Australian Government

Civil Aviation Safety Authority

VFRG

VISUAL FLIGHT RULES GUIDE

CASA VFRG | Version 8.2

Disclaimer: The guide has been prepared by CASA for information purposes only, and while every effort has been made to ensure that the contents accurately conform to the civil aviation legislation, this guide is not the law. CASA accepts no liability for damages or liability of any kind resulting from its use. You should ensure you are using the most current version of the VFRG, which can be found on the CASA website **casa.gov.au**

CASA is responsible for the safety regulation of civil air operations in Australian territory, and for the regulation of Australian-registered aircraft outside Australian territory.

For further information, visit CASA's website.

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About this guide

The Visual Flight Rules Guide (VFRG) has been designed to assist pilots prepare, plan and fly safely under the visual flight rules anywhere in Australia. It explains relevant regulations in plain English along with other useful guidance and practical information to assist the VFR pilot.

By following this guide, it is expected you will comply with the general operating and flight rules. The guide provides references to the corresponding legislation so you can easily refer to the full text of the CASR and the MOS if you wish. The current legislation can be found on the Federal Register of Legislation website.

We are committed to providing you with accurate, consistent, and clear information to help you understand your legal obligations. The information contained in this guide was correct at the time of publication but is subject to change without notice. You should ensure you are using the most current version of the guide, which can be found on the CASA website. Please visit the CASA website regularly for updates.

George Rudy | stock.adobe.com

What is included in this guide?

The VFRG has been designed to provide the relevant information and guidance for pilots who undertake VFR flights.

This guide contains general operating and flight rules and relevant regulations under Part 91 of the Civil Aviation Safety Regulations 1998 (CASR), as well as associated MOS provisions. The guide also includes requirements under the following CASR Parts:

- Part 61 – Flight crew licensing
- Part 67 – Medical
- Part 99 – Drug and alcohol management plans and testing
- Part 103 – Sport and recreation aircraft
- Part 131 – Balloons and hot air airships
- Part 137 – Aerial application operations, other than rotorcraft
- Part 138 – Aerial work operations
- Part 141 – Recreational, private and commercial pilot flight training other than integrated
- Part 142 – Integrated and multi-crew pilot training and contracted recurrent training and checking
- Parts 133, 135, and 121Z – air transport regulations for rotorcraft and smaller aircraft.

Material relating to commercial or military operations has been omitted unless it would assist the VFR pilot understand a particular topic.

With the implementation of the CASR, a small number of Civil Aviation Regulations 1988 (CAR) or Civil Aviation Orders (CAO) have not been carried forward either in total or in part into the new rules. Some have been combined into the new regulations. This is because they may have been out of date or simply corrected. As a result of the continuous improvement to regulations, you may find what you understood to be valid in the past, may no longer apply.

A section is included for helicopter pilots that explains certain differences between aeroplanes and rotary wing aircraft operations. The regulations always use the defined term rotary wing; however, for the VFRG we have retained the term helicopter as is appropriate for the audience using the VFRG.

A night visual flight rules (NVFR) section is also included for appropriately rated pilots.

In this guide, certain words have been defined to avoid repetition and the following terminology table has been created to improve readability:

Term	Meaning
MOS	refers to the Part 91 MOS unless otherwise specified
must	indicates an obligation or necessity (i.e. a mandatory requirement)
Part	unless otherwise specified refers to a part of the CASR
person	refers to a third person who is not a pilot or crew member (i.e. a passenger, or support person)
a pilot	refers to any flight crew member (not necessarily the pilot in command)
the pilot	refers only to the pilot in command
the regulation/ regulations	in general, this refers to Australian civil aviation legislation
you	refers only to the pilot in command unless it is used in another context

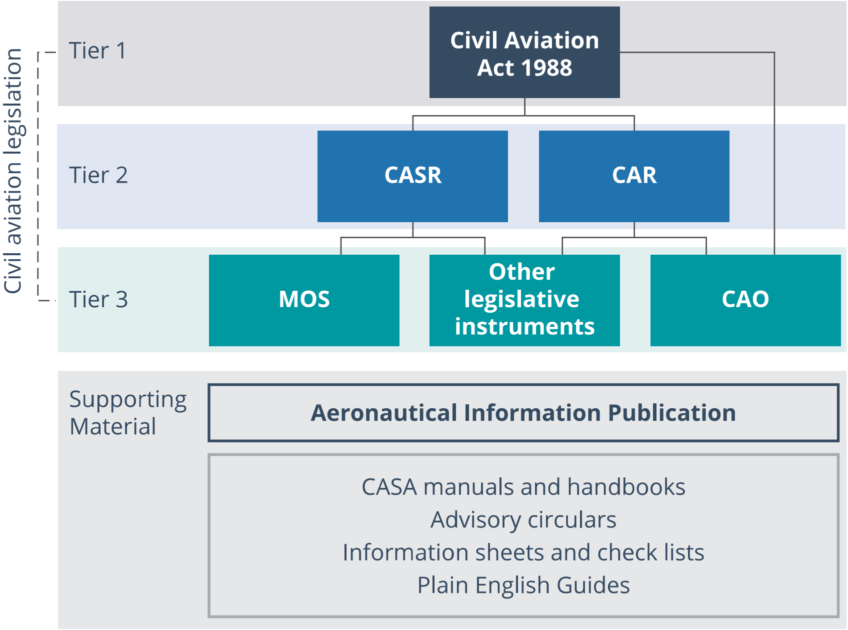
CHAPTER 1

KNOW YOUR RULES AND RESPONSIBILITIES

The structure of the aviation legislation

The structure of the Australian aviation legislation and advisory material is shown below.

Figure: Civil aviation legislation and supporting material



Australian civil aviation legislation is divided into primary and secondary (or delegated) legislation with three-tiers. Secondary or delegated legislation is enabled or authorised by primary legislation.

Tier 1 – Civil Aviation Act and Airspace Act

The *Civil Aviation Act 1988* establishes the Civil Aviation Safety Authority (CASA) and sets out its functions which are chiefly to conduct the safety regulation of (a) civil air operations in Australian territory; and (b) the operation of Australian aircraft outside Australian territory.

The *Airspace Act 2007* makes provision for regulations to be made that provide CASA with both the powers and functions necessary to administer and regulate Australian-administered airspace.

Tier 2 – CAR and CASR

The CAR and CASR are secondary legislation made under the Act and impose regulatory requirements.

The Civil Aviation Regulations 1988 (CAR)

With the gradual expansion of the Civil Aviation Safety Regulations 1998 most CAR will be repealed. However, the CARs will remain for the time being until transferred to the CASR or repealed.

The Civil Aviation Safety Regulations 1998 (CASR)

The CASR will ultimately incorporate most of the CAR. The numbering system for the CASR Parts generally follow the US Federal Aviation Regulations (FAR).

Tier 3 – MOS, CAO and other instruments

Secondary legislation in this third tier expands on the requirements of the CASR and CAR.

Manual of Standards (MOS)

The MOS provide the detail of any standards referred to in the CASR. They have in many cases been developed from the CAO. They also include conditions on AOC's imposed under the Act.

Civil Aviation Orders (CAO)

The CAO's set out the detail of the standards referred to in the CAR. Most will be repealed as additional standards are added to the MOS to support the CASR. Some will remain as CAO to support parts of the CAR that are not repealed or replaced by the CASR.

Other legislative instruments

Other legislative instruments such as directives, approvals or exemptions may be issued from time to time.

Aeronautical Information Publication (AIP)

The AIP is a set of publications provided by Airservices Australia as part of their Aeronautical Information Service (AIS). Information contained in publications of the AIP meet the definition of *authorised aeronautical information*.

The AIP set includes:

- The AIP book
- En Route Supplement Australia (ERSA) containing aerodrome, survival and other operational data
- Departure and approach procedures (DAP East and DAP West) primarily for IFR operations
- AIP Supplement (SUP) advising of temporary changes to the information contained in the AIP, which are published by means of special pages
- Notice to Airmen (NOTAM), a notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations
- Aeronautical Information Circular (AIC), a notice containing information that does not qualify for the publication of a NOTAM, or for inclusion in the AIP, but which relates to flight safety, air navigation, or to technical, administrative or legislative matters
- Terminal area chart (TAC)
- En route charts (High and Low) (ERC-H and ERC-L)

- Planning Chart Australia (PCA)
- World aeronautical charts (WACs), topographical charts at a 1:1,000,000 scale which do not show detail of airspace
- Visual navigation charts (VNC) navigation charts at a 1:500,000 scale with airspace detail
- Visual terminal charts (VTC) simplified topographical charts highlighting features/ structures helpful to visual navigation at a 1:250,000 scale with airspace detail
- Designated Airspace Handbook (DAH), containing the definitive description of Australian administered airspace and listing the volumes of airspace within the current airspace classifications (Classes A, C, D, E and G), protected airspace (prohibited, restricted and danger areas), and air routes, as well as other relevant material.

Supporting material

Supporting material is advisory. Where necessary it adds detail to clarify the legislation to assist in compliance. Supporting material should not introduce requirements that impose an obligation not contained in the legislation. Supporting material can be in the form of manuals, handbooks, guidance documents, information sheets, checklists and kits (such as plain English guides (PEGs). Supporting material is available from the CASA website.

CASA manuals and handbooks

CASA manuals and handbooks set out the underlying administrative policy and procedures to be followed by CASA staff for the benefit of industry participants/ applicants. Administrative policy and procedure should not introduce operational requirements beyond that contained in legislation.

An acceptable means of compliance and guidance material document (AMC/ GM) is a source of supporting information on a particular regulation. Entries in an AMC/GM are generally short and succinct. Guidance materials are developed to enhance a regulated entity's understanding with the implementation of regulations and subsequent complaince.

Advisory circulars

An advisory circular (AC) provides advice and guidance to illustrate a means, but not necessarily the only means, of complying with the regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material. Where the content explains a means of regulatory compliance, this will be clearly identified. ACs have replaced civil aviation advisory publications (CAAPs).

Information sheets and checklists

Compact, succinct information on select topics is published in the form of Information sheets, industry checklists and kits to cover aviation medicine, continuing airworthiness, drug and alcohol management plans, flight crew licensing, fuel requirements and ramp checks.

Plain English guides

Plain English guides (PEGs) are developed to convey complex legislative information in simple, easy-to-read and understandable language. They present a document structure that aligns more closely with operational needs, including digital interactive elements to enhance the overall user experience. PEGs combine regulations and associated MOS into one publication for ease of reference. The ongoing development of PEGs will give both industry and CASA enhanced visibility and a common understanding of the regulatory requirements relevant to each sector.

CASA has published the following plain English guides:

- CAO 48.1 Plain English guide for fatigue management rules
- CASR Part 101 Plain English guide for Micro and Excluded RPA operations
- CASR Part 105 Guide for parachuting from aircraft
- CASR Part 131 Guide for balloons and hot air airships
- CASR Part 61 Guide for aeroplane category flight crew licensing
- CASR Part 61 Guide for helicopter category flight crew licensing
- CASR Part 91 Plain English guide for general operating and flight rules
- Guide to vertiport design
- Visual Flight Rules Guide.

These documents, and others as they are developed, are available on the CASA website.

Fit to fly

Being fit to fly is a responsibility that rests not only with the operator (where applicable) but with the individual. Determining your fitness to fly requires sound and honest judgement. Illness, medication, illicit drugs, alcohol, stress, fatigue, lack of food and dehydration may affect your ability to fly safely.

Drugs and alcohol

Piloting an aircraft is a safety-sensitive aviation activity and you must comply with the requirements of CASR Part 99 in relation to drugs and alcohol. CASR Part 99 establishes a regime for random drug and alcohol testing conducted for, or on behalf of, CASA of all pilots in Australia.

Over-the-counter or prescribed medication/drugs may reduce your ability to function properly while flying. Search for 'testable drugs' at **casa.gov.au/aod**, or talk to an aviation medical professional.

Alcohol and flying do not mix

Alcohol affects the central nervous system, slowing down messages between the brain and the body. It affects concentration and coordination and slows your ability to respond to unexpected situations. The effect is directly proportional to the concentration of alcohol in the blood. Blood alcohol concentration (BAC) depends on the amount of alcohol consumed and the rate at which your body metabolises it. CASR 91.520 requires that a crew member must not commence their duty if they have consumed alcohol within 8 hours of the flight beginning, or if an alcohol test reveals they have exceeded the permitted level specified in CASR Part 99. However, it may take longer than eight hours for your BAC to return to the Australian permitted level of less than 0.02 grams of alcohol in 210 litres of breath. A BAC of 0.02 can be reached after the consumption of only one standard drink (a middy of beer, a nip of spirits or a small glass of wine). Alcohol is rapidly absorbed into the body, but the process of detoxification is slow; it takes about three hours for the effects of one standard drink to wear off.

Alcohol may help you go to sleep, but it will ruin your rapid eye movement. This causes distraction, slow reaction times and errors of judgement that expose you to hazards you will need to manage, thereby increasing your workload in the cockpit.

Psychoactive substances

Any illicit drug or alcohol is unacceptable. However, many common substances may also present a hazard. Coffee, tobacco and over-the-counter medications are commonly used in Australia and flying at altitude can heighten their effects. Prescription and over-the-counter drugs can impair judgment and affect coordination. Some cold tablets and cough mixtures previously sold over-the-counter are now only available by prescription. But just because a drug is available without a doctor's prescription does not mean it is safe to take in an aviation environment. All illegal drugs are unsafe for flying. The side effects of common drugs such as cold tablets, cough mixtures, antihistamines, appetite suppressors and laxatives can cause drowsiness, confusion, blurred vision and dizziness.

Always seek advice from a doctor or pharmacist before taking more than one drug at a time, as drugs can interfere with each other, or worsen any side effects. Antibiotics and antidepressants can have a pronounced effect on judgment, thinking and coordination. You should ask designated aviation medical examiner (DAME) if it is safe to fly while taking any prescription drug.

Check yourself before flying:

- Do not consume alcohol eight hours before you sign-on.
- Do not fly while under the influence of alcohol.
- Do not fly if you have taken illicit drugs.
- Do not fly while using any drug that may adversely affect safety.
- If in doubt, ask your DAME.
- Consider waiting 24 hours from the last use of alcohol before flying.

Fatigue and its effects

Fatigue is a challenge for anyone who drives, flies, or operates other vehicles or machinery. Pilots from all sectors of the aviation industry are subject to fatigue requirements. Pilots can be their own worst enemy when it comes to recognising whether they are able to continue to perform to a high standard.

Pilots must take steps to manage risks from fatigue, including possibly deciding not to operate an aircraft if they feel that they are unfit or will be unfit to do so as a result of fatigue. There are various obligations for pilots to do this under **Civil Aviation Order 48.1 2019**. CASA's Fatigue Management PEG provides comprehensive information with helpful hints explaining what is expected of pilots and operators, and what might need to be considered when complying with the fatigue management rules.

Warning signs of fatigue include:

- errors of judgment
- forgetfulness
- sleepiness or yawning
- loss of appetite
- aggressiveness or irritability
- inaccurate flying
- deviation from your usual operating standard.

The physiological and psychological effects of fatigue may result in:

- slowed reaction time
- forgotten or missed checklist items
- inaccurate flying
- missed radio calls.

If you are fatigued due to work or other issues, give yourself plenty of time to rest before flying—an early start after a late-night working should be avoided. Also, be aware of the cumulative effect of fatigue; a long period of poor sleep will not be overcome in a single night. Sometimes the excitement of a challenging flight can make it difficult to sleep the night before, especially if you are uncertain of the weather. Making as many decisions as possible the night before about the destination and weather may help you sleep better.

Fatigue, stress, high workload and struggling to stay healthy are constant issues for pilots. Depending on how they are managed, they can be simply daily challenges or an overwhelming problem which adversely affects performance. This VFR Guide provides practical information that pilots can use to stay both physically and mentally fit to fly.

Manage fatigue before flying

As a pilot you need to adopt strategies to better manage your rest and to decrease the effects of fatigue such as:

- planning your activities, meals, rest and sleep patterns during off-duty periods
- making the most of permitted rest breaks, including taking naps
- advising colleagues if you feel drowsy
- alerting colleagues if they appear to be becoming drowsy
- giving your employer feedback on the suitability of overnight accommodation
- eating appropriate meals.

Adequate sleep is the only way for us to minimise fatigue and its negative effects on our performance. An accumulated sleep debt from less-than-usual sleep over several consecutive days needs to be ‘paid back’ with several days of more-than-usual sleep.

Get a good night’s sleep

- Set your alarm clock to wake you at the same time every morning.
- Walk in the morning to reset your melatonin levels.
- Exercise during the day.
- Prepare for sleep at least 90 minutes before you go to bed.
- Avoid watching TV or using your phone and social media in the run-up to bedtime.
- Cut down alcohol consumption late at night.

Licensing

Flight crew licence and medical requirements

(CASR 61.405, 61.410)

You must not exercise any privilege of your licence unless you hold a current aviation medical certificate or, where applicable, an exemption.

There are different types of aviation medical certificates.

- **The Class 1 medical certificate** is the highest of medical standards, as set out in CASR 67.150. A Class 1 medical certificate allows you to fly most commercial operations. A Class 1 medical certificate will also allow you to conduct private and recreational flying operations (CASR 61.415).
- **The Class 2 medical certificate** is a medical standard that allows you to undertake private and recreational flying operations (CASR 61.410). Certain commercial operations, where no passengers are carried, are also allowed with a Class 2 medical certificate.
- **A Basic Class 2 medical certificate** is an alternative to a full Class 2 certificate for private day VFR operations below 10,000 ft above mean sea level (AMSL). It has the following additional operational restrictions:
  - a maximum of five passengers
  - piston engine aircraft
  - maximum take-off weight (MTOW) of less than 8,618 kg
  - no use of operational ratings (e.g. instructor rating, instrument rating)
  - no use of flight activity endorsements (e.g. aerobatics, low level).

You can get a Basic Class 2 examination from any medical practitioner who does medical examinations for commercial motor vehicle drivers. The medical standard is exactly the same as the commercial driver standard (Austroads).

- **The Class 5 medical self declaration** allows recreational pilot licence holders and other licensed pilots conducting private operations to be exempt from holding a medical certificate provided they declare that they are medically fit and comply with the requirements (operational limitations) of the exemption. This declaration can be made at **www.casa.gov.au/licences-and-certificates/aviation-medicals-and-certificates/class-5-medical-self-declaration**.

- **Recreational aviation medical practictioners certificate (RAMPC**)
  A RAMPC is valid if you have a recreational pilot licence but with the following conditions:
    - only single engine piston aircraft (fixed wing or helicopter) with a maximum take-off weight of 1,500 kg or less
    - only day operations under the visual flight rules (VFR) and below 10,000 ft
    - no more than one passenger on board
    - no aerobatic flight.

  If you have a RAMPC you must:
    - meet the Australian Fitness to Drive unconditional private drivers' requirements, and
    - not have any of the disqualifying conditions.

For complete details see the **CASA website**

The period for which a medical certificate remains in force is dependent on your age and the kind of medical certificate in question but may be varied for other reasons (CASR 67.205, 67.210 to 67.220).

Obligation to tell CASA of changes in medical condition

(CASR 67.265)

You must not fly if your ability to act efficiently is, or is likely to be, impaired due to illness or injury, no matter how minor it is.

Additionally, if you hold a private pilot licence or radiotelephone operator licence and the impairment lasts for 30 days or more, you must not fly until a DAME certifies that the impairment no longer exists. The above period is reduced to seven days for commercial pilots (CASR 67.265).

Requirements for women during pregnancy relating to their medical certificate validity can be found in CASR 67.235.

Pilot licence

For your pilot licence to remain in effect, your medical certificate must remain valid. For a private pilot licence, you must also meet certain recency requirements (CASR 61.395) and complete a flight review every two years (CASR 61.400). Your pilot licence contains a record of your flight crew licences and categories, of aircraft ratings and endorsements and any operational ratings and endorsements. CASA can, in writing, vary, suspend or cancel your licence if CASA considers the specified grounds in CAR 269 cannot be met.

Student pilot

Flying as a student pilot (CASR 61.112)

A person who does not hold a pilot licence is authorised to pilot an aircraft if:

- the pilot in command of the aircraft is a flight instructor and the flight is for the purpose of receiving flight training
- the flight is for a flight test for a pilot licence, or a rating or endorsement on a pilot licence
- the flight is approved by, and conducted under the supervision of, a flight instructor authorised by a CASR Part 141 or 142 operator to conduct the supervision, and is conducted under VFR, and in accordance with the flight instructor's approval.

A student pilot's flight must be under the supervision of a flight instructor.

The flight instructor must be:

- on board, or
- at the aerodrome from which the flight began (or flying within 15 NM of the aerodrome reference point) and contactable by radio or other electronic means to be able to provide guidance to the student pilot.

General requirements for student pilots (CASR 61.113)

Before a student pilot can fly solo, they must have an aviation reference number (ARN) and be at least 15 years of age.

A student pilot cannot fly an aircraft:

- carrying passengers, or
- which is not registered.

Solo flights – medical requirements for student pilots (CASR 61.114)

A student pilot must not fly solo if they do not hold and carry a copy of:

- a Class 1 or a basic class 2 medical certificate; or a medical exemption
- a recreational aviation medical practitioner's certificate and CASA's written acknowledgement that they have been provided a copy.

Solo flights – recent experience requirements for student pilots (CASR 61.115)

A student pilot not enrolled in an integrated training course may only fly solo if:

- they have conducted a dual flight check within the previous 30 days in the same type of aircraft
- their cumulative solo flight time since the last dual flight check will not exceed 3 hours.

Student pilots authorised to taxi aircraft (CASR 61.116)

A student pilot may only taxi an aircraft if they have been approved to do so by a flight instructor.

Identity checks (CASR 61.117)

To obtain a student licence, evidence of your identity must be provided to CASA in accordance with the Aviation Transport Security Regulations 2005 6.57 (1) (a).

Production of medical certificates and identification (CASR 61.118)

CASA may direct a student pilot to produce:

- their medical certificate or recreational aviation medical practitioner’s certificate unless they hold a medical exemption
- a document with a full-face photograph, including head and shoulders, that was issued within the previous 10 years and that is valid under the government, or a government authority of the Commonwealth or a state or territory, or a foreign country, or a state or province (however described) of a foreign country, and that has not expired or been cancelled.

These documents must be produced within 7 days or before the next solo flight (whichever is earlier).

Recreational pilot licence (CASR 61.475)

To apply to hold a recreational pilot licence, a person must be at least 16 years of age and have:

- passed the appropriate aeronautical knowledge and aircraft category rating examinations
- completed the appropriate flight training for the recreational licence and any associated aircraft category rating
- passed the flight test for the recreational licence and the associated aircraft category rating
- completed at least 25 hours of flight time as pilot of the appropriate aircraft for which the category rating is being sought, including at least:
    - 20 hours of dual flight
    - 5 hours of solo flight time.

The privileges of a recreational pilot licence (CASR 61.460)

A recreational pilot licence allows a person to fly under the VFR in private operations or flight training, as either pilot in command or co-pilot in an aircraft that:

- is powered by a single engine that is not rocket or turbine powered
- is not more than 1,500 kg at maximum certified take-off weight
- is single pilot certified.

The limitations on recreational pilot licence privileges (CASR 61.465, 61.470)

To carry more than one passenger or to fly above 10,000 ft AMSL, a recreational pilot or a person accompanying them must hold a current Class 1 or 2 medical certificate.

With further training, a recreational pilot may obtain the following endorsements (CASR 61.470, CASR 61.485 – 61.500):

- a recreational navigation endorsement to fly:
    - beyond a 25 NM radius of the departure aerodrome
    - beyond the flight training area for an aerodrome
    - along a route between the aerodrome and its flight training area
    - cross country
- the controlled airspace endorsement to fly within controlled airspace
- the controlled aerodrome endorsement to fly at controlled aerodromes
- the flight radio endorsement to operate an aircraft radio.

Private pilot licence

Private operation

An operation of an aircraft is a private operation if the operation is not one of the following:

- an operation that is required to be conducted under the authority of an AOC under Part 119, 129 or 131 or regulation 206 of CAR
- an operation that is required to be conducted under the authority of an aerial work certificate under Part 138
- a Part 141 flight training (within the meaning of Part 141)
- a Part 142 activity (within the meaning of Part 142)
- an adventure flight for a limited category aircraft
- a specialised balloon operation that is conducted for hire or reward
- an operation authorised by a New Zealand AOC with ANZA privileges that is in force for Australia
- an operation under a permission under subsection 25(2) or (3) (non-scheduled flights by foreign registered aircraft) or section 27A (permission for operation of foreign registered aircraft without AOC) of the Act.

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What does a private licence authorise a person to do?
(CASR 61.505)

A private licence holder is allowed to fly as pilot in command or co-pilot in private operations or as the pilot in command if they are under training.

General competency requirement (CASR 61.385)

You are only authorised to exercise the privileges of your licence for a class or type rating for the aircraft, including any operational rating or endorsement, if you are competent in operating it to the standards mentioned in the CASR Part 61 MOS, in all of the following areas:

- operating the aircraft's navigation and operating systems
- conducting all normal, abnormal and emergency flight procedures for the aircraft
- applying operating limitations
- weight and balance requirements
- applying aircraft performance data, including take-off and landing performance data, for the aircraft.

You may only operate an airborne collision avoidance system if you are competent in its use to the standards mentioned in the CASR Part 61 MOS.

Regular flight review requirement (CASR 61.400)

If you hold a flight crew rating that is either a class rating or an aircraft type rating, you must undertake a flight review every 2 years to continue to exercise the privileges of your licence. Glider pilot licences are also subject to periodic flight reviews.

You will also need to complete a flight review of any additional ratings you may hold. For example:

- an aerial application rating
- an instructor rating
- an instrument rating or a private instrument rating
- a low level rating
- a night VFR rating
- a night vision imaging system rating.

Please refer to CASR Part 61 and related exemptions for more details.

Recent experience requirements (CASR 61.395)

Before you can carry passengers by day you must have carried out three take-offs and landings in the previous 90 days. By day, if you are not carrying passengers there are no prescribed take-off or landing recency requirements.

Before you can carry passengers at night, you must have conducted three take-offs and landings at night in the previous 90 days.

Before you can fly at night without passengers, you must have conducted at least:

- one night take-off
- one night landing; within the previous 6 months in an aircraft of the same category.

You will be considered to have met the recent experience requirements to carry passengers by day if, in the last 90 days, you have successfully completed and passed a relevant flight check, review or test for a licence or rating, which included at least one take-off and landing. Similarly, if you wish to carry passengers at night, the above experience must have been conducted at night.

Personal logbooks (CASR 61.345 to 61.365)

The holder of a pilot licence or certificate of validation must retain and maintain a personal logbook.

You must record your full name, date of birth and details of each flight you conduct in an aircraft or flight simulator.

Jan Huber | Unsplash.com

Details of flights include:

- the date the flight began
- the aircraft (or simulator and simulated aircraft) type
- whether it was a single or multi-engine aircraft
- the aircraft's nationality and registration
- the take-off and landing points and each segment of the flight
- the flight time (if any) flown in each of the following capacities
    - pilot in command
    - co-pilot
    - pilot in command under supervision
    - pilot receiving flight training
- whether the flight was by day or night, or both
- any instrument flight time
- whether you performed any instrument approaches and, if so, the type of instrument approach.

You need to retain your logbook for at least 7 years after your last entry and you must ensure that it is unaltered within this time (CASR 61.355). Logbook entries must not be false or misleading (CASR 61.360).

You may be directed by CASA to produce your logbook within 7 days. Electronically formatted logbooks will need to be printed and each page certified as being a true copy (CASR 61.365).

CASA may direct you to correct any logbook errors within 14 days (CASR 61.360).

Production of licence documents, medical certificates and identification (CASR 61.340)

For various reasons, CASA may direct you to produce any or all of the following documents for inspection:

- pilot licence
- aviation medical certificates
- photo identification.

If you are issued with a direction between the time, you are about to fly, to when you have finished flying, you must immediately comply with the direction. However, if it was issued at any other time you have 7 days to comply.

Documents to be carried

Electronic documents (CASR 91.100)

A document required to be carried on a flight may be carried as a copy in electronic form.

Note: For flights that begin or end at an aerodrome outside Australia, you should be aware that electronic copies of documents might not satisfy a foreign country's legal requirements.

Carriage of documents (CASR 91.105)

You must ensure the following documents are carried on your flight:

- for each flight crew member
  - medical certificate (or recreational aviation practitioner's certificate or medical exemption if you are a recreational pilot). These can be physical or electronic copies (CASA EX67/24)
  - flight crew licence (this includes a certificate of validation)
  - passport or photographic ID (that is current and been issued within 10 years of the day of your flight (CASA EX67/24) as issued by a Commonwealth, state or territory authority or agency
- the aircraft's flight manual
- the operating instructions for any computerised navigation systems fitted to the aircraft
- the minimum equipment list for the aircraft (if any).

***Exception:** You do not have to carry the documents listed, if you are flying aerobatic manoeuvres and carrying the documents would present a risk to the aircraft or its occupants.*

You will meet the requirement to carry photographic ID by carrying your state issued driver's licence or your Aviation Security Identification Card (ASIC).

Carriage of documents for certain flights (CASR 91.110)

You must carry the authorised aeronautical information for the flight, and either the aircraft's flight technical log or its maintenance release.

***Exception:** You do not need to carry these documents if you are operating:*

- *under the VFR by day within 50 NM of your departure aerodrome, or*
- *inside a flying training area for an aerodrome, or*
- *on a route to or from a flying training area which is not adjacent to its associated aerodrome.*

Carriage of documents for flights that begin or end outside Australian territory (CASR 91.115)

When your flight begins or ends at an aerodrome outside Australia, you must carry:

- the aircraft's certificate of airworthiness and certificate of registration
- the journey log for the flight (CASR 91.120)
- a list of passengers including their name, place of embarkation and destination
- a manifest and detailed declaration of any cargo carried (other than passenger baggage)
- a copy of the radio licence, if the aircraft has a radio station licence that is an apparatus licence or a class licence
- a copy of any approval or authorisation held by the operator that is relevant to the flight.

If you intend to rely on electronic documents to satisfy this requirement when flying outside Australia then, before your flight, you should check that electronic copies of the required documents will satisfy the laws of a foreign country.

These regulations only apply to the aviation requirements of you flight. Other authorities have laws that you must comply with, such as customs, border security and quarantine.

Community service flight (CSF) (AIP GEN2.2)

A CSF is one that involves:

- the transport of one or more individuals (a patient) to a destination for the purpose of each such individual receiving non-emergency medical treatment or services at the destination, or
- the transport of a patient from a destination mentioned above (the treatment destination) to another treatment destination, or
- the transport of a patient from a treatment destination:
  - back to a place from which the patient departed for a treatment destination, or
  - to a destination at which the patient resides, and
- is provided to a patient, and any person who accompanies the patient to provide support and assistance, without a charge being made to any of those persons for their carriage, and
- medical treatment is not provided on board the aircraft for the flight, other than the administering of medication or in response to an unexpected medical emergency, and
- is coordinated, arranged or facilitated by an entity for a charitable purpose or community service purpose.

Requirements for Community Service Flights (CSF) (ENR1.1)

In addition to any other relevant requirements of the civil aviation legislation, the flight must meet the CSF definition above and satisfy the following requirements (where applicable).

Licence requirements

The pilot must hold either a CASR Part 61: Private Pilot Licence (PPL); Commercial Pilot Licence (CPL) or Airline Transport Pilot Licence (ATPL).

Note: A Recreational Pilot Licence (RPL) does not meet the requirement

Aeronautical experience, recency and medical

To conduct a CSF, a pilot must have:

- 400 hours total aeronautical experience and 250 hours as pilot in command, unless the pilot holds a CPL or ATPL
- a current Class 1 or Class 2 medical (not Basic Class 2) certificate
- performed one landing in the same aircraft class (or type, if type rated aircraft) in the past 30 days
- 25 hours experience in flying multi-engine aircraft (if flying multi-engine).

Experience on aircraft type

A CSF pilot must have for:

- IFR – 20 hours on the aircraft type
- VFR –10 hours on the aircraft type.

Note: A CSF at night must be conducted under the IFR. A CSF under Night VFR is not permitted.

Aircraft

It must be:

- a VH-registered aeroplane or helicopter
- not amateur built, and have limited category or an experimental certificate, and
- no longer than 100 hours or 12 months since the last periodic maintenance inspection for those aircraft using the CASA system of maintenance (Schedule 5 of the CAR).

Passengers

- No more than 5 passengers may be carried.
- Passengers must be either patients being transported for the purpose of receiving non-emergency medical treatment or services, or persons accompanying the patient to provide support and assistance to the patient.

Flight notification

- Full flight notification (IFR or VFR), or SARTIME (VFR) is required.
- Remark (RMK)/CSF must be noted in Item 18 of domestic flight notification.

If the flight notification is submitted by radio, then the pilot is required to request air traffic services (ATS) to annotate the flight as a CSF.

Record keeping

- The flight must be annotated as CSF in the pilot logbook.

Pilot responsibilities

Aircraft not to be operated in manner that creates a hazard (CASR 91.055)

You must not operate an aircraft in a manner that creates a hazard to another aircraft, person or property.

CASR 61.385 requires that you must be competent before you fly your aircraft. Although your competence is checked periodically you must always be conversant with aircraft equipment, systems, limitations and performance Seek refresher training if necessary. See **CASR 61.385** for more detail about the limitations on exercising the privileges of your pilot licence.

Mercy flights: There may be times when it is necessary for pilots to not follow aviation safety rules in order to respond to a sudden or extraordinary emergency. You are required to report such breaches to CASA. Please refer to **www.casa.gov.au/operations-safety-and-travel/safety-advice/mercy-fights-and-operating-emergency**.

Crew members to be fit for duty (CASR 91.520)

A crew member must not perform a required duty that is related to the safety of the aircraft, or the persons or cargo on the aircraft, if they are or are likely to be unfit.

An operator must not assign a crew member to duty for a flight if they have reasonable grounds to believe the crew member is, or is likely to be, unfit to perform a duty related to the safety of the aircraft, or the persons or cargo on the aircraft.

A crew member must not commence their duty if they have consumed alcohol within 8 hours of the flight beginning or if an alcohol test reveals that they have exceeded the permitted level of alcohol specified in CASR Part 99.

The permitted level of alcohol is less than 0.02 grams of alcohol in 210 litres of breath.

Certain aviation organisations are required to implement drug and alcohol management plans which apply to all employees performing, or who are available to perform, safety-sensitive aviation activities. CASA may conduct random tests for alcohol and other drugs in anyone performing a safety-sensitive aviation activity whether for an organisation or in a private capacity.

A crew member must not consume alcohol while onboard the aircraft.

A crew member is, or is likely to be, unfit to perform a duty if the crew member is:

- fatigued to the extent that their ability to safely perform the duty is reduced, or likely to be reduced, or
- under the influence of a psychoactive substance to the extent that their ability to safely perform the duty is reduced, or likely to be reduced.

> Being fit to fly is a responsibility that not only rests with the operator (where applicable) but with the individual. Determining your fitness to fly requires sound and honest judgement. Illness, medication, illicit drugs, alcohol, stress, fatigue, lack of food and dehydration may affect your ability to operate safely (refer **Fatigue management PEG**).

Authority and responsibilities of pilot in command

(CASR 91.215)

You must ensure the safety of persons and cargo, and the safe operation of the aircraft during the flight.

You have the final authority over the operation of the aircraft and the maintenance of discipline by all persons on board. Your authority over the operation of the aircraft begins when the aircraft doors are closed before take-off, or the time the flight begins (whichever is earlier) and ends when the doors are opened after landing, or the time the flight ends (whichever is later).

> Although this regulation identifies the period your authority begins and ends, you will have to take responsibility outside this period to ensure the safety of the flight. You may discharge your responsibilities by delegating certain tasks to others (such as crew members).
>
> By definition, a flight begins when an aircraft first moves under its own power for take-off and ends when it comes to rest after being airborne.

Compliance with flight manual (CASR 91.095 and CASA EX67/24)

You must operate an aircraft in accordance with the aircraft flight manual or, where it applies, any conditions specified in the certificate of airworthiness or special flight permit, from:

- when the aircraft's doors are closed before take-off, and the flight begins,

to

- the later of the time the aircraft's doors are opened after landing, and the flight ends.

You must also ensure that any activity in relation to the flight or operation, whether occurring before, during or after the flight, is conducted in a way that meets each requirement or limitation for the activity in the AFM.

A reference to a flight manual, AFM or AFM instructions includes the normal, abnormal and emergency procedures and any operating limitation, instructions, marking and placards relating to the aircraft. For older aircraft the AFM may be referred to as the Pilot's Operating Handbook (POH), Owner's Handbook or Owner's Manual (See AC 21-34).

Actions and directions by the operator or pilot in command (CASR 91.220)

The pilot or the operator may, if they believe it is necessary for the safety of the aircraft, a person on the aircraft, or a person or property on the ground or water:

- direct a person to:
    - do, not do or limit the doing of something while the person is on the aircraft or
    - leave the aircraft before the flight begins
- with assistance and use of reasonable and necessary force:
    - remove a person or a thing from the aircraft before the flight begins, or
    - restrain a person for the duration of the flight or part of the flight, or
    - seize a thing on the aircraft for the flight or part of the flight, or
    - place a person on the aircraft in custody, or
    - detain a person or a thing, until the person or thing can be released into the control of an appropriate authority.

A person directed by the pilot, or the operator must comply with the direction.

Note: Under regulation CASR 91.225, crew members of an aircraft have a limited power of arrest.

Manipulating flight controls (CASR 91.155)

A person must not, and you must not allow a person to, manipulate the flight controls of the aircraft unless the person is authorised or qualified to pilot the aircraft.

Offensive and disorderly behaviour (CASR 91.525)

A person must not behave in an offensive or disorderly manner which as a result may endanger the safety of the aircraft or persons onboard.

The operator or a crew member may refuse to allow a person to board an aircraft if they reasonably believe the person is likely to behave in an offensive or disorderly manner which could endanger the safety of the aircraft or persons onboard.

A person is taken to behave in an offensive or disorderly manner if they:

- assault, intimidate or threaten another person (this may be verbal or physical, and whether or not a weapon or object is used), or
- intentionally damage or destroy property.

Training flight limitations (CASR 91.725 and CASA EX67/24)

Training flights are associated with elevated levels of risk. For this reason, the regulations prevent the carriage of passengers on such flights. However, the regulations do allow the carriage of permitted persons in certain circumstances. Pilots under training should seek guidance from their flying school or flying instructor or refer to the Part 91 PEG.

Limitations regarding engine shutdown or simulating engine failure in flight (CASR 91.725 - 91.775)

You may only shutdown an engine or simulate an engine failure in flight in certain situations. Please review CASR Part 91 plain English guide, section 3 Training – Causing or simulating engine failures.

Simulating the failure of flight instruments (CASR 91.715 and CASA EX67/24)

You may only simulate the failure of the following flight instruments for the purpose of training checking and testing:

- an attitude indicator
- a gyro compass or an equivalent instrument
- an airspeed indicator
- an altimeter.

Simulating IMC (CASR 91.720)

You must not simulate flying in IMC unless a safety pilot:

- occupies a pilot seat with fully functioning controls
- is qualified on the aircraft type
- has adequate forward vision.

Seating and carriage of persons, cargo, animals and firearms

Seating for flight crew members (CASR 91.550)

At all times during a flight, at least one pilot who is qualified and competent, must occupy a pilot seat with the seatbelt securely fastened.

Each flight crew member must occupy their station and have their seatbelt and shoulder harness securely fastened during take-off, landing or at any other time you direct.

Seating for persons on aircraft (CASR 91.545)

The pilot and the operator must not assign a seat (or berth) that is not fitted with a seatbelt or shoulder harness.

***Exception:** This requirement does not apply where circumstances prescribed in the MOS apply.*

Restraint of infants and children (CASR 91.560)

A child means a person who has turned 2 but has not turned 13 years of age.
An infant is a person who has not turned 2 years of age.

Where a passenger is responsible for a child or infant and a direction is given, to fasten seatbelts or shoulder harnesses (as the case requires), they must ensure that the child or infant is restrained in accordance with the standards prescribed in the MOS.

Infant and child seatbelts as restraints (CASR 91 MOS 20.03)

An infant can be carried in the arms or on the lap of an adult provided their seatbelt is not fastened around the infant and the infant is otherwise restrained, for example, by using a supplemental loop belt also referred to as an infant seat belt.

A child that occupies their own seat must be restrained by the seatbelt.

A maximum of 2 children (neither can be infants) may sit side by side on one seat, provided their combined weight does not exceed 77 kg and the seatbelt, when fastened, restrains both children in the seat.

Provided you are reasonably satisfied that a child weighs less than 16 kg, they may be restrained as an infant as described above-provided they are not more than 12 years of age and have a serious medical condition which prevents them from sitting upright unaided and the responsible adult states in writing that the child:

- has a medical condition
- weighed less than 16 kg (at the time the statement was made)
- is unable to sit upright
- is otherwise fit to travel.

A supplemental loop belt provides an additional seat belt with a stitched loop through which the adult lap belt is passed. The seat belt is fastened around the adult, and the supplemental loop belt is then separately fastened around the infant (see figure below).

Figure: Supplemental loop belt

Child restraint systems that are not seatbelts

(CASR 91 MOS 20.04)

An infant or child is restrained when:

- they are restrained by an approved child restraint system
- their age, height and weight is within the ranges specified by the manufacturer of the system, and
- the system is:
    - used in accordance with the manufacturer’s instruction
    - secured so as not to be a hazard to the person using the system, or to any other person
- a suitable adult is responsible for the person using the system.

The suitable adult must be seated in the seat closest to the seat on which the child restraint system is installed, and be competent to install the system, and secure and release the child.

An **aviation child restraint system** means, a child restraint system that complies with or is approved under CASR Part 21. Reference to a **shoulder harness** includes a child restraint system.

An **approved child restraint system** means a child restraint system meeting the requirements of one of the following:

- an automotive child restraint system
- an aviation child restraint system.

Note: An infant sling is not a suitable child restraint system.

An **automotive child restraint system** means a child restraint system that meets the requirements of one of the following:

- AS/NZS 1754:2004 Child restraint systems for use in motor vehicles
- Federal Motor Vehicle Safety Standards (FMVSS) No. 213
- Canadian Motor Vehicle Safety Standard (CMVSS) No. 213
- European Safety Standard requirements of ECE Regulation 44.

Carriage of cargo – general (CASR 91.600)

The pilot and the operator must not allow cargo to be carried in a place where:

- it could damage, obstruct or cause the failure of a control, electrical wiring, or a pipeline of the aircraft, or any other equipment that is essential to the safe operation of the aircraft
- the cargo weight exceeds the load limitations for the floor structure or any other load-bearing components of that place, as set out in the aircraft flight manual or a placard on the aircraft
- it obstructs an aisle except for passenger service equipment or galley equipment in an aisle on a temporary basis while in use
- an emergency exit is obstructed or access restricted, unless CASA has given approval.

Carriage of cargo – cargo compartments (CASR 91.605)

The pilot and the operator of an aircraft—where the aircraft flight manual (AFM) or regulations require more than one flight crew member and where the cargo compartment is designed so that a crew member would need to enter the compartment to extinguish a fire—must ensure the cargo is loaded in a way that allows a crew member to reach all parts of the compartment with a hand-held fire extinguisher.

Carriage of cargo – unoccupied seats (CASR 91.610)

The pilot and the operator must not allow cargo to be carried on an unoccupied seat if it weighs more than 77 kg unless the seat manufacturer allows a greater weight. The cargo and the means of restraint must not interfere with the safe operation of the aircraft.

Carriage of cargo – loading instructions (CASR 91.615)

The pilot and the operator may only allow cargo to be carried where a placard with instructions for the carriage of cargo is in place.

***Exception:** This regulation excludes carry-on baggage weighing less than 9 kg stowed under a seat, or in a place designed for that purpose, or cargo that is carried on an unoccupied seat (CASR 91.610).*

Unauthorised travel or placing of cargo on aircraft (CASR 91.060)

A person may only travel, or place cargo, on an aircraft if the pilot or the operator has given their consent.

Carriage of animals

Carriage of animals (CASR 91.620)

A person may only bring an animal onto an aircraft with the permission of the pilot.

Before the pilot can give permission, all reasonable steps must be taken to ensure carrying the animal will not adversely affect aviation safety.

***Exception:** A person may bring an animal onto an aircraft without the permission of the pilot provided they have the permission of the air transport or aerial work operator. The operator may give the person permission provided that the operator and the pilot take reasonable steps to ensure that the carriage of the animal does not have an adverse effect on the safety of air navigation (CASA EX67/24).*

Despite anything in the *Disability Discrimination Act 1992*, the carriage of an assistance animal (within the meaning of the *Disability Discrimination Act 1992*) can be refused if the pilot or the operator reasonably believe that it may have an adverse effect on aviation safety.

You are responsible for ensuring the safety of the flight when an animal is carried on an aircraft. It applies to a small private aircraft through to an air transport aircraft and each circumstance will require different considerations.

In general, carrying an animal is no different to carrying cargo. The animal must not block or impede access to or egress through an emergency exit. A large animal should always be secured so as not to damage or affect the balance of the aircraft in flight. A small or medium-sized animal carried in the cabin would normally need as a minimum to be restrained during take-off and landing and in turbulence.

When giving permission, you may need to consider: the type of animal and how it is carried, contained and restrained; its reaction to noise and being out of its natural environment; nuisance to other passengers; distraction to flight crew; and how excrement or fluids will be contained.

An air operator's certificate (AOC) holder's operations manual should provide instructions for carrying animals, including any limitations or requirements the operator expects personnel to follow.

Firearms

Possessing firearms on aircraft (CASR 91.160)

For the carriage of firearms on the following aircraft, refer to the *Aviation Transport Security Act 2004* and the *Crimes (Aviation) Act 1991*:

- regular public transport aircraft
- an air service in which a jet aircraft is used
- an air service in which an aircraft with a certified MTOW greater than 5,700 kg is used.

For the carriage of firearms on aerial work flights see CASR Part 138.

Passengers on the flights listed above who wish to carry or transport firearms, should seek guidance from the airline or operator.

For other flights—for example privately operated light aircraft under 5,700 kg MTOW—a person may only carry or possess a firearm if the pilot or the operator has given their consent.

Discharge of firearms in or from an aircraft (CASR 91.165)

No person may discharge a firearm while onboard an aircraft unless they are permitted to do so under the *Aviation Transport Security Act 2004*, the *Crimes (Aviation) Act 1991* or CASR Part 138.

Smoking (CASR 91.530) (s37 Air Navigation Regulations 2016)

A person must not smoke at any time while onboard an Australian domestic air transport flight that is carrying passengers.

A person must not smoke at any time while onboard an Australian international air transport flight (other than a freight-only flight).

A person must not smoke on a CASR Part 103 aircraft at any time.

For any other operation, a person must not smoke on an aircraft:

- during take-off or landing
- in the aircraft's toilet
- at any time the pilot has directed a person not to smoke.

A person is considered to have been directed when the 'no smoking' sign in the cabin has been illuminated, or at any time a permanent 'no smoking' sign is displayed.

Smoke or smoking includes using electronic cigarettes.

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Fuelling

Oil requirements (CASR 91.460)

You must ensure an aircraft carries enough oil to complete the flight safely.

