equipment to be inoperative in accordance with an approved "Minimum Equipment List" (MEL). Rule Part 91.539 (c) states that an MEL shall not contain any equipment that is required by the airworthiness requirements under which the aircraft is type certificated.

This particular article was about a Robinson R22. The R22 has an FAA Master MEL. This states that flight is permitted with an inoperative cabin heater, provided the valve is secured in the OFF position.

Expert opinion is that the temporary repair on the R22, as reported in *Vector*, is in keeping with normal procedures as a deferred defect action. This is within the capabilities of a LAME if carried out in accordance with the Maintenance Manual. It should also be entered in the aircraft tech log as a deferred defect.

H_2O

During the rule-making process, no-one suggested a transition period.

To "escape detection" is a hangover from the old days, and it doesn't bring credit on an operator who would do that.

Returning to your first question, comparing aviation and boating passengers, the quick answer is that the aviation survivors have a greater chance of survival. There is a reason, however, why ditched passengers might need greater protection, and that is because they are more likely to have suffered injury. The TSO C13 jackets will keep an unconscious person's head out of the water.

Thanks for keeping us on our toes.

Videos

Here is a consolidated list of safety videos made available by CAA. Note the instructions on how to borrow or purchase (ie, don't ring the editors.)

Civil Aviation Authority of New Zealand

No	Title	Length	Year released
1	Weight and Balance	15 min	1987
2	ELBA	15 min	1987
3	Wirestrike	15 min	1987
5	The Human Factor	25 min	1989
6	Single-pilot IFR	15 min	1989
7	Radar and the Pilot	20 min	1990
8	Fuel in Focus	35 min	1991
9	Fuel Management	35 min	1991
10	Passenger Briefing	20 min	1992
11	Apron Safety	15 min	1992
12	Airspace and the VFR Pilot	45 min	1992
13	Mark 1 Eyeball	24 min	1993
14	Collision Avoidance	21 min	1993
15	On the Ground	21 min	1994
16	Mind that Prop/Rotor!	11 min	1994
17	Fit to Fly?	23 min	1995
18	Drugs and Flying	14 min	1995
19	Fatal Impressions	5 min	1995
20	Decisions, Decisions	30 min	1996
21	To the Rescue	24 min	1996
22	It's Alright if You Know What You Are Doing – Mountain Flying	32 min	1997

Miscellaneous individual titles

Working With Helicopters 8 min 1996*
*re-release date

Civil Aviation Authority, Australia

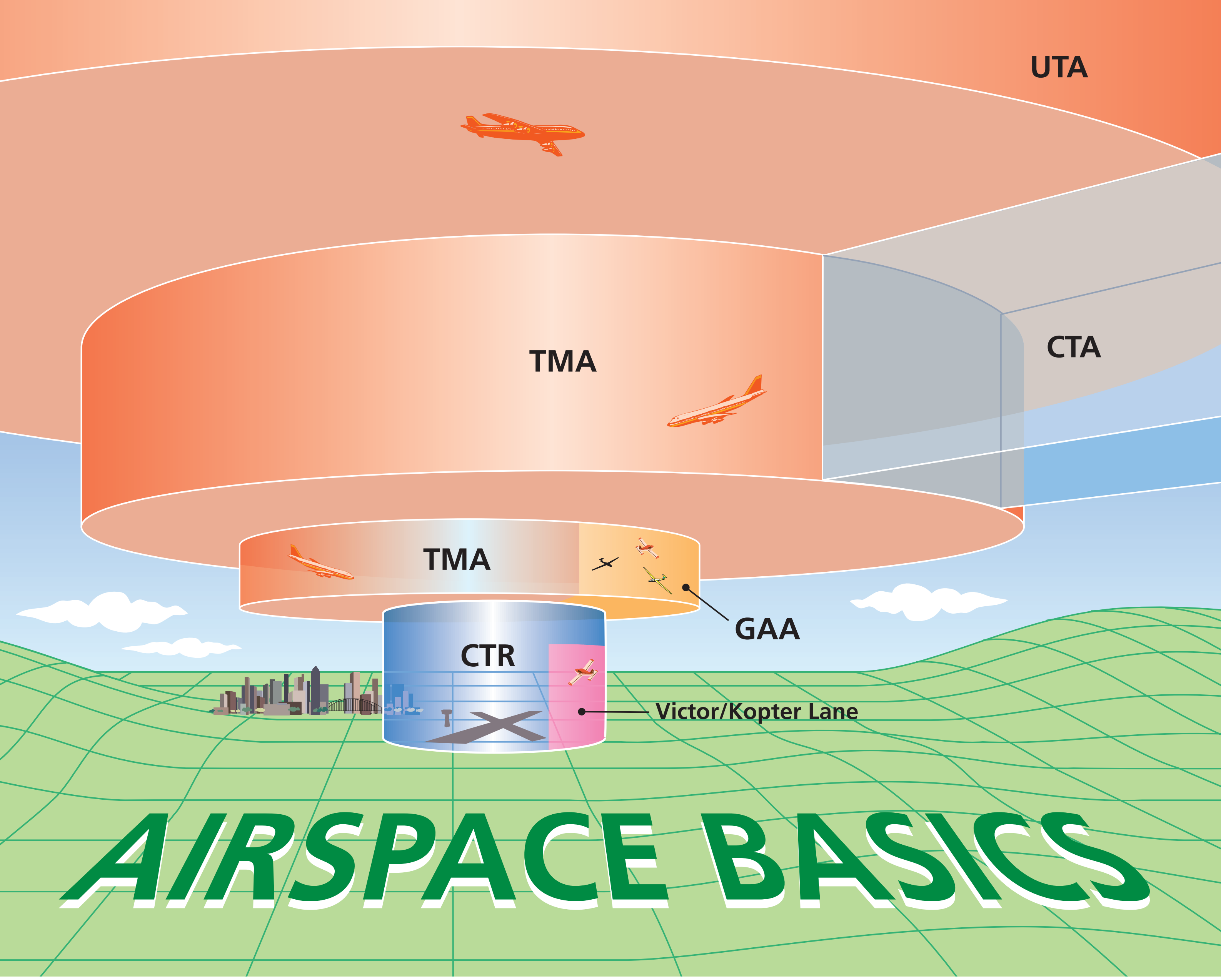
The Gentle Touch (Making a safe approach and landing)	27 min
Keep it Going (Airworthiness and maintenance)	24 min
Going Too Far (VFR weather decisions)	26 min
Going Ag – Grow (Agricultural operations)	19 min
Going Down (Handling emergencies)	30 min

The videos are VHS format and may be freely copied, but for best quality obtain professional copies from the master tapes — see "To Purchase" below.

The New Zealand tapes are produced on a limited budget, the first 11 titles using Low-band equipment. Quality improves in later titles. While the technical quality of the videos may not be up to the standard of commercial programmes, the value lies in the safety messages.

To Borrow: The New Zealand tapes may be borrowed, free of charge, as single copies or in multi-title volumes (Vol A contains titles 1 to 8, Vol B titles 9 to 14, Vol D titles 15 onwards. The Australian programmes are on a multi-title volume (Vol C). Contact CAA Librarian by fax (0–4–569 2024), phone (0–4–560 9400) or letter (Civil Aviation Authority, PO Box 31–441, Lower Hutt, Attention Librarian). **There is a high demand for the videos, so please return a borrowed video no later than one week after receiving it.**

To Purchase: Obtain direct from Dove Video, PO Box 7413, Sydenham, Christchurch. Enclose: **$10 for each title** ordered; plus **$10 for each tape** and box (maximum of 3 hours per tape); plus a **$5 handling fee** for each order. All prices include GST, packaging and domestic postage. Make cheques payable to "Dove Video".



AIRSPACE BASICS

How much do you understand about the structure of airspace in New Zealand? Well, a lot of that knowledge will need to be reviewed with the introduction of Civil Aviation Rule Parts 71 (Designation of Airspace) and 73 (Special Use Airspace). Controlled Airspace and Special Use Airspace are prescribed by the CAA for safety reasons – to protect IFR routes, police and search and rescue operations, and the public interest. Keeping pace with airspace changes, from a pilot's perspective, is an important aspect of maintaining aviation safety.

The introduction of Parts 71 and 73 will take place with the next issue of aeronautical charts (which you should already have) and will become effective from 29 January 1998. We recommend that you become familiar with these chart changes and the amendments to the RAC section of the AIP *Planning Manual*. Reference to this article should help you to understand these changes.

Part 71 Designated Airspace

Many of you will remember that airspace used to be prescribed in CASO 1. All airspace will now be designated by the CAA on the New Zealand Air Navigation Register, which is available on the CAA home page (http://www.caa.govt.nz). Those of you interested in coordinate data will now be able to obtain it straight from the CAA home page free of charge. This should be of use to pilots wanting to load visual reporting points into their GPS. It will also provide a legal description of New Zealand airspace.

All airspace will now have a unique alphanumeric designator as well as a geographical name. All airspace designators will start with NZ followed by a letter indicating the type of airspace, and then by three numbers, the first signifying the NOTAM Area, and the other two the area number. This should help locate the airspace geographically. For example, NZL761 is a Low Flying Area in NOTAM Area 7.

Control Zones

Controlled airspace consists of two main types, Control Zones (CTRs) and Control Areas (CTAs). CTRs are associated with aerodrome operations and are the only controlled airspace to touch the surface of the earth, while Control Areas extend from a specified lower limit to an upper limit.

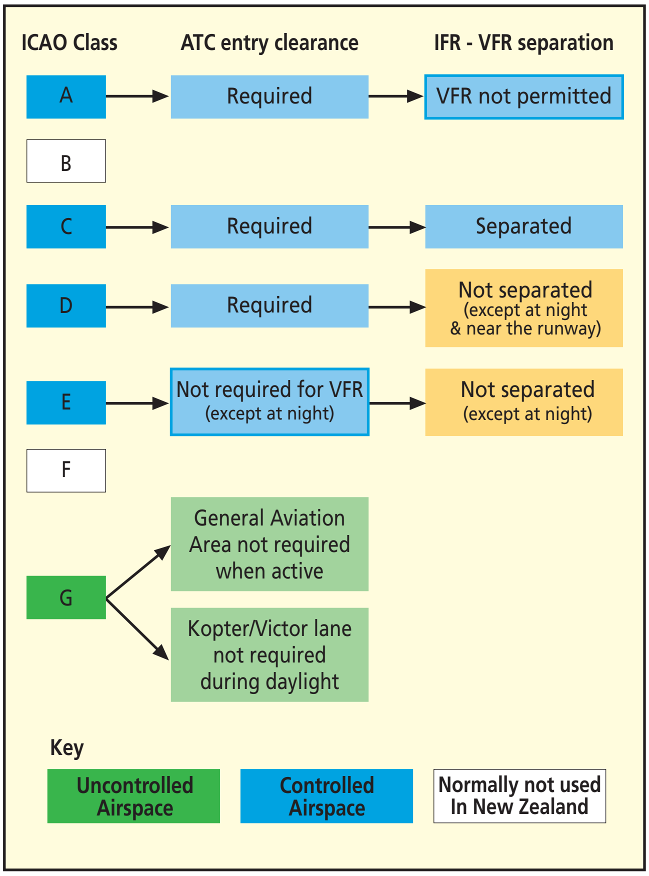
CTR Sectors are established within CTRs to facilitate air traffic management. These Sectors are depicted on your Visual Terminal Charts and Visual Arrival/Departure Sector charts in the VFG. VFR aircraft may be given joining or departure instructions via one of these Sectors. IFR aircraft on a visual approach may be instructed to use a Sector. As CTR Sectors are a subdivision of the controlled airspace, you must comply with any instructions that are issued.

Control Areas

Although these terms will eventually be phased out, currently CTAs may be further subdivided into:

- Terminal Control Areas (TMAs), which are established around one or more aerodromes and are designed to encompass the flight paths of controlled flights on instrument approaches or departures.
- Upper Control Areas (UTAs), which are designed to encompass high altitude IFR enroute operations.
- Oceanic Control Areas (OCAs), which normally incorporate areas over the high seas.