Contaminated, degraded or inappropriate fuels

(CASR 91.465)

The pilot and the operator must ensure that an aircraft has not been fuelled with contaminated, degraded or inappropriate fuel.

A person must not supply or fuel an aircraft with contaminated, degraded or inappropriate fuel.

Exception: *This regulation does not apply to a person supplying fuel for a Part 131 aircraft.*

Checking fuel for contamination is essential. Where various fuel types are available there is a risk of fuelling with an incorrect type. An aircraft's fuel system might still have enough fuel of the correct type to allow start, taxi and take off, only to have the engine fail or develop partial power soon thereafter.

You can assume that the fuel provided by the various fuel companies and suppliers will comply with the fuel standards. You should check the pump to ensure you are taking the correct fuel type for your aircraft.

Before your next flight you should take a sample of fuel from your aircraft by draining a small amount of fuel from each drain point on the aircraft into a clear container to check for water contamination. Normally water will show up by a separation in the bottom of the fuel sample. If this occurs, you should continue to drain the tank or line from where the sample was contaminated until you are obtaining a clear uncontaminated sample of fuel only. If there is still any doubt that the fuel is contaminated, do not take off. You may need to seek maintenance of the fuel system.

Often contamination of fuel by water can occur because of a poorly fitting fuel cap. Therefore, if you have washed your aircraft or it has been parked in the open and there has been rain or frost on the aircraft take particular care to check for water contamination.

Fuel from drums should be checked for contamination before it is pumped into your aircraft. Testing for the presence of water in fuel should be done using a water detecting paste, paper or other positive method.

In the case of turbine fuel, you should watch for signs of cloudiness or other indications of the presence of suspended water droplets. Compared to Avgas the presence of water contamination may not show up for some time after fuelling.

Always follow any flight manual instructions where provided.

Contaminated or degraded fuel has the potential to to result in an engine failure, or even partial loss of power soon after take-off.
To highlight the importance of managing partial power losses see the ATSB advisory document titled 'Avoidable Accidents No 3 – Managing partial power loss after take-off in single engine aircraft'.

For further guidance refer to AC 91-25 Fuel and oil safety.

Fire hazards (CASR 91.470)

When an aircraft is being fuelled, a person must not create a fire hazard, or allow a fire hazard to exist, within 15 m of the aircraft or equipment used to fuel the aircraft.

All reasonable precautions against fire hazard should be taken. All equipment should be of sound design and should be maintained in safe working condition. Give attention to sources of ignition such as:

- persons smoking
- incandescent carbon or naked flame which could be emitted from the engine or associated equipment
- arcing between metallic parts of electrical circuits and components caused by:
  - operation of switch contacts
  - faulty cable terminals
  - breakdown of electrical insulation
  - moving contacts, or rotary electrical equipment
  - accidental short circuiting or open circuiting
  - exposure of hot parts to combustible matter
  - overheating of working parts to the ignition temperature of any oils, fuel or other combustible matter in the vicinity of the engines.

In the event of a fuel spillage, measuring more than 2 m in diameter, the fuelling overseer should:

- consider evacuation of the area (it is generally safer to evacuate upwind and upslope of any fuel spillage)
- notify the aerodrome rescue and firefighting service and comply with laid-down aerodrome procedures
- prevent the movement of persons or vehicles into the affected area and restrict all activities in the vicinity to reduce the risk of ignition.

You should not start a vehicle engine within 6 m of a spillage until the area is declared safe.

Fuelling aircraft – firefighting equipment

(CASR 91.475)

A person who fuels an aircraft must ensure at least 2 fire extinguishers are readily available and positioned not less than 6 m but not more than 15 m from the fuelling point. Each fire extinguisher must be of a type and capacity suitable for extinguishing fuel and electrical fire.

A fuelling operation in Australia must comply with Australian/New Zealand Standard AS/NZS 1841.

Exception: *For a CASR Part 131 (balloon) aircraft, one fire extinguisher only is required to be positioned not less than 6 m but not more than 15 m from the fuelling point.*

The joint Australian and New Zealand Standard AS/NZS-1841 is the standard that applies to portable fire extinguishers that are to be available for use during a fuelling operation.

Fuelling aircraft – electrical bonding (CASR 91.480)

A person who fuels an aircraft must ensure the aircraft and equipment used to fuel the aircraft are electrically bonded.

Electrical bonding is important to equalise the electrical potential (charge) between the aircraft, the fuel tanks and the fuelling equipment so as to prevent any static electrical discharge between them. Before fuelling, the fuelling equipment must be bonded to the aircraft, and the filler nozzle must be bonded to the aircraft before removing the filler cap. Once fuelling has stopped, and the filler cap is replaced, all bonding can be removed.

Equipment or electronic devices operating near aircraft (CASR 91.485)

Operation of equipment or electronic device near aircraft during fuelling

When an aircraft is being fuelled a person must not operate equipment or an electronic device within 15 m of a critical fuelling point for the aircraft.

Fuelling aircraft while equipment or electronic device is operated near aircraft

A person must not fuel an aircraft when equipment or an electronic device is being operated within 15 m of a critical fuelling point of the aircraft.

Exception: *The above requirements do not apply if the equipment or electronic device:*

- *is part of the aircraft or the aircraft's fuelling equipment, or*
- *is designed for use during fuelling operations, or*
- *performs an aircraft servicing function and is safe for use within 15 m of a critical fuelling point for the fuelling of the aircraft, or*
- *complies with an industry standard about the safe use of equipment or electronic devices within 15 m of a critical fuelling point for the fuelling of the aircraft.*

Exception: *The auxiliary power unit (APU) of the aircraft may be operated during fuelling if it is permitted by the AFM and started before fuelling begins.*

Exception: *An operating electronic device, hazardous to the process of fuelling only because it is designed to produce radio emissions (within the meaning of the Radiocommunications Act 1992), may be used but must be at least 6 m from each critical fuelling point when fuelling the aircraft.*

Fuelling turbine-engine aircraft – low-risk electronic devices (CASR 91.490)

Use of device inside cabin of aircraft

A person may only operate a low-risk electronic device inside the cabin of a turbine-engine aircraft being fuelled when you have given permission, and each cabin door within 3 m of a critical fuelling point is closed.

Use of device outside cabin of aircraft

A person may only operate a low-risk electronic device outside the cabin of a turbine-engine aircraft while it is being fuelled if the device is operated more than 3 m from each critical fuelling point.

Exception: *A person may operate a low-risk electronic device outside the cabin of a turbine-engine aircraft while it is being fuelled, less than 3 m from each critical fuelling point, if:*

- *the person is employed or engaged by the operator*
- *they have been trained:*
  - *to operate the device in such areas*
  - *to avoid the risks associated with being distracted when doing so, and*
- *the operator has assessed the person's competence to comply with the fuelling regulations as set out in this section.*

Hot fuelling (CASR 91.495)

Only a turbine-engine aircraft may be hot fuelled.

Hot fuelling only applies to specialised operations and does not normally apply to Part 91 aircraft flying under the VFR. Please see Part 91 PEG for the requirements pertaining to hot fuelling.

Fuelling aircraft – persons on aircraft, boarding or disembarking (CASR 91.510)

Highly volatile fuel

When fuelling an aircraft with highly volatile fuel (AVGAS or MOGAS), the pilot must ensure that no person, other than a crew member is onboard, boarding, or disembarking from the aircraft.

Other than highly volatile fuel

When fuelling an aircraft with other than highly volatile fuel (AVTUR or kerosene), the pilot or the operator must hold an approval to do so when a person other than a crew member is onboard, boarding, or is disembarking.

Exception: *This regulation does not apply to the replacement of (gas) fuel cylinders on a balloon or hot air airship (a CASR Part 131 aircraft).*

A highly volatile fuel is one which easily evaporates when brought into contact with the air. In aviation, this generally refers to AVGAS or MOGAS fuel. Fuel 'other than highly volatile' generally refers to AVTUR or kerosene (also see the definition of 'highly volatile fuel' in the CASR Dictionary.)

Ground operations

Parked aircraft not to create hazard (CASR 91.420)

A person must not park an aircraft in a place where it is a hazard to the movement of other aircraft.

Safety when aeroplane is operating on the ground

(CASR 91.425) (MOS 18.01)

Only a pilot, a person qualified to taxi under CASR Part 64, or a person operating the aeroplane for maintenance or maintenance training, may start the engine of an aeroplane on the ground. When a person starts the engine the aeroplane must be secured from moving.

When hand starting the engine using the propeller, and assistance is not readily available, a person must secure the aeroplane from moving and no other person may be onboard.

However, a person may have another person in a pilot seat to assist with starting, to apply the brakes and control the engine including shutting down the engine, provided they have been instructed how and their competence has been assessed by a qualified person.

Taxiing aircraft (CASR 91.415)

An aircraft may only be taxied by a person who is qualified.

Taxiing or towing on movement area of aerodrome (CASR 91.365)

Unless an aircraft or tow vehicle is being operated in accordance with an air traffic control (ATC) clearance or instruction, a person taxiing or towing the aircraft on the movement area of an aerodrome, must:

- give way to a landing aircraft, or one on its final approach to land
- give way to an aircraft taking off, or preparing to take off
- keep well clear of another aircraft when overtaking that aircraft
- give way to the aircraft on the right if both aircraft are on a converging course
- stop, or alter course to the right to remain clear of an aircraft approaching head-on or approximately head-on
- when giving way to an aircraft preparing to take off, taking off, landing, or on final approach to land, hold at the marked runway hold position, or where no hold position is marked, not encroach on a graded runway strip.

***Exception:** You may take whatever action is necessary to avoid a collision.*

A movement area is any part of an aerodrome used for the take-off, landing and taxiing of aircraft including manoeuvring areas and aprons.

Aircraft with restricted forward visibility when on the ground—such as tailwheel or certain high wing aircraft—when holding for line up to take off should orient in such a way that other circuit traffic, particularly on the upwind or crosswind legs can be seen.

Safety when rotorcraft operating on ground (CASR 91.430)

For other than maintenance or maintenance training, only a qualified pilot may operate a rotorcraft on the ground.

The MOS may prescribe another person who may also operate a rotorcraft on the ground for other than maintenance or maintenance training provided they secure the rotorcraft from moving.

Anti-collision lights – display (CASR 91 MOS 26.22)

An aircraft operating by day or night must be fitted with the number of anti-collision lights required by the aircraft type design, that include at least:

- 1 red beacon, or
- 2 white strobes, or
- a combination of these lights.

Where anti-collision light equipment is comprised of red beacons only, or white strobes only, the lights must be displayed as follows:

- turbine-engine aircraft – from immediately *before* the engines are started until the engines are shut down at the end of the flight
- any other aircraft – from immediately *after* the engines are started until the engines are shut down at the end of the flight.

Where anti-collision light equipment is comprised of a combination of red beacons and white strobes, the lights must be displayed as follows:

- for red beacons as above
- for white strobe lights:
    - any time the aircraft crosses a runway in use for take-offs or landings while the aircraft is crossing the runway
    - from the time the aircraft enters the runway to take off until the time the aircraft leaves the runway after landing.

Exception: *Anti-collision lights do not need to be displayed (on) if:*

- *given the circumstances you reasonably believe the reflection or glare caused by the lights may pose a hazard to the aircraft, or*
- *if permitted by another MOS provision e.g. MOS 12.09 of the Part 138 MOS. See also MOS 3.08 of the Part 91 MOS*

It is recommended for piston engine aircraft, where practicable, that you switch anti- collision lights on prior to starting the aircraft's engines unless doing so might deplete the battery and prevent the engine from starting.

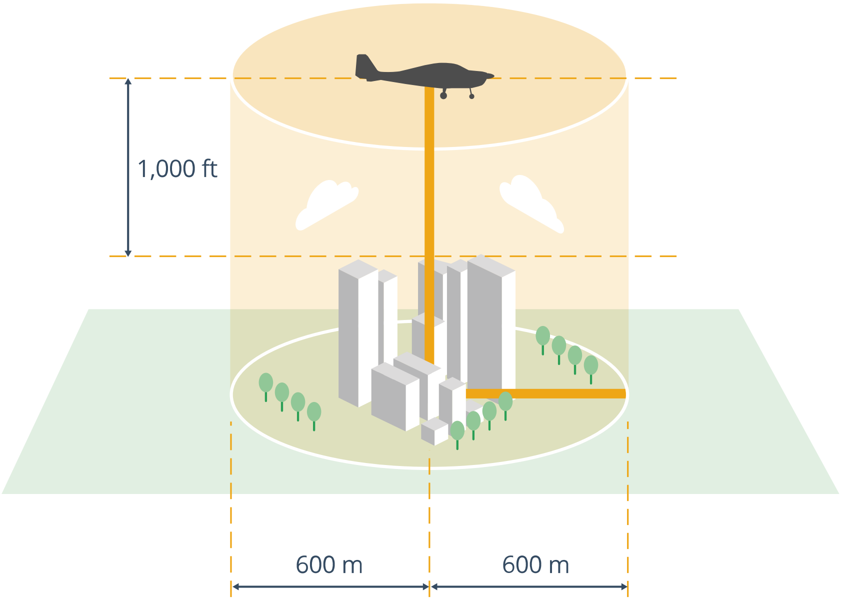
In flight

Minimum height rules – populous areas and public gatherings (CASR 91.265) (MOS 12.01)

Aeroplane

You must not fly an aeroplane over a populous area or public gathering below 1,000 ft above the highest feature or obstacle within a horizontal radius of 600 m of the point on the ground or water immediately below the aeroplane.

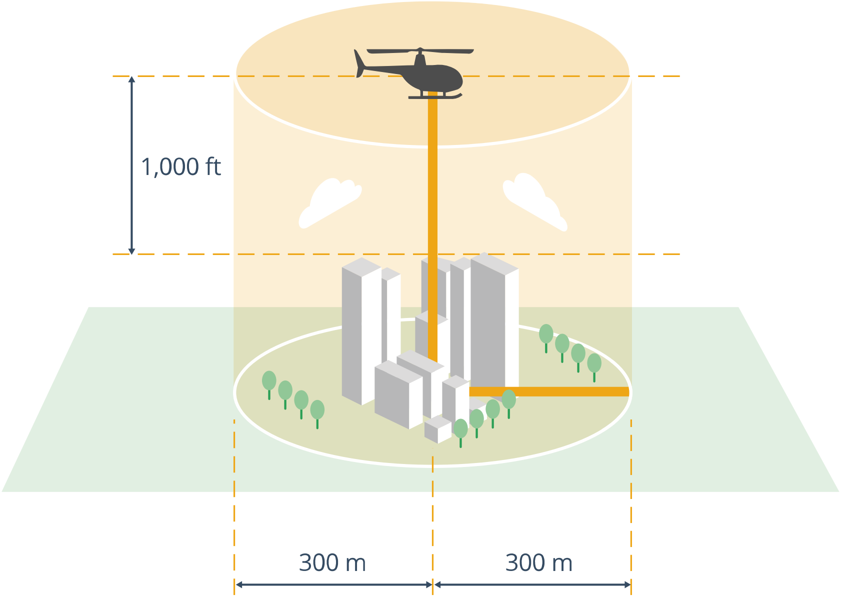
Figure: Minimum height populous areas and public gatherings for aeroplane



Helicopter

You must not fly a helicopter over a populous area or public gathering below 1,000 ft above the highest feature or obstacle within a horizontal radius of 300 m of the point on the ground or water immediately below the helicopter.

Figure: Minimum height populous areas and public gatherings for helicopter



Exception: *This rule does not apply in the following circumstances:*

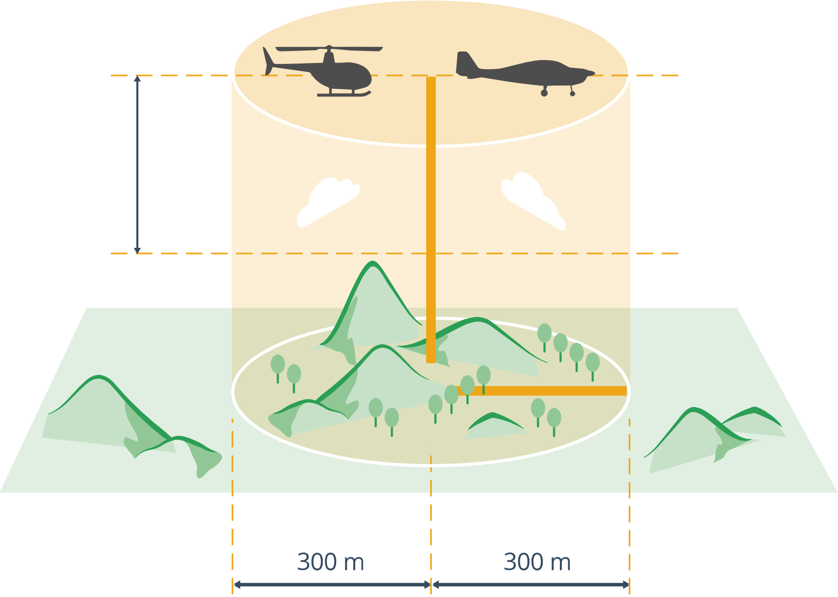
- *taking off or landing:*
  - *for take-off – when the point of lift off and climb to the planned cruising level is in accordance with the normal procedures for the aircraft type*
  - *for landing – when the landing is conducted in a continuous descent from the cruising level or circuit height to the landing threshold using rates of descent and flight manoeuvres which are normal for the aircraft type*
- *engaging in a missed approach*
- *practicing emergency procedures at an aerodrome without passengers onboard*
- *circuit training at an aerodrome*
- *carrying out air display activities for which you hold an approval*
- *for a rotorcraft – hovering, air transiting, air taxiing or ground taxiing at an aerodrome*
- *for a rotorcraft, seaplane or amphibian – flying within an access lane used by aircraft taking off from, or landing at, a particular place, and details of which are published in the Authorised Aeronautical Information (AAI)*
- *for a single-engine seaplane or a single-engine amphibian operating over water and within safe gliding distance of open water suitable for a forced landing, and not flown below 1,000 ft above the highest feature or obstacle within a horizontal radius of 300 m of the point on the water immediately below the aeroplane*
- *engaging in a procedure to determine the suitability of an aerodrome for a landing*
- *engaging in the validation of a terminal instrument flight procedure that is conducted in accordance with a terminal instrument flight procedure under regulation 173.095 of CASR and the Part 173 MOS. (CASA EX67/24)*

Minimum height rules – other areas

(CASR 91.267) (MOS 12.02)

When flying over an area that is not a populous area or public gathering (CASR 91.265), you must not fly an aircraft below 500 ft above the highest feature or obstacle within a horizontal radius of 300 m of the point on the ground or water immediately below the aircraft.

Figure: Minimum height for other areas



Exception: *This rule does not apply in the following circumstances:*

- *taking off or landing:*
    - *for take-off–when the point of lift off and climb to the planned cruising level is in accordance with the normal procedures for the aircraft type*
    - *for landing – when you are conducting a circling manoeuvre as part of an instrument approach procedure (IAP) using rates of descent and flight manoeuvres which are normal for the aircraft type*
    - *for landing – when the landing is conducted in a continuous descent from the cruising level or circuit height to the landing threshold using rates of descent and flight manoeuvres which are normal for the aircraft type*
- *engaging in a missed approach*
- *not carrying passengers and practicing emergency procedures at an aerodrome*
- *not carrying passengers and practicing a forced landing procedure with the consent of the person or authority having control over the land or water above which the procedure is carried out*
- *low-flying training by a CASR Part 141 operator, or a low-flying activity by a CASR Part 142 operator, and the aircraft:*
    - *is not carrying passengers, and*
    - *is being flown over an area that, with the consent of the person or authority with control of the area, has been determined by the operator to be suitable as a flight training area and the pilot has surveyed it for obstacles before the flight*
- *performing training circuits at an aerodrome*
- *to determine the suitability of an aerodrome for a landing*
- *carrying out air display activities for which you hold an approval*
- *all of the following apply:*
    - *you hold a low-flying authorisation under CASR Part 61, or hold an approval, provided the point on the ground or water vertically below the aircraft is not within 150 m of a person, vessel, vehicle, structure or livestock, and you conduct a risk assessment of the area to be flown over*
- *for a rotorcraft – when the rotorcraft is hovering, air transiting, air taxiing or ground taxiing at an aerodrome.*
- *for a rotorcraft, seaplane or amphibian – when flying within an access lane used by aircraft taking off from, or landing at, a place, and the details are published in the AAI.*

Low flying (CASR 61Q, 61.1040, 61.1050, 61.1075)

You must have at least a private pilot licence to hold a low-level rating. A low-level rating authorises you to conduct low-level operations under certain conditions.

Before flying any low-level operation, you must do a risk assessment of the proposed area. You must also hold the appropriate low-level endorsement for the type of low-level operation you wish to conduct. There are nine low-level endorsements:

- aeroplane
- helicopter
- powered lift
- gyroplane
- aerial-mustering aeroplane
- aerial-mustering helicopter
- aerial-mustering gyroplane
- sling operations
- winch and rappelling operations.

Recent experience requirements for low flying (CASR 61.1055)

You are allowed to exercise the privileges of your low-level rating only if, within the last six months, you have:

- flown at least 2 hours of low-level operations, or
- been assessed as competent to conduct low-level operations by a flight instructor who holds a low-level training endorsement, or
- successfully completed within the previous six months
    - an operator proficiency check in low-level operations, or
    - a flight review for the rating.

In addition, within the previous 24 months, you must have (CASR 61.1060) (CASA EX32/24 part 15):

- completed a rating flight review, or
- passed a rating flight test, or
- passed an endorsement flight test, but more than six months after passing a flight test, or

- completed an aerial application proficiency check, or
- completed an operator proficiency check, or
- successfully taken part in an operator's approved cyclic training and proficiency program that covers the rating.

Aerobatic flying (CASR 91.185)

You may only fly aerobatic manoeuvres over a populous area, at an air display, or at night, if you hold an approval.

You must not fly aerobatic manoeuvres in IMC.

> Pilots must hold an aerobatic flight activity endorsement (see CASR 61.380) and Flight activity endorsement table (CASR 61.1145).
>
> An aerobatic flight manoeuvre is one that has:
>
> - bank angles greater than 60°, or
> - pitch angles greater than 45° or otherwise abnormal for the aircraft type, or
> - abrupt changes of speed, direction, angle of bank or angle of pitch.
>
> You must not engage in aerobatic flight below 3,000 ft above ground level (AGL) unless your aerobatic activity endorsement permits lower heights.
>
> Before engaging in an aerobatic manoeuvre, you should ensure:
>
> - any loose objects are either removed from the aircraft or stowed securely
> - all hatches and doors are securely fastened
> - seat belts or harnesses are securely and firmly fastened
> - seat belts or harnesses of any vacant seat are made secure
> - you have checked for other aircraft in the vicinity.

Aerobatic activities in the vicinity of a non-controlled aerodrome – exemptions and directions (EX67/24)

If you are conducting an aerobatic activity that is a Club activity, instrument EX81/21 provides for certain exemptions and directions. Please consult the Part 91 Plain English guide appendix C for further guidance.

Formation flying

Aircraft not to be operated in manner that creates a hazard

(CASR 91.055)

You must not operate an aircraft in a manner that creates a hazard to another aircraft, person or property.

CASR 61.385 requires that you must be competent before you fly your aircraft. Although your competence is checked periodically you must always be conversant with aircraft systems, performance and limitations etc. Seek refresher training if necessary.

See CASR 61.385, for more detail about the limitations on exercising the privileges of your pilot licence.

Flying in formation (CASR 91.205) (MOS 6.01)

You may only fly an aircraft in formation, if you have prearranged the flight with the other pilots making up the formation.

You may only fly an aircraft in formation at night, or in IMC, if you hold an approval.

Note: Pilots must hold a flight activity endorsement to fly in formation. See CASR 61.380 and Flight activity endorsement table (61.1145).

Exception: *If you are soaring, with one or more gliders in a thermal, and although such a flight constitutes a formation flight, you do not need to have prearranged the flight with other pilots (CASR 91 MOS 6.02).*

Aircraft are flying in formation any time 2 or more aircraft are flown in close proximity to each other or one or more aircraft are flying in-company and they operate as a single aircraft with regard to navigation, position reporting and control.

Aircraft are also considered to be in formation when they are manoeuvring to achieve separation from each other to effect individual control (break away) and during join up.

For determining what constitutes 'close proximity', you must consider the type of aircraft in the formation and their speed.

For surveillance purposes, only one aircraft in the formation or company needs to operate surveillance equipment.

Aircraft speeds

All flights – airspeed limits (CASR 91.090) (MOS 4.02)

Unless it is required for aviation safety, you must not exceed the speed limits set out in the following Table.

Table: Airspeed limits – all flights

Class of airspace	Flight rules	Maximum Indicated airspeed
Class C	VFR	Below 10,000 ft AMSL – 250 knots (kt)
Class D	IFR or VFR	No limiting speed if you declare a higher speed is an operational requirement and it is authorised by ATC, otherwise 250 kt
		200 kt if at or below 2,500 ft above aerodrome elevation within 4 NM of the primary aerodrome in that airspace
Class E or G	IFR or VFR	below 10,000 ft AMSL – 250 kt

Note 1: Pilots must comply with airspace speed limitations unless specifically cancelled by ATC.

Note 2: Speed limitations are not applicable to military aircraft except as specified in ERSA.

You must advise ATC if you cannot comply with an ATC speed instruction or you cannot meet an arrival or departure speed constraint, or you cannot operate within the airspeed limits tabled above.

Pilot in command to report hazards to air navigation (CASR 91.675)

If you become aware of a hazard to air navigation that is not published in the AIP, as soon as circumstances permit you must report the hazard to:

- ATS
- the aerodrome operator if the hazard is on an aerodrome.

If you reasonably believe the hazard has already been reported there is no need to make the report.

Navigation logs

This was formerly a requirement under CAR 78. However, keeping of navigation logs is not required under the CASR.

Journey logs however are required for flights that begin or end outside Australian territory (refer CASR 91.120, MOS 5.02 and 5.03).

Fuel monitoring is required (see CASR 91, MOS 19.05).

Rules for prevention of collision

Basic rule (CASR 91.325)

During a flight, a flight crew member must maintain vigilance, so far as weather conditions permit, to see and avoid other aircraft.

See AC 91-10 – Operations in the vicinity of non-controlled aerodromes and AC 91-14 – Pilot's responsibility for collision avoidance, for information on and the limitations of 'see and avoid'.

Right-of-way rules (CASR 91.330)

When taking evasive action because of a collision risk with another aircraft, you must follow the right-of-way rules shown in the following table.

Table: Right-of-way rules

Item	Circumstance	Right-of-way rule
1	An aircraft is in an emergency and compelled to land.	All aircraft must give way to the aircraft compelled to land.
2	An aircraft is landing.	Any other aircraft (whether in flight or operating on the ground or water) must give way to the landing aircraft.
3	Two heavier-than-air aircraft are on approach to land at an aerodrome.	The following rules apply: › The higher aircraft must give way to the lower aircraft. › However, if the higher aircraft is in the final stages of an approach to land, the lower aircraft must not take advantage of the higher aircraft's requirement to give way to the lower aircraft and cut in front of the higher aircraft. › A power-driven heavier-than-air aircraft must give way to an unpowered glider.
4	An aircraft is overtaking another aircraft.	The overtaking aircraft must give way to the aircraft being overtaken.

Item	Circumstance	Right-of-way rule
5	An aircraft is in the vicinity.	The following shows right-of -way in descending order: › balloon › parachute descent › unpowered glider › airship › an aircraft that is towing something (including another aircraft) › power-driven aircraft.
6	Two aircraft are on converging headings at approximately the same altitude.	The aircraft that has the other aircraft on its right must give way to the other aircraft.

***Exception:** Although the right-of-way rules apply, you may take whatever action is necessary to avoid a collision*

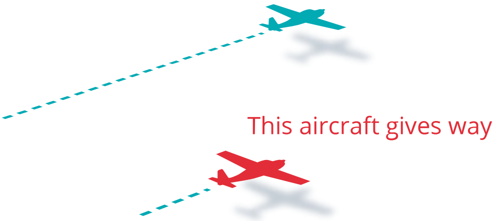
Additional right-of-way rules (CASR 91.335)

If there is a collision risk, the aircraft that has the right of way to another aircraft must maintain the same heading and speed until there is no longer a risk of collision.

Figure: Aircraft with right-of-way to maintain heading and speed

When overtaking another aircraft, whether climbing, descending or in level flight, you must keep out of the way of the other aircraft, even if it alters course while being overtaken; pass on the right, and remain on the right until well clear.

Figure: Overtaking aircraft to keep clear and to the right

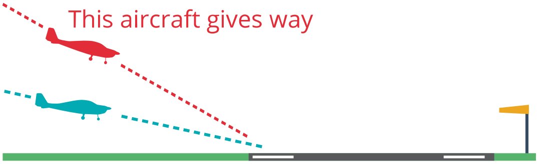


Where 2 aircraft are approaching head-on, or approximately head-on, each aircraft must alter heading to the right.

Figure: Aircraft approaching head-on to alter heading to the right

Where an aircraft is required to give way to another aircraft, the aircraft must not be flown so that it passes ahead, or directly over, or under the other aircraft so closely that there is a collision risk.

Figure: Aircraft giving way not to create collision risk



***Exception 1:** If necessary, you may take whatever action is necessary to avoid a collision.*

***Exception 2:** The right-of-way and additional right-of-way rules do not apply if you are responding to a command of the aircraft's airborne collision avoidance system and manoeuvring is necessary to ensure the safety of the aircraft.*

Right-of-way rules for take-off and landing

(CASR 91.340)

During a take-off or landing you must not fly an aircraft in a way that creates a risk of collision with another aircraft, person, vessel, vehicle or structure.

Compliance with international regulations (CASR 91.345)

An aircraft operating on water must comply with the requirements of the International Regulations for Preventing Collisions at Sea, 1972, except where they are inconsistent with CASR 91.355 – Giving way on water.

Giving way to vessels (CASR 91.350)

When in level flight or manoeuvring near the surface of the water, you must, as far as possible, keep clear of a vessel, or avoid impeding its navigation.

Giving way on water (CASR 91.355)

You must give way to, and keep well clear of, an aircraft or vessel converging from the right.

You must turn to the right to keep well clear of an aircraft or vessel that is approaching head-on, or approximately head-on.

If you are overtaking a vessel or another aircraft, you must give way to the vessel or aircraft being overtaken, by altering your heading to keep well clear.

***Exception:** If necessary, you may take whatever action is necessary to avoid a collision.*

The aviation regulations for avoiding collision on water are consistent with marine regulations.

Pilot maintenance

CASA strongly recommends guidance should be sought by pilots from a relevant Part 66 licence holder on the correct aircraft maintenance practices and procedures.

Part 61 RPL and PPL (or higher) licence holders are permitted to carry out some maintenance tasks on an aircraft. These are listed in CAR 1988 Schedule 8 for Class B aircraft, and various other conditions apply. These privileges do not apply to Recreational Pilot Certificate issued by a sport aviation body or ASAO.

What maintenance are you permitted to carry out?

As a pilot you can conduct daily inspections and perform maintenance for a Class B aircraft under 1988 42 ZC(d) and in accordance with CAR Schedule 8 and Schedule 5 of the CAR.

CASA may also issue instruments, which have a validity period-which permits specific maintenance tasks to be carried out by certain people. For example:

- 149/11 'Authorization-pilot of class B aircraft with optional dual controls'
- 67/13 'Authorization-pilot of class B helicopter'.

What you need to have when performing maintenance

- appropriate tools calibrated and in a good state of repair
- current approved data
- appropriate experience and training
- approved spare parts.

Daily inspection

The pre-flight inspection and the daily inspection is one of the most important inspections for an aircraft in service. It is the only thorough inspection between periodic inspections and is the last real opportunity to inspect the aircraft to ensure that:

- it is airworthy and fit to fly
- its equipment is serviceable and suitable for the day's particular operation/s.

Key considerations for daily inspection:

- Perform the daily inspection before the first flight of each day the aircraft is flown.
- It is more detailed than a pre-flight inspection or walk-around.
- It must be signed for in Part 3 of the maintenance release.
- It must be performed by either a licensed aircraft maintenance engineer (LAME) or a pilot who at a minimum holds an RPL which allows him or her to fly the aircraft as pilot in command.
- Perform the daily inspection in a systematic and thorough manner.

Further information

You can access further information from **Part 43 Maintenance of aircraft in private and aerial work operations (casa.gov.au)**

Aircraft equipment

Operating aircraft with inoperative, equipment – placarding (CASR 91.150)

Before a flight, the pilot and the operator must ensure an inoperative placard is applied to any inoperative item of equipment required to be fitted or carried which is accessible and likely to be used.

Figure: Example of an inoperative placard

Aircraft equiped to fly IFR
Directional Instrument (DI) is inoperative - aircraft can still be flown VFR - DI MUST be placarded INOPERATIVE

Required to be fitted means, required by the type certifying authority or the regulations. Where an item of equipment is permitted to be inoperative, you must comply with any associated conditions or restrictions to ensure that the aircraft is operated safely.

Day VFR equipment

Aeroplane – VFR flight by day (CASR 91 MOS 26.06 and 26.10)

An aeroplane flying under day VFR must be fitted with the equipment for measuring and displaying the flight information as shown in the following Table.

Table: Equipment for measuring and displaying flight information – aeroplane VFR by day

Flight Information	Requirements
Indicated airspeed	No additional requirements
Mach number	Only for an aeroplane with operating limitations expressed as a Mach number
Pressure altitude	The equipment must: › have an adjustable datum scale calibrated in millibars or hPa, and › be calibrated in feet, except: » for flights in a foreign country which measures FLs or altitudes in metres, be calibrated in metres, or fitted with a conversion placard or device.
Magnetic heading	The equipment must be: › a direct reading magnetic compass, or › both a remote indicating compass and a standby direct reading magnetic compass.
Time	The equipment must display accurate time in hours, minutes and seconds, and be either: › fitted to the aircraft, or › worn by, or immediately accessible to, the pilot for the duration of the flight.
Turn and slip	Only for aerial work operations
Outside air temperature	Only for aerial work operations from an aerodrome at which ambient temperature is not available from ground-based instruments

A full description of all aircraft equipment requirements can be found in CASR 91 and section 26 of the Part 91 MOS.

For comprehensive equipment information for light sport aircraft, experimental aircraft and certain Australian-registered aircraft see Part 91 PEG.

Night VFR equipment (CASR 91 MOS 26.07 and MOS 26.11)

An aeroplane for VFR flight at night must be fitted with:

- an approved GNSS, or
- an automatic direction finder (ADF) or VHF omni-directional radio range (VOR).

If an approved GNSS has automatic barometric aiding options as specified in the standards below, they must be connected:

- (E)TSO-C129a
- (E)TSO-C145a
- (E)TSO-C146a
- (E)TSO-C196a.

An aeroplane flying under night VFR must have equipment for measuring and displaying the flight information, as shown in the following Table.

Table: Equipment for measuring and displaying flight information-aeroplane VFR by night

Flight information	**Requirements**
Indicated airspeed	The equipment must be capable of being connected to: › an alternate source of static pressure that: » a pilot can select » includes a selector that can open or block the aeroplane's static source and alternative static source simultaneously, or › a balanced pair of flush static ports.
Mach number	Only for an aeroplane with operating limitations expressed as a Mach number
Pressure altitude	The equipment must: › have an adjustable datum scale calibrated in millibars or hPa, and › be calibrated in ft except » if a flight is conducted in a foreign country which measures flight levels (FLs) or altitudes in metres, be calibrated in metres or fitted with a conversion placard or device › for *aeroplane only* be capable of being connected to: » an alternate source of static pressure that a pilot can select, or » a balanced pair of flush static ports.

Flight information	Requirements
Magnetic heading	› a direct-reading magnetic compass, or › both a remote indicating compass and a standby direct-reading magnetic compass
Time	The equipment must display accurate time in hours, minutes and seconds, and be either: › fitted to the aircraft, or › worn by, or immediately accessible to, the pilot for the duration of the flight.
Turn and slip	The equipment must display turn-and-slip information, except when a second independent source of attitude information is available, in which case only the display of slip information is required.
Attitude	No additional requirements
Vertical speed	The equipment must be capable of being connected to: › an alternate source of static pressure that a pilot can select, or › a balanced pair of flush static ports.
Stabilised heading	The equipment must indicate whether the power supply to the gyroscopic instruments is working satisfactorily. **Note:** A gyro-magnetic type of remote indicating compass meets this requirement if it has a primary and an alternate power supply.
Outside air temperature	No additional requirements

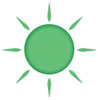
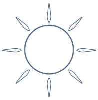
Note: For gyroscopic instruments (if any), equipment that indicates whether the power supply is adequate must be fitted.

For comprehensive equipment information for light sport aircraft, experimental aircraft and certain Australian-registered aircraft see Part 91 PEG.

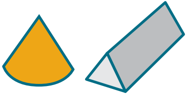
Aerodromes

Light and ground signals (AIP ENR 1.5)

Light signals

On ground	Light mode	In flight
Authorised to **take off** if pilot is satisfied that no collision risk exists	 Green	Authorised to **land** if pilot is satisfied that no collision risk exists
Authorised to **taxi** if pilot is satisfied that no collision risk exists	 Green flashing	**Return** for landing
Stop	 Red	**Give way** to other aircraft **and continue** circling
Taxi clear of landing area in use	 Red flashing	**Do not land** Aerodrome unsafe
Return to starting point on aerodrome	 White flashing	

Symbols near wind direction indicator

	Aerodrome unserviceable
	Gliding operations in progress
	Operations are confined to hard surface runways, aprons and taxiways only
	Unserviceable area marker
	Boundary markers

Aerodrome markings (AIP AD 1.1)

Visual approach slope indicator systems (VASIS)

Two types of VASIS are approved for use in Australia:

- T-VASIS – a high-intensity system for use by day or night
- precision approach path indicator (PAPI) – a colour discrimination system usable by day or night.

The standard installation aims to provide an obstacles clearance of at least 11 m above a 1.9° slope, within the azimuth splay of 7.5° either side of the runway centre line for a distance of a 5 NM from the threshold or 7 NM for a runway equipped with an instrument landing system (ILS).

When the installation differs from the standard, details are promulgated in the aerodrome documentation.

T-VASIS

The cross-bar indicates on-slope and deviations appear as one, two or three lights above or below the cross-bar. The sensitivity is similar to the 'dot positions' on an ILS glide path.

Increased eye height over the threshold can be achieved by flying the approach with one or more of the 'fly-down' lights visible.

Approach slope indication	Eye height above threshold
3 lights fly up	0 to 7 ft
2 lights fly up	7 to 25 ft
1 light fly up	25 to 41 ft
On glide slope	**49 ft**
1 light fly down	57 to 75 ft
2 lights fly down	75 to 94 ft
3 lights fly down	94 to 176 ft

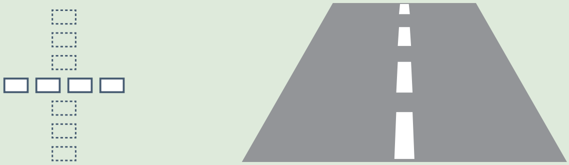
Notes: The night azimuth splay is normally increased to 30° to permit T-VASIS to be visible on the base leg. However, obstacle clearance is not guaranteed until the aircraft is within the runway approach obstacle limitation surface. Accordingly, T-VASIS should not be used for approach-slope guidance until the aircraft is aligned with the runway.

The presence of a thin layer of ground fog or mist may produce abnormal T-VASIS indications, including erroneous fly-down or fly-up signals, or other fly-up or fly-down lights together with the correct lights (which are usually much brighter than the erroneous lights). Consequently, you should exercise caution when using the T-VASIS in ground fog or other conditions conducive to light reflection or refraction.

The above requirements may vary by 15 ft depending on the location of the system. The intensity of the system may be varied at your request.

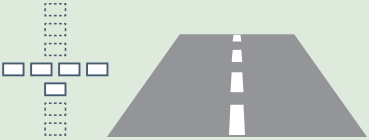
An abbreviated version of T-VASIS, AT-VASIS, is used at some locations, with the equipment located on only one side of the runway (usually the left).

On glide slope

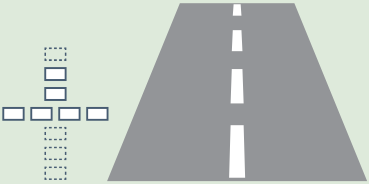


Slightly high

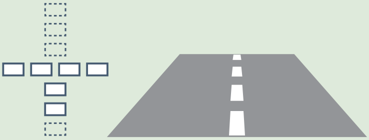
Slightly low



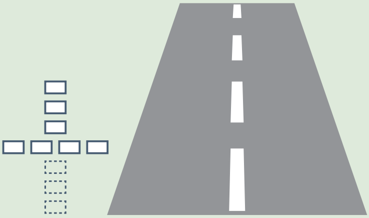
High



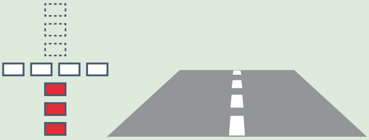
Low



Very high

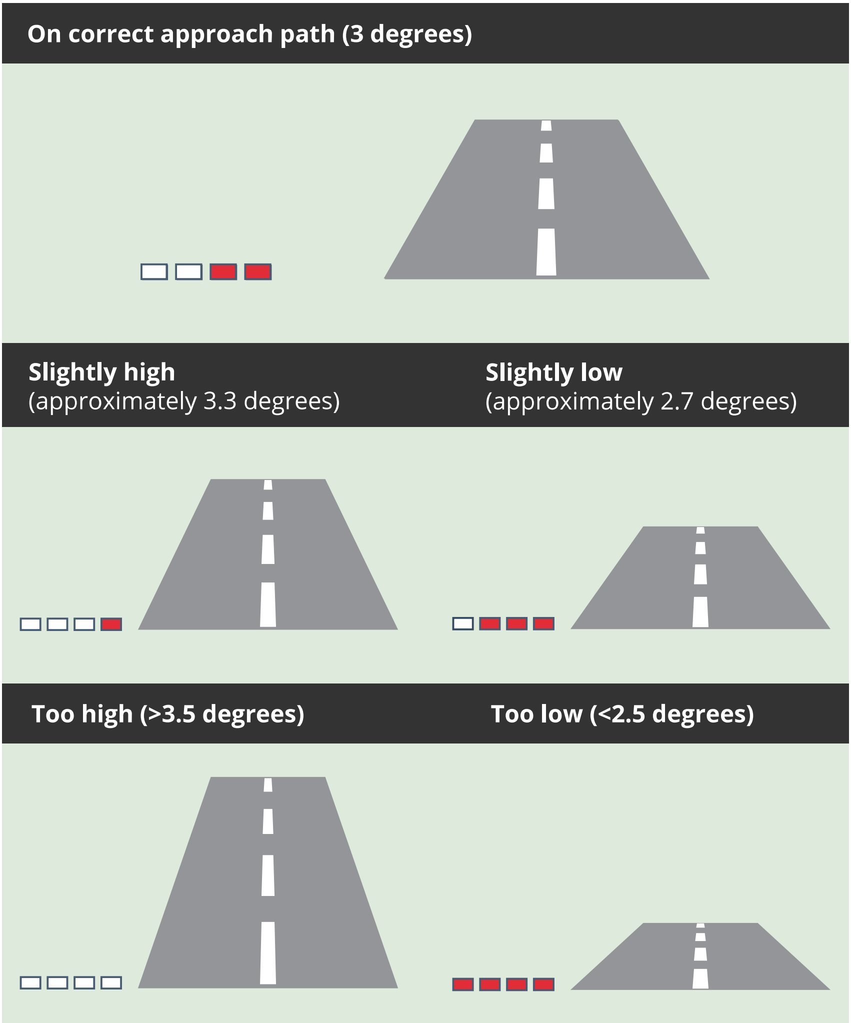


Very low



Precision approach path indicator (PAPI)

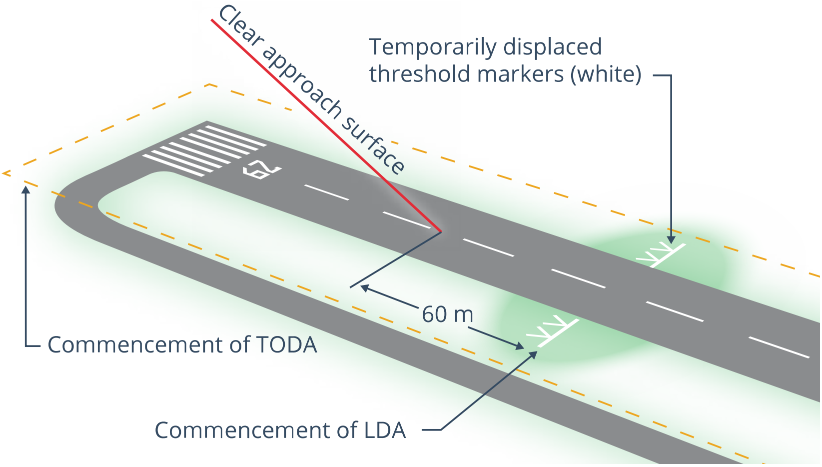
A PAPI installation consists of a set of four light boxes placed in a line at right angles to the runway, abeam the touchdown point, and usually on the left-hand side. Each box radiates both red and white light. The transition between the red and white will appear instantaneous to you (three minutes of arc); however, light changes between adjacent boxes will not occur unless the approach slope changes by about 0.25 degrees. A one-degree progressive incremental spread from the outermost to the innermost light unit about the standard approach angle provides the visual guide shown below.



Displaced threshold (AIP AD)

Pilots should be aware that for various reasons the runway threshold can be displaced. These will be indicated by NOTAMS. At controlled aerodromes, the displaced threshold will be notified by Automatic terminal information service (ATIS).

Figure: Markings for a temporarily displaced threshold due to obstacle infringement of approach surface for a period of 30 days or less



TODA: take-off distance available
LDA: landing distance available

Figure: Markings for a temporarily displaced threshold due to works on the runway for a period of 30 days or less

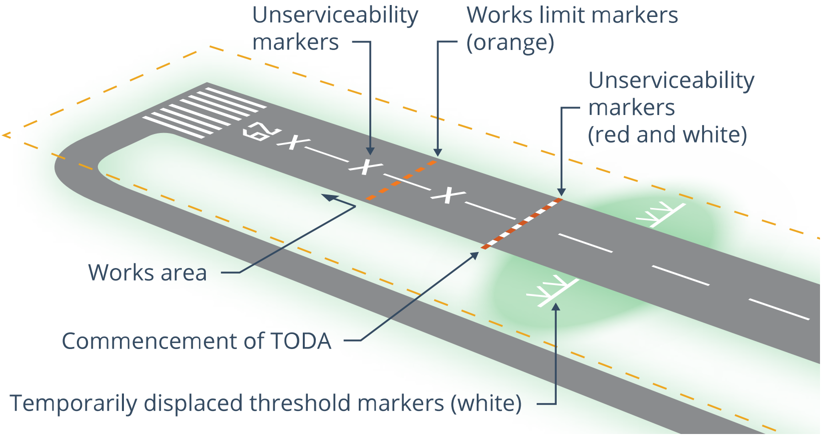


Figure: Markings for a temporarily displaced threshold due to obstacle infringement of the approach path for a period in excess of 30 days

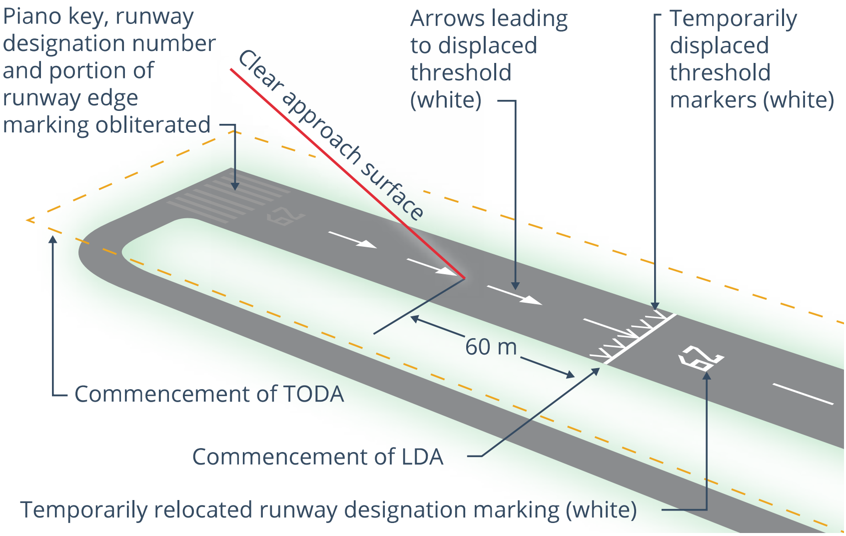
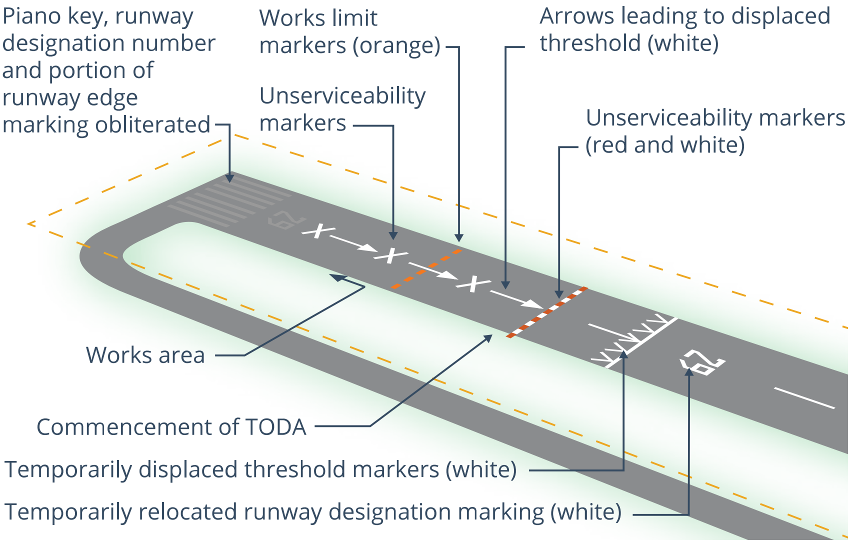


Figure: Markings for a temporarily displaced threshold due to works on the runway for a period in excess of 30 days



Accidents and incidents (AIP ENR 1.14)

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The bureau is managed by a commission and is entirely separate from the transport regulators, policy makers and service providers.

The ATSB is established under the *Transport Safety Investigation Act 2003* (TSI Act) and conducts its investigations in accordance with the provisions of the Act. The TSI Act provides guidance for the investigation of all civil aviation occurrences within Australian territory and for all occurrences involving civil registered Australian aircraft outside Australian territory.

Enquiries

Australian Transport Safety Bureau,
PO Box 967, Civic Square ACT 2608
t:1800 020 616 e: atsbinfo@atsb.gov.au
w: atsb.gov.au

Reporting to the ATSB

The items which a pilot must report are listed as either immediately reportable matters (IRMs) or routinely reportable matters (RRMs). A pilot is not required to report to the ATSB if they have reasonable grounds to believe another responsible person e.g. ATC, aircraft or aerodrome operator, or licensed aircraft maintenance engineer (LAME) has reported the occurrence.

Mandatory reporting – immediately reportable matters

IRMs are accidents and serious incidents that affect the safety of aircraft. These include matters involving death, serious injury or destruction or damage to the aircraft or to other property caused by the aircraft. IRMs must be reported to a nominated official by a responsible person as soon as reasonably practical. Immediate reporting of IRMs is required under the TSI Act so that investigators can act quickly to preserve valuable evidence to determine the critical factors underlying serious occurrences.

Examples of an IRM include:

- a death or serious injury to a person caused by contact with an aircraft, aircraft component or jet blast
- an aircraft believed missing
- an aircraft suffering damage, or reasonable grounds existing for believing so
- a breakdown of separation standards (vertical, lateral or longitudinal) in a control area (CTA).

Mandatory reporting – routinely reportable matters

RRMs are occurrences that have, or could have, affected safety, but the outcome was not serious. RRMs would involve non-serious injuries, minor aircraft damage or structural failure that does not significantly affect structural integrity, performance or flight characteristics and does not require major repair or replacement of affected components. Under the TSI Act, a responsible person must report RRMs within 72 hours of becoming aware of them.

Examples of an RRM include (AIP ENR 1.14):

- an injury, other than a serious injury, to a person on board the aircraft
- a flight crew member becoming incapacitated while operating the aircraft
- the unexpected close proximity of aircraft in flight known colloquially as an airprox or near miss
- an occurrence that results in difficulty controlling the aircraft, including any of the following:
    - an aircraft system failure
    - a weather phenomenon
    - operation outside the aircraft's approved flight envelope
- fuel exhaustion (For air transport operations this event is an IRM.)
- the aircraft's supply of useable fuel becoming so low (whether or not as a result of fuel starvation) that the safety of the aircraft is compromised (For air transport operations this event is an IRM if an emergency has been declared.)
- a collision with an animal, or a bird, on a certified aerodrome.

Mandatory reporting – contacting and submitting a report to the ATSB for immediately reportable matters (IRMs)

(CASR 91.606)

IRMs require immediate (as soon as practical) reporting by telephone and then a follow-up written report within 72 hours, preferably using the air safety incident report (ASIR) format.

RRMs only require a written report to be submitted within 72 hours.

Reporting

Australian Transport Safety Bureau
PO Box 967 Civic Square ACT 2608
Incident reporting hotline **t:** **1800 011 034**
To submit an online form: **atsb.gov.au/mandatory/asair-form**

What to include in the report?

These are outlined under AIP ENR 1.14 or go to **airservicesaustralia.com/aip/aip**

The minimum information required for a written report includes:

- aircraft make, model and registration
- names of the owner and operator
- full name of the pilot in command
- date and time of the occurrence
- last point of departure, point of intended landing and nature of the flight
- location of the occurrence
- number of persons on board and numbers and names of any injured persons
- nature and cause of the occurrence, as far as it is known
- description of any damage to the aircraft
- description of an accident site’s terrain and its accessibility.

Voluntary reporting – aviation confidential reporting scheme (REPCON)

REPCON is a reporting system that allows people to submit reports to the ATSB in confidence. Maintaining individual confidentiality is the primary element of REPCON so as to, for example, alleviate the risk of any retribution. Any person who has an aviation safety concern, whether involved in the aviation industry or a member of the travelling public, may submit a REPCON report.

Items that are not reportable under the mandatory reportable scheme (i.e. are not IRMs or RRMs) but still give rise to aviation safety-related concerns, should be reported with REPCON.

Examples of what should be reported with REPCON include:

- an incident or circumstance that affects, or has the potential to affect, an aircraft's safe operation
- a procedure, practice or condition that a reasonable person would consider endangers, or, if not corrected, would endanger, the safety of air navigation or aircraft operations, in relation to such things as:
  - practices of aircraft operators, aerodrome operators or ATC service providers
  - poor training, behaviour or attitudes
  - insufficient qualifications or experience of employees
- scheduling or rostering that contributes to the fatigue of employees and/or
- bypassing safety procedures because of operational or commercial pressures in relation to:
  - inadequate aerodrome facilities for safe operations
  - unsafe passenger, baggage or cargo management
  - inadequate traffic or weather information.

REPCON reporting

If you have any concerns, please contact REPCON confidential reporting:
t: 1800 020 505 or submit an online form
w: **atsb.gov.au/voluntary/repcon-aviation.aspx**

CHAPTER 2

PLANNING YOUR FLIGHT

Pre-flight preparation

Before beginning a visual flight rules (VFR) flight where you are intending to depart and track beyond 50 NM, you must carry the applicable information from the AIP and either the aircrafts, technical log or maintenance release (see CASR 91.110 for more details).

Applicable AIP information means the aeronautical maps, charts and other aeronautical information relevant to the route of the flight, and any probable diversionary route, that are published:

- in the AIP (or foreign equivalent when operating internationally), or
- by a data service provider (or foreign equivalent when operating internationally), or
- in Notices to Airmen (NOTAMs).

For all flights you must carry:

- weather forecasts and reports for flight planning as described in Manual of Standards (MOS 7.02 following) for your intended flight (CASR 91.230)
- Head Office, flight information region (FIR) and any location specific NOTAM. This will alert you to the suitability or serviceability of relevant airways facilities you intend to use en route
- information about the aerodromes to be used and their suitability for your aircraft. Where information on the suitability of an aerodrome is not available by NOTAM it is your responsibility to be satisfied the aerodrome, you are intending to take off from or land at is suitable (CASR 91.410)
- sufficient fuel for the flight, including additional fuel to hold if required by the forecast over your destination or to divert to an alternate aerodrome if the weather forecast conditions require you to plan for such conditions (CASR 91.455).

Pre-flight information (AIP GEN 3.1)

Pre-flight information services are provided from the Network Coordination Centre (NCC) Pilot Briefing Office, located in Canberra. This office provides the following services:

- meteorological
- NOTAM
- flight notification
- calculated off blocks time (COBT).

The pre-flight briefing service is primarily an automated service supported by the National Aeronautical Information Processing System (NAIPS). NAIPS contains a database of NOTAM and metrological information.

You are encouraged to obtain a pre-flight briefing either via the self-help electronic systems or through the briefing offices. If required, elaborative briefings are available by contacting air traffic services (ATS) and Bureau of Meteorology (BoM) staff from the briefing office.

You must obtain an appropriate pre-flight briefing before departure from those places where suitable facilities exist. Where suitable facilities are not available, a briefing may be obtained from FLIGHTWATCH as soon as practicable after the flight commences. However, this is subject to ATS workload. Information you request should be limited to data considered essential for the safe conduct of your flight to the first point of intended landing where additional information can be obtained from the General section of the Aeronautical Information Publication (AIP GEN 3.3).

Note: Pre-flight briefings will not normally be provided on (air traffic control) ATC communication channels.

Forecasts for flight planning (CASR 91 MOS 7.02)

Before beginning a flight, you must study the authorised weather forecasts and reports for the route, and for the departure, the planned destination and any planned alternate aerodrome to be used, as well as any other reasonably available relevant weather information for your intended flight.

If you have studied the weather forecast more than an hour before your flight you must obtain and review an update of that information before commencing your flight.

Note: If the aerodrome forecasts above are not available you must nominate a destination alternate aerodrome.

An authorised weather forecast must cover the whole period of the flight, and include a wind and temperature forecast and one of the following:

- for a flight at or below 10,000 ft above mean sea level (AMSL), a graphical area forecast (GAF) or general aviation meteorological (GAMET) area forecast, or
- for a flight above 10,000 ft AMSL, a significant weather (SIGWX) forecast, or
- for any operation – a flight forecast.

The term GAMET is not used in Australia but is of relevance to Australian aircraft operating overseas.

An authorised weather forecast used to satisfy the requirements for the departure, planned destination and planned alternate aerodromes nominated in a flight plan, must be valid for at least 30 minutes before, and 60 minutes after, the planned estimated time of arrival (ETA).

You may obtain a wind and temperature forecast from wind and temperature charts, grid point wind and temperature charts, route sector wind and temperature forecasts, a National Aeronautical Information Processing System (NAIPS) wind and temperature profile, as well as from approved flight planning systems deriving data from the Bureau of Meteorology or the World Area Forecast System.

Full details on the briefing services available can be found in En Route Supplement Australia (ERSA).

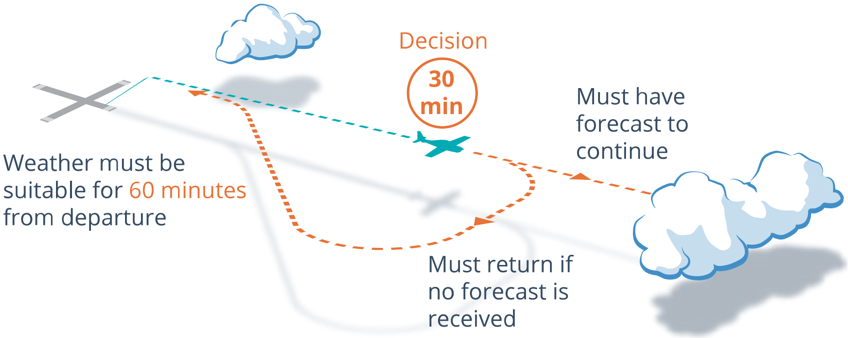
An authorised weather forecast in Australia means, a weather forecast made by the BOM for aviation purposes.

For night VFR operations, the forecast should indicate a cloud base ceiling no less than 1,000 ft above ground level (AGL) and above the highest obstacle within 10 NM either side of track.

Flights unable to obtain an authorised weather forecast before departure (CASR 91 MOS 7.03)

If a weather forecast or report is not available, you may depart, provided you reasonably consider that the weather conditions at the departure aerodrome will allow you to return and land safely within one hour after take-off; however, you must return to the departure aerodrome if you do not obtain a weather forecast within 30 minutes after take-off.

Figure: Forecast unavailable



If departure is delayed and results in the planned ETA falling outside the forecast validity period, you must obtain an updated forecast.

If the pre-flight briefing is obtained more than one hour before taxiing for departure, you must obtain an update before departure to ensure that the latest information available can be used for the flight. This update should be obtained by:

- NAIPS pilot access
- telephone, or
- when the above is not practical, by radio.

More than one flight may be included in one flight plan provided that the meteorological forecast validity period covers all flights and relevant Aeronautical Information Service (AIS) information is available at flight planning.

Alternate aerodrome due to weather

General alternate requirements (CASR 91.235) (MOS 8.04)

Flight preparation (alternate aerodromes) requirements (CASR 91.235)

If you are required to plan for an alternate aerodrome, you must comply with the following flight preparation (alternate aerodrome) requirements.

Destination alternate aerodromes weather (CASR 91 MOS 8.04)

Terminal area forecast (TAF)

You must nominate a destination alternate aerodrome if the ETA at the planned destination aerodrome is during the period that begins 30 minutes before or ends 30 minutes after the following weather conditions are forecast:

- cloud – more than scattered (SCT) below the alternate minima

Note: For alternate minima see **table on page 82**.

- visibility is either:
  - less than the alternate minima, or
  - equal to or more than the alternate minima but with a forecast of at least a 30% probability (PROB) of fog, mist, dust or any other phenomenon restricting visibility below the alternate minima
- wind – a headwind, crosswind or downwind component more than the maximum for the aircraft
- a thunderstorm (TS) or its associated severe turbulence, or a forecast of at least 30% PROB of their occurrence (see **Figure on page 81**).

Note: PROB is used in a TAF to indicate an expected 30–40% probability of an occurrence.

Terminal area forecast (TAF)3 or International Civil Aviation Organization (ICAO) landing forecast

If flight planning is based on a TAF3 or ICAO landing forecast, you must nominate a destination alternate aerodrome if the above weather conditions are forecast at your destination at the ETA. Note that:

- Your ETA must be within the first 3 hours of the validity period of the TAF3 but not outside the end time (if any) specified for the TAF3 service.
- You may ignore meteorological conditions described as PROB.
- The 30-minute buffer periods typically applicable to the commencement and cessation of weather conditions forecast in a TAF, do not need to be applied to the forecast commencement and cessation of those weather conditions in a TAF3.

Forecast not available

Where a forecast that is required for a planned destination is not available then you must nominate a destination alternate aerodrome.

Destination alternate not required

The nomination of a destination alternate is not required if:

- you are flying under the VFR by day within 50 NM of the departure aerodrome, or
- weather conditions exist that require the planning of a destination alternate aerodrome, but you ensure that enough fuel is carried to permit the aircraft to hold at the destination aerodrome until 30 minutes after the forecast end of the weather conditions, or
- an aerodrome forecast contains INTER or TEMPO weather conditions which require the planning of a destination alternate aerodrome, but you ensure enough fuel is carried to permit the aircraft to hold, when the forecast is endorsed as follows:
  - intermittent (INTER) – 30 minutes, or
  - temporary (TEMPO) – 60 minutes
  - for a forecast that has multiple INTER or TEMPO endorsements, the fuel for holding must be that for the most limiting requirement.

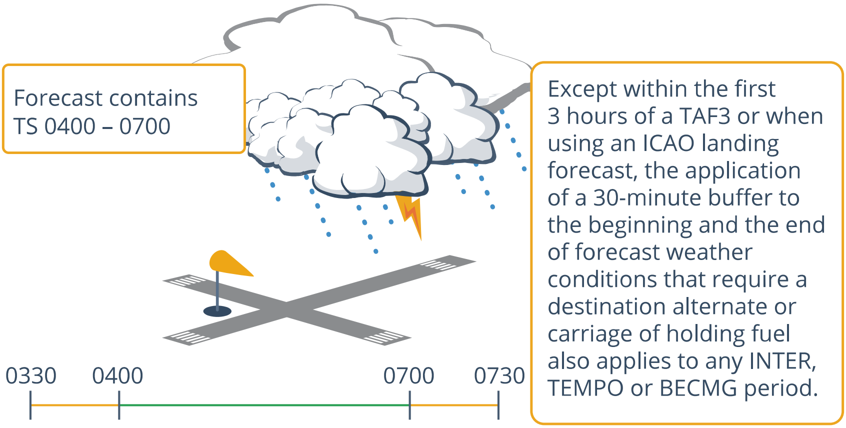
A forecast including the change indicator 'becoming' (BECMG)

For a forecast that includes a BECMG period, deteriorating weather conditions are taken to commence at the start of the BECMG period and improving weather conditions are to be taken to commence at the end of the BECMG period.

Buffer periods

Except within the first 3 hours of a TAF3 or when using an ICAO landing forecast, the application of a 30-minute buffer to the beginning and the end of forecast weather conditions that require a destination alternate or carriage of holding fuel, also applies to any INTER, TEMPO or BECMG period.

Figure: Example of the application of the TAF buffer



Forecast contains TS 0400 – 0700

Except within the first 3 hours of a TAF3 or when using an ICAO landing forecast, the application of a 30-minute buffer to the beginning and the end of forecast weather conditions that require a destination alternate or carriage of holding fuel also applies to any INTER, TEMPO or BECMG period.

Alternate minima – Australian aerodromes

(CASR 91 MOS 8.08)

The following table sets out for an aeroplane and rotorcraft the alternate meteorological minima for altitude and visibility for aerodromes in Australian territory.

Table: Alternate minima at Australian aerodromes

Type of aircraft	Type of operation	Cloud ceiling	Visibility	Additional requirements
Aeroplane	Day VFR and night VFR	1,500 ft	8 km	
Helicopter	Day VFR	1,000 ft	3 km	Only for aerodromes in Class G airspace
	Day VFR and Night VFR	1,500 ft	8 km	Only for aerodromes in airspace other than Class G
	Night VFR	1,500 ft	8 km	

Cloud ceiling in a TAF is expressed above ground level (AGL).

Note: For operations at foreign aerodromes see Alternate minima – at foreign aerodromes (CASR 91 MOS 8.09).

Destination alternate aerodromes – navigation

(CASR 91 MOS 8.05)

For a VFR flight by night, you must nominate a destination alternate aerodrome that is within one hour's flight time of the planned destination aerodrome unless:

- the destination is served by a ground-based radio navigation aid and the appropriate radio navigation system is fitted to the aircraft and you are competent to use the aid, or
- the aircraft is fitted with an approved global navigation satellite system (GNSS), and you are competent to use the GNSS.

If aircraft navigation is to be conducted using a GNSS certified only to technical standard order (TSO) C-129, navigation to a destination alternate aerodrome must be planned to use a navigation system other than GNSS.

Destination alternate aerodromes – restrictions

(CASR 91 MOS 8.07)

A destination alternate aerodrome may only be nominated if it is:

- suitable as a destination aerodrome
- not itself an aerodrome which would require a destination alternate
- not a helideck.

Radio communication system requirements

(AIP GEN 1.5)

Radiocommunication systems (CASR 91 MOS 26.18)

In any class of airspace, whether controlled or uncontrolled, the aircraft must be fitted with radio capable of communicating:

- two-way, by voice
- on all frequencies necessary to meet the reporting, broadcast and listening watch requirements under CASR 91.630, 91.635, 91.640 and 91.675, from any point on the route of the flight, including in the event of any diversions
- on the aeronautical emergency frequency 121.5 MHz.

Exception: *An aircraft is not required to be fitted with a radio when flying under the VFR by day, in Class G airspace, at or below 5,000 ft AMSL. However, when you do not have 1,000 ft vertical or 1,500 m horizontal separation from cloud, below the higher of 3,000 ft AMSL or 1,000 ft AGL, the aircraft must be fitted with a radio.*

Note 1: Certain light sport aircraft and experimental aircraft do not have to comply with the requirement for this equipment to be approved under CASR Part 21 (CASR 91 MOS 26.02).

Note 2: CASR 91.400 places certain requirements on aircraft without a radio at certain non-controlled aerodromes.

When aircraft may begin a flight with inoperative radio communications (CASR 91 MOS 26.19)

An aircraft required to carry a radio may only fly with it inoperative if:

- the flight is from an aerodrome with no facility for the radio to be repaired or replaced
- the flight is to the nearest facility where the radio can be repaired or replaced
- for a flight conducted in Class G airspace the flight is not conducted in IMC
- for a flight conducted in controlled airspace: ATS is informed, before the flight begins, of the inoperative radio
- clearance is obtained from ATS for the flight.

Note 1: For continuation of a flight with an inoperative radio, see sections CASR 91 MOS 11.10 and 11.18.

Note 2: CASR 91.400 places certain requirements on aircraft without an operative radio at certain non-controlled aerodromes.

Communicating at certified, military or designated non-controlled aerodromes (CASR 91.400)

An aircraft must have a VHF radio when operating on the manoeuvring area, or in the vicinity of a non-controlled aerodrome that is:

- certified, or
- military, or
- prescribed as a designated non-controlled aerodrome by the MOS.

***Exception:** However, at a non-controlled aerodrome described above, you may operate with an inoperative radio if you are flying during the day in VMC, in company with another aircraft that is carrying a radio.*

Take-off and landing requirement – use of aerodromes (CASR 91.410)

You may only take off or land if you can do so safely considering all the circumstances, including the prevailing weather conditions, at one of the following places:

- a certified aerodrome
- a military aerodrome
- a place suitable to take off or land from.

'Considering all the circumstance' should include consideration of:

- the risk posed to persons on the ground, and
- the aircraft performance – The take-off or landing distance available, obstacles in the take-off or landing flight path, temperature, wind direction and speed will all have a bearing on your decision of whether the place you are taking off from or landing at is a suitable place (see requirements to consider CASR 91 MOS 24.02 and 25.02).

The suitability of an aerodrome depends on many factors, including its characteristics, the surrounding terrain and obstacles, the aeroplane being used, as well as your formal qualifications and skills.

You are authorised by virtue of your licence to assess these factors before deciding whether a particular flight should take place. If you fail to discover or consider any significant factor affecting the safety of a take-off or landing, you may contravene CASR 91.410.

There are aerodromes all around Australia for which information is not published in any guide. Obtaining information about these aerodromes can be difficult, and you should take every step to satisfy yourself of the suitability of the aerodrome.

Some aerodromes may be managed by persons who have limited ability to assess the aerodrome's operational suitability. Information obtained from such persons should not be relied upon.

It is your responsibility to exercise sound judgment when the necessary information regarding an aerodrome is not available.

If an aerodrome presents a hazard to operations you should inform the aerodrome owner.

Military aerodromes used by Australian and foreign aircraft (EX81/21)

Before operating to, from, or at a military aerodrome the operator must obtain permission from the relevant military authority.

The operator and pilot must comply with any conditions of the permission that are not contrary to the civil aviation legislation.

When operating at a joint military/civilian aerodrome, the operator and pilot, must each comply with the AAI, unless those requirements are contrary to the civil aviation legislation.

Note 1: Information on military aerodromes including the relevant military authority are listed in the AIP-ERSA under the symbol 'MIL'.

Note 2: Permission may be in whatever form the relevant military authority chooses

Note 3: Information on joint military/civilian aerodromes are listed in AIP-ERSA under the symbol 'JOINT'.

Performance considerations

Loading of aircraft (CASR 91.805)

At all times you must ensure that the aircraft is loaded and operated within its weight and balance limits.

> The probability of overloading in small aircraft by assuming a passenger's weight is considerable. Therefore, it is recommended you use actual known passenger weight.

Take-off and landing performance for aeroplanes (CASR 91 MOS 24.02) (MOS 25.02)

You must ensure:

- during and after take-off, until reaching the minimum height, that the aeroplane has the performance to clear all obstacles by a safe margin, and
- during approach and landing, the aeroplane has the performance, from the time it descends below the minimum height, to clear all obstacles by a safe margin, after considering CASR:
  - CASR 91.265 Minimum height rules – populous areas and public gatherings
  - CASR 91.267 Minimum heights rules – other areas
  - CASR 91.277 Minimum heights – VFR flights by night, or
  - CASR 91.305 Minimum heights – IFR flights.

You must determine the aeroplane performance from one of the following:

- the aircraft flight manual (AFM)
- the manufacturer's data manual (if any)
- other data approved under CASR Part 21 for the purpose.

In addition, as it applies to the take-off or landing, you must consider:

- the take-off or landing distance available
- the pressure altitude (PA) and temperature
- the gradient of the runway in the direction of take-off

- the wind direction, speed and characteristics
- the take-off and en route or landing weather forecast
- the obstacles in the vicinity of the take-off flight path
- the obstacles in the approach and missed approach flight path.

Ambient conditions and performance considerations

The following information relating to the effect of various aerodrome surfaces and ambient meteorological conditions on aircraft performance is an extract from Advisory circular (AC) 91-02 v1.0 Guidelines for aeroplanes with maximum take-off weight (MTOW) not exceeding 5,700 kg – Suitable places to take off and land. For a complete discussion of what can be performance limiting plus the recommended use of safety factors see **AC 91-02 v1.2**.

Aerodrome surface characteristics and rolling resistance

Rolling resistance is determined by the aerodrome surface characteristics, aeroplane mass and tyre pressure.

Runway surfaces may be concrete, bitumen, coral, gravel, soil, grass on soil or sand, hard-packed sand or a dry salt bed (e.g. a salt-lake), each with its own characteristics, many of which vary with the weather and season. Generally, the rolling resistance on concrete or bitumen is minimal and predictable, but the rolling resistance on other types of surfaces varies widely and will even vary with changes in surface solidity along the length of a given runway.

Rolling resistance can be caused by standing water on a runway surface because it builds up in front of the wheels (like the braking effect on a car driven across a water-covered causeway).

In the case of any natural surface, the soil's moisture content significantly affects rolling resistance, as does surface looseness, presence of algal growth, grass mass and characteristics, surface irregularities and subsurface softness. A very dry top is helpful on some natural surfaces, but detrimental on others. A very wet surface almost invariably gives rise to an unsatisfactory surface. Grass density, greenness and length have a significant effect on the rolling behaviour of an aeroplane (grass can also hide obstructions, holes, water, stones, anthills and erosion trenches).

Up to a point, rolling resistance may be welcome during landing (e.g. the extra resistance may shorten your landing roll), but unexpected rolling resistance on take-off retards aircraft acceleration and may lead to either a decision to abort the take-off, or possibly even an over-run accident, if not considered.

There are tables in AC 91-02 that provide guidance about the effects of various surface conditions, but these tables do NOT cater for all scenarios or all factors, and you must develop an ability to make your own assessments. Some of the factors that will affect the safety of take-off are:

- transverse or lateral slope, which can affect the aerodynamics of flight and may also result in a longer take-off roll because the pilot needs to use asymmetric brake, nosewheel steering or rudder to keep straight
- gravel, which may mean a longer take-off roll because power may need to be applied slowly during the initial roll to avoid stone-chip damage to the propeller, and this may, if the gravel is very soft, give rise to a wave effect in front of the wheels that resists forward motion
- grass, which resists the passage of an aeroplane rolling over it; while attempts are made to predict the effects of certain lengths of grass, rolling resistance will vary not just with the length, but also freshness, moisture content, density of stalks and the mass of material present
- free water, which not only affects the softness or slipperiness of the surface, but can build up in front of an aeroplane's wheels and cause a resistance to rolling or, at higher speeds, lift the wheels and cause aquaplaning and difficulty in maintaining directional control
- water in soil, which can create mud, which can affect an aircraft's directional control and may choke spats or wheel wells and restrict rotation of the wheels. In addition, soft spots may allow an aeroplane's wheel(s) to sink enough for the propeller to hit the ground, or may cause erratic rates of acceleration during a take-off
- bearing capacity, which is related to the type of runway surface and the aeroplane's weight and tyre pressure. If the bearing capacity is insufficient for the combination of aeroplane, tyres and surface, a form of bogging may occur even in dry conditions (as might be experienced when driving a vehicle over sand or a freshly ploughed paddock). Bearing capacity is usually worse than gravel in terms of creating rolling resistance.

The limits of safety during landing would be that which would cause damage to the tyres or aeroplane structure, or loss of directional control. Low tyre pressure can have a very significant effect. An under-inflated tyre is more prone to blowout or failure during the take-off or landing, which may cause the pilot to lose directional control. In any case, an under-inflated tyre will increase the rolling resistance and lengthen the take-off run.

Without engineering support, it is often difficult to be sure of the correct tyre inflation in aeroplanes with MTOW not exceeding 5,700 kg. You should be aware of the correct tyre pressures. These can normally be found in the AFM/pilot operating handbook (POH).

Wind speed and direction

Note: CASR 91.380 requires you to take off and land into wind to the extent practicable unless the AFM/POH allows the aircraft to land or take off downwind or crosswind, and you are satisfied that traffic conditions at the aerodrome enable such a landing or take-off to be carried out safely.

You should be aware that wind affects the length of runway required for take-off or landing. A downwind take-off or landing can add a significant distance to a nil wind or headwind take-off or landing distance. Landing or taking off into the wind should be your first option. Aircraft conducting operations at non-controlled aerodromes into wind have priority over aircraft conducting downwind operations.

For non-controlled aerodromes without an aerodrome weather information service (AWIS), you will need other visual cues to determine the take-off and landing direction. The windsock has been used for many years to provide wind direction and strength at the aerodrome surface.

While other systems are routinely available today that provide wind information, considerable useful information can be obtained by observing the windsock(s) before taking off or landing.

Note: It is recommended that, where possible, you observe and interpret the behaviour of a relevant windsock prior to taking off or landing.

For windsock interpretation, see Figure next page. Note the following:

- A windsock at a 45º angle to the horizontal indicates a windspeed of approximately 15 kt.
- A windsock that is horizontal indicates a windspeed of 25–30 kt.
- A windsock at a 30º angle to the direction of the runway indicates that half of the total windspeed will be crosswind.
- A windsock at a 45º angle to the runway indicates at least a 15 kt crosswind.
- Gusting conditions will be indicated by the windsock varying rapidly in direction or angle. These conditions should be treated with caution.

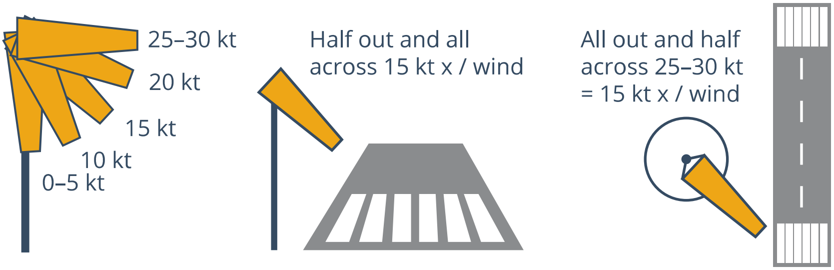
Note: It is recommended you consider both the possibility and effects of windshear, and whether the conditions remain within the maximum crosswind limit of the aircraft.

Where two windsocks are available, a difference in direction or speed between them can show a transient change or the influence of mechanical interference, such as trees or buildings. It is not unusual during the passage of frontal weather to have windsocks at either end of the runway showing completely opposite wind directions. Localised weather, such as gusts, or a willy-willy, can produce significant fluctuations of the windsock.

At uncertified aerodromes, it is recommended that, prior to your flight, you establish whether there are any windsocks and whether they are functional. Windsocks at uncertified aerodromes do not need to meet CASR Part 139 standards; therefore, they may not be able to be interpreted in accordance with the guidance in these paragraphs.

Note: When operating into unfamiliar uncertified aerodromes, it is recommended that, in addition to windsocks, you use secondary methods to judge the windspeed and direction, such as observing aeroplane drift, tree movements, glassy water on dams, directions of farm windmills, blowing dust etc.

Figure: Windsock interpretation



Temperature

Meteorological conditions must be considered when satisfying yourself that the place you intend to take off from or land at is suitable and safe (CASR 91.410).

High ambient temperature will have a significant effect on your take-off and landing performance.

Pressure altitude considerations

Pressure altitude (PA) is the height above a standard datum, which is a theoretical level where the pressure of the atmosphere is 1013.2 hectopascals (hPa) as measured by a barometer. An altimeter is essentially a barometer calibrated to indicate altitude in relation to the International Standard Atmosphere (ISA). As the atmospheric pressure changes, the standard datum may be below, at or above sea level. Pressure altitude is important as a basis for determining aircraft performance.

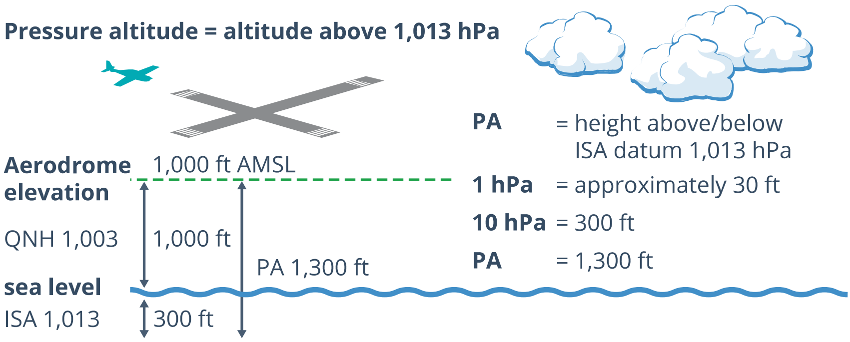
The reduction of ambient air pressure with height increases the true air speed (TAS) required for a given indicated air speed (IAS), which affects take-off and landing distance requirements.

- The pressure altitude for an aerodrome can be determined using one of two methods:
  - With the aeroplane parked on the aerodrome, set the barometric scale of the altimeter to 1,013 hPa.
  - The indicated altitude read is the pressure altitude
- Apply a correction factor to the aerodrome altitude above sea level according to the reported sea level pressure.

Put simply, pressure altitude is the height above the ISA datum of 1,013 hPa.

To determine pressure altitude at a sea level aerodrome, apply the regional or airfield pressure setting (QNH) to the aerodrome elevation as compared to 1,013h Pa. A 1,000 ft aerodrome elevation with a QNH of 1,003 hPa would be 10 hPa above 1,013. Where 1 hPa is equal to approximately 30 ft, 10h Pa x 30 ft gives a pressure altitude of 300 ft above the aerodrome elevation (or 1,300 ft above 1,013 hPa).

Figure: Pressure altitude calculation



As stated above, without making the above calculation, you are also able to read pressure altitude on the altimeter for the aerodrome (1,300 ft) of the aircraft at the aerodrome directly by setting standard pressure 1,013 hPa on the altimeter subscale.

Density altitude considerations

It is imperative that you are aware that the hotter the day gets, there is a decrease in air density. This, in turn, results in a decrease in aircraft performance. This decrease in air density markedly reduces engine power output, thereby having significant effect by reducing the aircraft's take-off and climb performance. This effect can be delayed if an aircraft is fitted with a turbocharger, which can maintain a regulated inlet air pressure to flight level heights. However, in all cases with an increase in temperature, not only is engine power reduced, but the volume or density of the air over the wing that generates lift is less. Increased humidity also reduces the density of air.

The term for correlating aerodynamic performance in the non-standard atmosphere is density altitude (DA) that is, the altitude in the standard atmosphere corresponding to a particular value of air density.

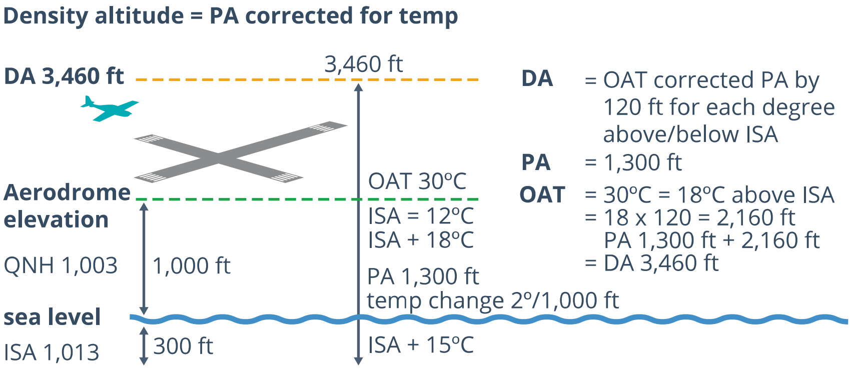
Density altitude can be determined by correcting the outside air temperature (OAT) compared to the ISA temperature value against the aerodrome elevation. With a higher-than-normal ambient temperature, the aircraft performance will be less than that at a standard ISA temperature. Conversely, if it is colder, the performance will be improved.

Determining the aircraft take-off or landing performance is predicated on knowing the density altitude. You do not always have to make a separate density altitude calculation because take-off and landing performance charts normally provide integral solutions for density altitude through entries of pressure altitude and temperature.

However, light sport aircraft (LSA) or experimental aircraft do not always have performance charts that allow for the calculation of performance when operating in other than ISA conditions. Although some POHs suggest corrections are to be made, you are often left with limited information to make such determinations. You should be acutely aware of the performance loss at high-density altitudes and apply factors to make allowance for the variation to the take-off and landing performance in these conditions when compared to ISA conditions.

Density altitude can be determined by applying an ambient temperature correction to the pressure altitude. Each 1°C variation from ISA (15°C at sea level) is equivalent to a 120 ft variation in density altitude. Thus, for a 1,000 ft aerodrome elevation in the example above having a 1,300 ft PA, ISA equals approximately 12°C. If the aerodrome has a 30°C outside air temperature, this is 18°C hotter than ISA. Therefore, 120 x 18 equals 2,160 ft, plus PA 1,300 ft, equals a density altitude of 3,460 ft. So, the performance of the aircraft will be degraded. It will perform as if the aircraft were at 3,460 ft and not at 1,000 ft aerodrome level.

Figure: Density altitude calculation



Humidity

Performance data for aeroplanes not exceeding 5,700 kg does not usually include a humidity correction, but you should be aware that all engines are adversely affected to some degree by high humidity. This is due to water vapour displacing oxygen, thus reducing the temperature rise during combustion. If an aeroplane's documentation provides relevant information related to humidity, you should allow for the effects of humidity during take-off.

Light conditions

You should not underestimate the difficulties associated with taking off or landing directly into a low sun and should take into account haze, smoke or low light when manoeuvring in the vicinity of an aerodrome or looking for other traffic.

Note: If a take-off or landing into the sun is known to be likely, it is recommended that you ensure the windscreen is clean.

Weight altitude temperature (WAT) limitations

It is important to remember there is more to performance than the ability to take off and land within the available runway length. Terrain and obstacles must be cleared after take-off and during the approach to land.

For aeroplanes not exceeding 5,700 kg, the take-off distance in the AFM has been determined from the commencement of the take-off run, through to lift off and to a height of 50 ft. For landing, it is taken from 50 ft at a speed of 1.3 V_{so} through to touchdown to pulling up with maximum braking applied. For certain LSA, experimental or certain certified aircraft, the POH may quote the take-off or landing roll; the distance quoted is significantly shorter than the true distance to take off and land from 50 ft with certainty and safety.

To ensure that climb performance does not fall below prescribed certification minimums, most AFMs give take-off and landing weights that should not be exceeded at the prevailing altitude and temperature. For multi-engine aircraft, climb performance is predicated on meeting the weight limitations specified under the aircraft's certification status.

V_{so} -The stall speed or the minimum steady flight speed in the landing configuration. In aeroplanes with MTOW not exceeding 5,700 kg, this is the power-off stall speed at the maximum landing weight in the landing configuration, i.e. flaps and landing gear extended.

Obstacles on and in the vicinity of an aerodrome

You should be aware that uncertified aerodromes may declare an available runway length that begins and ends directly at an obstacle. Common examples might be small trees at the beginning or the end of the runway surface.

Obstruction-free areas on a runway extended centreline provide for low angles of take-off and safe clearance on approach. A significant clear area at the end of a runway may have an important psychological effect on the way you handle an aeroplane during take-off and landing.

During take-off, close-in obstructions on the runway's extended centreline may cause you to lift off early and climb at an excessive angle, which will aggravate any problem of poor view of obstructions through the windscreen, at a high pitch angle; in turn, this may lead to a further increase in pitch.

During landing, high ground or obstructions in the approach area can cause you to adopt a higher-than-normal approach path to avoid the obstacle, but still achieve a touchdown early in the available runway length. Conversely, significant obstacles below the runway such as sea walls, creeks, or ditches may generate optical illusions that cause difficulties for you when assessing whether you are on a normal approach path. This effect is likely to be worse when the aeroplane has poor forward visibility or is approaching in a flapless configuration. In all cases, the likely outcome is a long landing and the subsequent psychological effect of pressing on with a landing from an unusual situation, which could be outside your experience.

It is recommended that you have a thorough awareness of the obstacles in the approach and climb-out flight paths. Where you do not have experience with non-standard approach and departure angles, it is recommended you consider alternative aerodrome options, or receive training in the special techniques necessary for these kinds of circumstances.

Aerodromes where there is an extended surface beyond the normal runway length provide additional margins of safety. Even where the surface of the obstacle-free area is not sound enough to permit normal operation of an aeroplane, it may, nevertheless, minimise structural damage if an aeroplane undershoots or overruns the runway.

For low-powered twin-engine aeroplanes, where an engine failure just after take-off would result in a significantly reduced rate of climb, runways that have obstacle-free, low-angle departure areas will significantly lower the risk of the aircraft striking obstacles in the climb-out flight path. If the runway being used for take-off does not have such an area, you should consider the use of an alternative runway.

Icing

Icing conditions – pre-flight information

When planning flights at or below 10,000 ft, note that the graphical area forecast (GAF) includes information about known or expected icing conditions, and which is available through NAIPS. General information about icing conditions is stated under the ‘Cloud, icing and turbulence’ heading of the GAF.

Information about reported icing conditions that may affect the safety of aircraft operations (that is severe icing), will be included in a SIGMET (Information concerning en route weather phenomena which may affect the safety of aircraft operations).

Information about icing conditions that may affect aircraft operations but to a lesser degree of severity than those issued as a SIGMET (that is moderate icing), will be included in an AIRMET. An AIRMET refers to information concerning weather significant to low level aircraft operations, and which was not already in the forecast for low level flights in the flight information region or sub area concerned.

Information about icing conditions within a 5 NM radius of an aerodrome serviced by an automatic weather station (AWS) or an authorised meteorological observer, may be included in aviation special weather (in aeronautical meteorological code) (SPECI) if it is likely to affect aircraft operations safety (AIP GEN 3.5).

Icing conditions – airframe (CASR 91.705)

Before you begin a flight there must be no frost, ice or snow adhering to the aircraft's wings, flaps, control surfaces, rotors, propellers, and horizontal or vertical stabilisers.

In addition, there must be no frost, ice or snow adhering to the top of the fuselage when the aircraft has rear mounted engines, or for any other aircraft where it could be hazardous to the safe operation of the aircraft.

***Exception:** These requirements do not apply if the take-off is conducted in accordance with the AFM that relates to take-off in the above conditions.*

Flight in icing conditions (CASR 91.710)

You must not commence a flight in known or suspected icing conditions unless your aircraft is certified as complying with the airworthiness standards to fly in icing conditions.

If your aircraft is not certified as complying with the airworthiness standards to fly in icing conditions, and you inadvertently fly into icing conditions, you must change your aircraft's flight path to try and avoid the icing conditions as soon as practicable.

Icing conditions – carburettor

For piston engine aircraft, carburettor icing is of particular concern because, unlike airframe icing, the risk of ice build-up in the carburettor can be high even with no visible moisture and an OAT of up to 38°C.

Carburettor icing occurs when the air temperature adiabatically decreases sufficiently to condense water vapour and for the localised air temperature to reduce below freezing. Ice builds up as the chilled condensed water contacts localised surfaces, such as the butterfly valve and the venturi walls. Carburettors experience additional cooling because of the evaporation of fuel. Furthermore, the risk of carburettor icing is significantly increased at partial power settings (for example, when power is reduced during descent), because of the cooling effect of a partly-closed throttle.

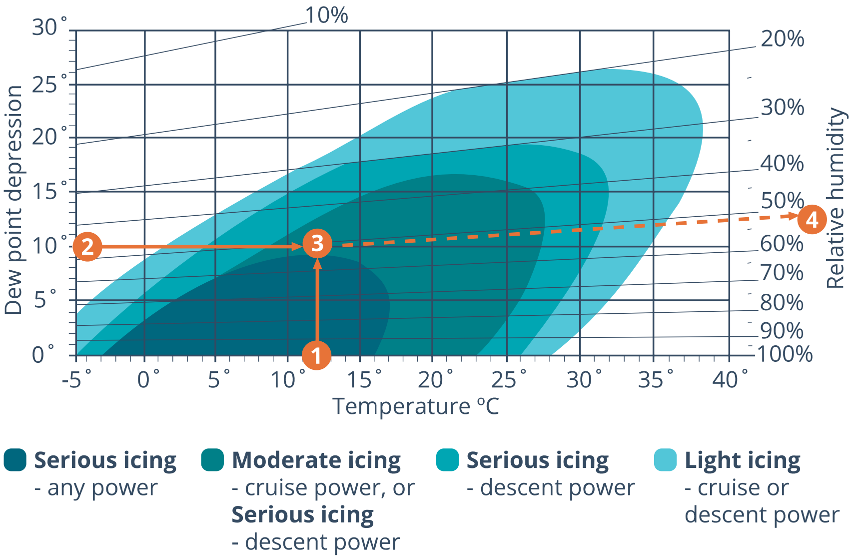
CASA has published a specialised chart to measure carburettor icing probability based on known OAT and dew-point depression. Dew-point depression is the difference between OAT and dew-point temperature, and this information is available from an aerodrome's AWS or in an aviation routine weather report (in aeronautical meteorological code) (METAR)/SPECI aerodrome meteorological reports.