Pilots should be aware that TMAs may not contain all instrument holding and arrival/departure procedures. Minimum altitudes specified for holding procedures provide at least 1000 feet terrain and obstacle clearance, but they do not necessarily ensure that the flight is contained within controlled airspace.



Classes of Airspace

In most parts of the world, including New Zealand, airspace is designated by International Civil Aviation Organisation (ICAO) airspace types. These determine the level of Air Traffic Control (ATC) service that will be provided and whether entry to that airspace requires an ATC clearance. This level of service can not be varied by ATC for any given class of airspace.

The chart above illustrates Part 71 designated airspace with the applicable ICAO airspace classes and their operating restrictions.

As can be seen from the chart above, there are seven classes of airspace. These range from class A through to class G. Classes B and F are not normally used in New Zealand. In controlled airspace (classes A to E), IFR aircraft are separated from other IFR aircraft.

Class A Airspace

Class A airspace is used to accommodate high-level international commercial routes in the Auckland Oceanic Flight Information Region (FIR). VFR aircraft are **not** permitted in this airspace.

Class C Airspace

Class C airspace is applied to large international aerodromes, associated TMAs, enroute airspace covering principal air routes, and in areas with radar coverage. In this airspace, IFR and VFR traffic are separated from each other at all times. VFR aircraft must maintain their own separation from each other, except when special VFR conditions prevail.

Class D Airspace

This type of airspace normally applies to smaller regional aerodromes, such as Rotorua and Gisborne. VFR aircraft are not separated from any other aircraft, except in the following circumstances:

- during special VFR conditions; or
- at night; or
- when runway separations apply.

Both VFR and IFR pilots operating within **class D** airspace must use their 'mark one eyeballs' to separate themselves from each other. Air traffic controllers are required to pass appropriate traffic information where aircraft separation is not provided. Air traffic controllers may occasionally separate IFR and VFR non-powered aircraft such as gliders or balloons, when accurate traffic information is not able to be passed.

Operation within **class D** airspace requires an entry clearance. This is used as a gate to ensure that all aircraft operating within such airspace are known to the controller and also for traffic management reasons (see AIP *Planning Manual* OPS 29 for details). Two examples of circumstances where controllers may reasonably refuse an entry clearance may be – a lack of accurate positional information from an aircraft or surveillance equipment (ie, radar), or during an emergency. The incidence of entry refusal for VFR aircraft should be reasonable and justifiable.

Class E Airspace

Class E airspace normally applies to medium-level enroute airspace used by turboprop commercial traffic. IFR aircraft are required to obtain an entry clearance, but VFR aircraft do not. Traffic information will be passed only to known VFR aircraft, and separation from other traffic will not be provided. It is therefore very important for VFR aircraft in class E airspace to maintain their cruising level (in accordance with the table of VFR cruising levels).

It should also be noted that **at night** class D and E airspace have the same requirements as class C airspace, as all aircraft are separated, and they require an entry clearance.

Classes C, D, & E airspace revert to uncontrolled class G airspace when there is no ATC service provided within that airspace.

Class G Airspace

Class G airspace does not require a clearance to enter or operate within it. You must, however, observe class G airspace rules (check the AIP *Planning Manual*) and maintain a listening watch on the appropriate FISCOM frequency.

Continued over...

Transponder Mandatory Airspace

Transponder mandatory airspace is designated where there is adequate radar coverage to help air traffic controllers determine aircraft positions. Within transponder mandatory airspace, aircraft are required to have an operating transponder or the approval of ATC to enter without a transponder. Transponder and non-transponder mandatory airspace is indicated on charts in the following way:

Transponder mandatory airspace is shown like this:

Non-transponder mandatory airspace is shown like this:

Victor and Kopter Lanes

Victor (VFR traffic) and Kopter (helicopter traffic only) lanes are part of a CTR which is released as class G airspace **during daylight hours**. This is to allow VFR aircraft to transit within airspace not normally used by IFR aircraft. These are significantly different from CTR Sectors, as no clearance is required to operate within them.

General Aviation Areas

The current terms, Glider Flying Area and Training Area, are being amalgamated into one term that indicates the possible use of airspace by either gliders or powered aircraft. Like Victors, GAAs are portions of controlled airspace which become class G airspace, when activated, during daylight hours. The table of VFR cruising levels does not apply within a GAA.

There are three distinct types of GAA:

- **Active during daylight hours –** without having to notify or request the use from ATC.
- **By notification –** where the appropriate ATC unit must be notified in reasonable time prior to the area being activated.
- **By approval –** where prior approval from the appropriate ATC unit is required before the area can be activated.

It may require up to 10 minutes notice before controlled airspace can be released for a "notification" GAA, because of the presence of IFR traffic. It is recommended that early advice be given to ATC for any GAA activation request, in order to help clear the airspace that is required.

Generally, ATC require entry and exit reports. ATC may waive these requirements when releasing a GAA for a specified period, but if in doubt confirm with ATC what is required.

As entry and exit reports may be needed, VFR aircraft are normally required to be radio equipped. It is recommended that transponders be used in order to provide ATC units with accurate position information. Powered aircraft should set an SSR code of 1400 and gliders 1300 on their transponders.

Aircraft operating within an active GAA should maintain a listening watch on the applicable ATC frequency – unless the GAA has been activated for a specific period for glider, hang glider or paraglider operations. If you are activating the GAA in these circumstances, it is your responsibility to ensure that ATC has a contact telephone number. Other pilots wishing to use the GAA must seek confirmation from the appropriate ATC unit that the GAA has been activated.

General Aviation Areas are depicted on charts with the designation **Gxxx**.

QNH Zones

After 29 January 1998 there will be eleven QNH zones within our domestic airspace. A diagram of the new QNH zone boundaries can be found in the VFG.

QNH zones extend from the surface of the earth to the transition altitude at 11,000 feet amsl, and they incorporate geographical areas which normally have similar barometric pressures. This enables aircraft, not in the vicinity of an aerodrome, to use a single pressure setting, and thus all aircraft in a QNH zone should be using the same reference altitude.

Part 73 Special Use Airspace

Special Use Airspace is made up of the following types of airspace:

- Restricted Areas
- Danger Areas
- Military Operational Areas (MOAs)
- Conditional Areas which can be further defined as:
  - Approach Conditional Areas (ACAs)
  - Mandatory Broadcast Zones (MBZs)
  - Volcanic Hazard Areas (VHAs)
- Parachute Drop Zones (PDZs)
- Low Flying Areas (LFAs)
- Aerodrome Traffic Zones (ATZs)

Special Use Airspace can be superimposed upon, but is not altered by, the presence of controlled airspace. For instance, an LFA remains class G airspace when it is contained within a class D CTR.

In effect, **Special Use Airspace requirements** take precedence over the class of airspace where they are co-incident. Where a MOA overlaps Controlled Airspace or a GAA for example, the requirements of the MOA must be met first.

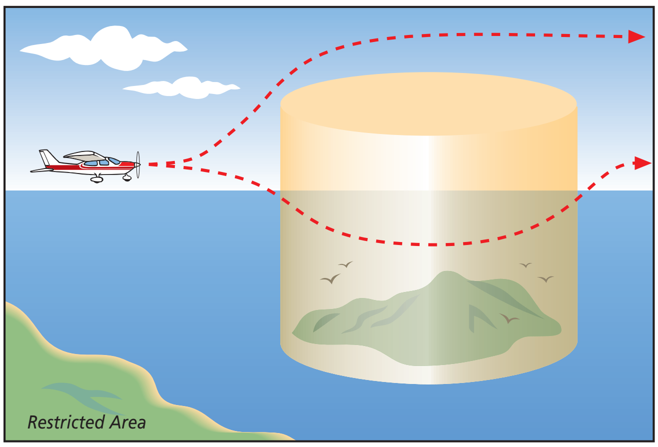
It should be noted that Prohibited Areas are no longer recognised in New Zealand.

Restricted Areas

Entry to a Restricted Area can be authorised only by the controlling authority. Their details can be found in the RAC section of the AIP *Planning Manual* or on the CAA web site.

After 29 January 1998, military areas (presently called Restricted Areas) will be redesignated as MOAs, leaving most of the remaining Restricted Areas as conservation areas.

Restricted Areas will be depicted on charts as **Rxxx**.

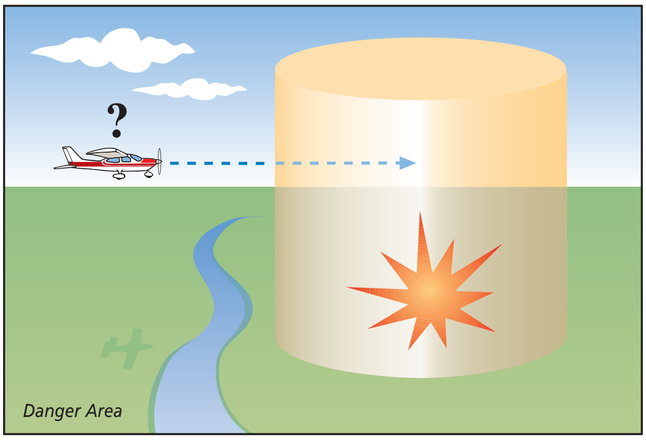


Danger Areas

A Danger Area should only be entered by aircraft after due consideration of the danger present, such as army firing. Danger Areas do not have a controlling authority as there is no requirement to control access.

There is usually an agency responsible for the activity within the Danger Area – their contact details are available in the RAC section of the AIP *Planning Manual* . Our advice is to avoid Danger Areas, or alternatively ascertain the likely danger by contacting the appropriate agency. If you do enter a Danger Area, it will be at your **own risk**.

Danger Areas will be depicted on charts as **Dxxx**.

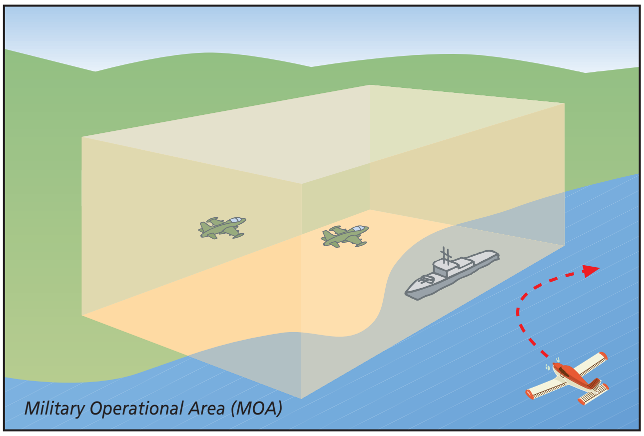


Danger Area

Military Operational Areas

As the name suggests a MOA is an area within which military operations, including live firing, may take place. MOAs have the same entry and operational requirements as Restricted Areas within New Zealand sovereign territory (12 NM from the coastline). If you are operating beyond New Zealand territory, a MOA effectively becomes a Danger Area, except that you must notify the controlling authority (normally Ohakea ATC Centre) before entry. Notification may be by radio, operational transponder, telephone, or other means.

MOAs will be depicted on charts as **Mxxx**.



Military Operational Area (MOA)

Conditional Areas

Conditional Areas are a new type of airspace. They have similar operational requirements to Danger Areas, in that aircraft may enter without specific approval from a controlling authority, but they must adhere to the conditions prescribed for the airspace.