Carburettor icing probabilities are shown on the chart following. The chart also shows the results of using the following example calculation to find the probability of carburettor icing and the relative humidity.

Assuming OAT (or dry bulb temperature) = 12°C and Dew point = 2°C:

- Calculate dew point depression: OAT (or dry bulb temperature) minus dew point = 12 − 2 = 10.
- Find the intersection of 12 (horizontal axis) and 10 (vertical axis) and note the shading indicates:
  - moderate icing for cruise power, or
  - serious icing for descent power.
- From the intersection, follow the slanted reference lines to the right and note relative humidity is 52 per cent.

Figure: Carburettor icing probability chart



To use the chart:

- Obtain the temperature and dew point.
- Calculate temperature minus dew point. This figure is used as the dew point depression.
- Find the intersection between the temperature (horizontal axis) and the dew point depression (vertical axis) and note the shaded area of its location.
- For relative humidity, follow the slanted reference lines to the right and refer to the relative humidity scale for a percentage value.

Fuel requirements (CASR 91.455)

You must comply with the fuel requirements set out in the MOS including (but not limited to):

- matters that must be considered when determining whether the aircraft has enough fuel to complete the flight safely
- determining the quantity of fuel you must carry
- monitoring fuel quantity
- what to do when fuel reaches a specified quantity.

Definitions of final reserve fuel and contingency fuel (CASR 91 MOS 19.02)

The terms 'final reserve' and 'contingency' are new terms that have replaced Fixed reserve and Variable reserve, respectively, used under the Civil Aviation Regulations 1988 (CAR). These new terms are consistent with International Civil Aviation Organization (ICAO) terminology.

You must carry the final reserve and contingency fuel amounts set out in the following table.

Table: Final reserve and contingency fuel requirements

Aircraft category	Flight rules	Final reserve	Contingency
Piston engine or turboprop 5700 kg and less	VFR	30 minutes	nil
Piston engine or turboprop 5700 kg and less	Night VFR	45 minutes	nil
Piston engine or turboprop 5700 kg and less'	IFR	45 minutes	nil
Any turbojet aeroplane or a turboprop aeroplane greater than 5700 kg	IFR or VFR	30 minutes	5% of trip fuel
Piston engine aeroplane greater than 5700 kg	IFR or VFR	45 minutes	5% of trip fuel
Helicopter	VFR	20 minutes	nil
Helicopter	IFR	30 minutes	nil

General requirements (CASR 91 MOS 19.03)

Fuel consumption data

When determining the amount of usable fuel required you must use one of the following fuel consumption data sources:

- the most recent aircraft specific fuel consumption data derived from the fuel consumption monitoring system used by the operator of the aircraft (if available)
- the aircraft manufacturer's data for the aircraft.

Note: The aircraft manufacturer's data includes electronic flight planning data. The manufacturer's data may be in the AFM, cruise performance manuals or other publications.

Operational requirements

When determining the amount of usable fuel required you must also consider the effect of the following:

- the operating conditions for the proposed flight, including the:
  - actual weight (if known or available), or the anticipated weight of the aircraft
  - relevant NOTAMs
  - relevant authorised weather forecasts and authorised weather reports
  - relevant ATS procedures, restrictions and anticipated delays
  - effects of deferred maintenance items and configuration deviations
- the potential for deviations from the planned flight because of unforeseen factors.

Amount of fuel that must be carried for a flight

(CASR 91 MOS 19.04)

At commencement of a flight

The minimum amount of usable fuel required to be onboard at the commencement of a flight must be the sum of:

- taxi fuel
- trip fuel
- destination alternate fuel (if required)
- holding fuel (if required)
- contingency fuel (if applicable)
- final reserve fuel
- additional fuel (if applicable).

At the point of inflight replanning (if any)

The minimum required amount of usable fuel to be onboard to continue a flight, from the 'point of in-flight replanning' must include:

- trip fuel from that point
- destination alternate fuel (if required)
- holding fuel (if required)
- contingency fuel (if applicable)
- final reserve fuel
- additional fuel (if applicable).

Continuation of flight at any time

The minimum required amount of usable fuel to be onboard at any time to continue a flight safely must include:

- trip fuel from that time
- destination alternate fuel (if required)
- holding fuel (if required)
- final reserve fuel
- additional fuel (if applicable).

If fuel is used after a flight commences for purposes other than originally intended during pre-flight planning, you must re-analyse the planned use of fuel for the remainder of the flight and adjust the flight parameters, if necessary, to remain compliant with the fuel requirements.

Procedures for determining fuel before flight and fuel monitoring during a flight (CASR 91 MOS 19.05)

You must ensure that the amount of usable fuel onboard the aircraft is determined before the flight commences.

You must ensure that the amount of fuel is checked at regular intervals throughout a flight, and that the usable fuel remaining is evaluated to:

- compare planned fuel consumption with actual fuel consumption
- determine whether the remaining usable fuel is sufficient to meet the fuel requirements (as applicable):
    - when re-planning from any point in-flight, and
    - for continuation of flight at any time
- determine the amount of usable fuel expected to be remaining when the aircraft lands at the destination aerodrome.

Procedures if fuel reaches specified amounts

(CASR 91 MOS 19.06)

If an in-flight fuel quantity check shows that the usable fuel on landing at the destination aerodrome will or is likely to be less than the fuel required for continuation of flight at any time you must consider the likely air traffic and operational conditions on arrival at:

- the destination aerodrome
- the destination alternate (if required)
- any en route alternate aerodrome, and
    - proceed to an aerodrome that will enable you continue to meet all the requirements for amounts of fuel that must be carried for a flight in CASR 91 MOS 19.04 above, as applicable.

You must request from ATS the duration of any likely delay in landing if unforeseen factors could result in landing at the destination aerodrome with less than the following amounts of fuel remaining:

- the final reserve fuel
- the destination alternate fuel (if required).

You must declare to ATS a 'minimum fuel' state if:

- you are committed to land the aircraft at an aerodrome
- it is determined that if there is any change to the existing air traffic control clearance issued to the aircraft in relation to that aerodrome, the aircraft will land with less than the final reserve fuel remaining.

Notes:

1. The declaration of 'minimum fuel' informs Air Traffic Services that all planned aerodrome options have been reduced to a specific aerodrome of intended landing, and any change to the existing clearance may result in landing with less than the final reserve fuel. This is not an emergency, but an indication that an emergency situation is possible should any additional delay occur.
2. You should not expect any form of priority handling because of a 'minimum fuel' declaration. Air Traffic Services will, however, advise the flight crew of any additional expected delays, and coordinate when transferring control of the aircraft to ensure other ATC units are aware of the aircraft's fuel state.

   If, at any time during a flight, the amount of usable fuel remaining on landing at the nearest aerodrome where a safe landing can be made, will be, or is likely to be, less than the final reserve fuel, then you must declare a situation of 'emergency fuel' by broadcasting 'MAYDAY, MAYDAY, MAYDAY FUEL'.

Note: The emergency fuel declaration is a distress message.

> Why declare 'MAYDAY FUEL'?
>
> The 'MAYDAY, MAYDAY, MAYDAY FUEL' declaration aims to increase safety. It alerts other airspace users to a potential fuel problem facing an aircraft in their vicinity and ensures priority is given to the aircraft making the declaration to reduce the chances of an accident.
>
> The declaration is an internationally recognised standard aligning Australia with the ICAO standards designed to manage aviation safety risks.
>
> Mandating the declaration of 'MAYDAY FUEL' is not aimed at setting conditions to prosecute pilots or operators; nor does it automatically mean that emergency services will be mobilised.
>
> It is fundamental to flight safety that you have enough fuel before you depart to allow you to land with at least your final reserve intact. Thorough fuel planning and in-flight fuel management must be a high priority for any pilot.
>
> Preserving final fuel reserve is a foundation for in-flight fuel decision-making which leads to safer operations. This does not mean that in all instances preserving your final fuel reserve is the highest priority. There may be occasions where it is more important to exercise judgement to determine the safest outcome, which may include landing with less than final fuel reserve.

For comprehensive guidance on fuel policy see **AC 91-15 v1.1** including Annexes **A** and **B**.

Know your aircraft fuel capacity and consumption

(CASR 91 MOS 19.03)

When determining the amount of usable fuel required you must use one of the following fuel consumption data sources:

- the most recent aircraft specific fuel consumption data derived from the fuel consumption monitoring system used by the operator of the aircraft (if available) or
- the aircraft manufacturers data for the aircraft – from AFM or POH.

You should refer to the AFM or POH to find:

- total fuel capacity
- useable fuel.

You should also familiarise yourself with the aircraft's fuel systems to know:

- whether the engine is fuel injected or fitted with a carburettor
- where to leave the fuel selector valve when parked:
  - both
  - left (or right), or
  - in the off position.

You should check fuel availability en route and note suppliers and operating hours (refer to ERSA).

Never plan to use final reserve fuel. You must always land with your final fuel reserve on board your aircraft.

Establishing fuel on board before flight

Establishing the amount of fuel on board can be difficult, especially in smaller aircraft. To gain accurate fuel quantities, if tanks are partially full, the aircraft should ideally be on level ground and you should use the manufacturer's accurately graduated dipstick, sight gauge, drip gauge or tank tab.

Try to fuel on level ground to avoid inaccurate fuel measurements and unwanted fuel transfer. Note the procedures that may be set out in the AFM or POH, especially regarding the positioning of the fuel selector valve.

Dip each tank to check the amount of fuel. If the tank is partially filled, any direct reading must be either discounted or rounded down to a figure consistent with the next lower tab or marking. However, direct readings of a partially filled tank may be used if the aircraft is level and:

- the fuel is at or above a tab with a clearly established value, or
- the fuel gauge reading corresponds to a dipstick value.

Before starting the aircraft engine, you should crosscheck fuel amounts by at least two separate methods. If you are not assured that the aircraft tanks are completely full, or a totally reliable and accurately graduated dipstick, sight gauge, drip gauge or tank tab reading can be done, consider the following methods:

- check of visual readings (tab, dip, drip, sight gauges) against fuel consumed indicator readings
- having regard to previous readings, a check of electrical gauge or visual readings against fuel consumed indicator readings
- after fuelling, and having regard to previous readings, a check of electrical gauge or visual readings against the fuelling installation readings
- where a series of flights is undertaken by the same pilot and fuelling is not carried out at intermediate stops, crosschecking the quantity gauge readings against computed fuel on board and/or fuel consumed indicator readings, provided the system is known to be reliable.

As part of your daily or prefight inspection:

- Ensure drains and vents are working properly.
- If you are using aviation gasoline (AVGAS), ensure that you rock the aircraft to move trapped water over the drain point before carrying out a fuel drain (refer aircraft manufacturer's recommendations).
- Check for contaminants, particularly water; and correct fuel type. Ensure the fuel filler cap is secure and sealed.

In flight fuel management

At regular intervals you must compare fuel remaining with planned figures and should monitor tank selection. Checking at least every 30 minutes and at turning points is recommended.

Use planned power settings and correct mixture-leaning technique (at all altitudes) and make sure gauge readings are conducted per the aircraft's fuel calibration card.

If you find that insufficient fuel remains to continue with the planned flight to land with your final fuel reserves intact, you must re-plan to an alternative safe landing area.

Post-flight fuel comparisons

You should compare usage figures with planned figures when next fuelling. The figures can be confirmed or crosschecked in aircraft where ‘dipping’ the fuel tank is possible as discussed above.

Fuel planning example

The following example is an extract from Annex A to **AC 91-15 v1.1**. It shows the fuel that is required to be carried in accordance with CASR 91.455.

Scenario and conditions

The flight route scenario is from Essendon to Swan Hill in a single engine piston aeroplane Cessna 210 (C210). Mildura is selected as the destination alternate aerodrome for the scenario development where a destination alternate aerodrome is required. The figures for the performance are extracted from the C210 POH:

Route distance:	161 NM
Destination alternate distance:	100 NM (if required)
Aircraft take-off weight:	3,750 lbs
Usable fuel capacity:	543 lbs
Climb wind and temp:	20 kt headwind, ISA +15 deg
Cruise wind and temp:	20 kt headwind, ISA +15 deg

Note: Wind and temperature for climb is generally taken at 2/3 of the cruise height. For descent, it is generally taken at ½ of the descent height.

Performance data – from POH

Extracted from Cessna 210 POH.

Units of Measurement

The unit of measurement for fuel values are in pounds (lbs) according to the C210 POH. In the example, fuel uplift information has been stated in litres (L). The conversion of AVGAS (specific gravity 0.720 at sea level ISA conditions) from lbs to L is based on a conversion factor of 1.58).

Note: Where fuel values contain varied units of measurement, care must be taken to ensure that the conversion of those values is based on correct information and accurately performed.

Taxi fuel

From the C210 POH, 12 lbs is the engine start, taxi, and take-off allowance. This should be taken as the minimum figure. In situations where extended taxi or ground delay after starting can be anticipated, this value should be increased accordingly.

As take-off fuel is a component of trip fuel, a simple proportional estimate can be used to determine the start and taxi (and run-up if required) and take-off.

- Start and taxi: 6 lbs.

Note: This is NOT part of trip fuel. While the AFM refers to 'start and taxi', for these calculations that amount of fuel will be referred to only as 'taxi'.

- Take-off: 6 lbs.

Note: Take-off fuel IS part of trip fuel.

Trip fuel

Trip fuel means the amount of fuel required to enable an aircraft to fly from any point along a route until landing at a destination aerodrome including (as applicable) the following:

- fuel for take-off and climb from departure aerodrome elevation to initial cruising level or altitude, taking into account the expected departure routing
- fuel for cruise from top of climb to top of descent, including any step climb or descent
- fuel from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure fuel for executing an approach and landing at the planned destination aerodrome.

Fuel for take-off and climb

Data time, fuel, and distance to climb (nil wind) are provided in the C210 POH.

Given the visual flight rules (VFR) nature of the flight, the planned cruising level is 8,500 ft, so it is suggested that the data be interpolated to achieve an accurate figure.

Data from the POH/AFM is interpolated between 8,000 ft and 10,000 ft lines. Temperature adjustment is made in accordance with POH/AFM instructions. To apply wind correction, climb wind is used to adjust the distance to climb (the result is called top of climb or TOPC).

Essendon airport is situated at an elevation of 282 ft AMSL. However, because the difference in aircraft performance between sea level and 282 ft is negligible, it has been taken to be at sea level.

Fuel for cruise

Cruise data is provided in the C210 POH. Tabulated data is again provided for 2,000 ft intervals. The table has % power, TAS and fuel flow for standard temperature and at 20 degrees above and below the standard temperature. Given the VFR planned cruising level is 8,500 ft, the data in the 8,000 ft table can be used (rounding down from 8,500 ft) as the approximation will be conservative with respect to fuel usage.

Fuel for descent, approach and landing

The C210 POH does not provide descent data. Cruise fuel planning from the previous section provides the amount of fuel required for cruise from the TOPC to overhead the planned destination aerodrome. If the descent and approach to the planned destination aerodrome is anticipated to consume more fuel than would be used to cruise the same distance at cruise level, it would be prudent to include an approach allowance in the cruise fuel. This may be calculated at an intermediate level and at an appropriate power setting for the anticipated circumstances.

Total trip fuel

Having calculated the climb, cruise, descent and approach fuel amounts, the elements of trip fuel are known and can be summed.

Destination alternate fuel

Not required for this part of the scenario.

Holding fuel

Not required for this part of the scenario.

Contingency fuel

Not required for operations in this aeroplane.

Additional fuel

Not required for operations in this aeroplane

Final reserve fuel (previously known as fixed reserve)

The final reserve fuel for this operation is fuel to fly for 30 minutes (0.5 hr), calculated at the anticipated weight at holding speed 1,500 ft above the planned destination aerodrome in ISA conditions.

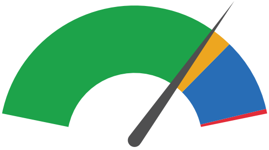
While it does not provide fuel consumption rates for holding, the C210 POH does suggest that holding be conducted using 45% power.

CAUTION, the amount of fuel that results from the 30-minute calculation under the conditions above DOES NOT ASSURE 30 MINUTES OF FLIGHT TIME IN ALL CONDITIONS. Should the actual aircraft fuel consumption rate exceed the rate calculated, such as for repeated circuits or approaches, somewhat less than 30 minutes of flight time may be available. For example, continuous application of full power at 2,000 ft would result in a fuel flow of greater than 100 lbs/hr (e.g. a C210 would consume 29 lbs of fuel in approximately 17 minutes at full power).

Table: Usable fuel required at the commencement of the day VFR flight

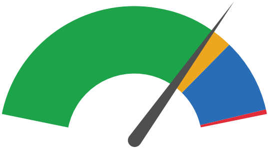
	Fuel amount	Minutes	Pounds	Litres
A	Taxi fuel	0	6	4
B	Trip fuel	72	111	70
C	Contingency fuel	0	0	0
D	Destination alternate fuel	0	0	0
E	Final reserve fuel	30	29	18
F	Additional fuel	0	0	0
G	Holding fuel	0	0	0
H	Fuel required (A+B+C+D+E+F+G) as required	102	146	92

Pounds

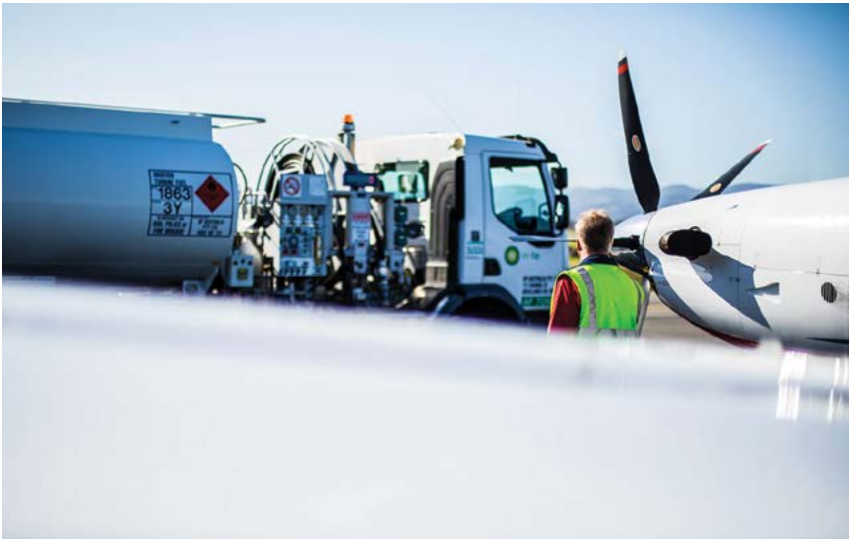


6 lbs	Taxi	146 lbs Required fuel
111 lbs	Trip	
29 lbs	Final	
397 lbs	Margin	
543 lbs	Fuel capacity	

Litres



4 L	Taxi	92 L Required fuel
70 L	Trip	
18 L	Final	
252 L	Margin	
344 L	Fuel capacity	



Duncan Grant | Adelaide refuel

Time

Before commencing your flight you should check your timepiece for accuracy to within plus or minus 30 seconds.

Australia uses Coordinated Universal Time (UTC) for all civil aviation operations (AIP GEN 2.1).

The term 'Zulu' is used when ATC procedures require a reference to UTC, for example:

- 0920 UTC is said as 'zero nine two zero zulu'
- 0115 UTC is said as 'zero one one fife zulu'.

Converting from Standard Time to UTC

Standard Time	UTC
Eastern Standard Time	Subtract 10 hours
Central Standard Time	Subtract 9.5 hours
Western Standard Time	Subtract 8 hours

Note: Daylight saving is not applied universally across Australia and is not published in the AIP.

The 24-hour clock system is used in radiotelephone transmissions. The hour is indicated by the first two figures and the minutes by the last two figures. For example:

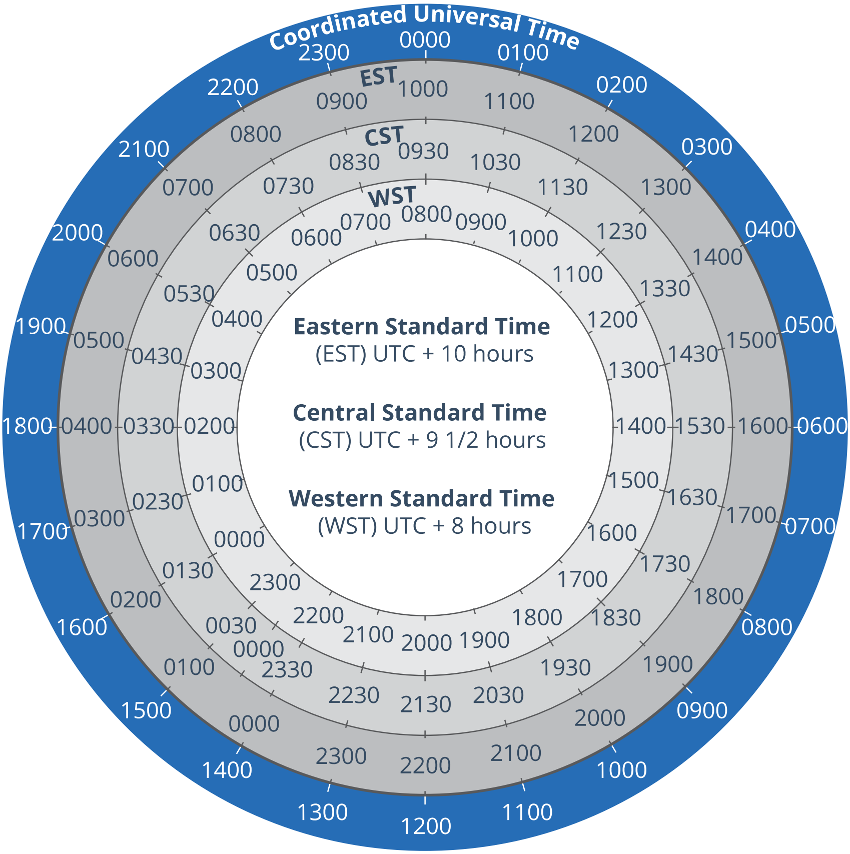
- 0001 is said as 'zero zero zero one'
- 1920 is said as 'one nine two zero'.

Time may be stated in minutes only (two figures) in radiotelephone communications when no misunderstanding is likely to occur. Current time in use at a station is stated to the nearest minute in order that you may use this information for time checks.

Control towers will state time to the nearest half minute when issuing a taxi clearance to a departing aircraft. For example:

- 0925:10 is said as 'time, two five'
- 0932:20 is said as 'time, three two and a half'
- 2145:50 is said as 'time, four six'.

Coordinated Universal Time



Time format

Date and time are indicated in a combination of the date and time in a single six-figure group. However, a 10-figure group comprising the year, month, date, hours and minutes is used for NOTAMs and AIS supplements (SUP)s. This is reduced to an eight-figure group (nil year) for a specific pre-flight information bulletin (SPFIB). The format is yymmddhhmm. For example:

> 1215 hours UTC on 23 March 2020 would be written as **2003231215**

Daylight and darkness (AIP GEN 2.7)

'Night' is that period between the end of the evening civil twilight and the beginning of the morning civil twilight. For all intents and purposes, first light should be construed as the beginning of civil twilight and last light as the end of civil twilight. The terms 'sunrise' and 'sunset' have no relevance when calculating daylight operating times for the VFR pilot.

Note: Sunrise, sunset and civil twilight times (first and last light) can also be obtained from Geoscience Australia.

To compute the beginning or end of daylight using the graphs contained below in this section:

- Enter the top or bottom of the scale at the appropriate date (each line represents five-day increments).
- Move vertically up or down to the curve for the latitude of the place concerned (interpolating for intermediate latitudes if necessary).
- Move horizontally to the left or to the right and read local mean time (LMT) on the vertical scale at the side.
- To convert to UTC, subtract (in E longitudes) from the LMT obtained, the time increment corresponding to the longitude of the place concerned in the Conversion of arc to time table.
- To convert to EST, add 10 hours to UTC.
- To convert to CST, add 9.5 hours to UTC.
- To convert to WST, add 8 hours to UTC.

When using these graphs, note that the parameters used in compiling them do not include the nature of the terrain surrounding a location, or the presence of other than a cloudless sky and unlimited visibility at that location.

Consequently, cloud cover, poor visibility or high terrain to the west of an aerodrome will cause daylight to end at a time earlier than that extracted from the appropriate graph. Allowance should be made for these factors when planning a flight having an ETA near the time of last light.

NAIPS automatically computes first light and last light. This information can be provided through pilot access, as part of a telephone briefing, or from Flightwatch.

Local time

Local time in Australia falls into three separate zones:		
EST	UTC + 10 hours	New South Wales (except the Broken Hill area), Queensland, Victoria, Tasmania and the Australian Capital Territory
CST	UTC + 9.5 hours	South Australia, the Northern Territory and the Broken Hill area
WST	UTC + 8 hours	Western Australia

However, certain states introduce local summer time each year between October of that year and April of the following year, which adds an additional hour to the local time applicable in that state.

A NOTAM or AIP supplement will be issued detailing revised hours of operation for those aeronautical facilities affected by local time changes during periods of state summer time and which do not have such hours publicised in the AIP.

Time of last light (AIP GEN 2.7)

Location	Echuca
Date	20-Nov
Lat/Long	S36 09.0 E144 46.0

Worked example

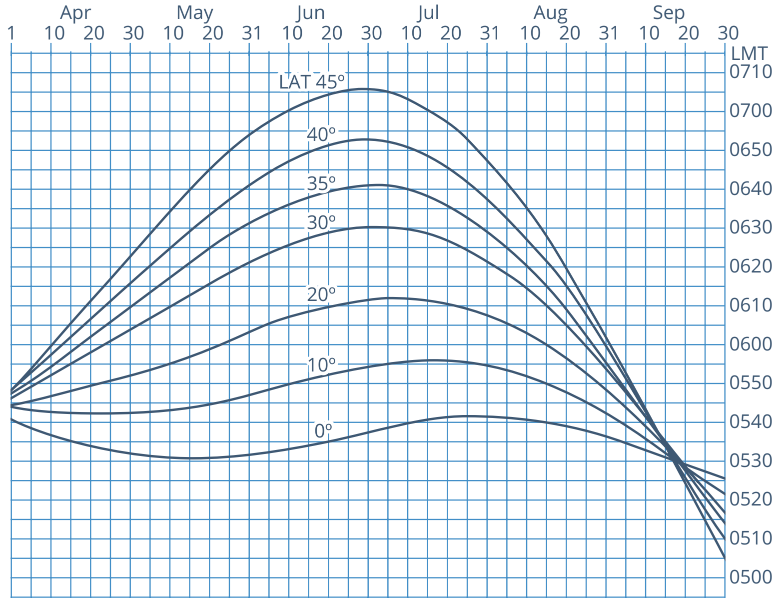
Find the time of last light at Echuca (360900S 1444600E) on 20 November.

Solution

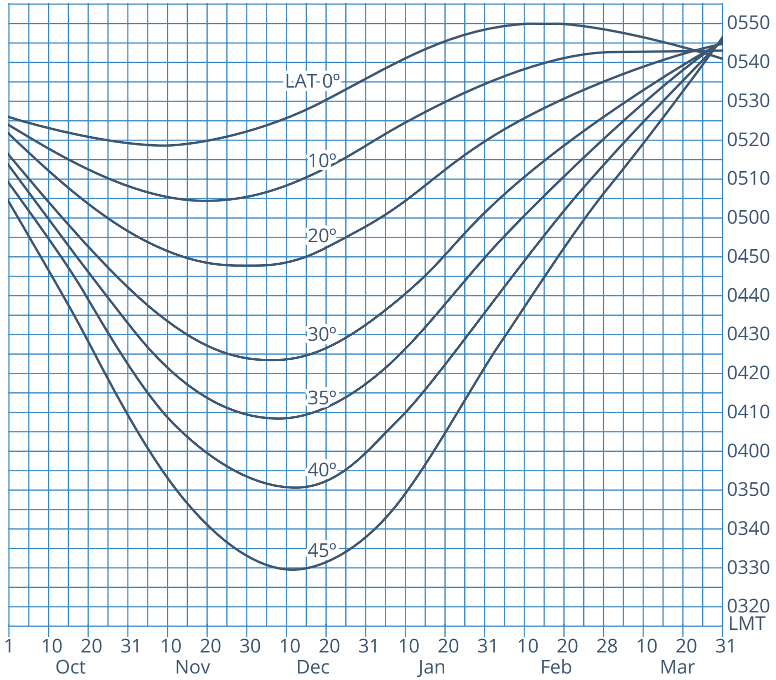
Use the Time of last light October to March chart and Arc to time conversion table (below):

- Using the Time of last light chart, enter at 20 November and follow downward until reaching latitude 36° (by interpolation) then straight across to read off Local Mean Time (LMT) = 1919.
- To convert to UTC, using the Arc to time conversion table, find longitude 144° = 9h 36m.
- Add the increment corresponding to 46′ in the right-hand column = 3′ 04″ + 0936 = 0939.
- Subtract the arc to time from the LMT to give the time of last light in UTC: 1919-0939 = 0940 UTC.

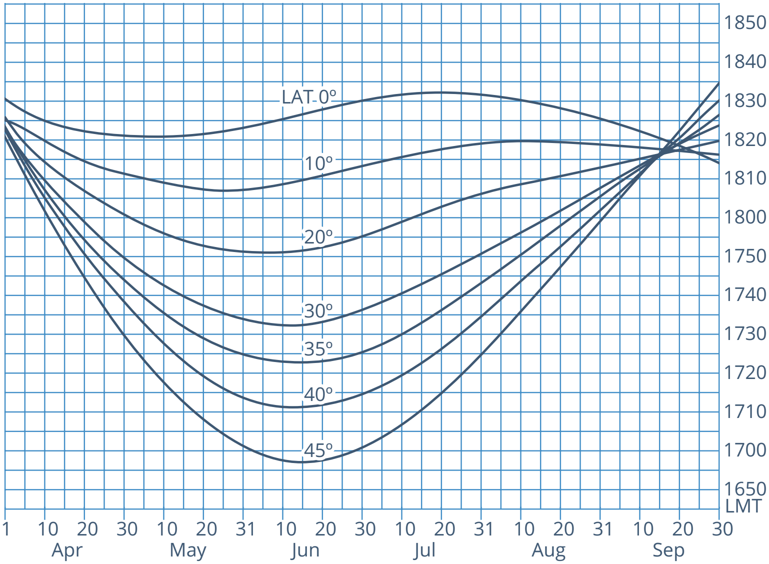
Time of first light April to September



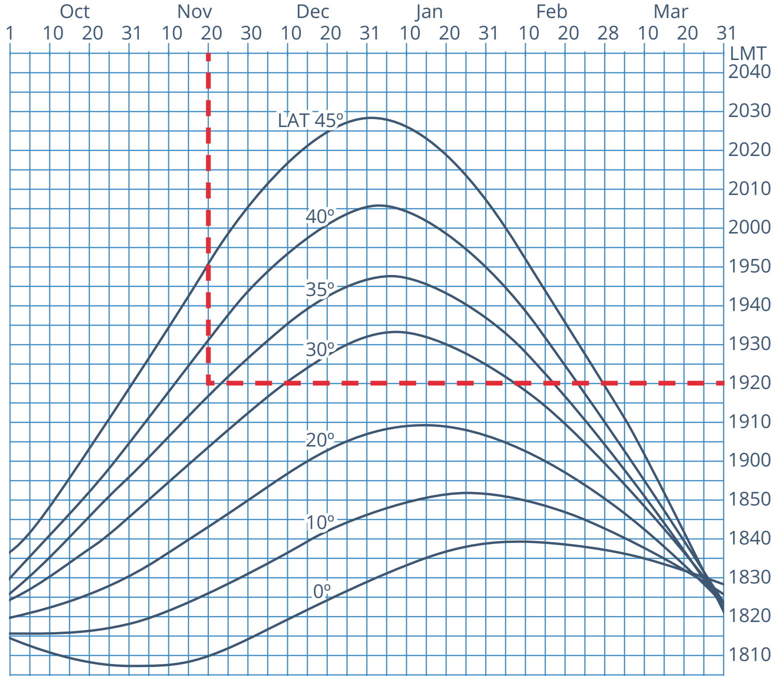
Time of first light October to March



Time of last light April to September



Time of last light October to March



Arc to time conversion (AIP GEN 2.7)

Degrees

Long. Deg.	Time		Long. Deg.	Time	
	Hr	Min.		Hr	Min.
110	7	20	**135**	9	0
111	7	24	**136**	9	4
112	7	28	**137**	9	8
113	7	32	**138**	9	12
114	7	36	**139**	9	16
115	7	40	**140**	9	20
116	7	44	**141**	9	24
117	7	48	**142**	9	28
118	7	52	**143**	9	32
119	7	56	**144**	9	36
120	8	0	**145**	9	40
121	8	4	**146**	9	44
122	8	8	**147**	9	48
123	8	12	**148**	9	52
124	8	16	**149**	9	56
125	8	20	**150**	10	0
126	8	24	**151**	10	4
127	8	28	**152**	10	8
128	8	32	**153**	10	12
129	8	36	**154**	10	16
130	8	40	**155**	10	20
131	8	44	**156**	10	24
132	8	48	**157**	10	28
133	8	52	**158**	10	32
134	8	56	**159**	10	36

Minutes

Long. min.	Time		Long. min.	Time	
	Min.	Sec.		Min.	Sec.
0	0	0	**30**	2	0
1	0	4	**31**	2	4
2	0	8	**32**	2	8
3	0	12	**33**	2	12
4	0	16	**34**	2	16
5	0	20	**35**	2	20
6	0	24	**36**	2	24
7	0	28	**37**	2	28
8	0	32	**38**	2	32
9	0	36	**39**	2	36
10	0	40	**40**	2	40
11	0	44	**41**	2	44
12	0	48	**42**	2	48
13	0	52	**43**	2	52
14	0	56	**44**	2	56
15	1	0	**45**	3	0
16	1	4	**46**	3	4
17	1	8	**47**	3	8
18	1	12	**48**	3	12
19	1	16	**49**	3	16
20	1	20	**50**	3	20
21	1	24	**51**	3	24
22	1	28	**52**	3	28
23	1	32	**53**	3	32
24	1	36	**54**	3	36
25	1	40	**55**	3	40
26	1	44	**56**	3	44
27	1	48	**57**	3	48
28	1	52	**58**	3	52
29	1	56	**59**	3	56

Charts (AIP GEN 3.2)

Charts available (but not limited to)

VFR	IFR
Planning Chart Australia (PCA)	En route chart – low (ERC–L)
World aeronautical chart (WAC)	En route chart – high (ERC–H)
Visual terminal chart (VTC)	Terminal area chart (TAC)
Visual navigational chart (VNC)	Aerodrome (AD) chart

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AUS PCA (Planning Chart Australia)

The PCA depicts the following information:

- GAF boundaries
- WAC coverage and chart titles
- location names and abbreviations
- estimated flight information service (FIS) very high frequency (VHF) coverage at 5,000 ft and 10,000 ft and
- high frequency (HF) network boundaries.

Visual charts

World aeronautical charts (WACs) (scale: 1:1,000,000) are designed for pre-flight planning and pilotage. They are constructed on Lambert’s Conformal Conic Projection. Australian coverage is shown on the front of each chart.

Visual Navigation Charts (VNCs) (scale: 1:500,000) are designed for VFR operations. They contain an aeronautical overlay of controlled airspace over a topographical base and contain some radio communication and other navigational data appropriate for visual navigation. Map coverage is shown on the front of each map.

Visual Terminal Charts (VTCs) (scale: 1:250,000) are designed for visual operations near terminal areas. They contain some topographical detail and appropriate airspace, radio communication and navigation aid information. VTCs are intended for use up to and including FL180.

Note: When planning visual navigation outside the coverage of VTCs, you will need to refer to the appropriate VNC (if available) or IFR chart ERC-L for depiction of controlled airspace and prohibited, restricted and danger areas (AIP GEN 3.2).

En route charts and terminal area charts

ERCs-L, ERCs-H and TACs are presented at various scales and depict airspace, air routes and radio navigation facilities.

ERCs-L are intended for use primarily up to and including FL200. ERCs-L show an outline of the areas covered by TACs and VTCs. These areas impact on the ERC-L presentation as follows:

- Within the areas covered by TACs, full details of air routes may not be shown due to lack of space.
- Air route information within these areas will usually only include the route line and bearing. Where space permits, the route designator, distance and lowest safe altitude (LSALT) may also be shown.
- Within the areas covered by TACs and VTCs, full details of airspace may not be shown. Information may only indicate lateral boundaries. Restricted and danger area numbers and sport aviation symbols may not be shown.

For complete details of aeronautical data in these areas refer to the appropriate TACs or VTCs.

ERCs-H are intended to be used for operations above FL200.

TACs show details applicable to both high and low-level operations in terminal areas. Aerodrome charts, apron charts, noise abatement procedures, standard instrument departure (SID) charts, standard arrival route (STAR) charts, distance measuring equipment (DME) and global positioning system (GPS) arrival charts and instrument approach and landing (IAL) charts are IFR charts and are published in Departure and Approach Procedures (DAP) East and DAP West (AIP GEN 3.2).

Restricted and danger areas

Restricted and danger areas are depicted on charts described as follows:

- On all charts restricted areas are shown with a magenta verge. See the restricted area (RA) conditional status (see AIP ENR 1.4) displayed on the chart with association to the RA. ERSA-prohibited, restricted and danger (PRD) area outlines each code and its meaning.
- On the ERCs and TACs, danger areas are shown with a solid magenta line.
- On the VTCs, danger areas are shown with a solid magenta line with a magenta dotted verge along the inside of its boundary.
- On all charts where a restricted and danger area have a common lateral boundary, only the restricted area verge is shown. The danger area boundary is indicated by labels (AIP GEN 3.2).

See also **Chapter 3**.

Airspace boundary information

Distances associated with airspace boundaries indicate the datum on which the airspace is based, and are shown as follows:

- 'NM' indicates a distance from the aerodrome reference point.
- 'DME' or 'TAC' indicates a distance based on a particular navigation aid (DME or tactical air navigation aid (TACAN)).
- Some control zones have boundaries based on a runway threshold. For example: '7 NM FM THR RWY 33' indicates a distance from the threshold of Runway 33 at the associated aerodrome (AIP GEN 3.2).

Frequency information

Flight information area (FIA) boundaries and frequencies are depicted in green. ATC frequencies and the associated boundaries for use in Class E airspace are depicted in brown (AIP GEN 3.2).

The prefix to a frequency indicates the provider of the service.

Where a single area is divided vertically between different frequencies, the vertical limits applicable to each frequency will be indicated.

Depiction of common traffic advisory frequency (CTAF)

(AIP GEN 3.2)

At non-controlled aerodromes where 126.7 MHz is not the CTAF, or non-controlled aerodromes that have an associated NAVAID, an entry 'CTAF' followed by the designated frequency, is annotated in a box associated with the location. Radio carriage is required at all non-controlled aerodromes which are identified in the ERSA as being certified or military. ERSA should always be consulted as part of the pre-flight planning process before operating at non-controlled aerodromes.

Broadcast areas (AIP GEN 3.2)

Broadcast areas are defined airspace volumes in Class G airspace for which a discrete frequency (CTAF) has been allocated. All operations, including those at aerodromes (charted and uncharted) and landing sites within this area shall use this CTAF as the broadcast frequency. Broadcast areas are depicted on charts by a dotted dark green line and a label stating, 'for operations in this area SFC -<altitude> use CTAF <frequency>'. Note that SFC refers to surface.

The vertical boundaries of a broadcast area are:

- Surface to 5,000 ft AMSL (default), or
- Surface to the base of control area (CTA) (if 8,500 ft or less) or a nominated level.

An example of a broadcast area is YRED located in the Redcliffe area in Queensland.

For the definition of –' in the vicinity of a non-controlled aerodrome' see CASR 91.360.

Mandatory broadcast area requirements (CASR 91 MOS 11.10A)

A mandatory broadcast area is a volume of airspace of defined horizontal and vertical limits in which broadcast and other requirements apply. Mandatory broadcast areas are depicted on the VTC, VNC and ERC-Low charts

Other requirements might, for example, include tracking or altitude requirements for the purposes of traffic deconfliction in an area of increased traffic density that is not established as controlled airspace. Sydney Victor 1 is one such area.

Refer to the Radio communication procedures chapter for a comprehensive description of mandatory broadcast requirements.

Meteorology

Services

Weather radar (AIP GEN 3.3)

Weather radar data derived from BoM radar sites is displayed at various ATS locations and is available to you on request, subject to ATS workload. When ATS provides weather radar information they will prefix information with 'MET RADAR DISPLAY INDICATES...' Weather radar sites available to ATS are shown in ERSA MET.

Meteorological briefing (AIP GEN 3.5)

A limited elaborative briefing service is available from Aviation Forecasting Centres (AFCs) on the following telephone numbers:

AFC	Telephone number
QLD—North	07 3239 8721
QLD—South	07 3229 1854
NT	08 8920 3814
WA—North	08 9263 2259
WA—South	08 9263 2255
NSW	02 9296 1527
VIC	03 9669 4850
TAS	03 6221 2026
SA	08 8366 2617

Meteorological documentation (AIP GEN 3.5)

Available documents include the following:

- surface synoptic charts
- forecast upper-level charts
- satellite imagery
- grid point winds and temperatures
- route sector winds and temperatures
- significant weather charts
- GAFs
- domestic TAFs.

Forecasts and reports

Notification required from operators for domestic operations

All meteorological information issued on a routine basis and held by the briefing office concerned is available without prior notice. Eight hours of notice is required for non-routine forecasts (AIP GEN 3.5).

Forecast for flights – valid graphical area forecasts (GAFs) not available (AIP GEN 3.5)

Flight forecasts required for flights for which valid GAFs are not available will be supplied subject to the request being received 3 days before departure and forecaster capacity to provide the service. However, every effort will be made to expedite meteorological (MET) documentation for search and rescue (SAR) flights. Notification should include the following information as applicable:

- departure aerodrome and estimated off blocks time (EOBT)
- destination and ETA
- route
- ETAs and EOBTs for intermediate stopping places
- heights for upper winds and temperatures
- time documentation required.

Significant abbreviations (AIP GEN 3.5)

In reports, forecasts and GAFs, the amount of cloud is indicated by the following abbreviations and acronym:

Abbreviations		
SKC	Sky clear	
FEW	Few	1 to 2 OKTAS (OKTAS refers to the fraction of the sky covered by cloud expressed in eighths)
SCT	Scattered	3 to 4 OKTAS
BKN	Broken	5 to 7 OKTAS
OVC	Overcast	8 OKTAS
NSC	Nil significant cloud	
CAVOK	Cloud and visibility OK	CAVOK is included in reports (from staffed stations only) or forecasts when the following conditions are observed, or forecast to occur, simultaneously: › visibility of 10 km or more › nil significant cloud, that is, no cloud below 5,000 ft or below the highest 25 NM minimum sector altitude, whichever is greater, and no cumulonimbus or towering cumulus at any height, and › nil significant weather. When the term CAVOK is given, the elements of visibility, weather and cloud will not be given.

The only cloud types that are included in aeronautical code format are towering cumulus (TCU) and cumulonimbus (CB). Forecasts, such as GAFs, will also include cloud types other than CB and TCU when appropriate; and in the case of CB cloud, the amount will be indicated in 'non-aerodrome' type forecasts as follows:

Cloud abbreviations		
ISOL	Isolated	For individual CB clouds
OCNL	Occasional	For well-separated CB clouds
FRQ	Frequent	For CB clouds with little or no separation

Ten kilometres is used in the visibility section of GAFs to indicate a visibility greater than 10 km over the entire area. When weather elements are forecast to reduce the visibility below 10 km, the weather and associated visibilities are given. Note that the visibility remains greater than or equal to 10 km in parts of the area unaffected by those elements (AIP GEN 3.5).

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Weather codes (AIP GEN 3.5)

Weather descriptors	
BC	Patches (or patches of)
BL	Blowing
DR	Drifting
FZ	Freezing
MI	Shallow
SH	Showers (or showers of)
TS	Thunderstorms (or thunderstorms with)
PR	Aerodrome partially covered (used only to describe FG)

Phenomena	
BR	Mist
DU	Dust
DS	Dust storm
DZ	Drizzle
FC	Funnel clouds
FG	Fog
FU	Smoke
GR	Hail
GS	Small hail pellets
HZ	Haze
PL	Ice pellets
PO	Dust devils
RA	Rain
SA	Sand
SG	Snow grains
SN	Snow
SQ	Squalls
SS	Sandstorm
UP	Unknown precipitation (from weather sensor)
VA	Volcanic ash

Notes: Intensity is indicated with precipitation, dust storms and sandstorms. In these cases, the weather code is prefixed by the qualifier '–' for light, or '+' for heavy. Moderate intensity is indicated by the absence of a prefix.

A METAR or a special report of meteorological conditions (in aeronautical meteorological code) (SPECI) may provide an indication of weather in the vicinity (within approximately 8–16 km of the aerodrome reference point). The proximity qualifier 'VC' will be used only in combination with the abbreviations: TS, DS, SS, FG, FC, SH, PO, BLDU, BLSA and BLSN.

TEMPO, INTER, FM and BECMG (AIP ENR 1.1)

TEMPO and INTER indicate significant variations, from the previous given mean conditions, of a temporary or intermittent nature, expected during the period which is given in TAF format: ddhh/ddhh, for example: 0108/0114 means from 08 until 14 UTC on the 1st

TEMPO is used when variations from the forecast mean conditions are expected to last for 30 minutes or more but less than 60 minutes in each instance, and which in the aggregate are not expected to cover more than half the given period. For instance, the variations take place sufficiently infrequently such that the mean conditions remain those of the preceding part of the forecast.

INTER is used when variations from the forecast mean conditions are expected to last for periods less than 30 minutes in each instance and which, in the aggregate, are not expected to cover more than half the given period. For instance, the variations take place sufficiently infrequently such that the mean conditions remain those of the preceding part of the forecast (AIP GEN 3.5).

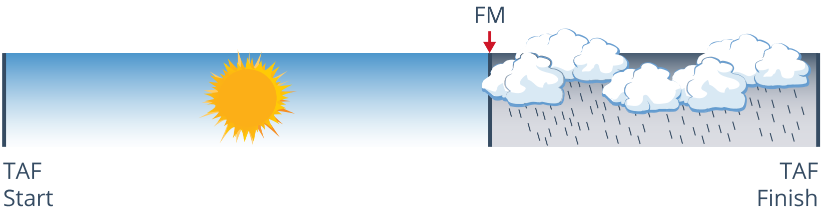
The change groups FM (from) and BECMG (becoming) are used for significant changes (both deteriorations and improvements) from the preceding information that are more lasting in nature.

FM is used when rapid changes are expected at the specified time, and is given in TAF format: FMddhhmm. For example: FM301000 means from 1000 UTC on the 30th.

- BECMG is used (in TAF only) when the changes are expected to develop at a regular or irregular rate during the specified time period, and is given in: TAF format: BECMG ddhh/ddhh. For example: BECMG 3010/3011 means between 1000 and 1100 UTC on the 30th.

In both cases (FM and BECMG), the new conditions will continue until the end of the validity period of the TAF/TAF3, or until replaced by another FM or BECMG.

Figure: Sun and rain illustrating an FM period



Cloud height datum

In aerodrome and trend forecasts, cloud heights are given above aerodrome elevations. In other forecasts, heights are expressed:

- as a flight level, or
- with reference to mean sea level.

Forecast amendments

Amendments (AMDs) to forecasts are issued as necessary when changes are expected during the period of validity of a given forecast.

Graphical area forecasts (GAF)

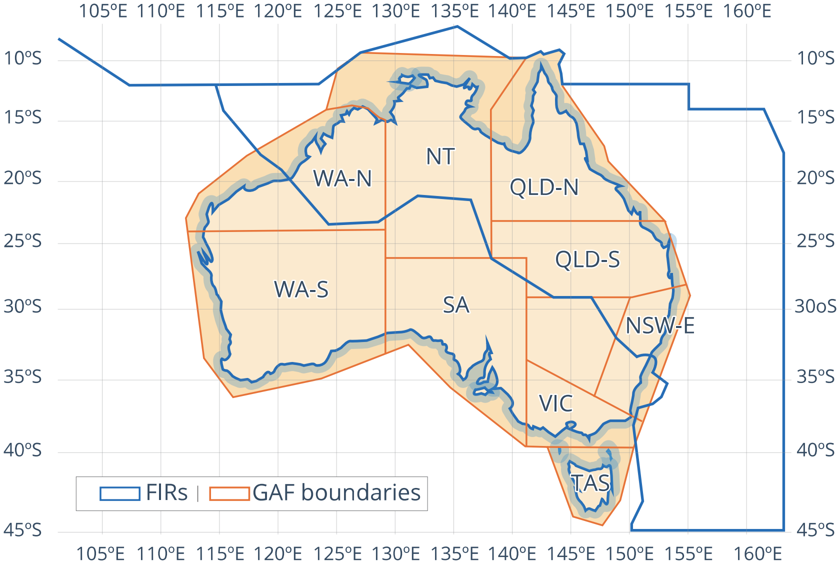
GAF forecasts for operations surface to 10,000 ft (AIP GEN 3.5)

These domestic forecasts are issued for aircraft operations at or below 10,000 ft. They comprise an image and supporting text detailing the meteorological conditions. GAFs are prepared and issued for the 10 areas as detailed on AUS PCA.

A flight forecast (text-based forecasts) may be issued for any part of a flight for which a routine GAF is not prepared.

These forecasts are available from the ATS automated briefing systems, and briefing offices listed in ERSA GEN.

Figure: GAF areas



Preparation and issue times

- GAFs are issued with the 6-hour validity periods 2300Z to 0500Z, 0500Z to 1100Z, 1100Z to 1700Z and 1700Z to 2300Z.
- At each issue time two GAFs will be issued covering a 12-hour period, for example at 2200Z, both 2300Z to 0500Z and 0500Z to 1100Z GAFs will be issued.
- GAFs will be issued no later than 30 min. before the commencement of the validity period of the first GAF.
- The issuing of a new GAF replaces the previously issued GAF for the same validity period.

Approved abbreviations used in graphical area forecasts (GAF)

GAF abrreviations	
Clouds	CU, TCU, SC, CB, ST, AS, AC, NS or combinations of these
Weather	CAVOK, MTW, NIL, TURB, and other abbreviations
Cloud amounts or descriptors	FEW, SCT, BKN, OVC and for CB, ISOL, OCNL, FRQ, EMBD, BASE, CLD ON GND
Qualifiers	MOD, SEV, +, –
Units	kn, km, m, ft
Time	Z
Variations	TEMPO and INTER are only used for critical locations. FM, TL, BECMG
Heights	ABV, BLW, LYR, SFC
Directions	N, NE, E, SE, S, SW, W, NW
Corrections	COR (correction), IMPR (improvement to conditions), TRANS ERR (transmission error), TYPO (typographical error).
General	FZLVL, FZLYR, WDSPR, WI, VAL, STNR, BTN and other abbreviations listed in AIP GEN 2.2 section 2.

Sections of the graphical area forecast (GAF)

The GAF comprises:

- a header giving details of issue time and validity times. It will also contain the word "CORRECTED" for a GAF correction
- an image depicting weather areas labelled with an alphabet character, e.g. A. Weather areas may be subdivided further with addition of a numerical character, e.g. A1. The weather in A1 will be the same as A with a minor differentiation, such as lower visibility in showers
- a table providing detailed meteorological information for the areas shown on the image divided into four columns:
  - AREA gives the alphabet character corresponding to areas in the image
  - SURFACE VIS and WX gives details of weather and associated visibility
  - CLOUD, ICING and TURB gives the cloud, icing and turbulence in the area or associated with the weather in the SURFACE VIS and WX column
  - FZLVL gives the height of the freezing level, or ABV 10,000 ft where the freezing level is above 10,000 ft AMSL
- a legend explaining information important to the interpretation of the product
- a remarks box for additional information including forecasts for critical locations and for a corrected GAF.

Changes to GAFs and corrected GAF

GAFs are not amended. Advice of deteriorating conditions will be in the form of an AIRMET or SIGMET. A corrected GAF will be issued between standard issue times to notify of:

- a typographical error (TYPO)
- errors such as transmitting before completion (TRANS ERR)
- an improvement in conditions (IMPR) – e.g. removal of fog, thunderstorms, etc.

Grid point wind and temperature (GPWT) forecasts

(AIP GEN 3.5)

GPWT charts provide a display of wind and temperature data derived from weather model data. The high-level and mid-level charts are produced with a 2.5° or 5° latitude and longitude grid resolution using data from World Area Forecast System (WAFS) models.

The low-level charts are produced with a 1.5° or 5° latitude and longitude grid resolution using data from the Bureau of Meteorology's numerical weather prediction model. The data is overlaid on a geographic background. The values given represent the wind and temperature at a specific pressure level, which is approximated to a height or flight level, for the mid-point of each square.

GPWT are presented to aircrew on a geographic background to facilitate interpretation on specific routes.

A block of GPWT data contains the following information for each level:

- dd: two numbers indicating the wind direction in degrees true to the nearest 10
- fff: three numbers indicating the wind speed in knots
- t: the sign of the temperature (+ or −)
- TT: two numbers indicating the temperature in whole degrees Celsius
- A dashed line (– — —) used when the grid point is below ground level and hence there is no valid wind or temperature for that point.

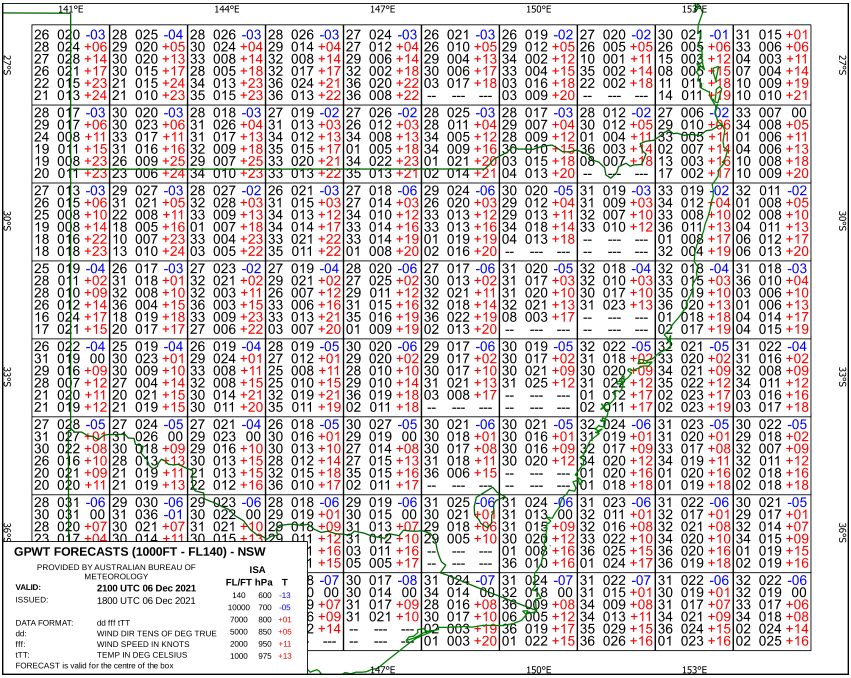
GWPT Example:			
25035−63	dd	fff	tTT
	25	035	−63

For example, GPWT data: 25035−63 means a wind with direction of 250 degrees and speed 35 knots and with an air temperature of −63°.

GPWT forecasts are issued every six hours. High-level and mid-level charts are valid in six-hourly time steps for the next 24 hours; however, low-level charts are valid in three-hourly time steps for the next 24 hours.

Receipt of a forecast for a particular validity time will automatically amend and supersede any prior issue for that time. Both issue and validity times appear with each forecast.

Example of grid point forecast presentation



GPWT FORECASTS (1000FT - FL140) - NSW

PROVIDED BY AUSTRALIAN BUREAU OF METEOROLOGY

VALID: **2100 UTC 06 Dec 2021**

ISSUED: 1800 UTC 06 Dec 2021

DATA FORMAT: dd fff tTT

dd: WIND DIR TENS OF DEG TRUE

fff: WIND SPEED IN KNOTS

tTT: TEMP IN DEG CELSIUS

FORECAST is valid for the centre of the box

FL/FT	hPa	ISA T
140	600	-13
10000	700	-05
7000	800	+01
5000	850	+05
2000	950	+11
1000	975	+13

Bureau of Meteorology | NSW 21Z

Aerodrome forecasts and reports

Aerodrome forecasts (TAF) (AIP GEN 3.5)

Aerodrome forecasts are a statement of meteorological conditions expected for the specified period in the airspace within a radius of 8 km (4.31 NM) of the aerodrome reference point.

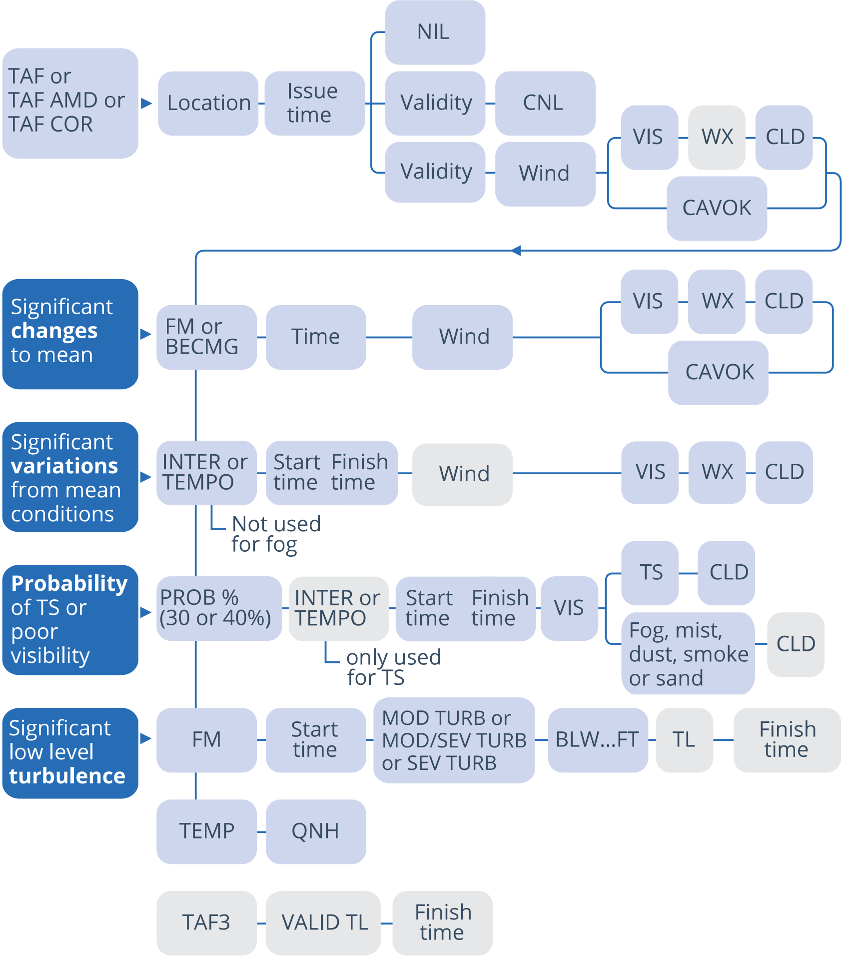
The TAF service is typically provided in accordance with the aerodrome's TAF category, determined by the aerodrome type.

Category	Aerodrome type	Routine TAF service
TAF3	Selected aerodromes specified in AIP GEN 3.5	Issued 3 hourly. Validity is either 18, 24 or 30 hours depending on aerodrome type (A or B).
A	International	Issued 6 hourly, valid for 24 or 30 hours. Commencement times: 00, 06, 12 and 18 UTC.
B	Large passengers above 150,000 per year or aircraft movements above 75,000 per year	Issued 6 hourly, valid for 12 or 18 hours. Commencement times: 00, 06, 12, 18 UTC.
C	Medium Passengers above 50,000 per year or aircraft movements above 10,000 per year	Issued 6 hourly, typically valid for 12 hours Commencement times: 02, 08, 14 and/or 20 UTC, except in Western Australia where commencement times are 04, 10, 16 and/or 22 UTC.
D	Small Aerodromes meeting passenger and movement thresholds, or other operational criteria	Issued 6 or 12 hourly, valid for up to 12 hours Commencement times are typically 20 and/or 02 UTC, except in Western Australia where commencement times are typically 22 and/or 04 UTC.

Notes: Commencement times for C and D TAFs will be one hour earlier in states using daylight saving.

TAF will be provided upon request for other locations in support of SAR and emergency flights.

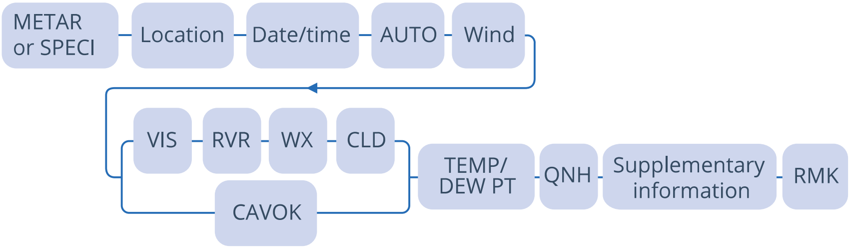
TAF (aerodrome forecast) format (AIP GEN 3.5)



⬜ The following lines will only be included as required

🟦 Indicates elements which may or may not be included in line

METAR/SPECI (aerodrome weather report) format



Aerodrome weather and forecast decode (AIP GEN 3.50)

Identifier

METAR is used to identify routine observations (hourly or half-hourly) when conditions are above specified levels. SPECI is used to identify special observations, that is, observations when conditions are below specified criteria, or when there have been significant changes since the previous report. SPECI is also used to identify observations reported 10 minutes following an improvement to above SPECI conditions.

TAF, TAF AMD, TAF COR, TAF... CNL, TAF... NIL and PROV TAF are used as follows: Aerodrome Forecast, Amended Aerodrome Forecast, Corrected Aerodrome Forecast, Cancelled Aerodrome Forecast, Nil Aerodrome Forecast and Provisional Aerodrome Forecast, respectively.

For message formats, see AIP GEN sections 14 (METAR/SPECI), 15 (TAF).

Location

The location is indicated by the ICAO location indicator, the place name, or the approved abbreviation.

Origination time

The origination date/time of TAF and METAR/SPECI is given in UTC using a six-figure group followed by the code Z (for UTC).

Validity period

The validity period of a TAF is given in UTC in the format ddhh/ddhh, where ddhh is the day of month and hour, for example: 0100/0206 is a validity period from 00 UTC on the 1st until 0600 UTC on the 2nd.

Auto

This group will be included when the METAR/SPECI contains only automated observations, which may include visibility, present weather and cloud.

When an AWS includes sensors for horizontal visibility, present weather and cloud, the AUTO report will include the parameters from these sensors in the body of the message (where previously only manually observed visibility, present weather and cloud data were included).

Note: You should exercise caution when interpreting automated visibility, present weather and cloud information as data from these instruments may not be equivalent to human observations.

Wind

Wind direction is rounded to the nearest 10 degrees and is given in three figures relating to true north. Wind speeds are given in two figures. When the wind is calm, the group is encoded as 00000KT.

A variable wind direction is given as VRB and is used when the reporting or forecasting of a mean wind direction is not possible, such as in the following conditions:

- light winds (3 kt or less), or
- when forecasting a single direction is not possible, for example: with a tropical cyclone (TC), or with the passage of a thunderstorm, in which case the forecast wind might be VRB60KT.

Maximum wind speed is given only when it is 10 kt or more greater than the mean wind speed. It is indicated by the letter G which is followed by the maximum wind speed, for example: 280°, mean speed 20 kt, maximum speed 35 kt, is given as 28020G35KT.

At some aerodromes, an additional wind group will be given in METAR/SPECI when the direction varies by 60° or more during the sampling period (normally ten minutes). The group gives the extreme range of directions in clockwise order, for example: 360V090 (360 degrees variable to 090 degrees).

Visibility

In a TAF, the prevailing visibility (the greatest visibility covering more than half the aerodrome) is always given.

In METAR/SPECI, if the visibility is not the same in different directions and:

- the minimum visibility is the prevailing visibility, or
- the visibility is fluctuating rapidly, then

the minimum visibility is the only information provided. When the minimum visibility is not the prevailing visibility and the minimum visibility is less than 5,000 m, both the prevailing visibility and the minimum visibility will be given. In this case the prevailing visibility is reported first followed by the minimum visibility including an indicator to show the general direction of the minimum visibility in relation to the observing point (the meteorological station). For example, the visibility groups 9000 0600N indicate a prevailing visibility of 9000 m and a minimum visibility of 600 m to the north.

A visibility of 10 km or more is given by 9999.

For vertical visibility (VV) description refer to AIP GEN 3.5.

Note: The BoM only uses VV to describe conditions when the sky is obscured by smoke.

Automatic visibility information

A report from an AWS with a visibility sensor will include data from this sensor in the body of the report if the report is fully automated (in which case the abbreviation AUTO is also included in the message).

Note: You should exercise caution when interpreting automated visibility information as it may not be equivalent to a human observation because:

- the information is reported as a ten-minute average and
- as it is sourced from a single instrument sampling only a very small parcel of the atmosphere, it may not be representative of the entire airport.

An AWS may issue SPECI reports for visibility using data from visibility sensors.

Note: Automatic visibility sensors do not currently provide information on VV.

Runway visual range (RVR)

RVR may be reported in SPECI messages from aerodromes with RVR instrumentation.

RVR at the runway's touchdown zone may be reported in SPECI messages from aerodromes with RVR instrumentation. It will be reported in the format RDD/VVVVi or RDD/VVVVVVVVVi where:

- R and V are fixed indicators
- DD gives the runway number, for example 36
- VVVV gives the RVR value
- i gives the tendency (either U, D or N for up, down or nil, respectively).

When RDD/VVVVi is reported, VVVV is the average – normally over 10 minutes.

RDD/VVVVVVVVV is reported when the RVR has varied significantly during the averaging period. The group gives the one-minute mean minimum RVR value followed by V followed by the one-minute mean maximum RVR value during the averaging period, for example: R16/0500V1100.

Present weather

Present weather is given using the codes listed in this chapter.

Appropriate intensity indicators and letter abbreviations will be combined in groups of two to nine characters to indicate present weather at, or in the vicinity of, the aerodrome. If more than one form of precipitation is observed, the appropriate letter abbreviations shall be combined in a single group with the first being the dominant type of precipitation. In such a group, the intensity shall refer to the total precipitation.

Up to three groups may be given.

The intensity of precipitation, blowing dust, sand or snow, dust storm and sandstorm will be indicated by the prefix − for light, + for heavy, and no prefix for moderate.

The qualifier VC will be used to report certain significant weather phenomena in the vicinity of the aerodrome (Note: vicinity, for meteorological purposes refers to the area between approximately 8–16 km of an aerodrome reference point).

Automatic present weather information

A report from an AWS with a present weather sensor will include data from this sensor in the body of the report if the report is fully automated, in which case the abbreviation AUTO is also included in the message (AIP GEN 3.5).

Note: You should exercise caution when interpreting automated present weather information, as it may not be equivalent to a human observation.

Cloud

Cloud height is reported in hundreds of feet using three figures, for example: 700 ft is reported as 007.

Cloud amount is given using the abbreviations listed in this chapter.

In a weather report, nil cloud is reported as SKC (sky clear). In a weather forecast, cloud information is not included if the sky is clear.

Cloud information is given from the lowest to the highest layer or mass in accordance with the following criteria:

- the lowest layer or mass, regardless of amount
- the next layer or mass, covering more than 2 OKTAS
- the next higher layer or mass, covering more than 4 OKTAS
- cumulonimbus and/or towering cumulus clouds whenever observed or forecast and not reported in one of the groups above.

Type of cloud is identified only for cumulonimbus and towering cumulus observed at or near the aerodrome. These will be given as CB and TCU respectively.
When an individual layer or mass of cloud is composed of cumulonimbus and towering cumulus with a common cloud base, the type of cloud is reported as cumulonimbus only, and the amount shall be reported as the sum of the CB and TCU amounts.

Whenever cumulonimbus cloud is forecast, the degree of associated thunderstorm activity or probability of occurrence is included.

A clear sky will be indicated in a report by SKC. When the sky is obscured, the cloud group is omitted and vertical visibility may be given in the format VVhhh, where hhh is the vertical visibility in hundreds of feet. When information on vertical visibility is not available, hhh may be given as ///, indicating that the sky is obscured but information on the vertical visibility is not available.

CAVOK

CAVOK is included in reports (from staffed stations only) or forecasts when the following conditions are observed, or forecast to occur, simultaneously:

- visibility of 10 km or more
- nil significant cloud, that is, no cloud below 5,000 ft or below the highest 25 NM minimum sector altitude, whichever is greater, and no cumulonimbus or towering cumulus at any height, and
- nil significant weather.

Note: When the term CAVOK is given, the elements visibility, weather and cloud will not be given.

In METAR/SPECI, whenever a total of BKN or more of low or middle cloud cover is at or above 5,000 ft, and CAVOK has been used, the cloud amount and base may be given as a remark after the remark (RMK) indicator.

Automatic weather stations with cloud information

A report from an AWS with a cloud sensor will include data from this sensor in the body of the report if the report is fully automated (in which case the abbreviation AUTO is also included in the message). The data will be in the same form as manual reports except that:

- NCD will be reported if no cloud is detected, and
- there will be no indication of cumulonimbus or towering cumulus.

Note: You should exercise caution when interpreting automated cloud information as it may not be equivalent to a human observation because:

- the information is reported as a 30-minute average with double weighting given to the last 10 minutes, and
- as it is sourced from a single ceilometer sampling only the sky directly overhead, it may not be representative of the entire skyline.

An AWS may issue special reports (SPECI) for cloud using data from cloud sensors.

Significant variations

Aerodrome forecasts will include significant changes or variations (indicated by FM, BECMG, INTER or TEMPO) to the previously given conditions when the relevant criteria are met. These relate to improvements as well as deteriorations.

The variation groups TEMPO (periods between 30 and 60 minutes) and INTER (periods less than 30 minutes) are used to indicate significant variations of a temporary or intermittent nature. The change groups FM and BECMG are used to specify changes that are more lasting in nature. FM is used when changes are expected at a specified time and which are rapid; BECMG is used when changes are expected to be regular or irregular and expected to occur during the specified period.

When thunderstorms or reduced visibility due to fog, mist, dust, smoke or sand is forecast, but the probability is assessed at between 30% and 40%, the terms PROB30 or PROB40 are used. INTER or TEMPO may also be used with a PROB for thunderstorms. If greater than, or equal to, 50% probability is forecast, reference is made to the phenomenon in the forecast itself and not by the addition of a PROB statement.

The terms NSW (nil significant weather), and NSC may be included following FM or BECMG to indicate significant improvements expected.

If a TAF includes a forecast of turbulence, its commencement will be indicated by the abbreviation FM, and its cessation within the forecast coverage will be indicated by the abbreviation TILL. Start and finish times are given in the format ddhhmm (day of month, hour, minute). Turbulence associated with CB and TCU clouds (and any TS activity) is not included in the forecast as it is implied.

Temperature

Aerodrome weather reports contain both air temperature and dew point.

Up to 4 forecast values of air temperature are given, for the times HH, HH+3 hours, HH+6 hours and HH+9 hours, where HH is the time of commencement of the TAF validity period. Users should use linear interpolation to determine the forecast value between these points.

The temperature forecasts are prefixed by the letter T. Negative values are indicated by the letter M before the numeral.

QNH

QNH is given in whole hectopascals using four figures.

Observed intermediate values are rounded down, for example: 1,001.9 is reported as 1,001.

QNH is always given, prefixed by the letter Q, for example: Q0999.

Up to 4 forecast values of QNH are given, for the times HH, HH+3 hours, HH+6 hours and HH+9 hours, where HH is the time of commencement of the TAF validity period. Users should use linear interpolation to determine the forecast value between these points. The QNH forecasts are prefixed by the letter Q.

Supplementary information

In METAR/SPECI, supplementary information is used to report the following:

- recent weather (RE) of operational significance, and
- windshear (WS) information on a take-off or landing runway.

Remarks section

Rainfall

The remarks section of the report will include rainfall recorded by an automatic rain gauge. The information is in the form RF##.#/###.# where the first three digits after the indicator RF will report the rainfall recorded in the 10 minutes prior to the observation time, and the next four digits report the total rainfall recorded since 0900 local time. Both amounts are expressed in millimetres to the nearest 0.2 mm.

Plain language

Any other significant weather conditions (for example an approaching front or visible bushfires) are appended in plain language.

Elements not available

A report from an AWS that does not include information from sensors for visibility, weather, or cloud will report ////, // or ////// respectively in lieu of these parameters.

Terminal area forecast (TAF) examples

TAF YCOM 070635Z 0708/0720 18015KT 9999 FEW005 BKN020

TEMPO 0710/0714 2000 -SHSN BKN005 SCT020

RMK T 03 00 M02 M04 Q 1008 1007 1006 1006

TAF YSSY 020435Z 0206/0312 31005KT CAVOK

FM021400 16015KT 8000 SHRA BKN008 SCT030

FM022300 23010KT 9999 NSW SCT030

RMKT 25 21 18 15 Q 1012 1013 1014 1014/span>

TAF YSCB 270448Z 2706/2806 33015G28KT 3000 +RABKN010 OVC100

FM271400 16015KT 8000 SHRA FEW010 SCT040 SCT100

INTER 2710/2714 1000 +TSRA BKN005 SCT040CB

RMK FM270800 MOD TURB BLW 5000 ft TILL271300

T 14 13 13 11 Q 1016 1015 1013 1016

Aerodrome weather report examples

SPECI YMML 092000Z 22012KT 170V260 6000 SHRA SCT035TCU 31/20 Q1020 RETS RMK RF02.0/004.0

SPECI YBCS 221745Z 23014G29KT 6000 1200NE TSRA FEW040CB BKN100 26/22 Q1003 RMK RF04.0/004.0

SPECI YSSY 271915Z VRB01KT 3000 VCFG FEW030 18/17 Q1018 RMK RF00.0/000.0

METAR YMOR 100400Z 06013KT 9000 VV/// 31/08 Q1010 RMK RF00.0/000.0 SKY OBS DUE BUSH FIRE SMOKE

SPECI YSCB 141400Z AUTO 20008KT 9000 // BKN016 14/11 Q1001 RMK RF00.0/000.0

SPECI YMAV 240215Z AUTO 36018G28KT 9999 // NCD 31/10 Q1014 RMK RF00.0/000.0

METAR YSBK 241700Z AUTO 15002KT 0900 // ////// 04/04 Q1020 RMK RF00.0/000.0 CLD: SKY MAY BE OBSC

TAF3

The remark TAF3 identifies an aerodrome forecast as one which is issued routinely every three hours and updated on a priority basis using the latest information provided by the BOM through its continuous weather watch. A TAF3 service is provided for the following locations:

Adelaide
Amberley
Brisbane
Darwin
Cairns
Canberra
East Sale
Gold Coast
Hobart
Melbourne
Nowra
Oakey
Pearce
Perth
Sydney
Tindal
Townsville
Williamtown

TAF3 examples

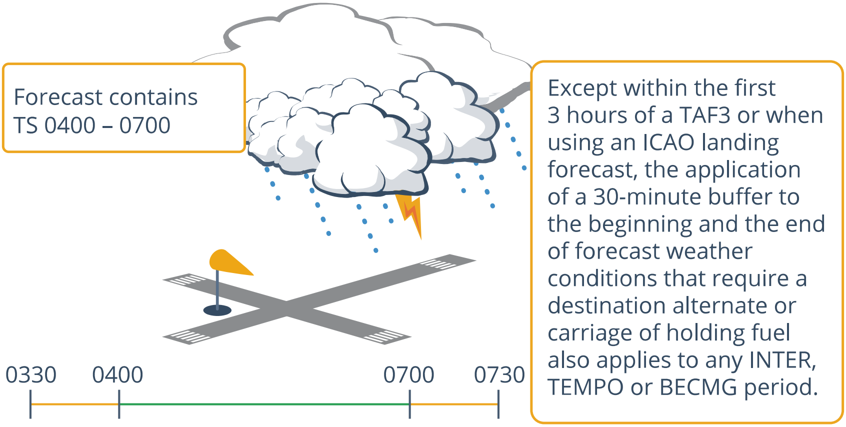
24/7 TAF3 service

TAF YBCG 292313Z 3000/0100
22008KT 9999 FEW030
FM300215 33012KT 9999 FEW020
FM300800 27006KT 9999 FEW018
FM302300 35014KT 9999 SCT020
PROB30 TEMPO 3004/3008 VRB20G35KT 3000 TSRA SCT015 BKN025 SCT045CB
RMK
T 25 26 25 23 Q 1003 1001 1002 1004

TAF3
TAF AMD YBCG 300215Z 3003/0100
33012KT 9999 SCT020
FM300800 27006KT 9999 FEW018
FM302300 35014KT 9999 SCT020
PROB30 TEMPO 3005/3009 VRB20G35KT 3000 TSRA SCT015 BKN025
SCT045CB
RMK
T 29 25 23 22 Q 1001 1002 1004 1006

TAF3
Limited TAF3 service (Military)
TAF YAMB 142314Z 1500/1600
26013KT 9999 FEW040
FM150900 27006KT CAVOK
FM151800 VRB04KT 9999 MIFG NSC
FM152200 28007KT 9999 NSW FEW030
RMK
T 17 22 21 13 Q 1016 1013 1012 1014
TAF3 VALID TL 150300

Figure: INTER/TEMPO holding fuel buffer variation if using a TAF3


Forecast contains TS 0400 – 0700

Except within the first 3 hours of a TAF3 or when using an ICAO landing forecast, the application of a 30-minute buffer to the beginning and the end of forecast weather conditions that require a destination alternate or carriage of holding fuel also applies to any INTER, TEMPO or BECMG period.

Authorised weather forecasts and reports

An authorised weather report for aviation is one that is made by any of the following:

- the Bureau of Meteorology (BOM)
- a person who holds a certificate from the BOM
- an automatic weather station at an aerodrome that is approved by the BOM
- an automatic service published in the AIP
- a person who holds a pilot licence
- a person appointed by the aerodrome operator to make visibility assessments
- a person of class of person specified in the AIP.

However, an authorised weather forecast for aviation can only be issued by the BOM.

Meteorological reports and advice

Aerodrome weather reports are observations of meteorological conditions at an aerodrome. The reports are generated by electronic recording devices called automatic weather stations (AWS) and may also have manual input by accredited observers.

METAR are routine reports of meteorological conditions at an aerodrome. METAR are normally issued on the hour and half hour.

Special reports (SPECI) are non-routine aerodrome reports issued whenever one or more observed meteorological elements meet specified criteria significant to aviation.

On request, other meteorological reports may be provided based on the whole horizon or only the area that will contain the probable flight path of an aircraft. Other meteorological reports are provided by:

- tower ATC at controlled aerodromes, or
- a certified air/ground radio service (CA/GRS) or UNICOM at certain non-controlled aerodromes.

SIGMET (AIP GEN 3.5)

SIGMET is a concise description of the occurrence or expected occurrence, in an area over which area meteorological watch is maintained, of specified phenomena which may affect the safety of aircraft operations.

SIGMET are issued by meteorological watch offices (MWOs) and disseminated by ATS as an element of ATC initiated FIS to aircraft operating on routes or in areas likely to be affected. This information will normally relate the phenomenon reported to designated reporting points and where possible will indicate the area in which the phenomenon exists.

SIGMET example

MWO	HR	FIR	Type and validity
Melbourne	H24	YBBB YMMM	SIGMET 4HR
Specific procedures: › SIGMET for turbulence or icing above 10,000 ft are issued north of 50°S. SIGMET for turbulence or icing above 10,000 ft south of 50°S upon request › SIGMET for thunderstorms are issued for north of 50°S. › SIGMET for phenomena at and below 10,000 ft (other than thunderstorms, tropical cyclones and volcanic ash) are issued for GAF areas, and outside GAF areas upon request.			
Melbourne	H24	YBBB YMMM	SIGMET VA/TC 6HR
Specific procedures: Nil			
Brisbane	H24	YBBB YMMM	SIGMET 4HR
Specific procedures: SIGMET for phenomena at and below 10,000 ft (other than thunderstorms, tropical cyclones and volcanic ash) are issued for GAF areas, and outside GAF areas on request.			

SIGMET for volcanic ash cloud and tropical cyclones is issued for the whole of Melbourne and Brisbane FIR (YMMM and YBBB).

SIGMET are issued in both text and graphical format.

If a text SIGMET cannot be rendered graphically, it will be displayed in text format on the graphic.

More information on SIGMET can be found in the Product Information section of BoM Aviation Knowledge Centre: **bom.gov.au/aviation/knowledge-centre/**

AIRMET

AIRMET information concerns the occurrence or expected occurrence, in an area over which meteorological watch is being maintained, of certain phenomena that have not been included in a current GAF.

AIRMET information, concerns phenomena of a lesser degree of severity than SIGMET information, at or below 10,000 ft.

AIRMET information is issued by MWOs and disseminated by ATS as an element of ATC initiated FIS, to aircraft operating on routes or in areas likely to be affected. It will indicate the locality or area in which the phenomena exist or are expected to exist.

AIRMET are issued in both text and graphical format.

More information on AIRMET, including the phenomena that warrant issuance, can be found in the Product Information section of BoM Aviation Knowledge Centre: **bom.gov.au/aviation/knowledge-centre/**

Hazardous weather (AIP GEN 3.5)

Responsibility

In areas where ground meteorological reports are infrequent or any hazardous weather is encountered, or observed either visually or by radar, you are encouraged to report observations of MET conditions which you consider will assist in the provision of meteorological services. Routine weather observations should be reported in accordance with the AIREP Format shown in AIP ENR 1.1, Appendix 1.

When manoeuvring in hazardous weather, you are responsible for the safety of your aircraft using advice and clearances passed by ATS and information obtained from your own visual or airborne radar observations.

Pilot action

Outside controlled airspace all hazardous weather avoidance action is solely your responsibility. However, in order to preserve the safety of the aircraft and other air traffic, you are requested to advise ATS of your intended actions.

When, both inside and outside controlled airspace, you must advise ATS promptly of any hazardous weather encountered, or observed visually or by radar. Those observations should include as much detail as possible, including location and severity. Hazardous weather includes thunderstorms, severe turbulence, hail, icing and line squalls, and volcanic ash cloud.

Windshear warning

Aircraft reports of windshear encountered during climb and descent are the primary means of detecting windshear. When possible, the MET forecasting office provides advice on the likely duration of the event and forecast low-level winds.

When windshear has been reported or the meteorological situation has been assessed as a risk, then a windshear warning is issued.

Windshear warnings for an event will specify a validity period and sequence numbers will be assigned to each warning associated with an event. A windshear warning will be cancelled when windshear is no longer expected.

This service is provided at Cairns, Brisbane, Sydney, Melbourne, Adelaide, Darwin, Perth, Hobart and some defence locations.

When windshear is forecast or reported by pilots at an intensity greater than 'light', this information, together with a forecast low-level wind, will be included on the aerodrome automatic terminal information service (ATIS) at any of the above aerodromes.

Windshear — pilot reporting

You must report windshear encountered by your aircraft to ATS as aircraft following may not have the performance required to recover from the same windshear encounter. The windshear may also be increasing in intensity, making flight through the windshear more dangerous for following traffic.

Due to cockpit workload, reports may be initially reported as windshear escape and a full report provided when workload allows.

The full report must include:

- an assessment of the intensity:
    - light – shear causing minor excursions from flight path and/or airspeed
    - moderate – shear causing significant effect on control of the aircraft
    - strong – shear causing difficulty in keeping the aircraft to desired flight path and/or airspeed, or
    - severe – shear causing hazardous effects to aircraft control
- a factual plain language report regarding airspeed/ground speed changes (gain or loss) or undershoot/overshoot effects
- the altitude or altitude band at which the adverse effect was experienced
- where practicable, other relevant information such as significant changes in wind direction and/or speed may be included.

At non-controlled aerodromes, the report should also be broadcast to all aircraft on the CTAF and should include the name of the aerodrome.

The responsibility to continue an approach to land, or take off, following notification of low-level windshear rests with you.

Aerodrome weather information service (AWIS) and weather and terminal information reciter (WATIR)

AWIS and WATIR transmit meteorological information from an AWS via a phone number, or at some aerodromes via a VHF radio broadcast. WATIR combines the meteorological information with additional terminal information from the airport operator. AWIS and WATIR information is classed as 'real time' data.

Some, or all of the following information may be provided:

- message identifier e.g. 'AWS AERODROME WEATHER' or 'AUTOMATED WEATHER INFORMATION SERVICE'
- station identifier as a plain language station name
- time (UTC)
- wind direction in degrees magnetic and speed in knots
- visibility
- RVR (where available)
- present weather
- cloud below 10,000FT, amount and height.
- temperature in whole degrees Celsius
- dew point in whole degrees Celsius
- QNH in whole hectopascals.
- rainfall (last 10 minutes).

When information is not available the relevant element of the broadcast will be identified as '[ELEMENT NAME] CURRENTLY NOT AVAILABLE', e.g. 'TEMPERATURE CURRENTLY NOT AVAILABLE'.

When the information from the AWIS is determined as being corrupt a NOTAM will be issued. The QNH from a BoM managed or BoM approved AWS is an approved source of QNH and may be used in accordance with ENR 1.5.

When AWIS information is available after hours (AH), and the aerodrome is uncontrolled, reference will be made to its availability in ATIS UTC.

The availability of AWIS and WATIR is contained in ERSA FAC.

AIREP Special (AIP GEN 3.5)

In the en route phase, you should make a special air report (AIREP) when requested, or as soon as practicable after encountering or observing hazardous meteorological conditions which, in the opinion of the pilot are, or may become, severe enough to warrant a SIGMET, regardless of any reports from other aircraft and regardless of any SIGMET issued.

A special AIREP should be made whenever any of the phenomena listed below are observed or encountered.

Turbulence: when the following specifications apply:

- Moderate: Changes to accelerometer readings of between 0.5 g and 1.0 g at the aircraft's centre of gravity. Moderate changes to aircraft attitude and/or altitude may occur but aircraft remains under positive control. Usually small changes in airspeed. Difficulty in walking. Loose objects move about.
- Severe: Changes to accelerometer readings greater than 1.0 g at the aircraft's centre of gravity. Abrupt changes to aircraft attitude and/or altitude may occur. Aircraft may be out of control for short periods. Usually large changes of airspeed. Loose objects tossed about.

Mountain wave severe means conditions in which the downdraft is 600 ft./min. or more and/or severe turbulence is encountered.

Thunderstorms: Only report those thunderstorms which are: obscured in haze, or embedded in cloud, or widespread, or forming a squall-line.

The report format should include:

- callsign of the ground station
- callsign of the aircraft
- position, time and altitude
- a weather report.

See ENR 1.1, appendix 1 (Position reports, AIREP Special and volcanic ash reports) for a complete description of details and the conditions warranting an AIREP Special and the format of the report.

Automatic en route information service (AERIS)

The AERIS continuously broadcasts METAR/SPECI and TAF where significant elements are forecast in the first three hours of validity, from a network of VHF transmitters installed around Australia. Details of transmitter sites, frequencies and locations for which meteorological information is provided are at ERSA GEN-FIS.

VHF automatic en route information service (AERIS) network (coverage at 20,000 ft)

Outlet	VHF	METAR menu
Mt William	119.75	Adelaide, Hobart, Launceston, Melbourne, Perth, Mildura
Mt Ginini	128.65	Adelaide, Canberra, Hobart, Melbourne, Wagga Wagga
Mt Canobolas	119.85	Adelaide, Alice Springs, Brisbane, Melbourne, Perth, Sydney, Williamtown
Point Lookout	119.75	Amberley, Brisbane, Gold Coast, Mackay, Rockhampton, Sydney, Williamtown
Mt Mowbullan	119.95	Amberley, Brisbane, Gold Coast, Mackay, Rockhampton, Sunshine Coast, Sydney
Mt Blackwood	119.85	Brisbane, Cairns, Hamilton Island, Mackay, Rockhampton, Townsville
Bellenden Kerr	119.75	Brisbane, Cairns, Hamilton Island, Mackay, Rockhampton, Townsville
Mt Isa	120.35	Alice Springs, Brisbane, Cairns, Mt Isa, Tindal, Townsville
Goochegoochera	128.45	Alice Springs, Cairns, Darwin, Tennant Creek, Tindal, Townsville
Derby	128.45	Broome, Darwin, Kununurra, Meekatharra, Perth, Port Hedland
Meekatharra	128.45	Broome, Karratha, Meekatharra, Mount Magnet, Perth, Port Hedland
Ceduna	128.45	Adelaide, Alice Springs, Kalgoorlie, Melbourne, Perth, Sydney
Kalgoorlie	128.25	Adelaide, Alice Springs, Ceduna, Kalgoorlie, Laverton, Perth
Broken Hill	128.25	Adelaide, Alice, Springs, Brisbane, Darwin, Melbourne, Sydney

Figure: AERIS network

Time that search action is required (SARTIME)

Changes to flight plans and SARTIME nominations

(CASR 91 MOS 9.03)

If you have submitted a flight plan you must notify ATS of any change to:

- the aircraft callsign or registration
- the flight rules under which the flight will be operating
- the serviceability of the equipment that, as stated in the flight plan, is carried onboard
- the planned departure time (but only if changed by more than 30 minutes)
- the route, landing points and destination alternate aerodromes
- your cruising level
- your cruising speed
- the number of persons on board (POB).

When you have nominated a SARTIME you must notify ATS of any of the following changes:

- the aircraft callsign or registration
- the planned departure time (but only if changed by more than 30 minutes)
- the route, landing points and destination alternate aerodromes
- the SARTIME.

Cancelling SARTIME (CASR 91 MOS 9.04)

You must cancel your SARTIME no later than the time nominated.

Responsible persons for receipt of a flight note (CASR 91 MOS 9.05)

A responsible person for the receipt of a flight note must:

- be over the age of 18 years
- have access to at least 2 appropriate means of communication with search and rescue, for example, 2 telephones or a telephone and a radio transmitter etc
- be able to satisfy you they know how to contact the Joint Rescue Coordination Centre (JRCC) Australia and will immediately do so if your flight is overdue.

SAR alerting (AIP ENR 1.1)

North of 65° South, Class G airspace is divided into designated Flight Information Areas (FIAs) within which a Flight Information Service (FIS) and SAR alerting services are provided by an ATS unit.

On and north of 65° South, in Class G airspace, IFR and VFR flights are permitted. IFR flights receive traffic information and a flight information service. VFR flights receive a flight information service and may receive a surveillance information service, if requested (ATC workload permitting).

South of 65° South, in Class G airspace, IFR and VFR flights are permitted, and all flights receive a flight information service on request

Flights over water (CASR 91 MOS 9.01)

There are specific over-water flight notification requirements (CASR 91.240 and MOS Chapter 9).

If your VFR flight is either

- an air transport operation, or
- a flight over water that is conducted at a distance from land greater than that which would allow the aircraft to reach land with an engine inoperative, you then must do one of the following:
  - submit a flight plan
  - nominate a search and rescue time (SARTIME) for arrival
  - leave a flight note (CASR 91 MOS 9.02).

Life jackets

Life jackets – carriage requirements (CASR 91 MOS 26.56)

For an aircraft that is a:

- seaplane or amphibian, or
- single-engine aircraft which is not a seaplane or amphibian that flies over water beyond the distance from which it could reach an area of land suitable as a forced landing area if the engine failed, or
- multi-engine aircraft which is not a seaplane or amphibian that is flown more than 50 NM from an area of land suitable as a forced landing area, must carry:
  - for each infant onboard – a life jacket or another equally effective flotation device that may have a whistle
  - for each other person onboard – a life jacket that must have a whistle.

***Exception:** An aircraft does not have to carry life jackets if it flies over water in the normal course of climbing after take-off, or descending to land, or in accordance with a navigational procedure that is normal for climbing from or descending at the aerodrome.*

Life jackets must be of a type approved by CASA. Life jackets that meet an Australian Standard might not meet the approval standards applied by CASA. Refer to section 6 of Airworthiness bulletin (AWB) 25-013 **casa.gov.au/content-search/airworthiness-bulletins/life-jacket-and-flotation-device-approved-standards** for information on approved CASA standards.

Stowage of life jackets (CASR 91 MOS 26.57)

For aircraft required to carry a life jacket or flotation device, unless being worn:

- each infant's life jacket or flotation device must be stowed where it is readily accessible by an adult responsible for the infant
- each other person's life jacket must be stowed where it is readily accessible from the person's seat.

Wearing life jackets – aircraft generally (CASR 91 MOS 26.58)

A person other than an infant:

- onboard a single-engine aircraft must wear a life jacket if it is flown over water beyond the distance from which it could reach land if the engine failed
- onboard a rotorcraft must wear a life jacket if the flight is over water to or from a helideck.

A person is wearing a life jacket if it is secured in a way that allows the person to put it on quickly and easily in an emergency.

Wearing life jackets – helicopter: special provisions are listed in (MOS 26.59); see Chapter 4 for more information.

***Exception 1:** In an aeroplane, a person does not have to wear a life jacket if the flight is higher than 2,000 ft above the water.*

***Exception 2:** A person does not have to wear a lifejacket if the aircraft flies over water while climbing after take-off or descending to land during normal navigational procedure for the aerodrome.*

Life rafts (CASR 91 MOS 26.60)

When to carry

An aircraft must carry enough life rafts for each person being carried whenever the aircraft is operated more than the shorter of :

- the distance the aircraft would fly in 30 minutes at its normal cruising speed in still air
- 100 NM.

(Greater distances apply to jet multi-engine aeroplanes with a MTOW greater than 2,722 kg or a turbine-engine propeller aeroplane with a MTOW greater than 5,700 kg.)

When calculating the number of life rafts required to be carried on the aircraft, the life raft rated capacity, excluding any overload capacity, must be used. Infants onboard need not be considered in the calculation.

This is a precis of the life raft requirements as described in the rule that would be applicable to most small light aircraft. For the complete rule see **Part 91 plain English guide**.

Stowage of life rafts (CASR 91 MOS 26.61)

A life raft must be stowed and secured so that it can be readily deployed, and the compartment or container used to stow the life raft marked in a clearly visible way.