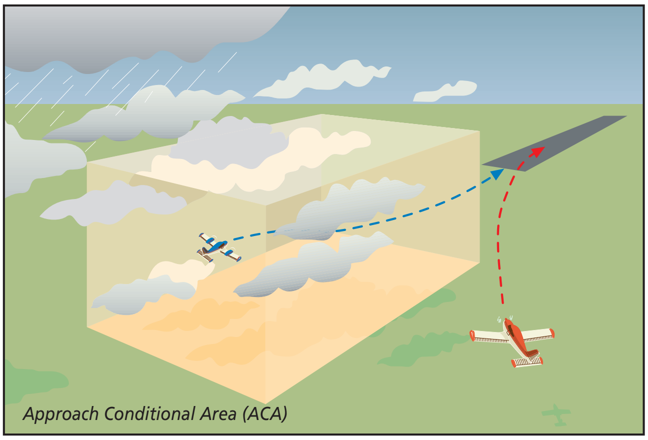
There are currently three types of Conditional Areas and all three will be depicted on charts as **Cxxx**.

Approach Conditional Area

ACAs replace Instrument Approach Restricted Areas. They are established in uncontrolled airspace when an aerodrome has sufficient scheduled IFR movements to warrant their establishment. VFR aircraft must comply with the minimum meteorological conditions (five kilometres visibility, 1000 feet vertical and one nautical mile horizontal distance from cloud) **unless it can be confirmed** that there are no IFR aircraft on an approach. If this is the case, class G airspace rules apply. Non-radio equipped (NORDO) aircraft must comply with the minimum conditions **at all times**.

IFR aircraft will broadcast the type of approach they are on, but not necessarily which runway they will be approaching for. Therefore, unless you can confirm which ACA IFR aircraft are using, it is best to avoid ACAs altogether.

IFR pilots are reminded that ACAs terminate within one nautical mile of the nearest runway threshold. There, class G airspace rules apply around the aerodrome – including the requirement under Part 91 to conform with, or avoid, the traffic pattern formed by other aircraft.

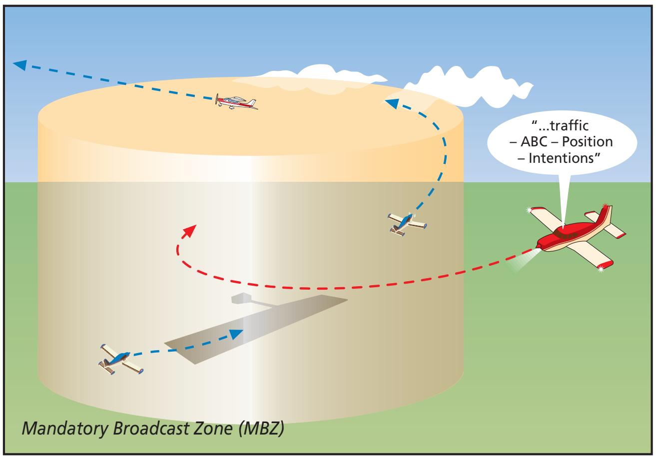


Approach Conditional Area (ACA)

Mandatory Broadcast Zone

An MBZ is an area normally established at a busy uncontrolled aerodrome, or encompassing airspace associated with tourist operations. An MBZ requires a pilot to broadcast position and intention reports on a specified frequency on entry, exit and at 10-minute intervals when operating within it. As an extra safety measure, landing or anticollision lights must be on (if fitted).

NORDO aircraft must not enter a MBZ unless another party, such as an ATS unit or another aircraft, can broadcast the required reports on their behalf. An example of this may be a parachute dropping aircraft broadcasting that the parachutists have commenced their descent.



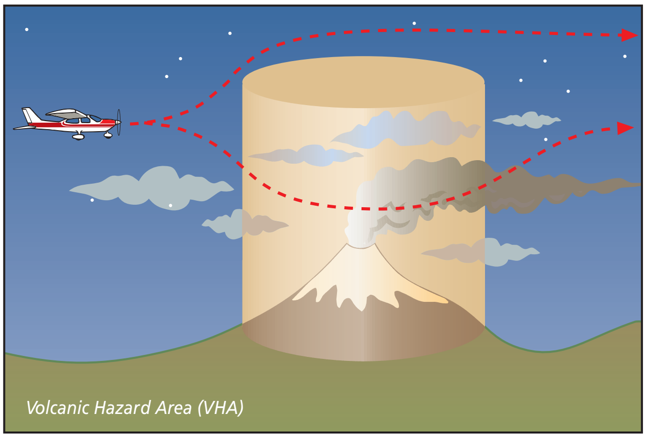
Mandatory Broadcast Zone (MBZ)

Volcanic Hazard Area

A Volcanic Hazard Area is a new term for an area where volcanic activity may be present. Aircraft are required to operate in **VMC by day** while in a VHA in order to be able to observe any volcanic ejecta or ash plume. New Zealand's most active volcanoes, the summits of Mt Ruapehu, Mt Ngauruhoe, and White Island will become permanent VHAs.

During an increase in volcanic activity, a permanent VHA may be increased in size by NOTAM, with the full extent of ash cloud being advised by SIGMET. Consult the RAC section of the AIP *Planning Manual* for further details on procedures.

Volcanic activity from normally dormant volcanoes may require temporary VHA designation.



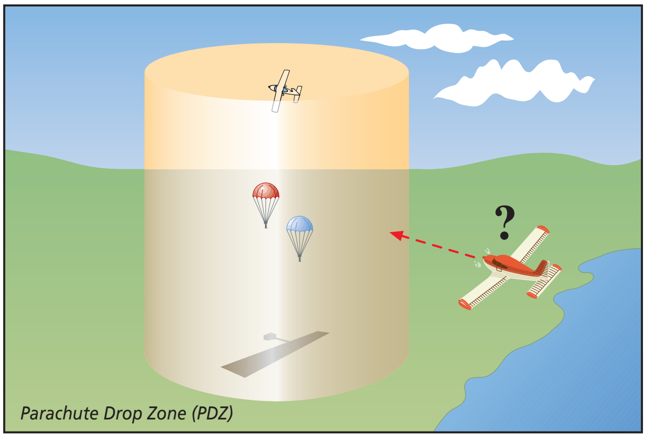
Volcanic Hazard Area (VHA)

Parachute Drop Zones

PDZs extend from the surface of the earth to an upper limit established by the drop height of the parachutists. The horizontal extent is a three nautical mile radius. Any portion of an active PDZ should be treated as a Danger Area – enter at your **own risk** – and pilots should always be on the lookout for parachutists particularly on the upwind side of the PDZ.

Aircraft flying near PDZs should take care to ascertain whether the PDZ is active by listening on the appropriate frequency – as listed in the RAC section of the AIP *Planning Manual*. This frequency will usually be the aerodrome frequency unless the parachute dropping is in controlled airspace. ATC approval will then be necessary and the use of the appropriate ATC frequency will be required. When in controlled airspace, a listening watch on the appropriate frequency will suffice, but when outside controlled airspace, you must listen on the aerodrome or flight information frequency.

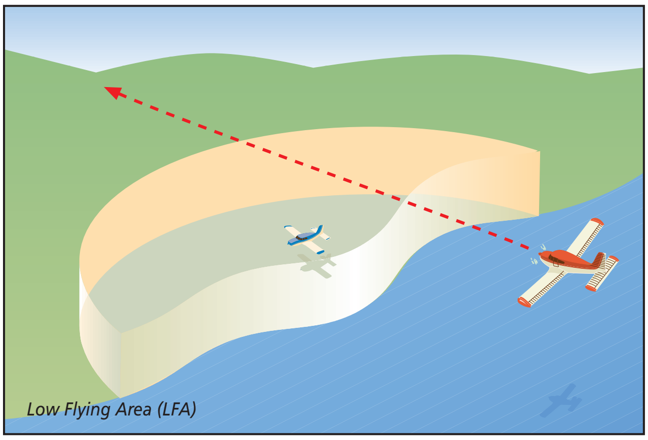
PDZs are depicted on the charts by a symbol and the code **Pxxx**.



Parachute Drop Zone (PDZ)

Low Flying Areas

LFAs normally exist over flat areas and extend from the surface of the earth to 500 feet agl. They are prescribed to allow low-level flight training by a specific agency, which is responsible for the LFA. If you wish to use a LFA, you must obtain a briefing on the appropriate procedures from the specified agency.

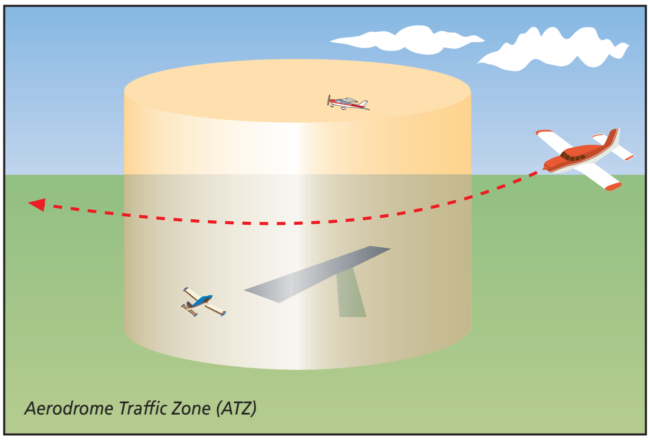


Low Flying Area (LFA)

Aerodrome Traffic Zones

ATZs are prescribed at uncontrolled aerodromes to protect busy aerodrome traffic circuits. Aircraft wishing to enter an ATZ must conform with the traffic pattern formed by established circuit traffic. Aircraft which need to operate within the ATZ but which do not intend to land (such as HT line checks) must conform with or avoid the traffic pattern and broadcast their intentions on the designated frequency. Aircraft **not** complying with the above must **not** enter a designated ATZ in order to transit through.

Aerodrome Traffic Zones will be depicted on charts by **Zxxx**.



Aerodrome Traffic Zone (ATZ)

Continual Airspace Review

All designated airspace will be subject to a review every five years. If designated airspace is not being used regularly, or for the purpose it was intended, that airspace may be cancelled. The CAA intends to actively manage airspace to ensure that redundant airspace is kept to a minimum. If, for example, an operator responsible for a LFA does not ensure they have a current agreement with the land owner/lessee (as required by Part 73), the LFA will be disestablished.

Air Traffic Services

There are two main types of Air Traffic Service (ATS) units in New Zealand:

- Air Traffic Control (ATC) – which includes Control Towers, Approach Control Units, and Area Control Centres.
- Aerodrome Flight Information Service (AFIS), and Area Flight Information Service.

All of the above ATS units provide an alerting service and a flight information service to aircraft on a flight plan. ATS will also provide the same services to an aircraft on request. Note that SARWATCH will only be provided if a specific SARTIME is nominated by the pilot. Alerting services will be provided in such a way that suitable organisations may be notified when an aircraft is in need of search and rescue or emergency assistance. This means that you may request emergency assistance at any time (even if you have had no previous contact with an ATS unit) – do not hesitate to call if you experience any kind of inflight problem.

Air Traffic Control Units

Control towers are the most visible ATC facility. They are normally located on the aerodrome (Wellington is an exception) and provide an ATC service within the vicinity of the aerodrome, primarily using visual observation of the aerodrome and the circuit.

Only ATC units provide an air traffic control service for the purpose of preventing collisions. Controllers will often provide both ATC and flight information service simultaneously. A good example would be a VFR aircraft joining a controlled aerodrome where other VFR aircraft are operating in the circuit. The joining aircraft would normally be given:

- Circuit joining instructions (as part of an ATC service); and
- information on the other VFR traffic (as part of a flight information service).

In this case, the pilot is responsible for avoiding collision with other VFR traffic, having been provided with appropriate traffic information. The controller, however, still has some responsibility for preventing collisions, by issuing appropriate instructions which achieve a safe and orderly flow of air traffic.

It is particularly important to understand that traffic information will be passed by an ATC unit to known aircraft on their frequency – even when ATC separation is not required. Such traffic information is issued to in order to help the **pilot avoid** a collision.

Approach Control and Area Control units may be separate, but they are more often combined within a Radar Centre. Approach and Area Control services may use radar to provide surveillance of traffic. In New Zealand radar is either primary (using radar echoes to detect position), or secondary (using aircraft transponders to respond to ground equipment interrogation).

Aerodrome and Area Flight Information Services

An *Aerodrome Flight Information Service* provides information to aerodrome traffic, such as the preferred runway, weather conditions and traffic information. Information passed to the pilot by an AFIS is not an instruction or a clearance – it is issued to enhance safety. Milford Sound is an example of a region where such information is important.

The *Area Flight Information Service* is provided by a Flight Information Centre (FIC) located in Christchurch. The primary tasks of the FIC are to provide an alerting and flight information service to pilots around the country as they require it. Pilots can request traffic information, SARWATCH or emergency assistance even if they have not filed a flight plan. The FISCOM chart in the VFG shows the various information areas throughout the country together with their frequencies.

Assistance

Remember if you ever get into difficulties in the air, Air Traffic Controllers are always keen to help. ATC is occasionally berated as 'policing' airspace, but rare overzealous controlling should not diminish the excellent overall standard of ATC in New Zealand. *Vector* recommends that if the opportunity arises all pilots should take the time to visit their local control tower or radar centre and take a look at what it's like from the 'other side'.

Conclusion

Take some time to familiarise yourself with the new airspace designations on the 29 January 1998 charts, and have a good look through the RAC section in the AIP *Planning Manual*. **Remember** that you need to have the **current charts** with you when flying. Although the changes on the 29 January 1998 charts mostly relate to new airspace designators, there have also been some minor alterations to designated airspace which you need to know about. Make a habit of checking your new charts for airspace changes when you receive them. Remaining familiar with the structure and operation of airspace will always help ensure that your next flight will be a more relaxed and expeditious one.

So make it your business to keep up to date – and keep your eyes peeled out there! ■

Enroute and Destination Decision-Making

There have been a number of incidents where general aviation aircraft have arrived at their intended destination to find the weather conditions less than favourable. When flight planning, it is important that the weather forecast is studied closely and careful consideration is given to how conditions may evolve en route and at your destination over the period of your flight. Don't just focus on the current situation – think ahead.

Already plenty has been said and written about enroute decision-making for the VFR pilot. It is a sad fact that after another recent light aircraft tragedy involving a cross-country flight in the South Island, the same sorts of questions and issues arise. Could it have been get-home-itis, pressing on into adverse weather when a '180', or a diversion to an alternate might have changed the outcome? Or could it have been a case of an aircraft that should have stayed on the ground in the first place? Whatever the circumstances, the weather information on the day, in relation to the terrain en route, suggested caution.

Personal Minimums

Throughout the CAA sponsored Aero-Kiwi and Heli-Kiwi seminars of the last two years, the presenters have been giving particular attention to factors influencing pilot decision-making in the general aviation (GA) VFR environment – where the combinations of weather, terrain and personal pressures mix all too frequently to form a lethal cocktail.

True, the 'rules' (CAR Part 91) ought to prevent some of these flights, or at least their deadly consequences. But, as has been stressed in the Aero-Kiwi and Heli-Kiwi seminars, the rules are a guide-line. They set the bare minimum height, visibility, distance from terrain and cloud limits. Individual organisations often have rules and by-laws which apply more conservative minimums. Beyond that, pilots should apply personal minimums[1] taking into account many factors, such as pilot experience, currency, well-being, etc. Sometimes it is only an element of luck – combined with a degree of pilot skill and a good measure of aircraft structural tolerance – that has enabled some pilots to come back from a trip beyond appropriate limits. Too many have not come back, and nor have their passengers.

Since the responsibilities of the pilot in command come with a licence, it should be evident that there are both legal and prudent personal requirements to be met to maximise the prospect of a safe takeoff, safe flight, and safe landing. For instance, when the meteorological conditions are close to minimums, it ought to be quite obvious that VFR flying may not be such a good idea. Think about probable visibility restrictions, terrain changes on your route, possible turbulence, and the effects of these on your workload and handling of the aircraft – and you will realise why we believe it is important for you to set personal minimums which are more conservative than those that the Civil Aviation Rules spell out.

Applying your minimums would be a relatively simple task if the terrain were flat and the weather both stable and benign. The trouble is, this is not the way it is in New Zealand. We are a mountainous country. We are a narrow, maritime country oriented northeast-southwest to the prevailing westerly air mass. As a result, we have rapidly changing and quite local weather patterns. So, personal minimums, whether formalised in a checklist or fixed in your memory, need to be developed and applied in this environment

Decision Factors

With VFR-into-adverse-weather incidents and accidents, it is often the case that the weather was deemed acceptable at the departure point. Trouble involving weather and terrain then developed and overwhelmed the pilot and the aeroplane en route, or at its destination. The trouble is not always fatal of course but, even if not, it can be very disruptive and expensive.

What appears to be a common factor in these events is a failure by the pilot to mentally review possible minimums en route and at the final destination, taking into account weather developments over the anticipated flight period. For example, the cloud base in relation to enroute terrain, or surface wind conditions at the destination in relation to available runways, are important points to consider before takeoff – and to re-consider during the flight. Continually reviewing the situation and updating possible alternative courses of action during a flight are important parts of inflight management by the pilot in command.

The questions GA VFR pilots might want to ask themselves could be something like these:

- Will the wide blue yonder remain the wide blue yonder?
- Will the grey yonder remain just grey over the terrain I wander?

[1] Personal Minimums Checklists (promoted at the Aero-Kiwi and Heli-Kiwi Seminars) are available from the CAA Safety Education Unit on request.

- Will today I squander an aeroplane (and maybe a life) in the wet and grey-to-black yonder?

At the Aero-Kiwi and Heli-Kiwi seminars, presenters have highlighted these kinds of departure, enroute and destination decisions, by using classic accident case studies that have etched themselves into the consciousness of the local aviation community.

In the case of the Cessna 185 that crashed by the Desert Road en route from Palmerston North to Taupo (back in 1979), the pilot, a recently qualified CPL, 'needed' to get a passenger back to work and the aeroplane back for an anticipated operation. Six people, including family members of the pilot, died on this early Monday morning flight. The pilot left, with two hours fuel, on the direct route via Waiouru in order to meet the time constraints and to 'beat the weather'. The forecast weather was a warm, moist northerly airflow. The pilot attempted to fly the aircraft at extremely low level across the Central Plateau, following the Desert Road north. The aircraft impacted in rain and cloud that was virtually at ground level, and it burst into flames.

Ten years later, a Bell 206 helicopter was transporting a television crew that had been filming in wet conditions on an East Coast marae. The departure for Gisborne was delayed, the weather was deteriorating, and CET was cause for concern. Shortly after departure it was discovered that an item of television equipment had been left behind. The aircraft returned, delaying the flight further. Having departed again, low cloud and mist dictated a coastal route to Gisborne. The cabin misted up, low-level sea mist, cloud and twilight contributed to disorientation, and the aircraft struck the sea while attempting to close with the coast. One of the television crew drowned during the swim to shore. Lifejackets were not carried on the flight.

Both cases, one fixed wing and one rotary, allowed participants to explore the areas of enroute and destination decision-making in the kind of circumstances that VFR pilots may encounter sooner or later in their flying. These events were not really more exceptional than numerous others in New Zealand. In the GA VFR fraternity, we are not really discovering new ways to crash aircraft. The trouble is – we are having difficulty applying what we **do** know to prevent us crashing aircraft in the same old ways.

More than in any other domain of flying, pilots undertaking VFR flights are 'the lone arrangers' of the fate of their aircraft, their passengers and themselves. IFR pilots and operations have a range of protections. The pilots and aircraft are IFR equipped and capable; the ATC system is watching out for them. The operating organisation (if a sound one) will have appropriate detailed weather and route information available, and it will have a senior person engaged in operational oversight. The weave of the safety net is close and strong.

Repeatedly with GAVFR operations, the pull of a destination appears to be a very powerful motivator. The departure decision can take primacy ("Let's get going … and we will see how it looks") over the more pertinent-to-survival decisions – those en route and those about your anticipated destination.

There is a real danger in focussing on the *gain* of reaching your destination compared with the *losses* associated with not going, or turning back – the latter for example, extra costs, missed appointments, disappointed passengers, etc. We need to change our perspective to see the very real *gains* from the alternative action – the main one being that of being alive and safe with an intact aircraft (with probably very relieved passengers), having avoided the potential major *loss* (and cost) of bent metal, injuries, or worse.

Perhaps in our basic training, we have the balance wrong. Perhaps we are asking too often, "Is it good enough to go flying today?" meaning only the local conditions. Thus we get good at making judgements about the local conditions (the small picture). Perhaps we need to ask more often, throughout training and beyond, the bigger picture question, "Is it good enough to go flying today to …?" Here the focus is on the enroute and destination issues over the period of the flight. Even if there is no intention to undertake the flight, the exercise could be useful. Take a few minutes and gather the information. Ask, "What could I anticipate en route over this terrain?", "What will conditions most probably be like at my intended destination?", "Will things change, and in what way, on the way back?", "What if I need an alternate, and do I have any idea about conditions to expect there?".

A Recent Incident

The ingredients alluded to above all played a part in an incident at a major airport in New Zealand this year. The Cessna 180 set off from another aerodrome approximately an hour and a half away. There was a need on the part of the pilot to make the flight for business reasons. The weather was flyable but not good. A winter depression was covering the country. At the destination aerodrome the wind was gusting 42 knots, with isolated gusts up to 46 knots. Visibility was down to 3000 metres in passing showers. These conditions were known from METARs and TAFs well prior to the departure of the aircraft, and no doubt they were reflected in general in the weather

information available from other sources, such as television, radio, newspapers – or through Metphone/fax.

Terrain presented little in the way of a challenge to this VFR flight, as it could largely be achieved by a coastal route. Possible changes in the weather and its effects on the destination aerodrome, however, needed to be considered. Was it, by the estimated time of arrival, likely to be suitable? Could there be, under the prevailing or forecast circumstances, any real restrictions on the aircraft capability and the pilot capability? What if the aerodrome closed?

Coincidentally, on the same day, a group of pilots planning their return home from a flying event were faced with similar pre-flight decisions. For one group, a normal alternate aerodrome was not a safe option because of the strength and direction of the wind in relation to its runways, so departure was not made until firsthand information was obtained for another alternate. Pilots whose home base was the subject aerodrome above, after assessing the destination weather and likely

Continued over...

conditions on their route (in particular, severe turbulence was likely there), elected to drive home.

The aerodrome in question has one runway, and the wind was estimated to be 40 knots with gusts higher, but luckily it was largely down the runway. The Cessna 180 landed but then immediately experienced difficulties in attempting to vacate the runway.

Could these difficulties have been foreseen? Maybe. It had happened before with this aircraft and this pilot. Clearly an important aircraft consideration, even before leaving, was going to be the crosswind limitation. As it happened, the forecast strong winds held the anticipated direction at the time of arrival – just as well, as there was no other vector. If the wind direction had changed significantly, was there sufficient fuel, and was the weather even marginally suitable for an alternate with favourable vectors?

Returning to the unfolding events, in attempting to vacate the runway the pilot experienced difficulties taxiing in the strong wind. It is well known that a high-wing 'tail-dragger' will weather-cock, and control once out of wind is difficult if not physically impossible. The foreseeable happened. The aircraft veered to the right, the starboard wheel ran off the runway and onto softer grass. The aircraft nosed over, and the propeller struck the ground. The pilot regained a measure of control and regained the runway. Wingtip assistance[2] was then given by airport services. The runway had to be cleared of debris, mainly dirt thrown up by the propeller.

It was a busy airport and the disruptions were expensive. The runway was inoperative for nine minutes during this event. Scheduled departures were delayed, and two inbound IFR flights had to make missed approaches. Commercial aircraft were delayed, schedules disrupted, passengers inconvenienced, fuel burned and workloads increased. The effects of what, on the surface, looks like a trivial incident can run on for hours at a busy airport.