Signalling equipment

Single-engine aircraft over water (CASR 91 MOS 26.48)

For a single engine aircraft, you must always carry a survival (portable) ELT if you fly over water, further than the distance the aircraft could reach an area of land, suitable for a forced landing, if the engine fails

Exception: *This requirement does not apply to:*

- *single seat aircraft*
- *a flight for the purposes of:*
    - *the aircraft's manufacture*
    - *preparing or delivery of the aircraft following the purchase or transfer of the operator*
    - *positioning of an Australian aircraft from a location outside Australia to any place at which any ELTs required to be fitted to the aircraft will be registered with AMSA*
- *an aircraft fitted with a radio or otherwise to alert and continuously communicate to an appropriate person relating to the emergency on the ground during the flight.*

Aircraft required to carry more than one life raft

For a flight where more than one life raft is required to be carried an aircraft must be:

- fitted with an automatic ELT and carry a survival ELT, or
- carry at least 2 survival ELTs.

***Exception:** The requirement that a transmitter which is carried or fitted needs to be registered with either the Australian Maritime Safety Authority (AMSA) or the authority in the aircraft's state of registry responsible for providing SAR services does not apply to a flight for a purpose related to:*

- *the aircraft's manufacture*
- *the preparation or delivery of the aircraft following its purchase or transfer of operator*
- *the positioning of an Australian aircraft from a location outside Australia to the place at which any ELTs required to be fitted to the aircraft will be registered with AMSA.*

Location of carriage of ELT (CASR 91 MOS 26.48)

If the ELT carried is a survival ELT, then you must ensure that the ELT is carried in one of the following locations on the aircraft:

- on the person of a crew member, or
- in, or adjacent to, a life raft, or
- adjacent to an emergency exit used for evacuation of the aircraft in an emergency.

Survival equipment

An aircraft shall carry survival equipment for sustaining life appropriate to the area being overflown on the following flights (CASR 91 MOS 26.64):

- where the carriage of life rafts is required
- during operations within or through the remote areas specified by the remote area maps, below.

Designated remote areas

Remote area survival equipment (CASR 91 MOS 26.64)

An aircraft that is flying over a remote area is required to carry appropriate survival equipment for sustaining life for the area that is being overflown.

Meaning of remote area (CASR 91 MOS 26.65)

Remote areas are the areas of Australia illustrated by shading in the following Figures and described as follows:

'Central Australia remote area' is the area enclosed within the boundary of a line from; Kalgoorlie to Leigh Creek, to Bourke, to Mt Isa, to Townsville, to Cairns, then following the coast north to Cape Horn, then along the coastline of the Gulf of

Carpentaria and on to Darwin, then following the coastline to Anna Plains, then to Wiluna, to Laverton, and back to Kalgoorlie, and

- includes Australian-administered islands adjacent to the remote area between Cairns and Talgarno
- excludes the area within a 50 NM radius of Darwin
- excludes the flight corridors within sight of, and not more than, 5 NM from the following:
    - the Stuart Highway between Alice Springs and Darwin
    - the Barkly Highway between Tenant Creek and Mt Isa
    - the Bruce Highway between Townsville and Cairns.

'Snowy Mountains remote area' is the area enclosed within the boundary of a line from Mt Franklin to Tharwa, to Berridale, to Delegate, to Mt Baw, to Jamieson, to Khancoban, and back to Mt Franklin.

'Tasmania remote area' is the area enclosed within the boundary of a line from; West Point to Black Bluff, to 15 NM beyond Cape Bruny, then back to West Point at a distance of 15 NM off the coastline (disregarding bays and inlets).

Exception: *A line to or from a named town is taken to come no closer than 5 NM from the town centre on the side of the town adjacent to the remote area.*

Figure: Central Australia remote area

Figure: Snowy Mountain remote area

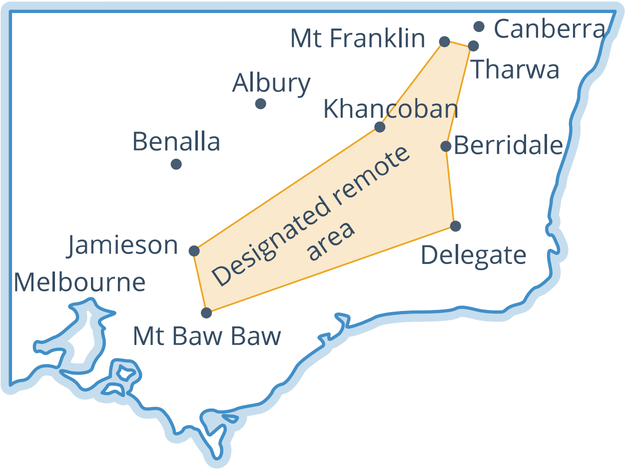
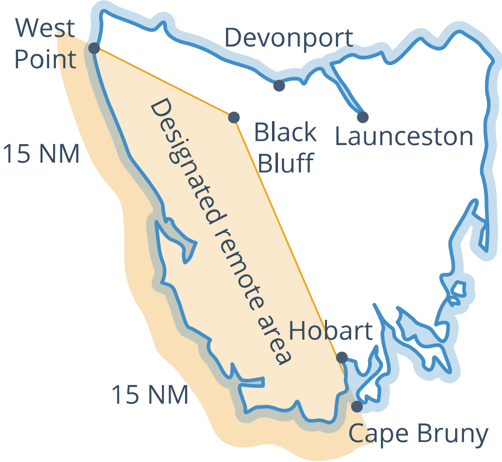


Figure: Tasmania remote area



Emergency locator transmitter (ELT)

ELT requirements (CASR 91 MOS 26.49)

An ELT must transmit, when activated, in the frequency band 406 MHz – 406.1 MHz, and on 121.5 MHz. An ELT must also be registered with the Australian Maritime Safety Authority. For further ELT requirements see CASR 91 26.50, 26.51 and 26.52.

Carriage of emergency transmitter

(CASR 91 MOS 26.48) (CASR 91 MOS 26.52)

When undertaking a flight more than 50 NM radius from the aerodrome of departure, you must carry a serviceable ELT. If the ELT is installed on the aircraft, it must be armed before flight. If it is a survival (portable) ELT it must be carried in a readily accessible place.

Exceptions to this requirement are:

- flights wholly within 50 NM of the aerodrome of departure
- single-seat aircraft
- a flight for the purposes of:
  - the aircraft's manufacture
  - preparing or delivery of the aircraft following the purchase or transfer of the operator
  - positioning of an Australian aircraft from a location outside Australia to any place at which any ELTs required to be fitted to the aircraft will be registered with AMSA
- an aircraft fitted with a radio or otherwise to alert and continuously communicate to an appropriate person relating to the emergency on the ground during the flight.
- the flight is for the purpose of moving the aircraft to a place to have an approved ELT fitted to the aircraft, or to have an approved ELT that is fitted to it repaired, removed, or overhauled, provided that:
  - an entry has been made in the aircraft's logbook stating the ELT make, model and serial number together with the date it was removed and the reason for doing so
  - a placard stating 'ELT not installed or carried' has been placed in a position visible to the pilot, and
  - not more than 90 days have passed since the ELT was removed.

Australian Joint Rescue Coordination Centre (JRCC)

(AIP GEN 3.6)

ENQUIRIES

Australian Rescue Coordination Centre, GPO Box 2181, Canberra City ACT 2601
t: 1800 815 257 or 1800 641 792. **f:** 1800 622 153
atsb.gov.au/voluntary/repcon-aviation

You should monitor 121.5 MHz before engine start and after shut down. Reception of an ELT transmission must be reported to ATS or the Rescue Coordination Centre immediately (AIP GEN 3.6).

Testing ELTs (AIP GEN 3.6)

Operational tests must be limited to 5 seconds and the preferred procedure is that they be conducted within the first 5 minutes of the hour. JRCC Australia must be notified in advance of the test and where the beacon is operated on 40 MHz, its HexID must be provided. Details of ELT testing can be found on the Australian Maritime Safety Authority (AMSA) website at **amsa.gov.au/beacons**.

Inadvertent ELT activation

If your ELT has been inadvertently activated for more than 10 seconds, this must be reported to ATS or the JRCC immediately (AIP 3.6)(ERSA EMERG).
t: 1800 815 257 to report inadvertent ELT activation

Emergency use of ELTs

Refer to ERSA EMERG.

ELT registration (AIP GEN 3.6)

All ELTs must be registered on the Australian Beacon Register. See **amsa.gov.au/beacons** for further details. Registration allows the JRCC Australia to respond more quickly and effectively to real distress activations of an ELT, and helps the JRCC Australia respond appropriately to inadvertent activations.

Pre-flight briefing and flight notification

The pre-flight information service offers a range of services which are supported by NAIPS (ERSA GEN PF). Information for the purposes of flight planning should be obtained through NAIPS.

NAIPS is the National Aeronautical Information Processing System. It provides briefings and flight notification functions, supports a range of pre-flight information services and has a database of NOTAM and meteorological information.

If you require personal assistance regarding pre-flight information and services, a National Help Desk is available 24 hours a day on 1800 801 960.

The service delivery options for pre-flight information and flight notification, in order of preference, are:

- NAIPS Internet Service (NIS) **airservicesaustralia.com/naips**
- Aviation facsimile (AVFAX) 1800 805 150
- METBRIEF **www.metbrief.com**
  Personal briefing 1800 805 150
- By radio (see following pages for more information).

NAIPS

Pre-flight briefing requirements

Remember that a weather forecast and NOTAMs are mandatory for flights away from the vicinity of an aerodrome and, for VFR, a destination alternate aerodrome must be provided for flights more than 50 NM from point of departure when the forecast is below alternate minima of 1,500 ft ceiling and 8 km visibility (AIP ENR 1.1).

For specific flight plan track requirements at certain locations, see ERSA GEN FPR.

Internet briefings

Visit **airservicesaustralia.com** (click on Flight Briefing Service). You must be registered to obtain a user ID and password to be able to use NIS. A wide range of services are available and menu choices and online help are provided for unfamiliar users.

Enquiries

Call the National Help Desk on 1800 801 960 for further assistance.

The NIS provides the following information:

- specific pre-flight information briefing (SPFIB);
- full text NOTAM
- location briefing
- GAF
- special MET briefing
- general MET forecasts
- first light and last light calculations
- wind and temperature profile
- restricted area briefing
- retrieval of previous SPFIB
- updated SPFIB
- updated AVFAX briefing
- GPS RAIM (receiver autonomous integrity monitoring) availability
- NAIPS charts
- UTC time check
- flight notification using:
  - stored flight file
  - SPFIB
  - Flight notification form
  - domestic/ICAO flight plan, and
  - SARTIME.

Note: An SPFIB is a briefing based on a route. The NOTAM and MET data presented are based on the set parameters of the route, time and height. The route can be either one stored in NAIPS and accessed via the route directory, or as described in the data entry form.

AVFAX products and custom codes can be accessed online via the NIS or by telephone. AVFAX has other MET products necessary for use in some operations (see ERSA GEN PF).

Each AVFAX briefing contains a reference number which can be used online, quoted to the briefing office, or in-flight to obtain an update on the original briefing.

To use AVFAX:

- Note which FIR and GAF areas cover your flight.
- Use a tone dialling telephone to access AVFAX on 1800 805 150.
- When AVFAX answers, enter your account number (to obtain an account number, you need to register with NIS or contact the Help Desk on 1800 801 960).
- When prompted, enter your password followed by the # key.
- Enter the relevant Product Number.
- Follow the prompts until you hear the ‘thank you’ message.

Product Number and Prefix Group Code form are available in ERSA GEN PF.

METBRIEF

METBRIEF is a self-help system which delivers meteorological information on the telephone, using a computer-generated voice, in response to a tone-generated telephone request.

METBRIEF **t:** 1800 805 150

Personal briefing

Briefing staff at a flight information centre provide a flight notification acceptance service and a NOTAM, as well as meteorological and other briefing information by telephone, or facsimile in response to requests for specific information.

Personal briefing **t:** 1800 805 150

By radio

Where telephone facilities are not available, FLIGHTWATCH and ATC provide an in-flight NOTAM and meteorological briefing service via air-ground communication channels to pilots unable to obtain information pre-flight, or who require an in-flight briefing update. This service only delivers information until the first point of landing where telephone facilities are available.

Weather briefings

For weather briefings visit the Bureau of Meteorology website at **bom.gov.au**

Note: Airservices Australia is the official provider of the Aeronautical Information Service, which includes the delivery of the Bureau of Meteorology’s aviation meteorological products. Therefore, all information for the purpose of flight planning should be obtained from Airservices Australia.

Notice to Airmen (NOTAM)

As part of the network operations centre's service, the NOTAM Office is responsible for issuing NOTAMs that provide information that is of direct operational significance, and which may immediately affect aircraft operations. Distributed electronically, a NOTAM contains information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations (AIP GEN 2.2).

A pre-flight information service is provided from an office located in Canberra. This office provides a NOTAM, meteorological, and flight notification service. Some charges are applicable.

In Australia, description of the pre-flight information services available is contained in ERSA GEN.

In Australia, three types of NOTAMs are available to pilots (AIP GEN 3.3):

- location NOTAMs, accessed by individual location identifier, for example YBWW for Brisbane West Wellcamp
- FIR NOTAMs, which consist of NOTAMs applicable to individual FIRs – Brisbane (YBBB) or Melbourne (YMMM)
- Head Office NOTAMs, accessed by the identifier YSHO and shown in the briefing results as Australia Gen (YBBB/YMMM).

Note: 'Trigger NOTAMs' are Head Office NOTAMs that are allocated to a specific FIR or location.

A NOTAM is issued in a format with the following fields:

- Location identification
- Time of commencement of information or time of publication where prior notification is required. This date/time will then reflect the actual commencement time of the NOTAM information
- Time of cessation of information
- Times of periods of activity
- Plain language text
- Lower limit, and
- Upper limit.

In the domestic environment, NOTAM numbering is preceded by the letter C followed by the number and year, CXXX/yy for example: C0689/14.

For each location, a separate series of numbers is issued; thus the NOTAM is identified by the location identifier and the number, not by the number alone.

NOTAM examples

Head Office NOTAMs

AUSTRALIA GEN (YBBB/YMMM)

C156/13 REVIEW C155/13

DAYLIGHT SAVING TIME EFFECTIVE IN THE STATES OF NEW SOUTH WALES, SOUTH AUSTRALIA, TASMANIA, VICTORIA AND THE AUSTRALIAN CAPITAL TERRITORY
FROM 10 051600 TO 04 051600

C46/13

D383 HR INFO ON AIS CHARTS AMD
VISUAL TERMINAL CHART (VTC) MELBOURNE, VISUAL NAVIGATION CHART (VNC) MELBOURNE, TERMINAL AREA CHART (TAC) MELBOURNE AND ENROUTE CHART LOW
(ERCL) 1:
DANGER AREA D383 HR TO READ 'ERSA'
FROM 03 280351 TO PERM

FIR NOTAMS

BRISBANE FIR (YBBB)

C1969/13 REVIEW C1633/13

A/G FAC ACC/FIA BRISBANE CENTRE 135.5 (WHITSUNDAY ISLAND AREA) SUBJ TO INTRP DUE INTERFERENCE
ALTN FREQ 133.2 OR AS ADZ BY ATC
FROM 12 170151 TO 03 170500 EST

Location NOTAMS

TOWNSVILLE (YBTL)

C560/13 REVIEW C230/13

TRIGGER NOTAM – AIP SUP

H58/13
TOWNSVILLE RNP-AR PROPRIETARY PROCEDURES
AVBL FM AIRSERVICES WEBSITE
http://airservicesaustralia.com/aip/aip.asp
FROM 12 120412 TO 05 290300 EST

Note: This is a Head Office NOTAM but allocated to a specific location.

C45/14 REVIEW C108/13

ABN DECOMMISSIONED
FROM 02 130516 TO PERM

C59/14

INCREASED BIRD HAZARD (MAGPIE GEESE) IN VCY OF AD
FROM 02 240427 TO 03 280100 EST
DAILY 2000/2230 0630/0900

C57/14

OM ‘ITL’ 75 (RWY 01) NOT AVBL DUE MAINT
EXCEPT ON 30 MIN NOTICE FOR OPR RQMNTS
FROM 02 280100 TO 02 280500

Flight notification – methods of SARTIME nomination

(AIP ENR 1.10)

For VFR flights nominating a SARTIME to ATS, and those intending to operate in controlled airspace (except for VFR flights in Class E airspace) you must submit flight details to ATS.

The order of preference for you to submit a comprehensive flight notification is:

- through pilot access to NAIPS (via the internet)
- in writing
- by telephone, or
- by radio to ATS.

When submitting SARTIME flight notifications by fax you must confirm receipt of the notification with the briefing office. Airservices strongly recommends that when any flight notification is submitted by fax, the pilot or operator telephones the briefing office before departure to confirm that it has been received.

Abbreviated details for operations in controlled airspace may be advised by radio if the flight is to operate locally, or operations will be for a brief duration. However, prior contact with ATC may avoid delays. You may submit details by radio to ATS when associated with a clearance request, or to nominate a SARTIME.

When submitting a flight notification by radio, you should be mindful of the need to minimise frequency congestion and transmit only that information required by the ATS for the current flight stage. Acceptance is subject to ATS workload and may be delayed.

Submission of a comprehensive travel flight notification by radio is not a preferred method and should not be used when submission by some other means is available. Flight notification by radio for travel flights requiring the submission of comprehensive details will not be accepted at controlled aerodromes.

For pilots of VFR flights wishing to operate in other than class C or D airspace, and who wish to nominate a SARTIME, they may submit details in the NAIPS SARTIME flight notification format (via the internet). If submitting the flight notification by fax or via telephone, the only form available is the Australian Domestic Flight Notification form.

You may cancel a SARTIME via:

- telephone to CENSAR (an automated centralised SARTIME database software package used by ATS to manage SARTIMES) on 1800 814 931
- Flight Service or ATC when telephone facilities are not available, or
- relay through another pilot.

Flight notification – SARTIME requirements for VFR flights (AIP ENR 1.10)

VFR flights in the following categories must submit a SARTIME flight notification to ATS, or, as an alternative, leave a Flight note with a responsible person:

- air transport
- overwater flights
- flights in designated remote areas and
- flights at night proceeding beyond 120 NM from the aerodrome of departure.

VFR flights which are required to, or wish to, use a SARTIME may do so by providing ATS with the following details:

- callsign
- aircraft type
- departure point
- route to be flown
- destination
- POB, and
- SARTIME.

Note: Only one SARTIME may be current at any time. To prevent the existence of multiple SARTIMEs for aircraft used by more than one pilot, SARTIMEs should be nominated immediately before the start of each flight.

VFR flights may operate on reporting schedules in the following circumstances:

- flood, fire or famine relief flights
- overwater flights
- search and rescue flights, and
- military flights.

Submission of flight details at least 30 minutes before EOBT is recommended.

Where notification of flight details, or changes to details, are submitted less than 30 minutes before EOBT, delays will be encountered when an ATC unit requires that the data be programmed into the computerised secondary surveillance radar (SSR) code/callsign management system.

The following table identifies flight notification options for the various classes and types of operations when flying IFR or VFR.

Table: Flight notification requirements

Flight rules	Class of airspace	Type of operation	Flight notification requirements
IFR	All classes	All operations	Submit a Flight Plan
VFR	Class C and D	All operations	Submit a Flight Plan
VFR	All classes	Air transport operations, or over water flight, or in designated Remote Areas, or at night proceeding beyond 120 NM from the aerodrome of departure	Submit a Flight Plan, or nominate a SARTIME, or leave a flight note
VFR	All classes	Community service flights (CSFs)	Submit a Flight Plan, or nominate a SARTIME
VFR	Class E and G	Any other operations not mentioned above	Submit a Flight Plan, or nominate a SARTIME, or leave a flight note, or not provide a notification

To assist in managing the airways system, you should always warn ATS of any flight notification amendments by using appropriate alerting phrases, for example: ‘Flightwatch, delta mike golf, SARTIME flight plan amendment’.

Domestic flight notification

Submission of flight details at least 30 minutes before estimated time of departure (ETD) is recommended.

Forms (AIP ENR 1.10)

An example of, and instructions for use of, the Domestic Flight Notification Form are shown on the following pages.

In a number of cases (particularly in Item 19 on the form (see Table following), completion is recommended as good practice. If mandatory items are left incomplete, delays may occur.

The reverse side of the Flight Notification Form has a flight log/template to assist you in planning and navigation. It is not intended to be mandatory or prescriptive, and you may use any template, or other device, of your choice.

Flight Notification Forms are available from the Airservices website: **airservicesaustralia.com/flight-briefing**

Flight rules (AIP ENR 1.10)

Flight rules must be indicated in any flight notification, except for VFR flights operating wholly outside controlled airspace and nominating a SARTIME.

Performance-based navigation (PBN) notification (AIP ENR 1.10)

No indication on the Flight Notification Form is required for visual navigation or dead reckoning (DR) substitute applications of GNSS.

Notification of PBN capabilities requires a combination of entries in Item 10 (Equipment and Capabilities) and Item 18 of the flight notification form (see Table following). Guidance is provided in the Domestic flight notification form user guide.

Prior to conducting required navigation performance – authorisation required (RNP AR) operations in Australian administered airspace, foreign operators must apply to CASA (International Operations) for an 'Authorisation: RNP-AR operations'. Foreign operators should not include any RNP AR capability in flight plan notification until so authorised by CASA.

POB

For VFR flights you must include POB when submitting a flight notification or when leaving a flight note and are encouraged to notify ATS of any subsequent changes.

General

For flights not operating along an ATS route, estimated elapsed times should be provided for locations approximately 30 minutes or 200 NM apart.

Location data

Any location abbreviations used should be authorised abbreviations (that is, published in the AIP).

If a common name is entered into NAIPS in lieu of an aerodrome abbreviation or navigational aid/waypoint, the flight notification output will assume that the aircraft is tracking over a navigational aid/waypoint and not the aerodrome, for example: the location Holbrook will translate to HBK, not YHBK.

When entering details in terms of latitude and longitude, or using polar coordinates, you must adhere to the correct format, for example: 2730S15327E.

Flight notification amendment (AIP ENR 1.10)

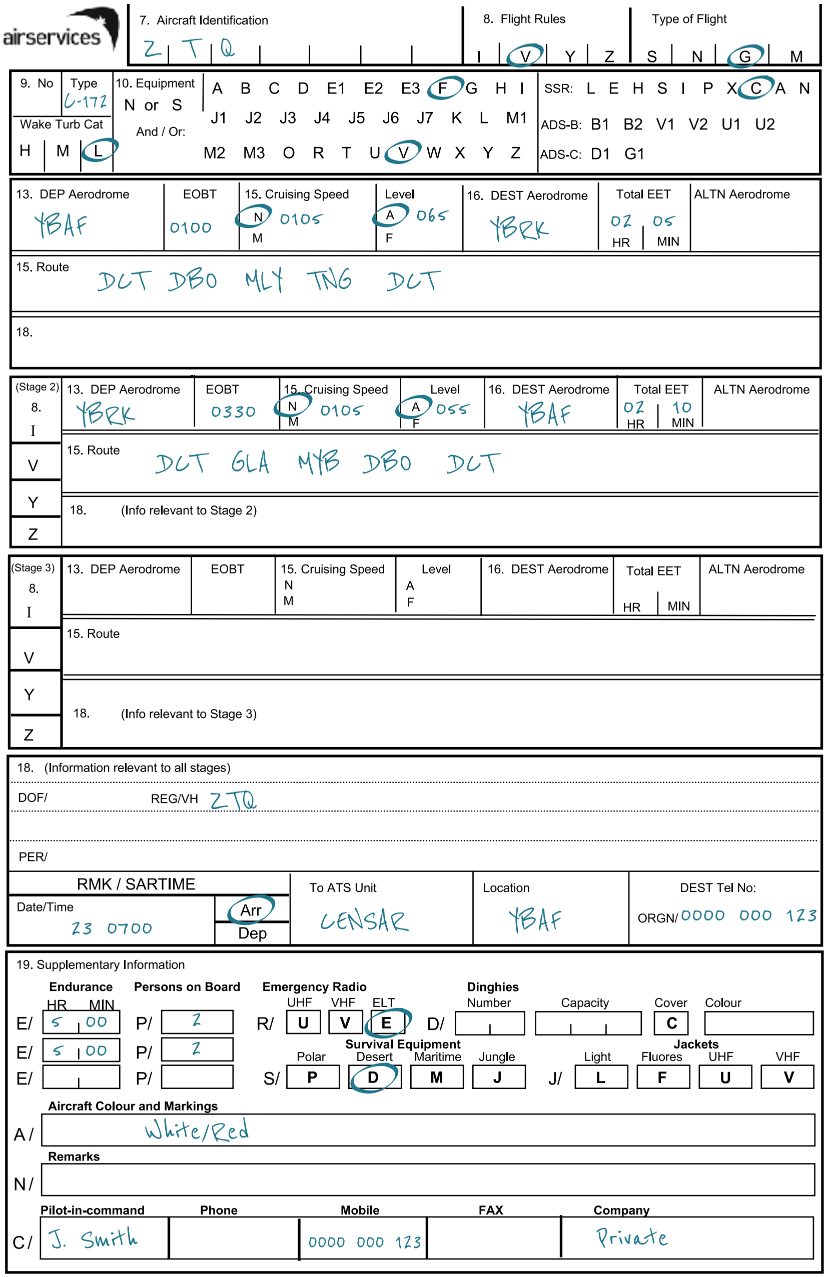
When flight notification details have been previously notified to ATS, you should advise, as soon as possible, when there is any significant change to the following items:

Table: Flight notification amendment

Item	Details	All IFR VFR in control zone (CTR)/ control area (CTA)	VFR wholly OCTA nominating a SARTIME
7	Aircraft ident and/or registration	X	X
8	Fight rules to which flight will be operating	X	
10	Serviceability of equipment carried	X	
13	Departure (DEP) aerodrome and EOBT if the change exceeds 30 minutes	X	X (DEP aerodrome only)
15 16	Route, landing points or alternates	X	X
15	Cruising level	X	
15	Speed and estimated total elapsed time	X	
18	Any change to: status (STS)/PBN/ navigation (NAV)/RMK/(includes SARTIME)	X	X
19	POB	X	

Domestic flight notification form user guide

Example of Domestic Flight Notification Form



airservices

7. Aircraft Identification: Z T Q

8. Flight Rules: I [✓ V] Y Z

Type of Flight: S N [✓ G] M

9. No | Type: C-172

Wake Turb Cat: H M [✓ L]

10. Equipment: N or S And / Or: A B C D E1 E2 E3 [✓ F] G H I J1 J2 J3 J4 J5 J6 J7 K L M1 M2 M3 O R T U [✓ V] W X Y Z

SSR: L E H S I P X [✓ C] A N

ADS-B: B1 B2 V1 V2 U1 U2

ADS-C: D1 G1

13. DEP Aerodrome	EOBT	15. Cruising Speed	Level	16. DEST Aerodrome	Total EET	ALTN Aerodrome
YBAF	0100	[✓ N] 0105 M	[✓ A] 065 F	YBRK	02 HR 05 MIN	

15. Route: DCT DBO MLY TNG DCT

18.

(Stage 2) 8. I V Y Z

13. DEP Aerodrome	EOBT	15. Cruising Speed	Level	16. DEST Aerodrome	Total EET	ALTN Aerodrome
YBRK	0330	[✓ N] 0105 M	[✓ A] 055 F	YBAF	02 HR 10 MIN	

15. Route: DCT GLA MYB DBO DCT

18. (Info relevant to Stage 2)

(Stage 3) 8. I V Y Z

13. DEP Aerodrome	EOBT	15. Cruising Speed	Level	16. DEST Aerodrome	Total EET	ALTN Aerodrome
		N M	A F		HR MIN	

15. Route

18. (Info relevant to Stage 3)

18. (Information relevant to all stages)

DOF/ REG/VH ZTQ

PER/

RMK / SARTIME

Date/Time: 23 0700 [✓ Arr] Dep

To ATS Unit: CENSAR

Location: YBAF

DEST Tel No: ORGN/ 0000 000 123

19. Supplementary Information

Endurance HR MIN

E/ 5 00

E/ 5 00

E/

Persons on Board

P/ 2

P/ 2

P/

Emergency Radio R/ UHF U VHF V ELT [✓ E]

Survival Equipment S/ Polar P Desert [✓ D] Maritime M Jungle J

Dinghies D/ Number Capacity Cover C Colour

Jackets J/ Light L Fluores F UHF U VHF V

A/ **Aircraft Colour and Markings**: White/Red

N/ **Remarks**:

C/ **Pilot-in-command**: J. Smith **Phone**: **Mobile**: 0000 000 123 **FAX**: **Company**: Private

PSN	LSALT	FL or ALT	TAS	TR(M)	WIND	HDG (M)	G/S	DIST	ETI	EET	PLN EST	REV EST	ATA ATD

Item	**Fuel Calculation**	**Min**	**lbs, L or kg**	**Min**	**lbs, L or kg**
a	Taxi fuel				
b	Trip fuel				
c	Variable fuel reserve (______% of b)				
d	Alternate fuel				
e	Fixed fuel reserve				
f	Additional fuel				
g	Holding fuel				
h	Fuel required (a+b+c+d+e+f+g)				
i	Discretionary fuel				
j	Margin fuel				
k	Endurance (h+i+j)				
	From				

Pilot Notes

CALLSIGN:	PHONE NO:	FAX NO:

BRIEFING 1800 805 150

FAX 1800 805 150

CENSAR 1800 814 931

Item 7 – Aircraft identification

Enter: aircraft registration/flight number. ZZZZ. TBA (to be advised) cannot be accepted.

Requirements

For VH-registered aircraft, enter the 3 letters after the prefix only, for example: VH-ZFR enter ZFR.

For flight numbers, and other approved callsigns, enter a mixture of figures and letters not exceeding seven characters, for example: QF 611.

One callsign per flight notification.

Item 8 (a) – Flight rules

Circle:

I	Instrument Flight Rules (IFR)
V	Visual Flight Rules (VFR)
Y	IFR then one or more changes of flight rules
Z	VFR then one or more changes of flight rules

Requirements

If Y or Z is circled, an entry in Item 15 must specify where the change of flight rules will occur, for example: YBAF VFR.

Type of flight

Circle:

S	scheduled air service
N	non-scheduled air service
G	general aviation
M	military

Item 9 – Number of aircraft

Enter: number of aircraft where there is more than one, otherwise leave blank.

Type

Enter: aircraft type. Where more than one aircraft type is included in a formation, enter the type of the lowest-performance aircraft. Additional details regarding the formation must be inserted at Item 18.

Requirements

Use the 2 or 4-letter ICAO-approved aircraft type abbreviations.

Note: Go to **www.icao.int/publications/DOC8643/Pages/default.aspx** for an extensive list of aircraft type abbreviations.

For aircraft type abbreviations not approved by ICAO, enter ZZZZ and specify the type of aircraft in Item 18 preceded by TYP/.

Wake turbulence category

Circle:

H	heavy aircraft 136,000 kg MTOW or more
M	medium aircraft between 7,000 and 136,000 kg MTOW
L	light aircraft 7,000 kg MTOW or less

Item 10 – Nav/com equipment

Circle to indicate the presence of serviceable equipment that you are qualified to use:

N	no COM/NAV/approach aid equipment for the route to be flown, or the equipment is unserviceable	**J7**	CPDLC FANS 1/A SATCOM (Iridium)
S	standard COM/NAV/approach aid equipment of VHF/ILS/VOR	**K**	MLS
A	GBAS Landing System	**L**	ILS
B	LPV (APV with SBAS)	**M1**	ATC RTF SATCOM (INMARSAT)
C	LORAN C	**M2**	ATC RTF (MTSAT)
D	DME	**M3**	ATC RTF (Iridium)
E1	FMC WPR ACARS	**O**	VOR

Item 10 – Nav/com equipment

Circle to indicate the presence of serviceable equipment that you are qualified to use:

E2	D-FIS ACARS	**P1**	CPDLC RCP 400
E3	PDC ACARS	**P2**	CPDLC RCP 240
F	ADF	**P3**	SATVOICE RCP 400
G	GNSS	**P4-P9**	See the AIP ENR 1.10
H	HF RTF	**R**	PBN approved
I	Inertial NAV	**T**	TACAN
J1	CPDLC ATN VDL Mode 2	**U**	UHF RTF
J2	CPDLC FANS 1/A HFDL	**V**	VHF RTF
J3	CPDLC FANS 1/A VDL Mode A	**W**	RVSM approved except STATE formation flights
J4	CPDLC FANS 1/A VDL Mode 2	**X**	MNPS
J5	CPDLC FANS 1/A SATCOM (INMARSAT)	**Y**	VHF with 8.33 kHz channel spacing capability
J6	CPDLC FANS 1/A SATCOM (MTSAT)	**Z**	other equipment

Notes: If the letter Z is used, specify the other equipment carried or other capabilities in Item 18, (preceded by COM/, NAV/ and/or DAT/ (data), as appropriate).

If the letter R is used, specify the performance-based navigation levels that can be met in Item 18 following the indicator PBN/.

The NAIPS interface does not currently support the use of P1, P2 and P3. Operators may only have to declare the required communication performance (RCP) capability for flights that will operate in airspace administrated by states that require it.

Enter 'G' (GNSS) and 'R' (PBN capability) in Item 10 for aircraft equipped with a GNSS-enabled area navigation system with additional entries as appropriate. The correlation between Item 10 and Item 18 entries for common PBN approvals is summarised below:

	PBN Capability	Item 10	Item 18
Oceanic	RNAV10 (RNP10)	GR and I (if appropriate)	PBN/A1
	RNP4	GR	PBN/L1
Continental	RNP2	GZ	NAV/RNP2
Terminal	RNP1, all permitted sensors	GRDI	PBN/O1
	RNP1, GNSS	GR	PBN/O2
Approach	RNP APCH	GR	PBN/S1
	RNP APCH with Baro-VNAV	GR	PBN/S2
	RNP AR APCH with RF	GRI	PBN/T1 OPR/ (name)
Precision approach	GLS	AGZ	NAV/GLS

For the majority of Australian IFR operations the appropriate field 10 navigation entries will be:

S	Standard COM/NAV/Approach aid combination of VHF/VOR/ILS, and
R	PBN capable, and
G	GNSS, and
Z	other equipment or capabilities (required to enable nomination of NAV/RNP2 in Item 18.

Surveillance equipment

Circle:

N Nil

Note: Aircraft width ADS-B capability indicated in a domestic flight notification is only for a capability suitable for ATC service. ADS-B equipment outputting a Source Integrity Level (SIL) of 1 (SIL=1) (e.g. TABS devices and EC devices) is not suitable for ATC service. Therefore, for an aircraft fitted with ADS-B equipment outputting SIL=1 you should not enter an ADS-B code in Field 10b. See later note about indicating transponder capability.

Light Sport Aircraft, experimental and other eligible aircraft fitted with non-TSO ADS-B equipment eligible to output SIL2 or SIL3 may indicate an ADS-B capability in field 10b.

Aircraft with ADS-B capability:

Enter: up to two ADS-B codes: either ‘L’ or ‘E’ and ‘B1’ or ‘B2’.

L	SSR Transponder Mode S, including aircraft identification, pressure altitude, ADS-B Out and enhanced surveillance capability.
E	SSR Transponder Mode S, including aircraft identification, pressure altitude and ADS-B Out capability.
B1	ADS-B ‘Out’ capability using 1,090 MHz extended squitter.
B2	ADS-B ‘Out’ and ‘In’ capability using 1,090 MHz extended squitter.

Note: Enhanced surveillance capability is the ability of the aircraft to downlink aircraft derived data via a Mode S transponder.

Use the following table to determine the Field 10b entries for ADS-B transponder (use only one entry)

Mode S transponder with ADS-B

Field 10b entry	Transponder capability					
	Mode S (ADS-B)	Aircraft ID	Pressure altitude	Enhanced surveillance	ADS-B 1,090 OUT	ADS-B 1,090 IN
LB2	X	X	X	X	X	X
EB2	X	X	X		X	X
LB1	X	X	X	X	X	
EB1	X	X	X		X	
L	X	X	X	X		
E	X	X	X			

Aircraft without ADS-B capability

Enter one SSR code representing the highest level of non-ADS-B surveillance capability available (in order: highest is H then S, I, P, X, C and A is lowest).

H	SSR Transponder Mode S, including aircraft identification, pressure altitude and enhanced surveillance capability; identification capability
S	SSR Transponder Mode S, including both pressure altitude and aircraft identification capability
I	SSR Transponder Mode S, including aircraft identification, but no pressure altitude capability
P	SSR Transponder Mode S, including pressure altitude, but no aircraft identification capability
X	SSR Transponder Mode S with neither aircraft identification nor pressure altitude capability
C	SSR Transponder Mode C
A	SSR Transponder Mode A

Note: Enhanced surveillance capability is the ability of the aircraft to down-link aircraft-derived data via a Mode S transponder.

Mode S transponder without ADS-B

Field 10b entry	Transponder capability			
	Mode S (non-ADS-B)	Aircraft ID	Pressure altitude	Enhanced surveillance
H	X	X	X	X
S	X	X	X	
I	X	X		
P	X		X	
X	X			

ADS-C (automatic dependent surveillance-contract)

Enter up to two ADS-C codes: D1 and/or G1

D1	ADS-C with FANS 1/A capabilities
G1	ADS-C with ATN capabilities

Note: The required surveillance performance (RSP) specification(s), if applicable, will be listed in Item 18 following the indicator SUR/. Operators may only have to declare the RSP capability for flights that will operate in airspace administered by states that require it.

Item 13 – Departure aerodrome

Item 16 – Destination aerodrome and total estimated elapsed time – Alternate aerodrome

Enter: aerodrome abbreviation in 4 letters.

Requirements

Enter: the 4-letter authorised abbreviation and then, without a space, the total estimated elapsed time as four figures in hours and minutes, for example 0340. Include any aerial work delay noted as DLE in Item 18.

For aerodromes without an authorised abbreviation, enter ZZZZ.

In Item 18 enter DEP/ (or as applicable DEST/, ALTN/) followed by either the:

- latitude and longitude of the aerodrome
- bearing and distance from a location with an authorised abbreviation
- first point of the route, or
- marker radio beacon if the aircraft has not taken off from the aerodrome.

In item 18 enter the common name of the alternate location after RMK/.

Note: For bearing and distance, enter the designator of the location followed by three figures in degrees magnetic followed by three figures in nautical miles, for example BN270120 is a position 270 degrees 120 NM, from Brisbane.

Use of authorised aerodrome abbreviations for mobile locations may be suspended by NOTAM when not in the normal location. You must enter ZZZZ and provide location details when the aerodrome abbreviation is suspended.

Total estimated elapsed time (EET)

Enter: total estimated elapsed time of the flight as four figures in hours and minutes, (for example 0340) and include any aerial work delay noted as DLE in Item 18.

Flight notification filed in the air (AFIL)

AFIL can be used instead of the departure aerodrome abbreviation when ATS services are only required for entry to, or to cross, controlled airspace. (Time of departure becomes an estimate for the point where the ATS service is to commence).

Note: For a flight plan received from an aircraft in flight, the total EET is the estimated time from the first point of the route to which the flight plan applies to the termination point of the flight plan.

Estimated off blocks time

Enter: EOBT, or an estimate for the point where the ATS service is to commence (applicable for use with AFIL – as referred to above), in four-figure UTC.

Requirements

Enter an EOBT for every flight stage as hhmm. All flights must also include DOF/ followed by the date of flight as yymmdd at Item 18, even if the date of the flight is the current day. EOBT/DOF more than 120 hours (five days) in advance of the time of notification cannot be accepted. A change of more than 30 minutes to a submitted EOBT should be advised to ATS or through NAIPS.

Time of departure

Enter: estimated time of departure (ETD) in four-figure UTC, or an estimate for the point where the ATS service is to commence (applicable for use with AFIL— as referred to above).

Requirements

ETDs of more than seven days from the time of notification cannot be accepted. A change of more than 30 minutes to a submitted ETD should be advised to ATS or through NAIPS.

Item 15 – Cruising speed

Enter: TAS in knots or Mach number.

Requirements

Circle:

- N then enter zero and three figures for knots, for example 0180
- M then enter zero and two figures for Mach number to the nearest hundredth of a unit, for example 082.

Level

Enter: first planned cruising level.

Requirements

Enter: either:

- A followed by three figures to indicate altitude in hundreds of feet up to and including 10,000 ft, for example, A085, or
- F followed by three figures to indicate flight levels above 10,000 ft, for example, FL350.

Item 15 – Route

Enter: details of the planned route, change of level, flight rules and cruise climb.

Requirements for locations/waypoints

For an aerodrome, use the authorised abbreviation, for example YMBL for Marble Bar. For a NAVAID identifier, use the published two or 3-letter abbreviation, for example KSC for Kingscote non-directional beacon (NDB).

For a latitude and longitude identification, use degrees and minutes in an 11-character group, for example: 2730S15327E.

For a waypoint use the assigned designator, for example: CANTY.

For bearing and distance, enter the designator of the location followed by three figures in degrees magnetic followed by three figures in nautical miles. For example: BN270120 is a position 120 NM, 270 degrees from Brisbane.

Requirements for route

For the ATS route designator, enter the published chart designator, for example B456, H62.

Route details must start with DCT (direct) to indicate the flight is planned to track from the departure aerodrome (for example YSCB for Canberra), to the first en route point and then from the last en route point to the destination (for example YSSY for Sydney), for example: DCT CB SY DCT.

When planning to track direct from the departure aerodrome to the destination aerodrome, that is, without the use of navigational aids, enter DCT only.

When operating outside a designated ATS route, enter DCT followed by a significant point, for example: DCT PH CKL BIU PH DCT or DCT 1239S14325E 1300S14335E DCT.

When operating in a designated ATS route, enter the name of the location where the route is joined followed by the route designator, for example, on a flight departing Ceduna for Griffith via the route designators J149 and B469 enter DCT CD J149 WHA B469 GTH DCT in Item 15.

On survey work in a block or airspace, enter DCT followed by significant points to the survey area, including the point of commencement of the survey, and then the point of exit from the survey area and the significant points to the destination, for example: DCT BN KCY GAY YGYM MC BN DCT.

When planning to conduct survey work, a map of the survey area must be provided to ATS with the flight notification.

When planning survey work, write in Item 18(b) the expected delay (DLA) at the commencement of survey, for example: DLA/GAY 0130 indicates a delay at Gayndah for 90 minutes.

Note: A designated route begins and ends at the NAVAID except where the departure or destination is not serviced by a NAVAID.

You should refer to AIP ENR 1.1 para 5 'Air route specifications', and AIP ENR 1.1 para 4.

Requirements for change of speed/level

Enter: the significant point where the change will occur, followed by an oblique stroke, the cruise speed and the level, for example AY/N0130A080. Both cruise speed and level must be entered even if only one has changed.

Requirements for change of flight rules

Enter: details of a change to flight rules, following the entry in item 8 of Y or Z.

Enter: the location where the change will occur followed by a space and VFR or IFR, for example: YBAF VFR.

A change in level may also be included, for example ROM/N018A090 IFR.

Requirements for cruise climb/block level reservation

Enter:

- the letter C followed by an oblique stroke, the point at which the cruise climb or reservation is planned to start, an oblique stroke, the speed to be maintained during the cruise climb or reservation, and
- either:
  - the two levels defining the layer to be occupied during the cruise climb or block reservation, or
  - one level and the word PLUS.

For example, C/FERET/N0380F370F390 or C/FERET/N0380F370PLUS

Item 18 (information relevant to all stages)

Enter: other information such as community service flight (CSF), NAVAID training, block surveys and other plain language remarks of significance. Note that aircraft communication addressing and reporting system (ACARS) and traffic alert and collision avoidance system (TCAS) or airborne collision avoidance system (ACAS) are not required to be included in the flight notification.

DOF/	Followed by YYMMDD to indicate the date of flight. e.g. DOF/121115
REG/	Followed by the full aircraft registration, e.g. REG/ VHZFR.
PER/	Followed by the aircraft performance category as described in ENR 1.5 para 1.2; e.g. PER/B. IFR aircraft arriving at a controlled aerodrome must insert their performance category

Note: Please check the AIP ENR for a complete description of Item 18 as most requirements do not apply to VFR flights.

Enter information in the sequence shown below:

STS/ Use for special aircraft handling, followed by one or more of the indicators below separated by a space e.g. STS/MEDEVAC NONRVSM;

ALTRV – flight operated in accordance with an altitude reservation

ATFMX – flight approved for exemption from ATFM measures by ATC

FFR – fire-fighting

FLTCK – flight check for calibration of NAVAIDS

HAZMAT – flight carrying hazardous material

HEAD – flight engaged in, or positioning for, the transport of dignitaries with Head of State status

HOSP – medical flight declared by medical authorities

HUM – flight operating on a humanitarian mission

MARSA – flight for which a military entity assumes responsibility for separation of military aircraft

MEDEVAC – life critical medical emergency evacuation

NONRVSM – non RVSM-capable flight intending to operate in RVSM airspace

SAR – flight engaged in a search and rescue mission; and

STATE – for a flight engaged in domestic or international military services; or international customs or police services.

Note: Other reasons for special handling by ATS may be denoted under the designator RMK/

Item 19 – Supplementary information

Enter: additional information relevant to the flight for search and rescue purposes.

E/	Endurance – Enter a 4-figure group giving fuel endurance in hours and minutes for each stage of flight.
P/	Persons on board – Enter the total number of persons on board (passengers and crew) for each stage of flight. Enter TBN if the total number of persons is not known at the time of filing.
R/	Emergency radio – Circle the following if carried:

U	UHF radio on 243.0 MHz
V	VHF radio on 121.5 MHz
E	ELT

D/ Dinghies – Enter the following:
NUMBER Total number of dinghies carried.
CAPACITY Total capacity, in persons, of all dinghies.
COVER Circle if dinghies are covered.
COLOUR Colour of dinghies.

S/ Survival Equipment – Circle the following if carried:

P	Polar
D	Desert
M	Maritime
J	Jungle

Note: See ERSA – EMERGENCY PROCEDURES for further information

J/ Jackets – Circle if life jackets carried and circle if equipped with the following:

L	Lights
F	Fluorescent
U	UHF radio on 243.0 MHz
V	VHF radio on 121.5 MHz

A/ Aircraft colour and markings is used to record predominate colour and significant markings of the aircraft.

N/ Remarks – Indicate any other survival equipment carried and any other remarks regarding survival equipment.

C/ Pilot in command – Include telephone, mobile and email address and company name (if applicable).