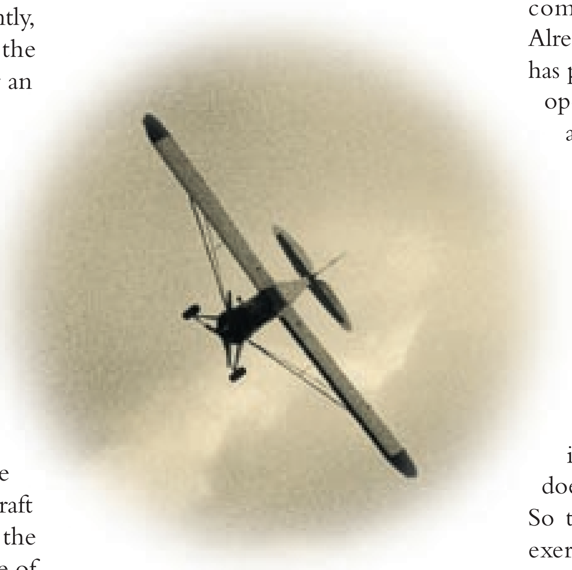
Aftermath Considerations

Then there is the aftermath, the incident reports and the follow-up. It all adds to the aviation bill. As do such items as a bulk strip of the engine and repairs to the propeller. The insurer would pay, less any excess.

But remember that really, with insurance, all of us in aviation pay. It is the contributions of the many that cover the losses of the few. That means the premiums on aircraft that GA pilots hire or own (which after debt servicing are probably the biggest standing annual cost in flying) have to reflect the anticipated levels of all losses, avoidable and unavoidable. Reduce the avoidable losses from the sorts of events described, and flying has to be both more affordable and safer.

Often unaccounted for in such events are the costs of inconvenience and all the incidentals that flow from a mishap.

Pride cannot be quantified, but there is a price here too – though there can also be a gain if we are open to the lesson.



There are also some new cost realities entering the equation, costs that are likely to be imposed on GA for the kinds of events that have prompted this article.

In the case of an aircraft that does not arrive at its destination, there are search costs. For a period, and depending on information available, these are borne by the State (through taxes). But this resource is finite, and private search expenditure by friends and relatives is common. On top of this expenditure, there are the real and lasting emotional costs from such an event.

Future Possibilities

There has been a general shift in public attitudes towards what are perceived as preventable accidents, events where there is damage, injury or loss of life – where prudent judgement or foresight based on knowledge and training ought to have led to a different outcome. Legal redress is being pursued more often in transport accidents. The actions may be taken under either the criminal or civil codes and exemplary penalties sought. With limitations upon the no-fault premise of the New Zealand accident compensation scheme, and the trend towards more litigation, legal costs are a part of the accident or incident balance sheet. Legal action can be prompted by what are alleged to be poor decisions and poor judgement in exercising the privileges of a pilot licence.

Re-insurance may be harder to obtain, or obtained only for an increased premium.

Another cost that is just starting to emerge will be restrictions placed on GA operations as a form of preventive action, to minimise the risk of disruption to commercial air transport operations. Already a major airport in New Zealand has placed a period of restriction on GA operations prior to a public holiday, so as to safely handle all the IFR commercial traffic in the slots available. The decision involved risk management. So where was a delay or incident most likely to come from? Regrettably, from a GA VFR operation.

If GA VFR operations, the core of recreational and private flying, are going to make in-roads into this issue, it best that this sector of aviation does so itself. Formal training can help. So too can the personal discipline, the exercising of sound decision-making principles, and the good airmanship that should go with being pilot in command.

Learn the Lessons

Apart from the sad long list of fatalities where we tend to see history repeating itself as a result of questionable decisions, there is no shortage of incidents where the outcome has been a serious scare for all concerned. It is hard to predict what will be taken from such incidents. We hope more GA pilots will reflect on the events and take positive steps to learn the safety messages of a close encounter, rather than believe they are more skilled, more knowledgeable, more bullet-proof as a result. The good thing about such incidents is that they can be a learning opportunity for the pilot, his or her flying peers, and the organisation. There is a second chance with an incident or a scare. There is no second chance with a fatal accident. ■

[2] Wingtip assistance can be requested, but availability would depend on airport resources at the time. Pilots should not rely on this assistance as a matter of course, but rather in the event of getting caught out.

But I Could Hit a Hill…

The following tale from Canada (TCA Aviation Safety Letter, Issue 3/97) has a very serious conclusion, alluded to in the title above.

Almost from the day that Doug McCurdy lifted the Silver Dart off the frozen surface of Bras d'Or Lake, pilots have sought a reliable way to stay on track while traversing the vast wilderness that makes up so much of Canada.

In the bad old days, they used maps. Often, the maps were inaccurate. But as time wore on, the maps got better. In many areas of the country, that wasn't much help. One little lake looked much like another. So did the valleys and what-not. On a clear day, it didn't matter too much. Pilots could see for miles and generally stayed somewhere near the intended track.

Some of the time, it wasn't clear. Oh, there was generally enough visibility to remain in visual meteorological conditions (VMC) in visual flight rules (VFR) flight if one was flexible about how one interpreted one or two miles, but map-reading became much more difficult under those conditions.

Over the years, maps and Nav-Aids improved. Still, for most pilots, the only time they were on track was when they unknowingly crossed it. As a result, many aviators spent considerable time being momentarily unaware of their position. For some, that moment stretched to eternity.

To get around such unhappy accidents, many incredibly talented people developed a navigation system so accurate that it could be and is used in some cities to deliver pizzas to specific residences. Aviators soon found that this system, known as the Global Positioning System (GPS), could be used to supplement the map-reading skills that were the bedrock of their VFR navigation over remote terrain. As a result, pilots flocked to buy GPS receivers that would keep them right on track.

As more and more pilots began using GPS, they started developing a great degree of confidence that it would always lead them to their destination. Confidence is one thing, over-confidence another. We've had a lot of reports that pilots with GPS sets are setting out on VFR flights that they would have cancelled in the past because the weather was marginal or because it was dark. This attitude has a lot of accident potential.

First of all, GPS is not infallible. As we've said many times in the past, GPS satellites can transmit faulty signals and, unless you have an installation certified for instrument flight rules (IFR) flight, you won't be warned. Faulty satellites have caused 80-mile position errors in the past. Even if you have an IFR box, there will be times when there just won't be enough satellites to navigate. What if this happens at a critical point in your flight when the visibility is too poor to map-read?

Even if there are lots of satellites, and they're all working properly, all that GPS can do is take you to the waypoints you've programmed into the box. What if you've entered the wrong coordinates? Even experienced airline crews flying 747s have made this mistake, so what makes you immune? If you can't see the ground well enough to confirm you're on track, how will you know if your mistake is leading you into the side of a hill?

On the subject of controlled flight into terrain (CFIT), let's suppose that GPS is working flawlessly and you've entered the correct waypoints. You'd still better have plotted your track on a map and checked for obstacles. Not just along the track, but to either side as well, and don't forget to look for obstacles below the altitude you intend to fly.

If the weather is already bad, it could get worse, and you might have to descend or deviate. The course you've plotted may not give you these options, and so now you're betting your life on the weather not changing. Does this sound like a good idea to you? Suppose you can deviate and find some better conditions. Now you'll likely use the "Direct-To" feature on the box to continue to destination. You'd better have another look at the map at this point. Plot your new track to destination and follow all the advice we've given above.

For years, pilots wanted a navigation system to keep them precisely on track all the time. Now that we have it, some are replacing the risk of getting lost with the risk of flying into an obstacle. VFR navigation means being able to see the ground well enough to navigate safely.

There's no category between VFR and IFR. Make a choice, and follow the common-sense rules that go with your choice! ■

Passenger

A recent event, heard third-hand by a CAA Field Safety Adviser, was the catalyst to prompt this discussion on passenger briefings. The aircraft in question was approaching an airfield with a lot of trees in close proximity to the approach path. These caused considerable low-level turbulence. As it was reported, the front-seat passenger sought something "stable" to hang on to prior to the flare. The passenger took hold of the control yoke, causing a few moments apprehension for the pilot! Such a reaction by the passenger was natural enough – particularly if not briefed about '**not** grabbing the yoke or touching any other controls'. The pilot subsequently amended his passenger briefing.

This incident is another example of how we all can improve safety and ensure more enjoyable flying for all by learning from the experience of others.

The following is some practical advice on ways to improve your standard of passenger briefing and to comply with Part 91.211 (passenger briefing requirements) of the Rules. Also, have you seen our safety video *Passenger Briefing*?)

Conducting a Passenger Briefing

It can be difficult for the pilot of a light aircraft to broach the subject of passenger safety briefings for fear of causing unnecessary worry to nervous passengers. Private pilots will tend to find this task even more difficult, because their passengers are likely to be known to them and are also bound to ask plenty of questions. Passengers who have had little flying experience are likely to express a wide range of misconceptions about flying in light aircraft.

As pilots, we need to put some thought into how we might structure the briefing that we are required to give. Remember that the object of the exercise is to convey as much useful safety information as possible, not just to go through the motions so that we can get airborne quickly.

Demonstrate your aviation professionalism by the content and manner of your briefing.

Regardless of whether your passengers are experienced aviators, frequent airline travellers, or have no knowledge of aircraft at all, you will still need to give them a comprehensive safety briefing before the flight. Even a passenger who has more time in their logbook than you will appreciate a decent briefing, especially on an aircraft type they are not familiar with. Do not feel that you might insult their intelligence – if they are truly professional then they will have no objections. Passengers will generally feel more assured of their safety if they receive a well-thought-out briefing. Remember that your passengers are placing a considerable amount of trust in your flying abilities; you owe it to them to be competent when it comes to safety briefings.

Freshly graduated private pilots have usually had little training in coping with the demands that passengers may place on them, although they begin to build these skills rather quickly as their flying hours accumulate. Such difficulties are not confined just to the ground, but extend to the multitude of questions that passengers will ask – often during critical stages of the flight. Conversation during radio calls, or on short final with a crosswind, are examples that we would all prefer to avoid. Mention to your passengers that there will be periods during the flight when you will need to concentrate on radio calls and on flying of the aircraft. Using a raised hand to indicate that "I need to concentrate" is a good suggestion.

Introducing your Briefing

Think about how you might structure a safety briefing for your particular flight, taking into account the aircraft type, weather conditions, proposed route – and the nature of your passengers. Here are a couple of examples that can be incorporated into the introduction of your brief:

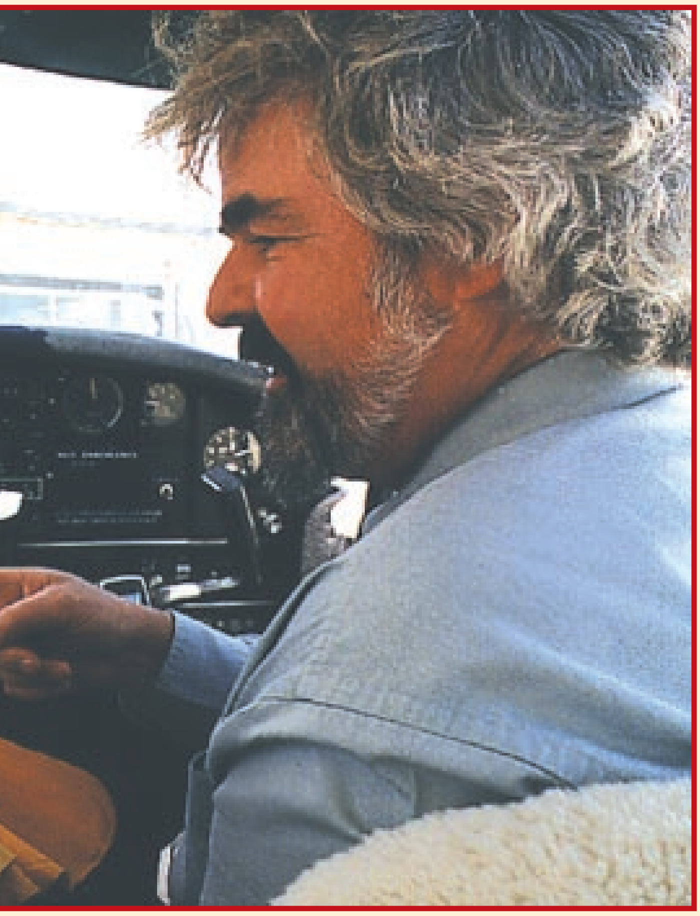
- "Okay folks, I would now like to run through a safety briefing and explain the procedures that you will need to follow in the unlikely event that we develop a problem ...". This type of approach would probably be adequate for passengers who have had some kind of flying experience.
- Here is a possible approach for the more apprehensive or inexperienced traveller. "Before we get under way I would like to take a few moments to explain some important safety items to you. Please remember that light aircraft are an extremely safe way to travel. My briefing will cover most of the safety aspects, and it is designed to add to the overall flight safety margin – in much the same way that a cabin attendant's briefing does for a larger commercial aircraft". You might also like to add that the aviation industry is traditionally very thorough when it comes to safety procedures, which is not necessarily a reflection of the risks involved in flying, and indeed is why aviation has such a good safety record.

Passenger Briefing Content

If you have them, reference to passenger briefing cards is essential. It should be combined with the briefing items mentioned in the following list, which is for passengers of light aircraft on both private operations or air transport:

- **Seat Belts:** An explanation on how to use seat belts or harnesses correctly. This is something that should not be overlooked, especially if young children are involved. Make sure you include how to undo the belt. Passengers also need to be aware that belts must be tight during takeoff, landing,

Briefings



turbulence, and below 1000 feet agl – and they should be especially tight during an emergency landing. Advise your passengers that it is wise to keep the belt fastened at all times.

- **Exits:** The position of all exits and how to unlatch the doors in the event of an emergency. It is also a good idea to mention that the axe may be used to smash a window in order to escape. Aircraft can suffer damage around their doors on impact, making the doors difficult to open.
- **Emergency Equipment:** The location of the first-aid kit, axe, fire extinguisher and ELT. You should include how and when to use these safety items. Informing your passengers of the need to remain with the aircraft, especially in remote areas, is something that Search and Rescue will appreciate. Remember that in an accident you, as the pilot, may be unable to offer assistance.
- **Procedures:** Any other procedures relevant to an emergency landing. Demonstrate the passenger brace position.
- **Do Not Touch:** Bearing in mind the incident at the beginning of our article, the front-seat passenger should be briefed about not touching the flight controls or any other critical items.
- **Lifejackets:** If flying a single-engine aircraft over water, more than gliding distance from land, you will need a lifejacket as required by Part 91.525. Your briefing will therefore need to include the location and use of lifejackets. Points to emphasise are: where they are located, when to put them on during the course of the flight, how to fit them correctly, extra features that they incorporate (such as lights, and when they should be inflated (ie, after exiting the aircraft).
- **Clothing:** During early planning of the trip, you may need to discuss the need to have sufficiently warm clothing and sturdy footwear, depending on the route of your flight and the prevailing weather conditions. This requires thought, even in the summer months, especially when heading into 'the hills' – conditions can change quickly. Always consider the conditions that you are likely to encounter throughout the entire flight.
- **Survival Equipment:** If you feel that your flight will take you into particularly rugged terrain, then a briefing on the location of any special survival equipment may be worthwhile. How to use flares and HF radio may well be life-saving.
- **Airsickness:** It is often wise to address the issue of motion sickness while still on the ground – especially if flying conditions are expected to be rough or where constant manoeuvring of the aircraft is anticipated. Pointing out the location of sick bags can avoid the distraction of coping with an 'in-flight emergency' that ends with messy consequences. Food and fluid intake, particularly the need to avoid large amounts of alcohol beforehand, should be monitored. A person's pre-disposition to motion sickness is an important factor that needs to be considered.
- **Remaining Calm:** Mention to your passengers that if anything does go wrong during the flight, they should remain as calm as possible so that you can get on with the job of managing the emergency. Pilot distraction caused by hysterical passengers can be fatal.

Take the Time

Finally, make sure that you allow yourself enough time to incorporate a passenger briefing into the flight planning process. It should be a standard part of ground preparation. Briefings part way through a mid-air emergency, where it is often too late, are not much use. There may be time to issue further instructions, but these should be as a reminder and to give reassurance. Flight preparation should, therefore, always allow sufficient time for filing your flight plan, pre-flight inspection, **and a passenger briefing**.

Informing your passengers of the dangers that they are likely to be exposed to around an aircraft is always good practice. Children – and some adults – can become excited about the prospects of going flying, and they may wander off to investigate things of interest. It is your responsibility to monitor their activities. Of course, you will need to make adjustments to your advice depending on your passengers' familiarity with light aircraft.

Remember, it is **your** responsibility as the pilot in command to ensure that **your** passengers know about safety in and around aircraft. This will always be far more satisfactory than the thought of **your** passengers trapped inside the burning wreck of an aircraft unable to locate the fire extinguisher and axe because **you** did not brief them fully. Construct and conduct a briefing that fits your type of operation and its passengers. It won't happen if you do not plan for it. ■

Remember that, with regard to passenger briefings:

Being prepared is the antidote to **being scared!**

Aerodrome Joining Procedures

The standard overhead join is a fundamental procedure, used particularly when joining an unattended aerodrome. Carried out correctly, it ensures the safe and orderly sequencing of traffic around an aerodrome. With the increasing frequency of IFR operations and recreational traffic at unattended aerodromes, pilots must be fully conversant with all joining procedures. This article should assist your understanding.

The 'overhead join' is an important phase of flight, which contributes to improving the level of aviation safety. The purpose of a standard overhead join is to allow a vertical separation of at least 500 feet from circuit traffic while the pilot establishes the runway in use relevant to other circuit traffic and the prevailing conditions. Part 91.223 of the Rules states that when operating in the vicinity of an aerodrome the pilot in command shall, "observe other aerodrome traffic for the purposes of avoiding collision and … conform with or avoid the aerodrome traffic circuit formed by other aircraft." The standard overhead join is considered to be one of the best methods of complying with this rule when there is some doubt as to traffic sequencing or as to the conditions at an unattended aerodrome.

The New Zealand Independent Confidential Aviation Reporting System (ICARUS) published a number of reports in *ICARUS Report* Vol 1, Nos 2 and 3 on incidents involving incorrect joining procedures at unattended aerodromes. This prompted some useful discussion within the general aviation industry, highlighting the differences in opinion that some pilots have about joining unattended aerodromes.

We felt that it was time to revisit this topic in order to improve the current level of understanding. This is especially important as unattended aerodromes become more congested with a wider variety of traffic types. The presence of general aviation aircraft, gliders, microlights, helicopters, parachutes and even model aircraft in ever increasing numbers has highlighted the need to improve the level of awareness for all the parties involved. This article (and the poster on the inside back cover of this issue) looks at the overhead join in detail and expands on safety issues associated with circuit joining. We hope that it will assist in the standardisation of overhead joining procedures.

The Overhead Join

Ground Preparation

One of the keys to carrying out a successful and competent overhead join is to be well organised and to anticipate each step of the process. If you are planning to join an unfamiliar aerodrome circuit, then your preparation should begin on the ground as part of the flight planning process. This should include studying the appropriate up-to-date charts and VFG thoroughly. Make sure that you note any prominent reference points, spot heights and terrain that will be in the vicinity of the aerodrome. You will then begin to form a mental picture of how you will locate and approach the airfield – this might make all the difference in less than perfect weather conditions. You will also need to think about the aerodrome elevation, circuit direction, radio frequencies, runway length, displaced thresholds, surface conditions, windsock locations, and obstacles on approach.

Reading the aerodrome notes will provide local knowledge and highlight any legal requirements or special procedures. A decision can then be made as to whether joining that aerodrome is realistic for your individual ability, aircraft type, load on board and the conditions that you are likely to encounter. Consulting the VFG for this type of detailed information as you approach the aerodrome does not allow you the luxury of maintaining a good standard of lookout and level of concentration. Try to avoid this where possible.

Approaching the Aerodrome

Good cockpit management skills are necessary when approaching an aerodrome to join overhead. Making your overhead join safer can be achieved by taking note of the following advice.

Accurate map reading will enable you to locate a track so that your present distance from, and required heading to the joining aerodrome (taking into account the prevailing wind) can then be gauged. This will assist in bringing you within visual distance of the aerodrome, especially in reduced visibility.

Get the VFG out, open it to the landing plate required and orientate it with respect to your heading. Review the runway layout and note the position of the windsocks.

Descend, or climb, to joining height (caution airspace requirements) and aim to position so that you will arrive with the entire aerodrome suitably positioned on the left of the aircraft. Accurate navigation by regularly consulting the map is essential to keep ahead of the aircraft. Map to ground and then back to map, in conjunction with your directional indicator, helps to establish headings to fly.

Make the appropriate joining call within five to ten miles of the aerodrome. This call should be made as early as possible (as close as practicable to ten miles is preferable) as it will alert other aircraft to your position and intentions. Keep this radio call short to avoid unnecessary clutter – some unattended aerodromes can be busy. An example of appropriate radio work would be – "Rangiora Traffic, Piper Tomahawk Quebec Oscar Juliet, nine miles south, 1700 feet, joining overhead". (It is not essential to specify altitude unless joining at a non-standard height, but it does provide confirmation for other traffic and follows the standard "position, height and intentions".) It is important to make sure that you have your radio volume turned up and squelch adjusted correctly so that a satisfactory listening watch can be maintained.

Carry out your circuit joining checks (there are different versions of these). **FIREH** checks are given as an example below:

F – Fuel. Make certain that it is on the fullest tank and the fuel pressure is within limits (don't forget to use the fuel pump if changing tanks).

I – Instruments checked. Directional indicator set by magnetic compass and QNH set from the last known accurate source.

R – Radio. This is a prompt to ensure that you have made the necessary calls to indicate that you are joining the aerodrome. In the case of joining a controlled aerodrome, it confirms that you have made a call requesting clearance into the control zone. It will also remind you to listen to any ATIS (Automatic Terminal Information Service) or AWIB (Aerodrome Weather Information Broadcast) that might be available.

E – Engine. Check temperatures and pressures, mixture fully rich, primer locked, apply carburettor heat (20 to 30 seconds should remove any carburettor icing) and turn on any lights, especially if visibility is poor.

H – Harness and hatches secure.

Maintaining a good ***lookout*** around the aircraft and a continuous ***listening watch*** on the radio are both important aspects of conducting a safe overhead join. Formulate a picture of where other aircraft are and what their intentions might be. It is advisable to make another radio call within several miles of the circuit if it is busy – to let other aircraft know what you are doing (if you feel it is appropriate).

Training operations can often involve simulated forced landings, engine failures after takeoff, and crosswind landings, all of which can be happening within the same circuit. Expect that there could be a number of other different recreational activities such as gliding, parachuting and microlight operations (some of which may be NORDO) occurring at any given aerodrome.

Try to determine the prevailing wind direction by drift, smoke, dust, known circuit traffic and local wind reports. This way you can anticipate the likely into-wind runway and mentally review the appropriate letdown and circuit direction. (Do not develop a mind-set, however – the correct runway may not be able to be positively confirmed until the windsocks are seen.)

These procedures will prepare you well for the next phase of the overhead join.

Arriving Overhead

Normally, keep the aerodrome a suitable distance on your lefthand side. The faster your aircraft the more space you will need. Position yourself to provide good visual contact with the windsock and to observe the orientation of the runways. Overhead joining height (or greater) **must** be maintained at all times until the letdown begins. You can take plenty of time to identify which runway the wind favours, as you will not be conflicting with other traffic established in the circuit at this stage – several laps of the aerodrome may be required. Be aware that wind direction and speed can vary significantly from one end of a runway to the other – check all windsocks when

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deciding on the most into-wind runway.