Flight note

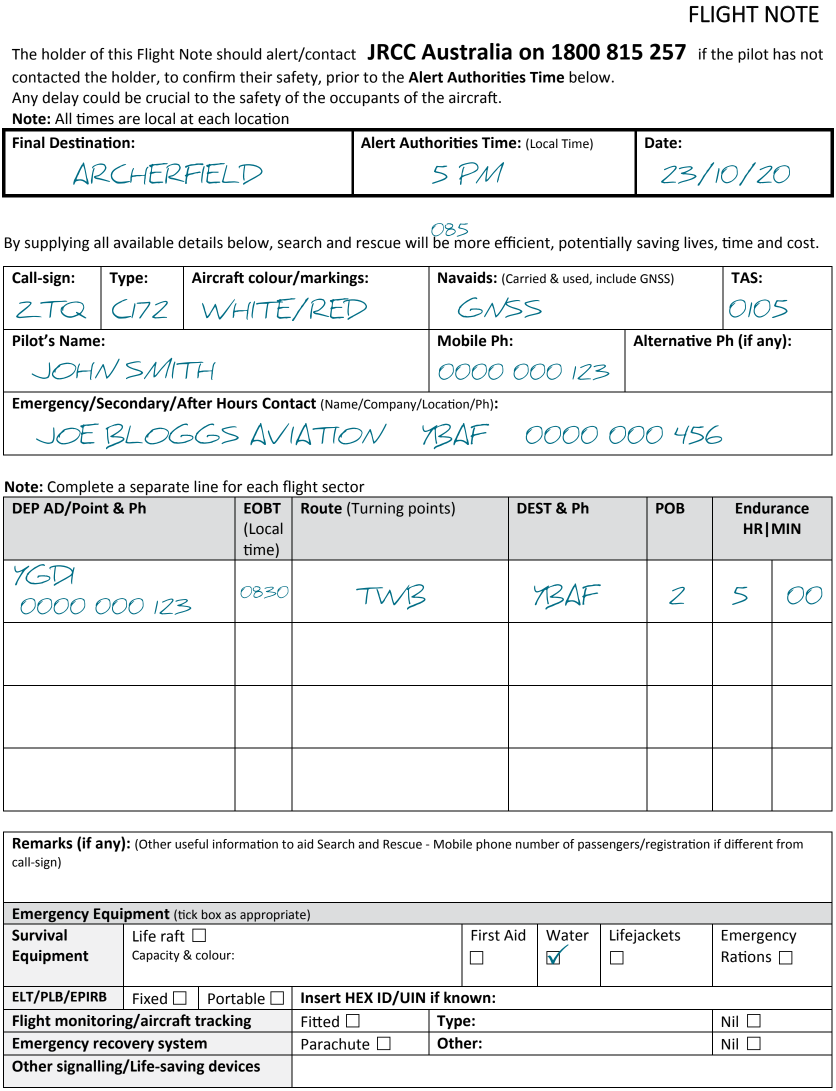
A flight note is not submitted to Airservices as part of the ATS SARWATCH system, whereas an AVFAX or NIS flight notification is submitted to Airservices.

A flight note details the route and timing of a proposed flight and must be left with a person who can notify appropriate authorities if the flight is overdue.

Thus, a flight note does not provide an official SARWATCH but relies on the responsible person calling JRCC Australia (t: 1800 815 257).

Note that, in order to be fully effective, complete details of the planned tracks and landing points should be provided on the flight note.

Example of a flight note



FLIGHT NOTE

The holder of this Flight Note should alert/contact **JRCC Australia on 1800 815 257** if the pilot has not contacted the holder, to confirm their safety, prior to the **Alert Authorities Time** below.
Any delay could be crucial to the safety of the occupants of the aircraft.
Note: All times are local at each location

Final Destination:	**Alert Authorities Time:** (Local Time)	**Date:**
ARCHERFIELD	5 PM	23/10/20

085

By supplying all available details below, search and rescue will be more efficient, potentially saving lives, time and cost.

Call-sign:	**Type:**	**Aircraft colour/markings:**	**Navaids:** (Carried & used, include GNSS)	**TAS:**
ZTQ	C172	WHITE/RED	GNSS	0105

Pilot's Name:	**Mobile Ph:**	**Alternative Ph (if any):**
JOHN SMITH	0000 000 123	

Emergency/Secondary/After Hours Contact (Name/Company/Location/Ph)**:**
JOE BLOGGS AVIATION YBAF 0000 000 456

Note: Complete a separate line for each flight sector

DEP AD/Point & Ph	**EOBT** (Local time)	**Route** (Turning points)	**DEST & Ph**	**POB**	**Endurance HR|MIN**	
YGDI 0000 000 123	0830	TWB	YBAF	2	5	00

Remarks (if any): (Other useful information to aid Search and Rescue - Mobile phone number of passengers/registration if different from call-sign)

Emergency Equipment (tick box as appropriate)

Survival Equipment	Life raft ☐ Capacity & colour:	First Aid ☐	Water ☑	Lifejackets ☐	Emergency Rations ☐
ELT/PLB/EPIRB	Fixed ☐ Portable ☐	**Insert HEX ID/UIN if known:**			
Flight monitoring/aircraft tracking	Fitted ☐	**Type:**			Nil ☐
Emergency recovery system	Parachute ☐	**Other:**			Nil ☐
Other signalling/Life-saving devices					

Flight information service

In-flight information

Pilot responsibility

You are responsible for requesting information necessary to make operational decisions (AIP GEN 3.3).

Operational information

Information about the operational aspects of the following subjects is normally available from ATS:

- meteorological conditions and hazard alerts
- air routes and aerodromes, other than aircraft landing area (ALAs)
- navigational aids and communication facilities
- ATS procedures, airspace status and search and rescue services
- maps and charts
- regulations concerning entry, transit and departure for international flights.

Pre-flight information

Pre-flight briefing services are primarily automated.

Pilots are encouraged to obtain pre-flight briefings, either via the self-help electronic systems or through the briefing offices. These services are listed in ERSA GEN.

For pilots who require an elaborative briefing, contact numbers for ATS and BoM staff are available from the briefing offices.

Pilots must obtain an appropriate pre-flight briefing before departure from those places where suitable facilities exist.

Where suitable facilities are not available, a briefing may be obtained from FLIGHTWATCH as soon as practicable after the flight commences. The information requested should be confined to data considered essential for the safe conduct of the flight to the first point of intended landing where additional information can be obtained.

Pre-flight briefings will not normally be provided on ATC communications channels.

In-flight information

In-flight information services are available to support you in meeting your responsibility to obtain information in-flight on which to base operational decisions relating to the continuation or diversion of a flight. The service consists of three elements:

- ATC-initiated FIS
- automatic broadcast services
- on-request service.

ATC-initiated FIS

ATC provides pilots with pertinent information that will affect flight within one hour's flight time (two hours for SIGMET). At the time the information is identified, information will be directed to pilots maintaining continuous communications and broadcast on appropriate ATS frequencies.

Aerodrome flight information service (AFIS)

An AFIS provides pilots with an alerting service, information about local traffic and operational information on the CTAF assigned to the particular aerodrome.

Essential aerodrome information is provided by an automatic aerodrome information service (AAIS) broadcast on a dedicated frequency (similar to ATIS) during AFIS hours.

Automatic aerodrome information service (AAIS)

Essential aerodrome information is provided by an automatic aerodrome information service (AAIS) broadcast on a dedicated frequency (similar to ATIS) during AFIS hours.

Automatic terminal information service (ATIS)

Operational information required by aircraft for take-off or landing is broadcast on a dedicated frequency and/or on the voice channel of radio navigation aids. Outside the hours of tower activation, operational information of an unchanging nature may be broadcast over ATIS.

At aerodromes specified in ERSA the normal operational information required by aircraft before take-off or landing is broadcast on a discrete frequency, or on the voice channel of one or more radio navigation aids. The broadcast may be pre-recorded or computerised.

When control zones are deactivated the ATIS may be used to broadcast operational information of an unchanging nature. This information may include the CTAF pilot activated lighting (PAL) frequency, preferred runways and noise abatement procedures. It may also include the expected reopening time of the tower. You are encouraged to monitor the ATIS outside the normal hours of the tower.

The following information is transmitted on the ATIS:

Terminal information (aerodrome)

'(Code letter)', for example: 'alpha', 'bravo', etc., as assigned to each separately prepared transmission (zulu is not used).

'(Time (hh mm)) UTC', '(Time of observations (hh mm))' if appropriate.

'(Type of approach expectation)', for example: 'expect ils approach'.

One runway in use

'Runway (number)', ['wet'] ['water patches'] if applicable.

More than one runway in use

'Runway/s (number/s) and (number/s) for arrivals'.

'Runway/s (number/s) and (number/s) for departures', ['wet'] ['water patches'] if applicable.

'Land and hold short operations in progress' (when being used).

Holding delay (if appropriate), for example: '…minutes holding may be expected'.

Curfews

There are curfews on some operations at Adelaide, Gold Coast, Essendon and Sydney airports. For details, see DAP East/West and noise abatement procedures (NAP) for those airports (AIP ENR 1.5).

Wind direction

Wind direction is quoted in degrees magnetic as either:

- a single mean direction, or
- two values representing variation in wind direction, which will be given whenever:
  - the extremes in wind direction vary by 60° or more, or
  - the variation is considered to be operationally significant (for example the variation is less than 60°, but the variation from the mean result is either a downwind and/or significant crosswind component on a nominated runway).
- The term 'variable' will be used when the reporting of a mean wind direction is not possible, such as:
  - in light wind conditions (3 kt or less), or
  - the wind is veering or backing by 180° or more, for example in the passage of thunderstorms, or in a localised wind effect.

Wind speed

Wind speed is quoted as either:

- calm when less than 1 kt, for example, 'wind calm'
- a single maximum value whenever the extremes between minimum and maximum are 10 kt or less, for example, 'wind 250 degrees maximum 25 knots'
- two values representing minimum and maximum values whenever the extremes in wind vary by more than 10 kt, for example, 'wind 250 degrees minimum 15 knots, maximum 28 knots'.

Note: When reporting wind conditions with variations in speed and direction, the above criteria may be varied in order to indicate the true crosswind and/or downwind.

Where threshold wind analysers are installed, and the wind at the threshold of a duty runway varies from that of the central wind analyser or the threshold wind on the other duty runway by criteria specified for the revision of ATIS, threshold winds may be broadcast on the ATIS, for example: 'threshold wind runway (number), .../..., runway (number), .../...'.

Where runway threshold wind analysers are installed, a tower controller must provide a departing aircraft with the wind at the upwind area of the runway if it varies from the ATIS broadcast by 10° or 5 kn or more, and the variation is anticipated to continue for more than 15 min. Such information shall be passed by use of the phrase 'wind at upwind end.../...'.

Visibility

Distance is reported as either:

- >10 km – ‘greater than one zero kilometres‘, or actual distance ‘(number) kilometres’, or
- greater than 5 km and 10 km (inclusive) – ‘(number) kilometres’, or
- up to and including 5,000 m – ‘(number) metres’, or
- <1,500 m (RVR is reported when available).

Present weather

Weather is reported as applicable. For example: ‘showers in area’.

CAVOK:

- Cloud (below 5000 ft or below minimum sector altitude (MSA), whichever is greater; cumulonimbus, if applicable; if the sky is obscured, vertical visibility when available).
- Temperature
- QNH
- [Other information]:
  - any available information on significant meteorological phenomena in the approach, take-off and climb-out, including the presence of freezing fog
  - advice on hazard alert information including unauthorised laser illumination events.

ATIS broadcast

On first contact with (for example [‘ground’], [‘tower’], [‘approach’]) notify receipt of (code letter of the ATIS broadcast). This contact information may not be transmitted when recording space is limited.

Wind shear

When moderate, strong or severe windshear has been reported on the approach or take-off paths, or has been forecast, the information will be included on the ATIS in the format shown in the following example:

‘Wind shear warning – Cessna 210 [(wake turbulence category) category aircraft (if military atis)] reported moderate windshear on approach runway 34 at time 0920’, (plus, if available, windshear advice issued by MET, for example: ‘Forecast wind at 300 feet above ground level 360 degrees 45 knots’, or ‘Probable vertical windshear from 0415 to 0430 – forecast wind at 200 feet above ground level 110 degrees 50 knots’).

On request service – ATC and Flightwatch

An on-request FIS is available to aircraft in all classes of airspace on ATC VHF or HF (domestic and international) frequencies.

You must prefix any request for FIS on ATC VHF frequencies with the callsign of the appropriate ATC unit and the generic callsign 'Flightwatch', for example:

'Melbourne centre flightwatch request actual weather (location)'

Due to workload considerations, ATC may redirect your requests for FIS to an alternative VHF frequency or FLIGHTWATCH HF.

When operating on domestic HF (callsign 'Flightwatch') and international HF (callsign 'Brisbane'), you must include the frequency on which they are calling. For example'(Flightwatch or Brisbane), romeo juliet delta, six five four one, request actual weather (location)'.

Information will be provided in an abbreviated form, paraphrased into brief statements of significance. The full text of messages will be provided on request.

Traffic Information

A traffic information service is provided, depending on higher priority duties of the controller or other limitations, e.g. surveillance limitations, volume of traffic and/or frequency congestion. Additionally, controllers may not be able to provide traffic information concerning all traffic in the aircraft's proximity.

Traffic information does not relieve pilots of their responsibility to see and avoid other aircraft.

In Class G airspace, a traffic information service is provided to IFR flights about other conflicting IFR and observed VFR flights except:

- an IFR flight reporting taxiing or airborne at a non-controlled aerodrome will be advised of conflicting IFR traffic that is not on the CTAF
- an IFR flight inbound to a non-controlled aerodrome will be advised of conflicting IFR traffic until the pilot reports changing to the CTAF.

Surveillance information service (SIS)

- A SIS is available on request, to VFR flights in classes E and G airspace within ATS surveillance system coverage, subject to ATC workload. Pilots receiving a SIS are provided with traffic information, an alerting service and on request position or navigation information.

Note: All information is advisory in nature. The pilot remains responsible for terrain clearance, aircraft-to-aircraft separation and obtaining clearances into controlled airspace.

Note the following:

- Pilots wishing to receive a SIS must be in direct VHF communications with ATC and equipped with a serviceable SSR transponder or ADS-B transmitter. The pilot must maintain a continuous listening watch with ATC, advise ATC prior to any changes to track or level and advise prior to leaving the frequency.
- SIS may be terminated at any time by the controller, or by pilot advice.

Alerting Service

An alerting service will be provided:

- for all aircraft provided with ATC service
- in so far as practicable, to all other aircraft having filed a flight plan or otherwise known to the air traffic services, and
- to any aircraft known or believed to be the subject of unlawful Interference.

Safety Alerts and avoiding action

ATC will issue a safety alert to aircraft, in all classes of airspace, when they become aware that an aircraft is in a situation that is considered to place it in unsafe proximity to:

- terrain
- obstruction
- active restricted or prohibited areas, or
- other aircraft.

When providing an ATS surveillance service, ATC will issue avoiding action advice as a priority, when they become aware that an aircraft is at risk of collision with another aircraft.

Hazard alert

A sudden change to a component of FIS, not described in a current MET product or NOTAM, having an immediate and detrimental effect on the safety of an aircraft will be communicated by ATC using the prefix ‘Hazard alert’. Hazard alerts (AIP GEN 3.3) will:

- be repeated at H+15 and H+45 in the hour following the initial transmission
- normally cease after one hour or after an updated MET product or NOTAM is available for dissemination, whichever is earlier
- be directed to those aircraft maintaining continuous communications with ATS at the time the hazard is assessed and that are within one hour's flight time of the hazardous conditions.

Hazard alert information, or its availability, will be directed or broadcast on the appropriate ATS frequencies.

For example:

‘All stations hazard alert Melbourne. Weather observation notifies unexpected deterioration below the IFR alternate minima’.

‘All stations hazard alert Dubbo. Pilot reports unexpected deterioration below the VFR alternate minima’.

When appropriate, ATC towers may provide advice about hazard alert information on the ATIS.

Information from pilots – reporting hazards to air navigation

If you become aware of any irregularity of operation of any navigational or communications facility or service or other hazard to navigation, you must report the details as soon as practicable unless you believe they are already known (CASR 91.675). Reports must be made to the appropriate ATS unit except that defects or hazards on a landing area must be reported to the person or authority granting use of the area.

When a landing is made on a water-affected runway, you are to advise ATS (unless you believe they are aware) of the extent of water on the runway and the braking characteristics experienced.

Terms to describe water on a runway	
Dry	Only used to describe a dry runway previously reported as wet or contaminated
Wet	
Standing water	If possible, the report should include an assessment of the extent of standing water or other contamination

Terms to describe braking characteristics experienced	
Good	Braking deceleration is normal for the wheel braking effort applied and directional control is normal.
Good to Medium	Braking deceleration or directional control is between good and medium.
Medium	Braking condition is noticeably reduced for the wheel braking effort applied or directional control is noticeably reduced.
Medium to Poor	Braking deceleration or directional control is between medium and poor.
Poor	Braking condition is significantly reduced for the wheel braking effort applied or directional control is significantly reduced.

During the bushfire danger period, you should notify the nearest ATS unit promptly of any evidence of bushfires which you believe has not been reported previously.

CHAPTER 3

FLYING YOUR AIRCRAFT

Visual flight rules (CASR 91.270)

An aircraft may only be flown under either the VFR or IFR.

A Part 103 aircraft may only be flown by day under the VFR.

A Part 131 aircraft may only be flown under the VFR.

VFR flight navigation requirements

(CASR 91.273) (MOS 13.02)

When navigating by visual reference to the ground or water, you must positively fix the aircraft's position by visual reference to features marked on topographical charts at intervals not exceeding 30 minutes.

When navigating by visual reference over the sea, visual reference features may include rocks, reefs and fixed human-made objects marked on topographical charts and readily identifiable from the air.

When you are not navigating by visual reference to the ground or water, you must comply with the requirements of IFR flight (CASR 91.287 MOS 14.02) as if the flight were an IFR flight. You must be competent (under Part 61 – flight crew licensing) to use any IFR navigation techniques and any IFR navigation equipment, such as a global navigation satellite system (GNSS).

You may fly in airspace, on a route, or fly a terminal instrument procedure – where a minimum navigation performance value is specified – provided the aircraft is approved for flight under that navigation specification by:

- the aircraft flight manual (AFM), or
- a document approved under CASR Part 21 based on an airworthiness assessment, or
- for a foreign-registered aircraft, a document approved in writing by the national aviation authority (NAA) of the state of registration or state of the operator of the aircraft.

In addition, any global navigation satellite system (GNSS) equipment is required to be approved, including where a GNSS is used as a substitute or alternative for any ground-based navigation aid within the meaning of CASR 91 MOS 14.05.

During flight you must maintain a time reference accurate to within 30 seconds (ENR 1.1).

Note: Flight above more than scattered (SCT) cloud, or over featureless land areas, or sea, may make visual navigation impracticable.

Note: In Australia, only man-made obstacles above 360 ft are required to be reported and these are only shown on aeronautical maps and charts where they are required for navigation purposes.

Position fixing with navigation aids (NAVAIDs)

A positive radio fix is one that is determined by the passage of the aircraft:

- over a non-directional beacon (NDB)
- over a VHF omni-directional radio range (VOR)
- over a tactical air navigation aid (TACAN)
- over a marker beacon
- over a distance measuring equipment (DME) site
- via the intersection of two or more position lines which intersect with angles of not less than 45° and which are obtained from NDBs, VORs, localizers or DMEs in any combination, or
- with reference to GNSS meeting the equipment requirements of AIP GEN 1.5.

VFR flights speed limitation (CASR 91.283)

You must not fly an aircraft operating under the VFR at a transonic or supersonic speed.

Determination of visibility for VFR (CASR 91.280)

You may only fly an aircraft under the VFR in accordance with the visual meteorological conditions (VMC) criteria for the aircraft and airspace in which you are flying.

***Exception:** This requirement does not apply if you have a clearance from ATC to conduct the flight under the special VFR and you comply with the special VFR.*

It is your responsibility to determine that you can maintain VMC flight criteria (MOS 2.07) from the cockpit while in flight.

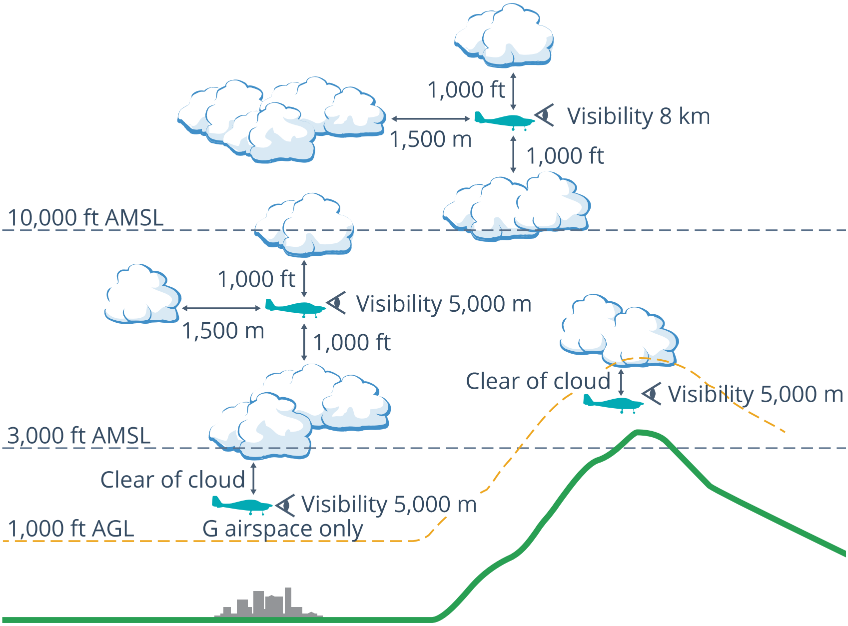
In determining visibility it is recommended you consider, sun glare, smoke haze or rising dust and any other condition that may limit your effective vision.

For a VFR flight you must not take off in weather where the cloud and visibility are less than the VMC criteria.

Visual meteorological conditions (CASR 91.280) (MOS 2.07)

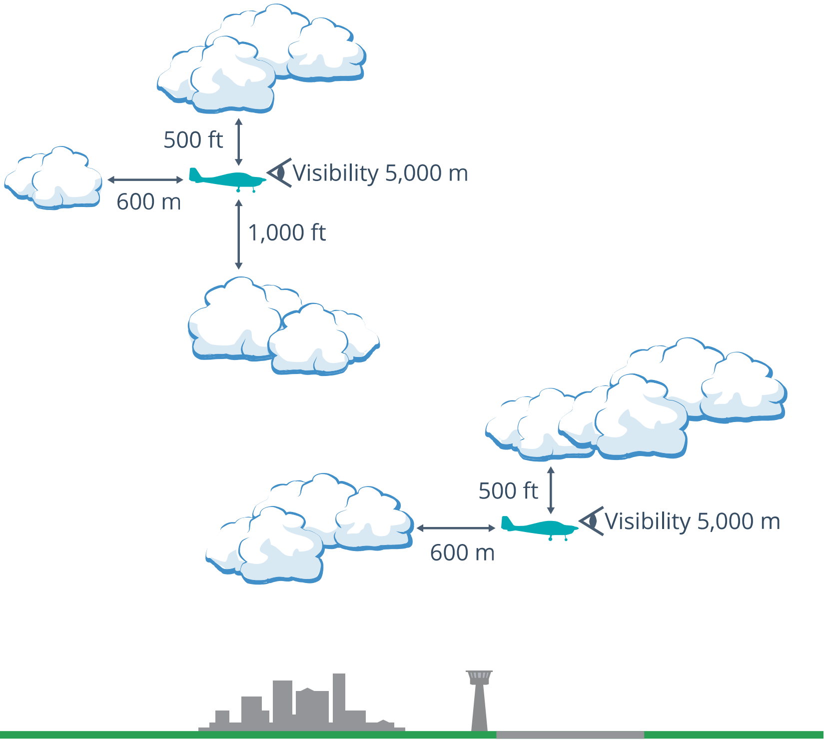
VMC criteria means, the meteorological conditions expressed in terms of flight visibility and the horizontal and vertical distance from cloud. See the following Figures for the application of VMC criteria in various airspace classifications.

Figure: VMC criteria all aircraft Class A, C, E and G



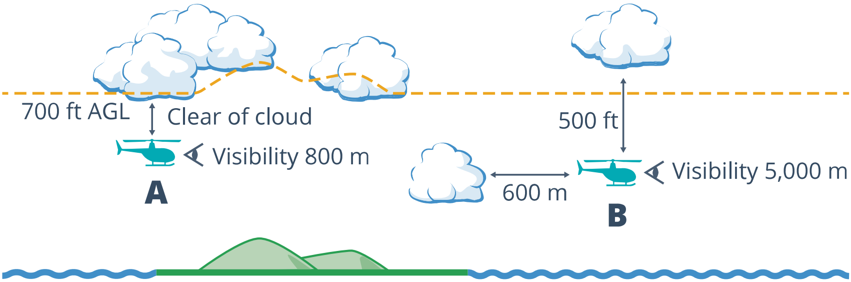
Class of airspace	Height	Flight visibility	Distance from cloud	Operational requirements
A, B, C, E or G	At or above 10,000 ft AMSL	8,000 m (8 km)	1,500 m horizontal 1,000 ft vertical	
A, B, C, E or G	Below 10,000 ft AMSL	5,000 m (5 km)	1,500 m horizontal 1,000 ft vertical	
G	At or below whichever is the higher of: 3,000 ft AMSL 1,000 ft AGL	5,000 m (5 km)	Clear of cloud	In sight of ground or water Radio must be carried and used on appropriate frequency

Figure: VMC criteria all aircraft for Class D controlled airspace



Class of airspace	Height	Flight visibility	Distance from cloud	Operational requirements
D	All heights	5,000 m (5 km)	600 m horizontal 1,000 ft vertical above cloud, 500 ft vertical below cloud	

Figure: VMC criteria for helicopter in Class G non-controlled airspace



A. Overland with/without track guidance or overwater with track guidance from navigation system.

B. Overwater without track guidance from navigation system.

Class of airspace	Height	Flight visibility	Distance from cloud	Operational requirements
G	**Helicopter A** Below 700 ft over land Below 700 ft over water with track guidance from navigation system	800 m	Clear of cloud	Applicable only if the helicopter is operated: › by day › at a speed that allows the pilot to see obstructions or other traffic in sufficient time to avoid collision, and › if within 10 NM of an aerodrome with an instrument approach, in a way that ensures the flight maintains separation of at least 500 ft vertically from any IFR aircraft that is also within 10 NM of the aerodrome.
	Helicopter B Below 700 ft over water without track guidance from navigation system	5,000 (5 km)	600 m horizontal and 500 ft vertical	

Special VFR (CASR 91 MOS 2.01)

By day, when VMC do not exist, the ATC unit responsible for a control zone (CTR) or control area (CTA), at your request may issue a 'special VFR clearance' for flight in the CTR, or in a CTA next to the CTR, for the purpose of entering or leaving the CTR, providing an IFR flight will not be unduly delayed.

When operating under a special VFR clearance you are responsible for ensuring that:

› the flight can be conducted clear of cloud
› the visibility is not less than
  » 1,600 m for aeroplanes
  » 800 m for helicopter, and you operate at such a speed that allows you adequate opportunity to observe any obstructions or other traffic in sufficient time to avoid collisions
  » for balloons, not less than 100 m below 500 ft AGL and not less than 1,600 m at or above 500 ft AGL.

VFR flight above cloud (AIP ENR 1.1)

Flight above more than scattered (SCT) cloud, over featureless land areas, or over the sea, may preclude visual position fixing at the required intervals and may therefore make visual navigation impracticable.

- VFR flight on top of more than scattered cloud is available provided that:
  - VMC can be maintained during the entire flight, (including climb, cruise and descent)
  - you can meet the visual position fixing or IFR navigation requirements
  - you are sure that current forecasts and observations (including those available in flight) indicate that conditions in the area of and during the period of, the planned descent below the cloud layer will permit the descent to be conducted in VMC, and
  - the position at which descent below cloud is planned to occur must be such as to enable continuation of the flight to the destination and, if required, an alternate aerodrome in VMC (see note below).
- When navigating by reference to radio navigation aids or GNSS, you must obtain positive fixes at the intervals and by the methods prescribed in MOS 14.
- If you are wishing to navigate VFR by means of radio navigation systems or any other means you must indicate in the flight notification only those radio navigation aids with which the aircraft is equipped and that you are competent to use under (CASR 61.385).

Note: Pilots should not initiate VFR flight on top of more than SCT cloud when weather conditions are marginal. Before committing to operate VFR flight on top of more than SCT cloud, pilots should be confident that meteorological information used is reliable and current, and clearly indicates that the entire flight will be able to be conducted in VMC.

Inspections and briefings

Matters to be checked before take-off

(CASR 91.245) (MOS10.02)

Before take-off, you must complete the following checks:

- each aerodrome, air route and airway facility that you plan to use will be available for use
- all Head Office and flight information region (FIR) NOTAMs applicable to the en route phase of the flight have been consulted
- all location-specific NOTAMs for relevant aerodromes have been referred to
- the availability of global navigation satellite system (GNSS) integrity, if required by CASR 91 MOS 11.03 or MOS 14.06 has been confirmed
- all equipment required to be fitted to, or carried on the aircraft is available and functioning properly
- emergency and survival equipment carried on the aircraft are readily accessible
- that each crew member is fit to perform their duties
- the aircraft's hatches, access ports, panels and fuel tank caps are secured
- the control locks, covers and ground safety devices and restraints have been removed
- that if the aircraft is an Australian aircraft, there is either:
  - a certificate of release to service for the most recent maintenance carried out on the aircraft, or
  - a maintenance release for the aircraft
- that the aircraft's flight controls have been tested and are functioning correctly
- for each system fitted to the aircraft for measuring and displaying pressure altitude, the system's accuracy has been established in accordance with the procedures described in CASR 91 MOS 10.03 and MOS 10.04.
- that if an amount of supplemental oxygen or protective breathing equipment is required to be carried for a flight crew member, the following checks (as the case requires) have been made:
  - the required amount of supplemental oxygen is available
  - the protective breathing equipment is operative
  - the oxygen mask is connected to the supply terminal

  - each communication system associated with the oxygen mask is connected to the aircraft's communication system
  - if the oxygen mask is adjustable, the mask fits the flight crew member correctly.

Pilots should consider whether supplemental oxygen should be carried even if it is not required since hypoxia is insidious, and its onset is determined by many variables.

Electronic oximeters are available for personal use and may be useful for those who have not been trained in hypoxia symptom awareness (for example, experiencing hypoxia in a controlled setting such as in a hyperbaric chamber).

Pilots and operators should identify the requirements that must be addressed that are applicable to their aircraft operations. Checks of aircraft equipment should be completed in accordance with any criteria or limitation expressed in the AFM or, where the AFM has no instruction for other equipment, the manufacturer's requirements or guidance for that equipment.

Although not mandatory under CASR Part 91, CASA recommends operators develop checklists for the following flight phases, as a minimum:

- before take-off
- approach
- landing.

Refer to **AC 91-22 Aircraft checklist systems** for further information.

Fuel system inspection

The operator and pilot must ensure that they do not have contaminated, degraded or inappropriate fuel on board before flight (CASR 91.465).

The following inspections and tests for the presence of water in the fuel system of the aircraft should be made as part of your flight preparation:

- you should complete an inspection and test in accordance with the approved data, either:
  - the aircraft manufacturer's data that specifies the way inspections and tests for the presence of water in the aircraft's fuel system are to be made, or
  - the data that has been approved under CAR 42M as part of the aircraft's system of maintenance, or

- in any other case, before the start of each day's flying, and after each fuelling, with the aircraft standing on a reasonably level surface, drain a small quantity of fuel from each fuel tank into a clear transparent container and check by an approved method for the presence of water, and
- on aircraft types, that have fuel system filters and collector boxes it is recommended that all aircraft fuel system filters and collector boxes be checked for water contamination at frequent intervals.

It is important that checks for water contamination of fuel drainage samples be positive in nature and do not rely solely on sensory perceptions of colour and smell, both of which can be highly deceptive. The following methods are recommended:

- Place a small quantity of fuel into the container before taking samples from the tank or filter drain points. The presence of water will then be revealed by a visible surface of demarcation between the two fluids in the container.
- Check the drainage samples by chemical means such as water detecting paper or paste, where a change in colour of the detecting medium will give clear indication of the presence of water.
- In the case of turbine fuel samples, tests should also include inspection for persistent cloudiness or other evidence of the presence of suspended water droplets, which will not necessarily be detected by the methods mentioned above. Should any doubt exist about the suitability of the fuel, the checks specified in the aircraft operator's maintenance manual should be followed. It is advisable to allow turbine fuel a reasonable period of stagnation before drawing test samples from fuel drain points. This allows settling of suspended water which is a slower process in turbine fuel than in aviation gasoline.

If, at any time, a significant quantity of water is found to be present in an aircraft fuel system, the operator and pilot should ensure that all traces of it are removed from the fuel system, including the fuel filters, before further flight.

In eliminating water from an aircraft fuel system, it is important that consideration be given to the possibility of water lying in portions of the tanks or fuel lines where, because of the design of the system or the existing attitude of the aircraft, it is not immediately accessible at a drain point.

It is good practice to ensure that, before each day's flying, you inspect all external fuel tank vents to check that they are free from obstruction.

Passengers – safety briefings and instructions

(CASR 91.565) (MOS 20.06)

Before take-off, your passengers must be given a safety briefing that includes the following:

- a passenger in a control seat not to manipulate or interfere with the controls
- rules about smoking (no smoking during take-off and landing or at any other time you so direct)
- when seat belts must be worn and how to use them (you must direct your passengers before you, taxi and take-off and land, or at any other time you consider it necessary for the safety of your passengers)
- how and when to adopt the brace position
- emergency exits and how to evacuate
- if the aircraft carries oxygen, how and when it is used
- the stowage of baggage or any personal effects
- if life jackets are carried, not to inflate them while in the aircraft and where they are carried and how to use them.

***Exception:** The safety briefing and instructions may be omitted for a passenger who has been carried and briefed previously if it can be reasoned that the same safety briefing is not necessary in the circumstances.*

This is a precis of the briefing as described in the rule that would be applicable to most small light aircraft. For the complete rule see (CASR 91 MOS 20.06).

Example

A typical passenger briefing on a private flight could go something like this:

'You must refrain from smoking on the tarmac and in the terminal as well as during take-off, landing and fuelling.'

'Your seatbelts are similar to your car's and I would ask you to keep them fastened comfortably during take-off, landing and any other time I feel it is necessary for your safety.'

'The exits operate like this … and will only be opened on the ground. Please stow your hand luggage under the seat, or I can secure it in the baggage compartment.'

'Please don't touch any of the flight controls.'

'If you feel uncomfortable in any way, please let me know and I'll do everything I can to improve the situation.'

Passenger briefings such as this can instil confidence in your passengers and start the flight off well.

Passengers – safety directions by pilot in command
(CASR 91.570)

Before taxiing, taking off or landing you must direct passengers to:

- fasten their seatbelt or shoulder harness
- ensure that their seat back (or berth), if adjustable, is in an upright position or other position permitted by the AFM
- stow any attachments to or for the seat (including a tray table or footrest) or position them as permitted by the AFM.

During the flight, if you believe it is necessary for the safety of the passengers, you must direct them to fasten their seatbelt or shoulder harness. Switching on an illuminated 'fasten seat belt' sign is a direction.

Exception:

- *A direction need not be given to a person whose health may suffer by being restrained by a seatbelt if you agree the person is otherwise safely restrained.*
- *A direction need not be given to a person who is ill or incapacitated if you agree to the passenger not adjusting their seat (or berth) and the person is otherwise safely restrained and will not affect the safety of other passengers.*

Passengers – compliance with safety directions (CASR 91.575)

A passenger must comply with safety directions given by the pilot.

Passengers with special needs

The operator of an aircraft shall ensure that a person with a disability, and the person assisting that person, if any, is given an individual briefing appropriate to that person's needs in the procedures to be followed in the event of emergency evacuation of the aircraft. The briefing should include which emergency exit to use and when to move to the exit. The person giving the briefing should also enquire as to the most appropriate manner of assisting the person with a disability to prevent pain or injury.

For additional information see Multi-Part AC 91-19,121-04,133-10,135-12 and 138-10 – **https://www.casa.gov.au/sites/default/files/2021-08/multi-part-advisory-circular-91-19-ac-121-04-ac-133-10-ac-135-12-ac-138-10-passenger-safety-information.pdf**

Altimetry

QNH is an atmospheric pressure adjusted to sea level and measured in hPa or millibars so that when QNH is set the altimeter will read elevation above mean sea level (AMSL).

area QNH means an altimeter setting forecast by the BoM and is, within ±5 hPa, of any actual QNH of any location within a QNH geographical area published in the Aeronautical Information Publication (AIP).

local QNH means a QNH in an aerodrome terminal area forecast (TAF), forecast by the Bureau of Meteorology (BoM) or the actual QNH reported by the automatic terminal information service (ATIS), aerodrome weather information service (AWIS), certified air/ground radio service (CA/GRS), weather and terminal information reciter (WATIR), automatic aerodrome information service (AAIS) or air traffic control (ATC).

Checking systems for measuring and displaying pressure altitude – general (CASR 91 MOS 10.03)

If the site elevation is known and an accurate QNH is available then before take-off, you must check the accuracy of each altimeter.

At aerodromes that have instrument approaches elevations are depicted at both the aerodrome reference point (ARP) and threshold of each runway. Aerodromes depicted in En Route Supplement Australia (ERSA) only provide the aerodrome reference point elevation. You should be aware that there can be a difference between the aerodrome reference point and the runway threshold elevation. For example, Bathurst NSW, ARP aerodrome elevation is 2,435 ft. The threshold of Runway 17 elevation is 2,391 ft. The threshold runway 35 has an elevation of 2,434 ft.

Checking pressure altitude systems – visual flight rules (VFR) flight (CASR 91 MOS 10.05)

An altimeter used for a VFR flight with an accurate QNH, is only operative if it reads site elevation to within:

- 100 ft, or
- 110 ft at test sites above 3,300 ft.

If an aircraft fitted with 2 altimeters continues to fly VFR with 1 altimeter reading erroneously by more than 100 ft (or 110 ft as the case may be), then you must consider the erroneous altimeter as inoperative for further use.

If you plan to fly VFR above FL200, you must check the altimeter accuracy against the IFR accuracy requirements.

Accurate QNH and site elevation (CASR 91MOS 10.06)

QNH is to be considered accurate only if it is provided by one of the following:

- automatic aerodrome information service (AAIS)
- air traffic control (ATC)
- aerodrome automatic terminal information service (ATIS)
- automatic weather information service (AWIS)
- certified air/ground radio service (CA/GRS)
- weather and terminal information reciter (WATIR).

QNH from an authorised weather forecast must not be used for checking the accuracy of a pressure altimeter.

Site elevation must be derived from aerodrome survey data that is authorised in writing by the Civil Aviation Safety Authority (CASA) or a national aviation authority (NAA) or supplied in writing by the relevant aerodrome operator.

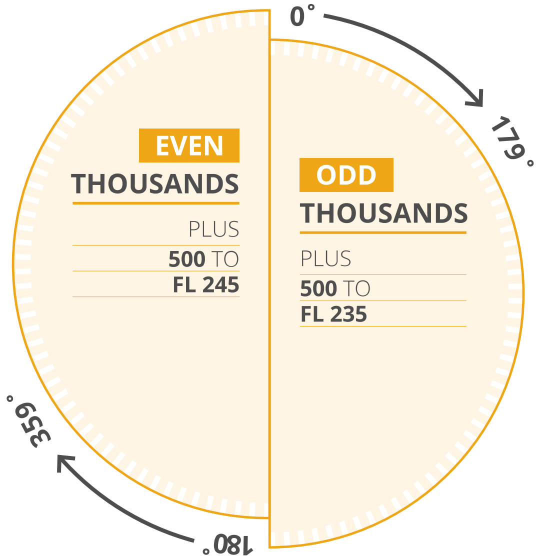
Specified VFR cruising levels (CASR 91.275)

When flying under the VFR you must fly at a specified VFR cruising level for the aircraft track (see Figure below).

***Exception:** You may fly at a non-specified VFR cruising level:*

- *when in uncontrolled airspace, and*
- *the aircraft is below 3,000 ft AMSL, or*
- *the aircraft is at, or above, 3,000 ft AMSL, but below 1,500 ft above ground level (AGL) or*
- *it is not practicable to do so, or*
- *if the aircraft is a glider in soaring flight*
- *when in controlled airspace, and ATC has given you a clearance or instruction.*

Figure: Specified VFR cruising levels – at or north of 80 degrees south



VFR flights in Class A airspace must be approved (see CASR 91.285).

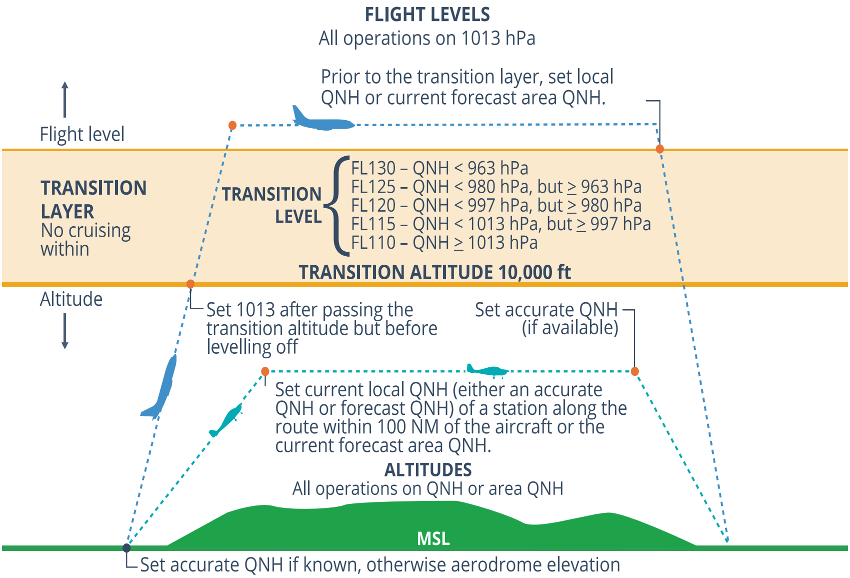
The specified VFR cruising level for the aircraft track for VFR flights is shown above. A cruising level flown north of latitude 60 degrees south must be selected with reference to the aircraft's magnetic track, and south of latitude 60 degrees south, the aircraft grid track.

The specified cruising level for VFR aircraft in weather conditions of visual meteorological conditions (VMC) will only provide you with 500 ft separation between your VFR aircraft and an instrument flight rules (IFR) aircraft that maybe crossing your track in your proximity. It is important to fly and maintain at the correct specified VFR cruising levels. Pilots should be aware that VFR aircraft outside controlled airspace may be operating at random levels below 3,000 ft AMSL.

Transition altitude, transition layer and transition level (CASR Part91 MOS 11.02)

When you are flying within the Australian flight information region (FIR), the transition altitude is 10,000 ft. The transition level is FL110 when the area QNH is 1,013.2 hPa or higher; however, it will vary when an area QNH is below 1,013.2 hPa (see Figure below).

Figure: Positions to change between QNH and 1,013.2 hPa



Note: The intention is to retain a minimum buffer of 1,000 ft between the lowest available flight level (FL) and the transition altitude and therefore cruising within the transition layer is not permitted.

You must not cruise within the transition layer.

If you are flying below the transition altitude, set your altimeter using either:

- the current local QNH (either an accurate QNH or forecast QNH) of a station along the route within 100 NM of the aircraft
- the current forecast area QNH.

Note: QNH is available from a reporting station (AAIS, ATIS, AWIS, CA/GRS, VOLMET or WATIR), a TAF, the area QNH forecast, or from ATS (ATC or FIS).

If you are flying at, or above, the transition altitude, you must use an altimeter setting of 1,013.2 hPa.

On climb, you must change between QNH and 1,013.2 hPa after passing 10,000 ft and before levelling off. On descent, you must change between 1,013.2 hPa and the QNH before entering the transition layer.

Reminder: VFR Flight in Class A airspace must be approved (CASR 91.285).

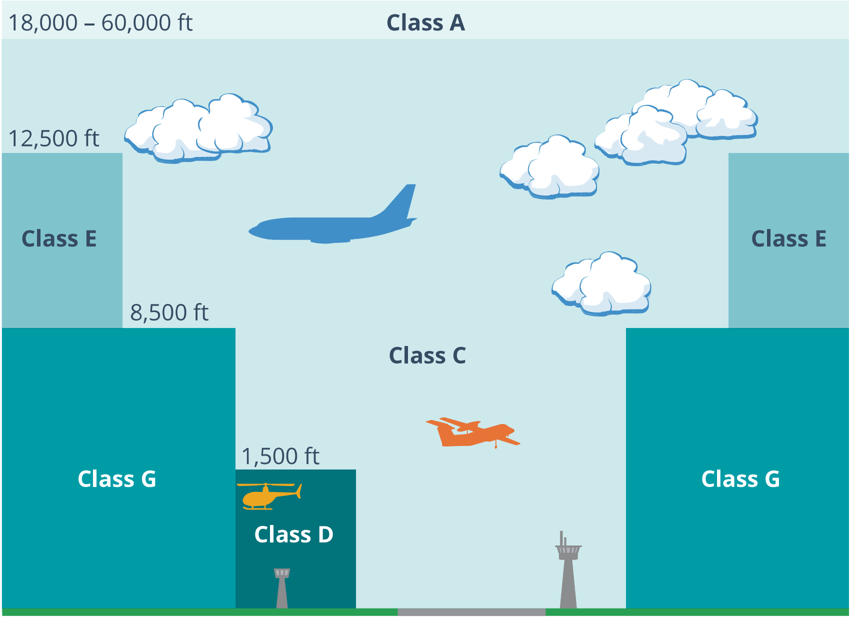
Airspace classification

Airspace can be broadly classified as:

- non-controlled airspace – Class G/E*
- controlled airspace – Classes A C D E.*

*For a flight in Class E airspace, a VFR aircraft does not require an air traffic control clearance provided they have two way communications; however, for an IFR aircraft they must obtain a clearance.

Figure: Classes of airspace



General aviation and regional airport e.g.Tamworth

Major airport e.g. Sydney

The classes of airspace in Australia's FIRs are generally aligned with those specified by the International Civil Aviation Organization (ICAO) Annex 11.

The following table describes the airspace classification (class) used in Australia including ATC services and separation, speed limitation, communications, and ATC clearance requirements.

Class	**Type of flight**	**Separation provided**	**Service provided**	**Speed limitation**	**Radio communication requirements**	**Subject to ATC clearance**
A	IFR	All aircraft	ATC service	Not applicable	Continuous two-way	Yes
	VFR not permitted unless approved (CASR 91.285)					
C	IFR	IFR from IFR, IFR from VFR, IFR from Special VFR	ATC service	250 kt below 10,000 ft AMSL, except where specified in ERSA, departure and approach procedures (DAP) or varied by ATC (see Note 2)	Continuous two-way	Yes
	VFR	VFR from IFR	ATC service for separation from IFR VFR/VFR traffic INFO (and traffic avoidance advice on request)	250 kt indicated air speed (IAS) below 10,000 ft AMSL	Continuous two-way	Yes
	Special VFR	Special VFR from special VFR, when visibility (VIS) does not meet VMC	ATC service		Continuous two-way	Yes

Class	Type of flight	Separation provided	Service provided	Speed limitation	Radio communication requirements	Subject to ATC clearance
D	IFR	IFR from IFR IFR from special VFR	ATC service, traffic information about VFR flights	200 kt IAS at or below 2,500 ft above aerodrome level (AAL) within 4 NM of the primary Class D aerodrome (see Note 3) 250 kt IAS in the remaining Class D airspace	Continuous two-way	Yes
	VFR	Nil	ATC service, traffic INFO on all other flights		Continuous two-way	Yes
	Special VFR	Special VFR from special VFR when visibility is less than VMC	ATC service		Continuous two-way	Yes
E	IFR	IFR from IFR	ATC service and traffic INFO on VFR flights as far as is practicable	250 kt IAS below 10,000 ft AMSL	Continuous two-way	Yes
	VFR	Nil	Flight information service (FIS)	250 kt IAS below 10,000 ft AMSL	Continuous two-way	No
			Surveillance information service (SIS) – flight following on request (O/R) (ATC workload permitting)			

Class	Type of flight	Separation provided	Service provided	Speed limitation	Radio communication requirements	Subject to ATC clearance
G On & North of 65 degrees South	IFR	Nil	FIS	250 kt IAS below 10,000 ft AMSL	Continuous two-way	No
	VFR	Nil	FIS SIS – flight following O/R (ATC workload permitting)	250 kt IAS below 10,000 ft AMSL	VHF radio required for operations above 5,000 ft AMSL and at aerodromes where carriage and use of radio is required	No
				250 kt IAS below 10,000 ft AMSL	VHF radio required for operations in reduced VMC	No
G (South of 65 degree south)	IFR	Nil	FIS O/R	250 kt IAS below 10,000 ft AMSL	Continuous two-way	No
	VFR	Nil	FIS O/R	250 kt IAS below 10,000 ft AMSL	Nil	No

Note 1: Pilots must comply with airspace speed limitation unless specifically cancelled by ATC.