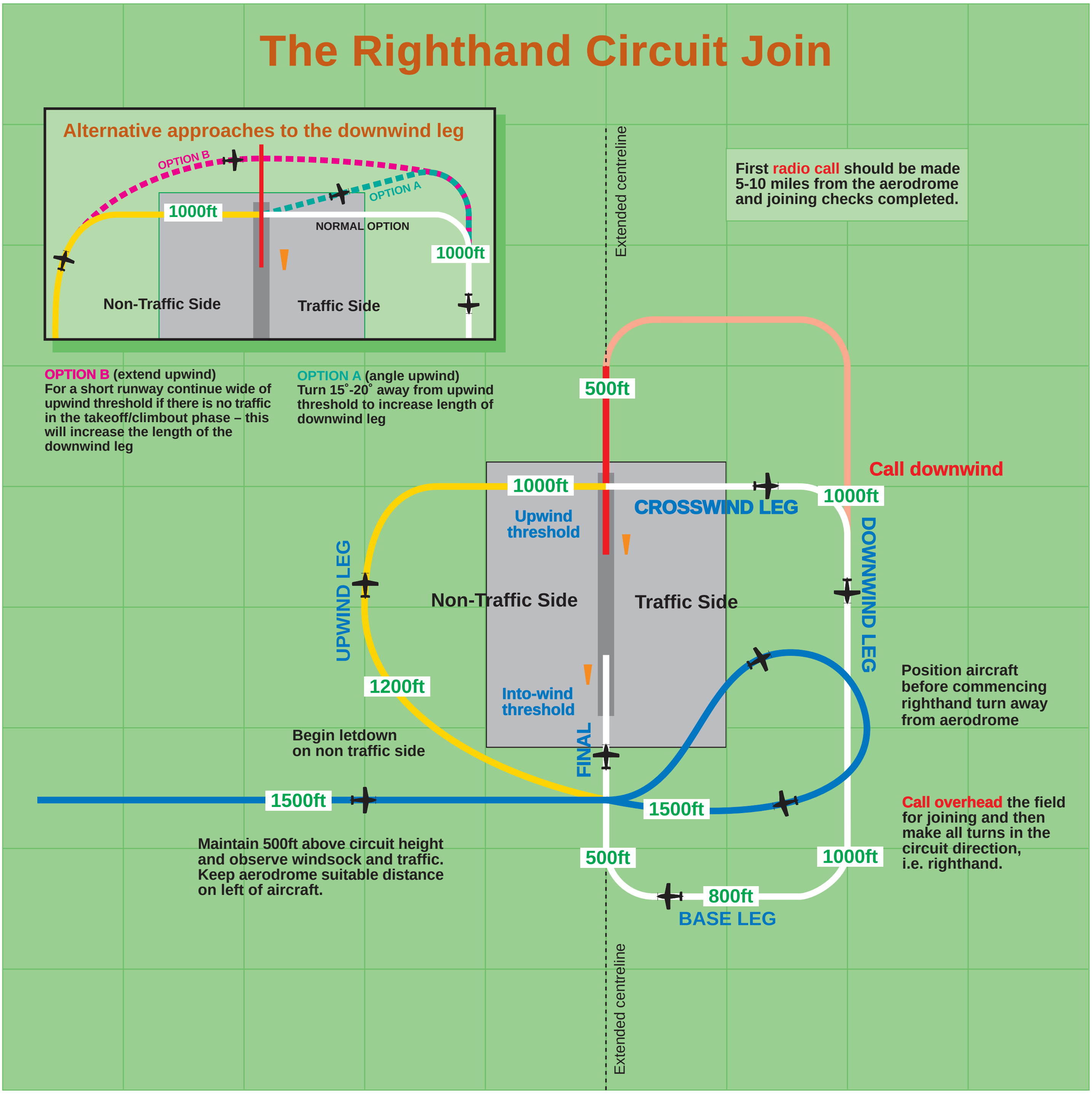
Confirm that the runway you intend to use is identified correctly on the VFG plate and note the circuit direction. Make sure it is within the group rating of your aircraft, is free of stock, fences, parked traffic, and has a suitable surface. Assess obstacles on the approach and overshoot, such as wires and trees, and consider the possibilities of turbulence or sink on finals.

The overhead radio call should be made when you have positively identified a suitable runway and have positioned the aircraft such that the circuit direction can be adhered to. (An advisory call could be made if there is significant traffic and you intend to orbit for a time). Make your letdown call brief. "Rangiora Traffic, Quebec Oscar Juliet, overhead, joining for runway 07". There is no need to include unnecessary detail about letting down on the non-traffic side as other pilots will know that to be your intention as part of the standard procedure.

An area of concern often expressed by pilots is that of which way to orbit overhead until the runway is identified – subsequent turns should be in the circuit direction. If all circuits are lefthand, there is no problem – all turns will be lefthand. If the aerodrome has both left and righthand circuits, it is conceivable (but not likely) that there could be joining aircraft circling both left and right overhead.

As pointed out earlier, it is usually possible to anticipate the likely runway in use, either from radio calls, from other traffic or from knowledge of the wind direction (derived from drift, smoke, dust, etc).

If the anticipated runway is righthand, a pilot may position the aircraft overhead in such a way as to facilitate an efficient letdown, using righthand turns. At the same time, another pilot may have no idea of the possible wind direction (through poor planning, inexperience or fickle wind conditions) and will join overhead, orbiting lefthand until he or she can sort things out. The likelihood



of conflict will be reduced if all pilots give clear RTF reports of their intentions. Other aircraft planning to join will also become aware of, and conform with, the aerodrome traffic circuit adopted by earlier arrivals. In addition, an orbiting aircraft should be reasonably easy to spot (because it is banking and turning). See the diagram for details on joining righthand.

If you are concerned about conflict with other aircraft, you may prefer to initially join higher than 1500 feet agl.

Descending to Circuit Height

Observe the position of other aircraft taking off, landing or flying in the circuit, and plan your letdown to ensure adequate spacing when joining the downwind leg. Aircraft that are already established in the circuit have the right of way. Aircraft training in a crosswind circuit are required to give way to into-wind circuit traffic.

If you feel that the position of other aircraft in the circuit will prevent adequate spacing being achieved, continue circling at joining height until you are satisfied that you can sequence comfortably.

Descend on the non-traffic side (be sure that you have positively identified the non-traffic side), planning to cross within the upwind threshold at circuit height.

It is important to be down to circuit height before crossing the centre-line to the traffic side. This means that it will be easier for you to see aircraft in the downwind leg against the horizon and also eliminate the possibility of descending on top of other circuit traffic.

It is equally important **not** to descend lower than circuit height, to ensure sufficient separation between yourself and any aircraft taking off. You may decide to cross an appropriate distance **inside** the upwind threshold if a high-performance aircraft is about to roll, provided that this would leave sufficient time in the downwind leg. (Good practice dictates that pilots of aircraft with a high rate of climb should ensure they are aware of any potential conflict during their takeoff).

In strong wind conditions, or where the runway in use is short, a useful tip is to fly slightly away from the runway, at an angle of approximately 10 to 20 degrees. This will increase the time you have available in the downwind leg. See option A – angle upwind, in the righthand joining diagram. Option B – extending upwind, can be followed if no aircraft are in the takeoff or climbout phase. This will also allow you more time in the downwind leg. Avoid cramping yourself by cutting inside the true circuit.

Make the crosswind leg sufficiently long enough so that your turn downwind puts you the correct distance out from the runway. This can be adjusted to allow adequate spacing with any aircraft already in the circuit.

Make your downwind call and proceed with the remainder of the circuit as normal.

Note: High rates of descent, high angles of bank, and high airspeeds should be avoided throughout the standard joining procedure.

Bad Weather

What if the cloud base does **not allow sufficient height** for an overhead join?

Transmit your intentions early and update frequently. If the low cloud base is accompanied by relatively strong winds, then the into-wind runway should be able to be established before you reach the aerodrome, through drift and other wind clues. If other (radio-equipped) aircraft are present, you should be able to establish the runway in use through radio calls and will then be able to sequence yourself safely into the circuit.

Use all the means at your disposal to try to establish wind direction (and active runway) before you enter the circuit area. Position yourself on what you expect to be the non-traffic side, keeping a good lookout for other traffic. You should be able to see the windsock from this position to confirm the runway in use. Continue with normal procedure from that point. Maintain normal circuit height if cloud base permits but remain clear of cloud (and sufficiently below to have a clear view ahead).

Other Joining Procedures

At an unattended aerodrome, or where an aerodrome flight information service is being provided, a pilot may elect to join directly downwind, on a base leg, or on a straight-in approach to the runway in use – under certain conditions. These are that:

- the runway in use and aerodrome traffic are properly ascertained; and
- if radio equipped, (essential for mandatory broadcast zones) joining intentions must be advised to the aerodrome Flight Service (if present) or to 'aerodrome traffic'. "Rangiora Traffic Quebec Oscar Juliet, three miles south, 1200 feet, joining downwind for runway 25" is an example of the appropriate kind of radio call that should be made; and
- the aircraft must be sequenced in such a way as to **give priority to other aircraft already established in the circuit.** If this is not possible, you must join in accordance with the standard procedure; and
- when entering or flying within the circuit, all turns must be made in the direction appropriate to the runway in use.

If you are **not** radio equipped it can be difficult to properly ascertain the runway in use and traffic flow – you should then join overhead. If you **are** radio equipped, but are in some doubt as to which runway to actually join for, or about the presence of other traffic (possibility of NORDO traffic, for instance) then it is safer to carry out a standard overhead join.

There are several traps associated with joining straight-in. For instance, using a wind that has been obtained some distance away from the aerodrome only to find that you are approaching on final with a 10-knot tailwind. Joining straight-in does not allow you to: view all the windsocks; inspect the surface condition of the runway you are about to land on; note any ground movements or hazards (such as microlights, livestock, birds); or assess any other unexpected situations. Any of these could result in a go-around. **Expect the unexpected**.

It takes very little extra time to join overhead, especially if you have planned for the most likely scenario. Carrying it out is then simply confirmation of the conditions that you expected and provides an opportunity to see other traffic.

IFR Traffic at Uncontrolled Aearodromes

With the increasing frequency of high performance IFR commuter flights into both Flight Service and unattended aerodromes, both IFR and VFR pilots must be especially vigilant, and they must be fully conversant with the procedures for unattended aerodromes. Note that the term Instrument Approach Restricted

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Area (IARA) no longer applies as from 29 January 1998.

Approach Conditional Areas

Approach Conditional Areas (ACAs) are established at some uncontrolled aerodromes to provide increased protection to IFR flights carrying out instrument approach procedures. They replace the former IARAs. Conditional Areas are depicted on your charts and will specify an upper and lower limit which IFR aircraft are likely to be approaching in.

ACAs enclose the final instrument approach area and extend from the beginning of the final approach track to not less than one nautical mile from the runway threshold. ACAs have an upper limit of 3000 feet amsl, and a lower limit (which depends on the minimum altitude for the instrument procedure) usually just 100 feet or so above the ground.

VFR traffic operating in ACAs must either:

- remain 1000 feet vertically and one nautical mile horizontally clear of all cloud, and maintain a flight visibility of not less than 5000 metres when an IFR aircraft has entered the ACA; or
- if it can be established that no IFR aircraft are using the ACA for an instrument approach (by contacting ATS or maintaining a continuous listening watch) then abide by normal class G rules, ie, operate to the appropriate VMC minima for uncontrolled airspace (clear of cloud, in sight of ground, and 5000 metres visibility – see RAC5 for details).

If a VFR pilot is aware of an aircraft carrying out an instrument approach, it is good aviation practice to remain clear of the ACA until the IFR aircraft has completed its approach even if the flight minimums can be complied with.

Aerodromes Without ACAs

Not all aerodromes with instrument approach procedures have ACAs, and IFR traffic (particularly training or private aircraft) may be making instrument approaches at these airfields. Some aerodromes no longer have the old IARAs (now ACAs) because the number of instrument approaches occurring has not warranted their retention. The *Planning Manual* has a table of ACAs and their limits (see RAC5).

If the airfield has a navigation aid (which may be marked on the aeronautical chart), maintain a good listening watch, communicate with other aircraft if necessary, and maintain an ever vigilant lookout. IFR final approach path depictions are currently being trialed on the Taupo VTC and are represented by a wedge-shaped light blue arrow extending up to 10 miles from the approach Nav-Aid. If proven to be successful, such depictions will be shown on other charts, to highlight for VFR pilots the likely direction that IFR traffic will approach from.

The IFR pilot **should** be making radio calls at certain points in the approach procedure and will usually elaborate on their mandatory calls in order to give other traffic an idea of their position and altitude. For example, "Ashburton Traffic Quebec Oscar Juliet, Final approach NDB – approaching from the south descending to 600 feet." When operating in or encountering VMC, both IFR and VFR pilots have an equal responsibility for collision avoidance.

Other Special Areas

Mandatory Broadcast Zone

A Mandatory Broadcast Zone (MBZ) is a zone that can exist around an unattended aerodrome that has moderate to high traffic density. They are depicted on your charts by a light blue diamond chain line and specify an upper and lower limit that can extend for some distance around the aerodrome – typically from five to ten miles. Refer to the RAC section of your *Planning Manual* for tables on MBZ locations.

Note: MBZs have been set up around some unattended aerodromes that are situated along frequently used flight paths. This helps to prevent enroute aircraft flying unannounced through the aerodrome circuit or surrounding area. Kaikoura and Paraparaumu are examples of two such locations. It should also be noted that, as traffic patterns change, MBZs may in the future include aerodromes with flight service facilities.

Pilots can enter an MBZ **provided that they broadcast** their position, altitude and intentions on a specified frequency at entry, every ten minutes while operating within the MBZ, and again when exiting. Landing lights and anticollision lights must be turned on where possible.

Pilots joining an unattended aerodrome, which is located within an MBZ, must therefore make their intentions known by radio before reaching the zone's boundary.

Non-radio (NORDO) aircraft must not enter an MBZ unless another party, such as an ATS unit or another aircraft, can broadcast that aircraft's position and intentions.

Pilots of transiting aircraft are generally encouraged to divert around or over the top of an MBZ where possible. Thick blue arrows on your VTC indicate such alternative routes around these zones.

There will often be a diverse variety of traffic types associated with some MBZs, which could mean that conducting an overhead join will conflict with glider, microlight or parachute activity. Joining downwind or straight-in may be a better alternative to help reduce this conflict. Such a decision must be based on the intensity of the traffic, known circuit traffic, and the availability of an accurate ATIS or AWIB. Common sense must therefore apply in this type of situation.

UNICOM

When joining an unattended aerodrome, which has a UNICOM facility, listen to the ATIS or AWIB (if available) at 10 miles from the aerodrome, and then make your decision on how to join based on this information. Broadcast your intentions as soon as practicable. Report again entering the MBZ (if present) and then continue with the normal joining procedure. If you are confident that traffic warrants it, you may elect to join the circuit directly – if not, join overhead and sequence with other traffic.

ATZ

Aerodrome Traffic Zones (ATZs) may be prescribed at uncontrolled aerodromes to protect aerodrome circuit traffic. Aircraft must not enter an ATZ unless intending to land at or take off from that aerodrome. Radio equipped aircraft wishing to land at the aerodrome contained within the ATZ **must broadcast** their position and intentions before reaching the ATZ boundary and then proceed with the normal joining pattern.

Some ATZs may be close to, or incorporated into, a control zone – which means that the standard 1500 feet agl overhead join may not apply because of the airspace above.

Microlights, Gliders and the Circuit

Microlights and general aviation aircraft can have quite different requirements when joining and using an unattended aerodrome circuit. Differences in speed, climb, and approach profiles mean that it is sometimes not practical to mix some microlight type aircraft with their heavier counterparts, such as Piper Tomahawks, etc. Maintaining a smooth circuit flow can be difficult because of these differences.

The microlight circuit height and pattern is usually no less than 500 feet agl and within gliding distance of the runway in use. It is thus considerably tighter than a conventional circuit. Such a circuit will match the performance characteristics of most microlights and provide a 500 foot separation between the two different traffic types.

There are, however, several points that light aircraft pilots need to consider so that adequate separation is always preserved.

Light Aircraft Pilots

A vigilant lookout is an extremely important factor when joining an aerodrome that is known for its microlight, glider and parachute activities. Remember that many microlights do not have radios (perhaps up to 50 percent), so maintaining a listening watch when joining is not always a satisfactory means of establishing the circuit traffic. One can generally expect to find microlights at low level and in close proximity to the aerodrome. Pilots of heavier aircraft can thus modify their lookout accordingly.

Microlights will be more visible in plan form while you are directly overhead the aerodrome at joining height. The overhead join also gives you the chance to observe any microlight ground movements which could indicate the presence of microlights in the circuit – it can be useful for pilots to share this type of information over the radio. Advice on location and type of aircraft in the circuit, especially if the traffic in question is NORDO, will make everyone more aware of what is happening.

Where aircraft callsign and type are unknown, the inclusion of aircraft colour in the radio call can be a good method of identifying individual traffic movements. Remember that microlights will also be joining overhead at 1500 feet agl and will have a relatively steep descent profile on the non-traffic side. This may appear somewhat unusual, but it is standard procedure.

Pilots **must check** for microlight traffic **before** turning base leg and **again** when turning onto final. Such a scan should emphasise the inside of the circuit pattern, where you are likely to find microlights (but don't forget your normal scan outside the circuit before each turn). This will help ensure that you do not overtake any traffic that is established on final. Blind spots can exist for pilots (especially low-wing aircraft) approaching the late downwind position. Such a visual check will minimise the chances of a collision and the possibility of a go-around.

Our instructors often emphasised, particularly at busy aerodromes, the need to look in the direction of long final while on base and prior to turning final. This was a last minute check, outside of the circuit, to ensure that you were not about to be run down by a larger aircraft. So, putting yourself in the shoes of a microlight pilot, who is established in a close proximity 500 foot circuit, we need to place equivalent emphasis on scanning this 'blind spot' for the smaller and more vulnerable microlight. This is much the same sort of vulnerability that we experience when mixing with heavy traffic at a busy aerodrome.

If a conflict is going to occur, it is likely to take place on the base leg or final approach.

Light aircraft will often have a much greater speed envelope than a microlight. Light aircraft pilots, therefore, have the ability to increase or decrease their speed within safe limits in order to sequence with microlight traffic. Microlights are less able to achieve this result. It is therefore suggested you use this capacity, where possible, as it will probably have little effect on the duration and shape of your overhead join and circuit.

Microlight Pilots

The following points are factors that microlight pilots should consider when operating at the same aerodrome as light aircraft.

Microlight pilots should place an emphasis on scanning above and outside their circuit pattern as part of their lookout. The position and speed of traffic in the circuit above can be used to adjust your circuit in order to sequence as required.

Prior to turning base leg, check outside your circuit to see if another aircraft is on a base leg or final approach (this could be some distance away for faster aircraft) – adjust your circuit as appropriate. This could include extending downwind so that you can sequence behind the other aircraft if you feel that it has right of way over you. Remember that most light aircraft can not fly as slow as you can and could be forced to go around.

Adhere to the standard overhead join, 500 feet agl circuit height and rectangular pattern where possible. This way light aircraft will know where to look for you and will plan their approach with you in mind.

Gliders

Gliders will not usually use a standard overhead rejoin for obvious reasons. They will commonly enter the downwind leg at approximately 800 feet agl in a close

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circuit pattern, turning base at around 500 feet agl and final at roughly 300 feet agl. Since gliders have less control over their circuit profile than powered aircraft, they have the right of way. This means that all powered traffic must try to sequence in such a way that accommodates gliders' needs – especially if both types are joining for the same runway.

Right of Way Rules

- Powered aircraft are required to give way to gliders, parachutes and balloons.
- Give way to aircraft below you that are approaching to land – light aircraft pilots should never attempt to use their speed advantage to overtake when established on base or finals. Such a move, if safe and practicable, should take place during the downwind leg.
- Aircraft being overtaken always have the right of way. The aircraft overtaking shall alter its course to the right, if necessary, until it has completed the overtaking manoeuvre.
- Where simultaneous landings are possible, the aircraft landing shall land as far as practicable to the left of the runway so as to leave sufficient room for aircraft to land on its right.

Conclusion

The 'overhead join' will continue to be an important ingredient of general aviation safety as traffic densities at unattended aerodromes around New Zealand increase. The wide variety of traffic types using these facilities are sometimes not easily compatible. It is, therefore, important that pilots of all aircraft types are aware of, and follow the procedures that have been discussed in this article.

Local resources often dictate that there will only be one aerodrome that all users have access to. For many years, at many New Zealand aerodromes, pilots have been used to some sort of circuit traffic information, either from ATC or AFIS. For economic reasons, a number of aerodromes with low traffic density have had these facilities had their AFIS withdrawn. This has left many pilots, who have been accustomed to receiving this type of information, to fend for themselves.

If all parties are to continue to share such a resource, it is in everyone's interest to ensure that accidents do not occur because of lax circuit and circuit joining procedures. Circuit related accidents (especially between different user groups) could jeopardise the future of combined operational activities.

Conducting a standard overhead join will generally be the safest alternative in most situations. As pilot in command, it is your decision, based on good aviation practice, as to when to use the standard overhead join. ■

Dinghy Fever

Members of the aero club were practising liferaft dropping for a competition. The aircraft being used was a Cessna 172 with the lefthand door off. The aircraft was making a pass over the target zone at 200 feet agl. When the pilot judged that the raft would fall on or near the target, a command was given to the back-seat assistant to release the raft package by pushing it out the door opening.

The liferaft package was ejected, but the strapping on the package, which was a little loose, caught around the step on the lefthand undercarriage leg of the Cessna.

There would obviously be some drag, but of greater immediate concern at low level could be the resulting pilot distraction and the prospect that events could go horribly wrong – and quickly at that.

As it happened, the aircraft was kept under control, and the liferaft package was hauled back inside by the back-seat assistant. The assistant had to loosen their seatbelt and lean out the door in order to recover the liferaft – clearly there was also a risk here.

The 'rafts' used for these events are packages similar in size, shape and construction to the real 'McCoy'. The recommended construction is a sack, tightly stuffed with old carpet and securely stitched to give a firm compact unit, approximately 60 cm by 30 cm with a weight of 20 kg. Other constructions are permitted provided the overall specifications comply.

If one tore open in such an event, would its contents disrupt, damage or jam controls? If it had dropped intact at a point other than the drop zone, it would certainly have come down with a wallop – on something!

Lessons

- Murphy is alive and well and waiting to strike.
- Had the liferaft for some reason deployed or torn out of the bag …
- Had the liferaft fallen or been released after the aircraft passed over the drop zone … Ouch! (and maybe litigation – check your insurance).
- Check **all** the risks or 'what ifs'. What could the liferaft package foul on? Obviously the step. What about the strapping or handle looping around the wheel spat, or the strut step?

Possible Solutions

- Tape up handles and check on potential fouling points on the aircraft.
- Thoroughly brief the assistant on procedures (including emergencies).
- Practice the scenarios on the ground, including 'what ifs'.
- Write down a check procedure in the club manual for the conduct of these and other events, so that the lessons are not forgotten. ■

Note: The RNZAC is currently reviewing the rules and procedures for this competition.

Publications

0800 800 359 — Publishing Solutions, *for CA Rules and ACs, Part 39 Airworthiness Directives, CAA (saleable) Forms, and CAA Logbooks. Limited stocks of still-current AIC-AIRs, and AIC-GENs are also available. Also, paid subscriptions to Vector and Civil Aircraft Register.*

0800 500 045 — Aviation Publishing, *for AIP documents, including Planning Manual, IFG, VFG, SPFG, VTCs, and other maps and charts.*

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