Note 2: Speed limitations are not applicable to military aircraft, except as specified in ERSA.

Note 3: If traffic conditions permit, ATC may approve a pilot's request to exceed the 200 kt speed limit to a maximum limit of 250 kt unless the pilot informs ATC a higher minimum speed is required. For flights in A,C,D and E airspace, aircraft must be fitted with a transponder.

Air traffic services provided by airspace and class of operation (AIP ENR 1.4)

Airspace	Class of operation
Class A	Controlled airspace IFR flights only VFR not permitted unless they are approved
Class C	Controlled airspace below Class A excluding airspace designated as Class D, E or G IFR and VFR are permitted and are subject to ATC clearance. Both IFR and VFR are separated
Class D	IFR and VFR flights are permitted, and all flights are subject to ATC clearance. IFR flights are separated from other IFR flights. IFR flights receive a separation service in respect of other VFR flights. A separation service is a controlled condition whereby a separation standard need not be applied between IFR and VFR aircraft.
Class E	IFR and VFR flights are permitted. IFR flights are subject to ATC clearance. IFR flights are separated from other IFR flights. IFR flights receive traffic information on known VFR flights, as far as practicable.
Class G	IFR and VFR flights are permitted and receive flight information service, if requested. Non-controlled airspace

For flight in close proximity to the boundary of controlled airspace, separation is not provided with traffic operating outside controlled airspace.

Prohibited, restricted and danger areas

Airspace reservation (AIP ENR 1.4, ERSA-SUA)

A designated airspace or portion thereof under the control of another authority may be reserved to allow the following:

- flights of special military significance requiring the use of controlled airspace, which would be subject to unacceptable restrictions if normal operations applied, or
- civil flights requiring passage through military airspace when weather conditions or other factors make flight on the normal air route inadvisable, or impossible, and when other routes are unavailable, or the use of such routes would impose severe economic penalties on the operation of the aircraft.

There are two types of airspace reservations:

- fixed defined areas
- 'mobile' (for example aerial fuelling, en route formation flights).

Such reservations are normally only applied during limited periods. A designated airspace or portion thereof under the control of a military ATC authority may also be reserved to confine particular activities.

Airspace in which a potential hazard to aircraft operations may exist, are promulgated as follows:

- **Prohibited area** – Airspace within which the flight of aircraft is prohibited.
- **Restricted area** – Airspace within which the flight of aircraft is restricted in accordance with specified conditions.
- **Danger area** – Airspace within which activities dangerous to the flight of aircraft may exist at specified times.

These areas are promulgated in the AIP designated in the Designated Airspace Handbook (DAH) and on aeronautical charts by boundaries outlined in red and containing the identification of the area as a letter and a number.

The letters allocated are:

P	Prohibited area
R	Restricted area
D	Danger area
M	Military operating area

A number identifies the area.

When used internationally, the identification of these areas is preceded by an FIR identifier as follows:

YB	Brisbane
YM	Melbourne

Details are shown in ERSA or through Notices to Airmen (NOTAMs).

Prohibited, restricted and danger area numbers in the 900 series are allocated for temporary special use airspace such as military exercises, air shows and special events.

These areas are promulgated by the AIP supplement (SUP), or FIR NOTAM for the Brisbane (YBBB) or Melbourne (YMMM) FIRs as appropriate for the location.

Unless otherwise specified, vertical limits are promulgated as AMSL when at or below the transition altitude, or as a flight level when above the transition altitude. The abbreviation SFC means the surface of the ground or water. 'NOTAM' indicates that the vertical limits or hours of activation will be notified by NOTAM.

The promulgated vertical limits of prohibited, restricted and danger areas include all the buffers necessary for the protection of aircraft operating outside these areas. Therefore, the promulgated levels may be used by aircraft avoiding the areas, except where the vertical limit abuts controlled airspace, in which case a clearance is required.

If you become aware your aircraft is in an active prohibited or restricted area, and you are able to communicate, you must inform ATS, or the controlling authority specified in the AIP and:

- fly out of the area, or
- for balloons and hot air airships (Part 131 aircraft) unable to fly out of the area, land and then inform the controlling authority as soon as practicable.

CASA may declare an area to be a prohibited area for reasons of military necessity.

CASA may declare an area to be a restricted area, if CASA believes it is necessary to restrict flight in accordance with specified conditions for public safety or to protect the environment.

Prohibited and restricted areas declared for 3 months or longer are published in the AIP. For shorter periods they are published by NOTAM (see regulation 7 of the Airspace Regulations 2007).

Flight within prohibited areas

Flight within a prohibited area is not permitted in any circumstances.

Flight within restricted areas

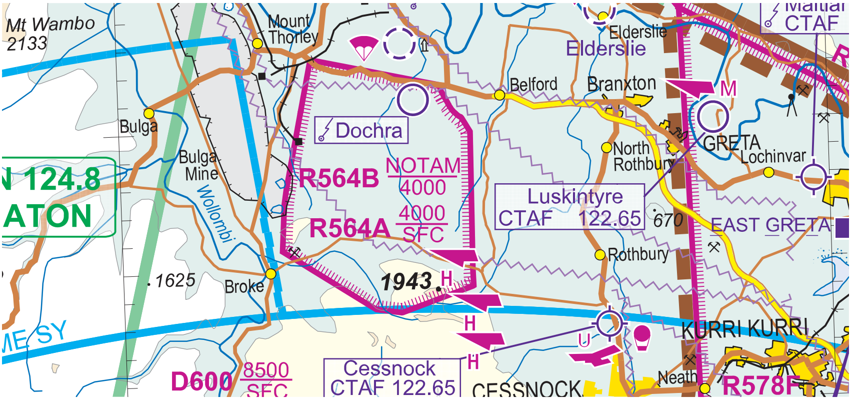
A flight must not enter an active restricted area without authorisation (CASR 91.260).

To obtain access to a restricted area or airspace you must request approval from the controlling authority (see ERSA prohibited, restricted and danger areas (PRD)). When an ATC service is available within that airspace, approval may be requested from ATC directly, in the same manner as a clearance request to enter a control area (CTA).

On 15 June 2023 Australia's Airspace Regulations 2007 were amended so that in international airspace (airspace outside Australian territory) areas designated as restricted were redesignated as danger areas. This included military exercise areas and military training areas.

Note: Clearances may be withheld when activities hazardous to the aircraft are taking place, or when those activities require absolute priority.

Figure: Restricted area example



R564A $\frac{4000}{SFC}$

Must NOT operate without permission

R564B $\frac{NOTAM}{4000}$

May operate ABOVE 4,000 ft without permission provided not activated by NOTAM

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SFC/4000 shown in the picture means R564A extends from surface level to 4,000 ft. AMSL when active.

NOTAM/4000 shown in the picture means R564B extends from 4000 to an upper level which will be promulgated by NOTAM.

When air traffic service (ATS) is available within an activated restricted area, ATS may approve your flight within or across the area if you request clearance in the same way as for entering controlled airspace.

A clearance may be withheld when hazardous activities are taking place or when those activities require priority.

Provided you receive an ATC clearance, you may fly:

- from controlled airspace into an adjoining activated restricted area, or
- through an activated restricted area into adjoining controlled airspace, or
- through an activated restricted area within controlled airspace.

To assist with shared use of airspace, all restricted areas have been allocated a restricted area (RA) conditional status. This status will give an indication as to the likelihood of obtaining a clearance to fly through restricted airspace. NOTAMs may be issued to indicate changes to the RA conditional status and should be checked prior to flight planning.

RA conditional status legend

RA1 – Pilots may flight plan through the restricted area and under normal circumstances expect a clearance from ATC.

RA2 – Pilots must not flight plan through the restricted area unless on a route specified in ERSA General (GEN) Flight plan route (FPR) or under agreement with the Department of Defence. However, a clearance from ATC is not assured. Other tracking may be offered through the restricted area on a tactical basis.

RA3 – Pilots must not flight plan through the restricted area and clearance will not be available.

Note: In a declared emergency, every effort will be made to obtain approval to transit a restricted area, irrespective of its conditional status.

Civil aircraft operating in military restricted areas or airspace in which an ATC service is provided will receive a service equivalent to that of Class C airspace, unless specified otherwise by ERSA Facility (FAC).

You may assume that ATC has obtained approval, when complying with an air traffic clearance for flight:

- from controlled airspace into an adjoining active restricted area or airspace
- through an active restricted area or airspace into adjoining controlled airspace, or
- through an active restricted area or airspace within controlled airspace.

Flight within danger areas

You may fly in a danger area.

You should be aware of the specific activity which causes an area to be designated as a danger area (see Figure below).

The operator and the pilot must take such precautions and make such contacts as a reasonable pilot in the same circumstances would take and make, when flying within or over an area in which an activity exists that is a potential danger to aircraft.

A danger area may be classified as a military operating area (MOA) and will be distinguished by the use of the prefix M.

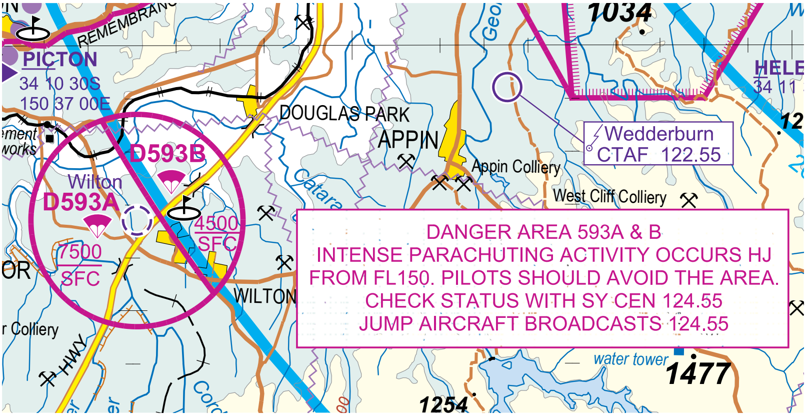
MOAs have been established at Cerberus (Vic), Edinburgh (SA), East Sale (Vic), Nowra (NSW) and Williamtown (NSW). See current aeronautical information circulars (AIC).

The following conditions will apply when seeking access to MOAs:

- Australian-registered aircraft must request a clearance to transit a MOA and conditions of entry may be imposed.
- foreign-registered aircraft can transit a MOA outside Australian territory without a clearance. Within Australian territory however, a clearance must be requested and conditions of entry may be imposed.

Danger areas in international airspace may lie in controlled airspace.

Figure: Danger area example



Airservices Australia | Sydney VTC

Details on prohibited, restricted and danger areas can be found in the relevant aeronautical charts, NOTAMS, the En Route Supplement Australia – prohibited, restricted and danger areas (ERSA-PRD) and the DAH.

Lanes of entry

Lanes of entry are established to permit passage to and from specified Class D control zones (CTRs) without entering an adjacent Class C or military control zone. The vertical limits provide separation from overlying control or restricted areas (AIP ENR 1.4).

Broadcast areas

The following broadcast areas (BAs) including associated mandatory broadcast procedures relating to BAs are detailed in Chapter 5: Radio communication procedures.

- Ayers Rock BA
- Ballina/Byron Gateway BA
- Port Hedland BA

Common traffic advisory frequency (CTAF)

At non-controlled aerodromes published on aeronautical charts, when you are operating in the vicinity of these aerodromes, you are to use 126.7 MHz or the discrete CTAF frequency as published on the chart.

When you are in the vicinity of an uncharted aerodrome, you have discretion to use the most appropriate frequency that ensures safe operation. This may be 126.7 MHz. However, because pilots may not know such uncharted aerodromes exist, you should be aware that transiting aircraft may be monitoring Area VHF. To ensure mutual traffic awareness, it is recommended that when you are using an alternative frequency you also monitor Area VHF.

Air defence identification zone

From time to time it may be necessary for an air defence identification zone (ADIZ) to be established. Such zones will be promulgated by NOTAM and/or Aeronautical Information Circular (AIC). Procedures relating to ADIZ can be found later on in this Chapter.

Air traffic services (ATS) surveillance services

Carriage of transponder equipment (CASR 91 MOS 26.68)

Transponder surveillance equipment required to be fitted to an aircraft must meet the relevant operational and airspace requirements.

An aircraft operating at Brisbane, Sydney, Melbourne or Perth aerodrome must be fitted with, or carry, at least one approved Mode S transponder with automatic dependent surveillance-broadcast (ADS-B) capability.

Note: An approved Mode S transponder with ADS-B capability is not required to transmit ADS-B OUT for a VFR flight.

See **Part 91 PEG** for a comprehensive description of transponder requirements in in all classes of airspace.

Operation of transponder equipment – general requirements (CASR 91 MOS 26.69)

Except for any requirements governing inoperative transponders and unless ATC has issued an instruction otherwise:

- Transponders required to be fitted or carried on an aircraft must be continuously operated.

Note: Continuous operation for a transponder implies that the equipment must be operated in a mode that enables a secondary surveillance radar (SSR) response to be transmitted and, where an altitude reporting capability is available, that this capability is also activated.

- Unless otherwise required by ATC, an aircraft that is flying in formation with, or is in-company with, other aircraft, is not required to operate a transponder if a transponder is always operated by another aircraft while the aircraft are flying in formation or are in-company.
- If an aircraft is fitted with more than one transponder, only one transponder is to be operated at any time.

- Where a transponder is fitted, the Mode A code must be set:
  - to the transponder code assigned by ATC for the flight, or
  - if no transponder code is so assigned – to the relevant standard code in the Table below.
- The emergency codes 7500, 7600 and 7700 do not need to be set if it would be safer to retain an existing code.

Table: Transponders – Mode A standard codes

Situation	Mode A Code
Flights in class A, C or D airspace, and IFR flights in class E airspace	3000
IFR flights in class G airspace	2000
VFR flights in class E or class G airspace	1200
Flights in class G over water at a distance greater than 15 NM from shore	4000
Flights engaged in coastal surveillance	7615
Ground testing by aircraft maintenance staff	2100
Unlawful interference	7500
Loss of radio communication	7600
In-flight emergency (unless ATC instructs otherwise)	7700

VFR flights in Class E or G airspace squawk 1200 Mode C (ALT)

ATS will assign a discrete code for each flight for aircraft operating in controlled airspace, and for aircraft participating in SIS.

Unless otherwise advised by ATC, if your aircraft is equipped with a Mode 3A or Mode S transponder you must activate the transponder, and where a Mode C capability is also available it must be activated simultaneously with Mode 3A.

You must ensure that transponders and ADS-B transmitters are activated, and that altitude function is selected so that:

- primary radar coverage only exists within 50 NM of major airports and the remainder of the ATS surveillance system relies on SSR transponder and ADS-B transmitter information
- the traffic alert and collision avoidance system (TCAS) relies on transponder information for its pilot alerting and collision avoidance functions.

When you require a SIS and/or a clearance into controlled airspace, and for which a discrete code has already been coordinated, you must select that code immediately prior to making the SIS/clearance request.

You must not operate the identification (IDENT) pushbutton (shown in the picture below) unless requested to do so by ATC.

The IDENT pushbutton activates the special position indicator (SPI) function of the transponder.

When departing from a radar-controlled aerodrome you must leave the transponder selected to **Standby** until entering the departure runway, and on arrival select **Standby** or **Off** as soon as practicable after landing.

You must select the transponder to Standby before effecting any SSR code change and then return the transponder to ON/ALT.

Note: This action is required to prevent loss of possible display of aircraft position/label information and possible misidentification of aircraft in automated Australian ATC systems due to temporary selection (while effecting the change) of a code already in use.

Transponder emergency codes (AIP ENR 1.6)

Pilots of aircraft encountering an emergency in flight, other than loss of two-way communications, should select code 7700 unless they have a specific reason to believe that maintaining the assigned code would be the better course of action.

Transponder emergency codes

Transponder emergency codes

The pilot of an aircraft losing two-way communications must set the transponder to code 7600.

A radar controller observing a 7600 code shall request the pilot to 'squawk IDENT' (which means to activate the SPI function). If the identification signal is received, further control of the aircraft will be continued using the identification transmission to acknowledge receipt of instructions issued.

If the identification is not received, the aircraft must continue with the transponder on code 7600 and follow radio failure procedures set out in Chapter 7 – Dealing with emergency situations.

Radio communications procedures (AIP ENR 1.6)

Pilots requesting ATS surveillance services should address their request to the ATS unit with which they are communicating.

Where an area approach control centre (AACC) is not established, the pilot will be advised the time or place to transfer to a control frequency.

Where an AACC is established, procedural and ATS surveillance services may be provided on a common frequency. The callsign identifies the service being provided, for example:'... centre', '... approach', '...departures'.

Identification procedures (AIP ENR 1.6)

Before providing an ATS surveillance service there will be positive identification of the aircraft concerned. However, control services will not be provided until the aircraft is within controlled airspace.

Vectoring procedures (AIP ENR 1.6)

On receipt of heading instructions, you must, unless otherwise instructed, immediately commence a rate 1 turn, or the standard rate of turn for the aircraft type, and then maintain the heading given.

Aircraft will normally be vectored on routes along which you can monitor your navigation.

ATC are not permitted to vector special VFR flights, unless warranted by an emergency.

When an aircraft is given a vector, which will take it off an established route, you will be advised of the reason for the vector, unless it is self-evident.

Where you have reported your aircraft has unreliable directional instruments, you will be asked, before being issued with manoeuvring instructions, to make all turns at an agreed rate and to carry out the instructions immediately on receipt.

When aircraft are being vectored, the controller will assign altitudes which allow for terrain clearance. However, in VMC by day, an aircraft may be permitted to arrange its own terrain clearance. In such instances the aircraft will be instructed to:

> **[Turn left (or right) heading (heading)] [climb (or descend) to (level) visual.]**

When being vectored you will be routinely advised of your position to enable you to navigate in the event of radio or ATS surveillance system failure.

The interval between ATC transmissions will be kept short to enable you to quickly recognise a communication failure. When aircraft are on headings that could infringe terrain clearance or separation standards, the intervals between transmissions will not exceed 30 seconds.

Before take-off, ATC may assign you a heading to assume after take-off, followed by frequency change instructions if appropriate.

Arriving aircraft may be vectored to:

- establish for a radar or pilot-interpreted approach
- a position from which a visual approach can be made
- avoid areas of hazardous weather or severe turbulence
- expedite traffic flow or conform to noise abatement requirements.

Search and rescue – SARWATCH and SARTIME

SARWATCH refers to search and rescue watch and SARTIME to the time that search action is required.

Cancellation of SARWATCH (AIP ENR 1.1)

Pilots wishing to cancel SARWATCH may do so by reporting to ATS. When cancelling SARWATCH, pilots must include:

- the aircraft radio callsign
- place of arrival, or point from which SARWATCH services are no longer required
- the words 'Cancel SARWATCH'
- when communicating with a unit other than that nominated, the name of the ATS unit to which the report should be relayed.

SARWATCH may be cancelled in combination with a pilot report of changing to a common traffic advisory frequency (CTAF), in the circuit area, or after landing.

ATS will acknowledge **'Cancel SARWATCH'** reports with a read-back of the place of arrival, if appropriate, and the words **'SARWATCH terminated'**.

The preferred method to cancel SARTIME is via telephone to the automated centralised SARTIME database (CENSAR) on 1800 814 931. When telephone facilities are not available you may use ATS frequencies.

For SARTIME flights, pilots of single VHF radio-equipped aircraft must cancel SARTIME before changing to CTAF, or after landing.

SARTIME for departure

When submitting flight notification, you may nominate a SARTIME for departure for the initial departure aerodrome through the National Aeronautical Information Processing System (NAIPS). Intermediate departure times can be nominated by telephone after landing, or as part of the arrival report associated with that aerodrome. Only one SARTIME can be current at any time.

You can also submit the flight notification that includes a SARTIME by fax or via telephone, using the Australian domestic flight notification form (AIP ENR 1.10).

The nomination of a SARTIME for departure does not absolve the pilot from complying with the requirements for the carriage of serviceable radio equipment, or from making the prescribed reports.

Pilots of a VFR flight wishing to extend the SARWATCH for the period of landing and subsequent take-off, can nominate a SARTIME for departure when arriving at an aerodrome where radio or ground communication cannot reasonably be assured. SAR alerting action will be initiated if a taxiing or departure report is not received by the nominated SARTIME.

Operational information

Information about the operational aspects of the following subjects is normally available from ATS:

- meteorological conditions and hazard alerts
- air routes and aerodromes, other than aircraft landing areas (ALAs)
- navigational aids and communication facilities
- ATS procedures, airspace status and search and rescue services
- maps and charts, and
- regulations concerning entry, transit and departure for international flights.

You are responsible for requesting information necessary to make operational decisions. (AIP GEN 3.3). See Chapter 5 under Flight information service for more information.

Non-controlled aerodromes

At non-controlled aerodromes there is often a variety of aircraft operations. These could include larger passenger-carrying turboprop aircraft and jets, as well as agricultural, training and various sport and recreational aircraft, and on occasions even military aircraft. For all pilots this requires vigilance. When undertaking flights to a certified aerodrome it requires that you must be equipped with a VHF radio.

A non-controlled aerodrome is one where air traffic control is not operating. This can be either an aerodrome that is always in Class G airspace, an aerodrome with a control tower where no air traffic control service is currently operating, or an aerodrome that would normally have an ATC service, but the service is temporarily unavailable.

Non-controlled aerodromes where the carriage of radios is required include all certified and military aerodromes as published in ERSA. CASA may designate other aerodromes on a case-by-case basis, as published in ERSA or by NOTAM. Pilots of aircraft fitted with a radio must maintain a continuous listening watch (CASR 91.640).

Note: Pilots are reminded that non-controlled aerodromes include those aerodromes with Class C or D ATC services during the times when such services are unavailable. Pilots should always consult ERSA and the latest NOTAMs for operating times of ATC services at those aerodromes.

Operations at non-controlled aerodromes can present many challenges to pilots who operate into, out of, or in the vicinity, of these aerodromes. These challenges can include:

- complying with standard operating procedures
- fitting into the circuit traffic
- dealing with threats and hazards that may be encountered.

At aerodromes where the carriage of radio is not mandatory, good flying dictates that pilots of radio-equipped aircraft monitor their radios and broadcast their intentions in accordance with the minimum required calls. Pilots should also observe local and published noise abatement procedures, circuit direction and curfews.

When you are flying at, to, from or over a non-controlled aerodrome there will be times when you will be flying 'in the vicinity' at that aerodrome. The term 'in the vicinity' has been defined in the regulations for you to determine what is required by you when flying at non controlled aerodromes. You need to understand the meaning of 'in the vicinity' to safely fly and comply with the regulations at those aerodromes.

Meaning of 'in the vicinity' of a non-controlled aerodrome (CASR 91.360)

An aircraft is in the vicinity of a non-controlled aerodrome if it is:

- in uncontrolled airspace, and
- within 10 NM of the aerodrome, and
- at a height above the aerodrome that could result in conflict with operations at the aerodrome.

For an aerodrome that has a reference point published in the AIP, the distance must be measured from that point. The definition of 'in the vicinity' of a non-controlled aerodrome applies in CASR 91.375, 91.380, 91.385 and 91.390.

Operating on manoeuvring area, or in the vicinity, of a non-controlled aerodrome – general requirements (CASR 91.375)

When operating on the manoeuvring area, or in the vicinity of a non-controlled aerodrome you must:

- keep a lookout for other aircraft to avoid a collision
- ensure that your aircraft does not endanger other aircraft
- either join or avoid the circuit pattern of the aerodrome
- for an aeroplane only, take off or land within the aerodrome landing area.

Managing traffic at non-controlled aerodromes

(AC 91-10)

Pilots of radio-equipped aircraft are strongly recommended to use standard aerodrome traffic circuit procedures and radio broadcasts at all non-controlled aerodromes. See Chapter 5 – radio communication procedures for more detail.

Pilots are encouraged to turn on external lights, where fitted, when in the vicinity of a non-controlled aerodrome, and until the aircraft has landed and is clear of all runways.

Transponders can be detected by aircraft equipped with airborne collision avoidance system (ACAS) or traffic collision avoidance systems (TCAS), allowing them to 'see' other aircraft and take evasive action. Pilots of transponder-equipped aircraft should, at all times, ensure their transponder is switched to ON/ALT (Mode C), especially when operating in the vicinity of a non-controlled aerodrome. In the event of a radio failure, it is important for pilots to select and squawk (transmit) code 7600 in Mode C on their transponders.

So as not to impede commercial aviation, pilots flying recreational, sport or general aviation (GA) aircraft for their own leisure, should consider giving way to aircraft being used for commerce provided that the inconvenience to their own operation is not great and it can be done safely. Operators of commercial aircraft should never expect a give-way offer to be made. Any offer to give way must be explicit and its acceptance acknowledged.

Pilots are reminded of their responsibility (CASR 91.325) to maintain vigilance so far as weather conditions permit to see and avoid other traffic. Pilots should not assume that no local air traffic exists if they do not receive any radio transmissions relating to the presence of other aircraft.

The following is a non-exhaustive list of examples where not receiving a radio transmission fails to prove that the airspace is clear of traffic.

You and/or the other pilot:

- may not have radio communication available, or VHF coverage is limited (for example, due to lack of ground-based VHF equipment) and only pilots in the immediate vicinity of other aircraft with VHF radios can communicate (see investigation number AO-2013-105 at **www.atsb.gov.au**)
- may not have set up the aircraft's radio equipment properly (for example, volume) (see investigation number 200605091 at **www.atsb.gov.au**)
- transmit on the CTAF simultaneously, in which case neither you nor the other pilot would receive any audible transmissions (see investigation numbers AO-2013-205 and AO-2013-148 at **www.atsb.gov.au**).

Circuit procedures at non-controlled aerodromes

Separation minima for take-off and landing (CASR 91.370)

Rules for take-off

Note this requirement only applies at a non-controlled aerodrome. ATC may vary these minima at a controlled aerodrome.

You must not commence a take-off until a preceding departing aircraft using the same runway:

- has crossed the upwind end of the runway, or
- has commenced a turn, or
- the runway is longer than 1,800 m and the other aircraft must have become airborne and be at least 1,800 m beyond your proposed lift off point, or
- the other aircraft and your aircraft must each have a maximum take-off weight (MTOW) below 2,000 kg and the other aircraft must be airborne at least 600 m beyond your proposed lift off point.

You must not commence a take-off until a landing aircraft that is using the same runway has vacated the runway or if using a crossing runway, has crossed or stopped short of the runway intersection.

Rules for landing

You must not continue an approach to land beyond the threshold of the runway until:

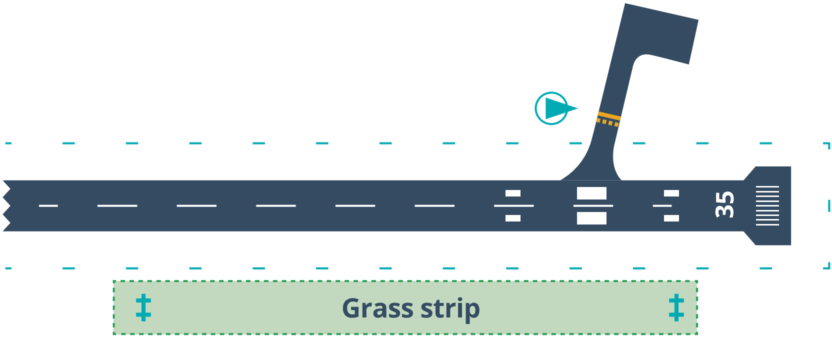
- an aircraft that is taking off from the same runway has become airborne and commenced a turn, or
- an aircraft that is taking off from the same runway is beyond the point of the runway at which your aircraft could be expected to complete its landing roll, and there is enough distance to manoeuvre in the event of a missed approach, or
- an aircraft landing on the same runway has vacated the runway, or is taxiing away from the runway, or
- if a landing aircraft ahead is using a crossing runway, the aircraft ahead has crossed or stopped short of the runway intersection.

Application of rules where gliders or glider tugs operate

At an aerodrome where gliders or glider tugs are operating to a common circuit pattern from either a runway or parallel strip, you cannot take off or land when another aircraft on the parallel strip or runway is taking off or landing. However, you may take-off or land if there is another aircraft taxiing or stationary, on either the runway or parallel strip, provided it does not affect your ability to take off or land safely (see Figure below).

Exception: *The above requirements do not apply where gliders and glider tugs are permitted to operate in contra-rotating circuits on both a runway and a parallel strip outside the runway strip, and simultaneously.*

Figure: Runway with parallel strip



Landing and taking off into the wind (CASR 91.380)

To the extent practicable, you must land and take-off into wind unless:

- the aircraft's flight manual allows you to land or take off downwind or crosswind, and
- you are satisfied that traffic conditions at the aerodrome will allow you to land or take off safely.

It is well documented that taking off and landing into wind is the safest option. However, runway options do not always allow for an into-wind take-off without some crosswind component. Pilots should be familiar with the crosswind limitation in the AFM.

Although the regulation does not preclude a downwind take-off or landing, they should not be attempted in other than very light winds. You should be aware that the take-off and landing distance will increase, and you should apply a considerable safety margin to the normal take-off and landing calculations. You should also consider that the climb and descent angle will be lower/flatter than when operating into wind, and obstacle clearance may become a critical issue after take-off or on your approach to land. You must not exceed any limitation in the AFM.

Standard circuit procedures (CASR 91.385)

The standard aerodrome traffic circuit pattern facilitates an orderly flow of traffic and is normally a circuit pattern made with all turns to the left. When arriving at an aerodrome to land, a pilot will normally join the circuit upwind, crosswind (mid-field), or downwind (before mid-downwind). Landings and take-offs should be made on the preferred runway or the runway most closely aligned into wind.

If a secondary runway is being used, pilots using this secondary runway should avoid impeding the flow of traffic on the preferred runway.

Aerodromes that have right-hand circuits are listed in ERSA. Circuit information may also be published or provided by aerodrome operators in other sources of aeronautical information.

Note: At many aerodromes, the circuit direction at night is different to the direction during the day. This is generally because of terrain, obstructions or noise abatement issues.

Exception: *The above circuit pattern requirements do not apply:*

- *to a seaplane or amphibian, where it is necessary:*
  - *to avoid an obstacle, or*
  - *without compromising the aircraft's safety, to avoid undue noise over a populated area, or*
  - *for a single-engine seaplane or amphibian, to enable the aircraft to land on water if its engine fails*
- *to a glider (other than a glider with an engine operating) if the pilot believes it is necessary to land safely.*

Requirements for maintaining the same track after take-off

(CASR 91.390)

For other than a helicopter, you must, after take-off, maintain the take-off track until the aircraft is above 500 ft AGL unless a track change is necessary to avoid terrain.

Exception: *The above circuit pattern requirements do not apply to a seaplane or amphibian, where it is necessary:*

- *to avoid an obstacle, or*
- *without compromising the aircraft's safety, to avoid undue noise over a populated area, or*
- *for a single-engine seaplane or amphibian, to enable the aircraft to land on water if its engine fails.*

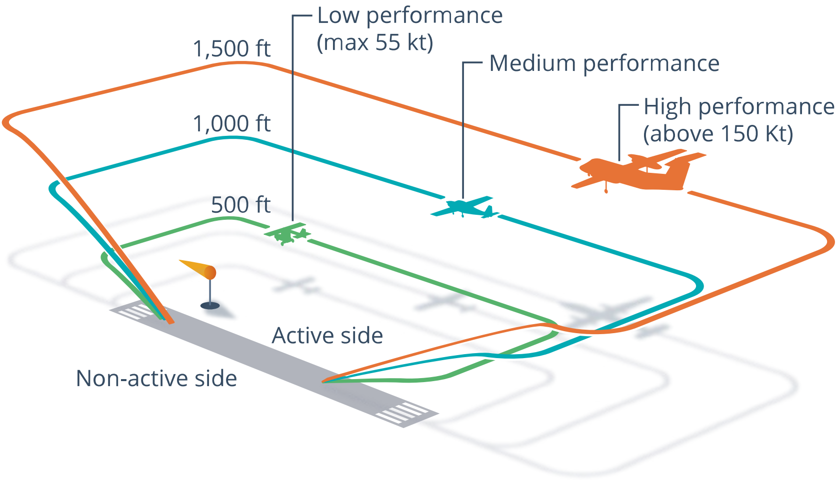
Maximum speed

Aircraft should not be flown in the circuit at more than 200 kt.

Circuit heights

By convention, aircraft should fly the standard traffic circuit at the heights above aerodrome elevation (as in the table and diagram below).

Type of aircraft	Standard circuit speed	Standard circuit height
High performance (includes jets and many turboprops)	Above approximately 150 kt	1,500 ft above aerodrome elevation
Medium performance (includes most piston engine aircraft and gliders)	Between approximately 55 kt and 150 kt	1,000 ft above aerodrome elevation
Low performance (trikes and ultralight aircraft)	Approximately 55 kt maximum	500 ft above aerodrome elevation



During initial climb-out, the turn onto crosswind should be made at a height appropriate to the performance of the aircraft but, in any case, not less than 500 ft above terrain so as to be at circuit height when turning downwind.

Pilots may vary the size of the circuit depending on:

- the performance of the aircraft
- AFM/pilot operating handbook (POH) requirements
- company standard operating procedures (SOPs) and/or
- other safety reasons.

Final approach

The turn onto final approach should be:

- completed by a distance and height that is common to all operations at the particular aerodrome
- commensurate with the speed flown in the circuit for all aircraft of the same type.

In any case, the turn onto final should be completed by not less than 500 ft above aerodrome elevation. This should allow sufficient time for pilots to ensure the runway is clear for landing. It will also allow for the majority of aircraft to be stabilised for approach and landing.

Departing the circuit area

Aircraft should depart the aerodrome circuit area by extending one of the standard circuit legs or climbing to depart overhead. However, the aircraft should not execute a turn to fly against the circuit direction unless the aircraft is well outside the circuit area and no traffic conflict exists. This will normally be at least 3 NM from the departure end of the runway but may be less for aircraft with high climb performance. In all cases, the distance should be based on the pilot's awareness of traffic and the ability of the aircraft to climb above and clear of the circuit area.

Be aware of traffic joining the circuit by the recommended overfly procedure, especially if climbing to depart overhead of the aerodrome (**AC 91-10**).

Note: Pilots of departing aircraft should be aware of traffic intending to join the circuit by the recommended overfly procedure as they can be 2,000 ft or more above aerodrome elevation.

Arrivals, departures and transits (AC 91-10)

Figure: Arrival procedure

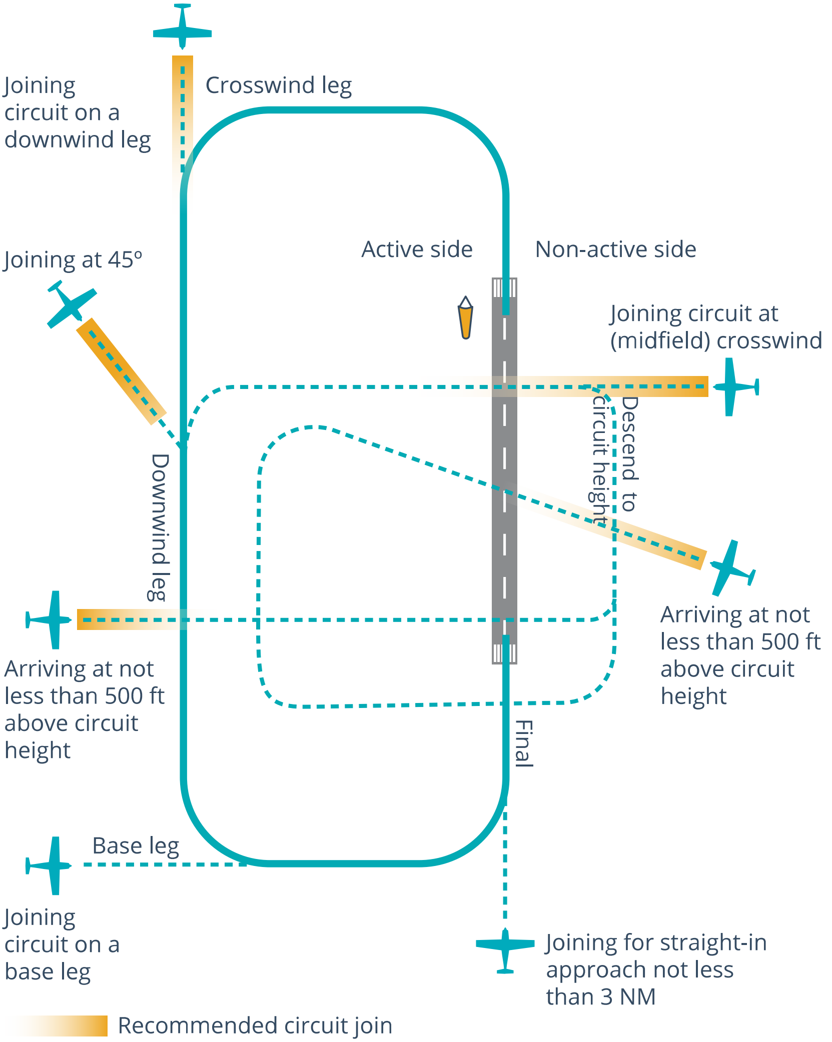
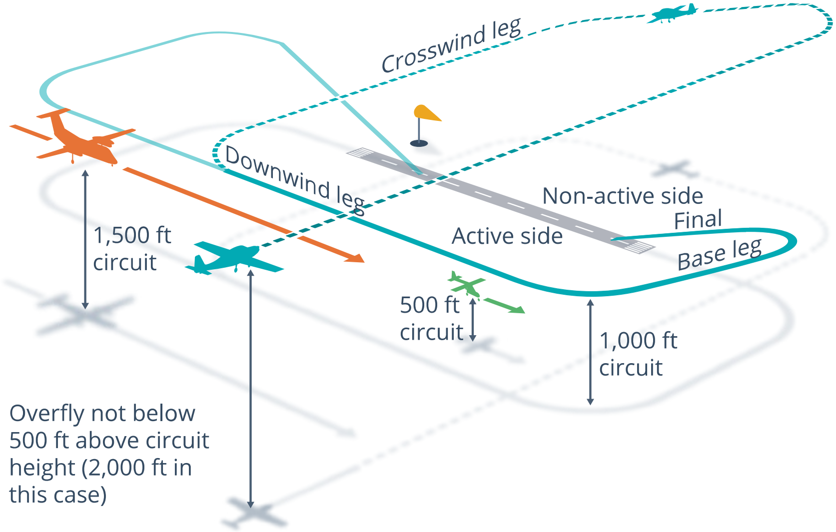


Figure: Recommended circuit join



Pilots departing and arriving at non-controlled aerodromes where the carriage of radio is mandatory are expected to monitor their radios and broadcast their intentions. Pilots should also make additional broadcasts when considered necessary to minimise any risk of collision.

Where a pilot is unfamiliar with the aerodrome layout, or when its serviceability, wind direction, wind speed, or circuit direction cannot be ascertained prior to arrival, use the overfly procedure. Overfly or circle the aerodrome at least 500 ft above the circuit altitude, which may be 2,000 ft or more above the aerodrome elevation (as in the case shown above). When you have determined the circuit direction, position the aircraft to a point well clear (normally the non-active side of the circuit) before descending to a circuit altitude that equates to the aircraft's performance.

Do not descend into the active side of the traffic circuit from above because of the difficulty of seeing – and being seen by – aircraft directly below the aircraft's flight path.

Low performance aircraft – For low-performance ultralight aircraft and rotorcraft with a maximum speed of approximately 55 kt, it is recommended that the aircraft overfly midfield at 500 ft above aerodrome elevation. This will minimise the risk of conflict with higher or faster traffic.

Descent on the non-active side – When arriving and intending to join the circuit from overhead, descend on the non-active side of the circuit so that the aircraft is established at its circuit altitude as it crosses the runway centreline on crosswind, between midfield and the departure end of the runway.

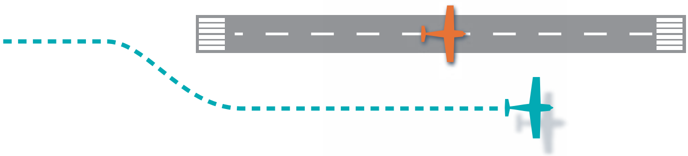
Arrival on the active side – When arriving on the active side, the recommended method is to arrive at the circuit altitude entering midfield at approximately 45° to the downwind leg, while giving way to aircraft already established in the circuit.

The downwind leg – On downwind, maintain the applicable circuit altitude until commencement of the base leg turn. The base leg position is normally when the aircraft is approximately 45° from the reciprocal of the final approach path, measured from the runway threshold. Along the base leg, continue to look out and maintain traffic separation.

The final leg – When on the final leg, confirm that the runway is clear for your landing.

Go around – When you elect to abort a landing you should manoeuvre to keep other traffic in sight, maintain a safe distance from all aircraft and re-join the circuit when it is safe to do so. This may involve manoeuvring to the right, left or maintaining the runway centreline, depending on traffic, the circuit direction and terrain.

Figure: Suggested go-around manoeuvre



Straight-in approaches at non-controlled aerodromes

(CASR 91.395)

Before commencing a straight-in approach, you must determine the wind direction and the runways in use at the aerodrome.

Unless you are carrying out an instrument approach in instrument meteorological conditions (IMC) or an approach in a specific Part 103 aircraft, you must complete your manoeuvring and be established on final approach by at least 3 NM from the threshold of the runway you intend to use for the landing.

The aircraft making the straight-in approach must give way to any other aircraft flying in the circuit pattern for the aerodrome.

Exception: *The following Part 103 aircraft need not comply with the requirement to be established on final approach by 3 NM:*

- *sailplanes (except for powered sailplanes including touring motor gliders, and power-assisted sailplanes, when the engine is operating)*
- *hang gliders and paragliders (whether or not power-driven).*

The exception is necessary since compliance with the 3 NM straight-in rule would expose slower Part 103 aircraft to a collision risk from faster overtaking aircraft. Part 103 aircraft are therefore permitted to establish on a short final approach within 3 NM of the runway threshold.

If you choose to adopt a straight-in approach you should only do so when it does not disrupt or conflict with the flow of circuit traffic. You must give way to any other aircraft flying in the circuit pattern. Nonetheless, when conforming to the circuit pattern, particularly on the base leg, you should continue to check for traffic entering along the final approach path.

Except when piloting a Part 103 aircraft, you must be established on final approach at not less than 3 NM from the landing runway threshold.

You should announce your intention to conduct a straight-in approach with your inbound broadcast. A further broadcast of your intentions should also be made when not less than 3 NM from the runway threshold.

You should not commence a straight-in approach to a runway when the reciprocal runway is being used by aircraft already established in the circuit.

You should only make minor corrections to speed and flight path, to maintain a stable approach, within 3 NM on final approach. Your aircraft's transponder should be selected to ON/ALT (Mode C). Your aircraft's external lights (where fitted) should be illuminated and remain on until the aircraft has landed and is clear of all runways.

You must remember that an aircraft established on the base or final leg for any runway has right of way over an aircraft carrying out a straight-in approach.

See **AC 91-10 – Operations in the vicinity of non-controlled aerodromes.**

Joining on base leg – You should be mindful that the following types of incidents are more common when joining on the base leg:

- landing downwind in direct conflict with other traffic using the into-wind runway
- having to go around from a late final approach due to other aircraft or vehicles on the runway
- landing on a closed runway or at a closed aerodrome.

Joining on the base leg is not a standard procedure. CASA recommends that you join the circuit on either the crosswind (midfield) or downwind leg. However, if you do choose to join on base leg should only do so if you:

- have determined the:
  - wind direction and speed
  - runway in use
  - circuit direction
  - presence of obstructions on the runway
  - serviceability of the aerodrome and runway
- give way to other circuit traffic and ensure the aircraft can safely (no traffic conflict likely) join the base leg applicable to the circuit direction in use at the standard height, and
- broadcast your intentions.

Note: Base-leg joins must be conducted in accordance with the circuit directions as published in the ERSA. If joining on the base leg cannot be conducted to meet the above criteria, pilots should descend on the non-active side of the circuit.

Taxi after landing – After landing, vacate the runway strip as soon as practicable. You should not stop your aircraft until clear of the runway strip.

Transiting flights – If you prefer to track via non-controlled aerodromes for risk mitigation or other purposes, you should avoid overflying the aerodrome at an altitude that could conflict with operations in the vicinity of the aerodrome. Be aware, however, that IFR approach procedures may commence at significant heights above the aerodrome (for example 4,954 ft at Innisfail).

If you determine that you are flying at a height that is within the vicinity of an aerodrome that requires the carriage of a radio, you must monitor and broadcast your position on the CTAF (CASR 91.375).

VFR pilots can find information on IFR approach procedures on the Airservices Australia website at **airservicesaustralia.com/aip/aip.asp**.

Call Airservices Service Desk for assistance on 1800 801 960.

Traffic mix (AC 91-10)

Non-controlled aerodromes can host a variety of operations including passenger air transport in large jet and turboprop aircraft, as well as glider, parachute, helicopter, gyroplane, ultralight, balloon and agricultural operations. This diversity presents a range of potential safety risks that are mitigated through the adoption of a standard code of conduct and good flying.

Turboprop or jet aircraft passenger operations – At certain non-controlled aerodromes, regular public transport passenger, corporate and air transport companies may use large turboprop or jet aircraft. These aircraft may have different operating parameters/criteria to those of many general aviation aircraft. They fly under IFR and are generally operated in accordance with company SOPs. Pilots of large aircraft flown at slow speeds with a high nose angle may find it difficult to see other smaller aircraft below their flight path, particularly on approach. These aircraft will broadcast their intentions, but it is essential that pilots of smaller aircraft also make and respond to broadcasts and do not simply assume that the larger aircraft is aware of their position.

General aviation pilots should be aware that, in certain circumstances, passenger transport aircraft may not be able to use the preferred runway. Passenger transport aircraft must operate under more stringent regulations, including specific aircraft performance regulations. For example, an aircraft may depart downwind, accepting an increased take off distance because of a performance limitation imposed by terrain clearance requirements on the preferred runway. Similarly, landing into wind may not always be possible when relevant performance limitations are taken into account.

Glider operations – These can be conducted from normal runways associated with an aerodrome, or from adjacent sites within the confines of an aerodrome. Gliders can be launched using a variety of methods including aero tow, vehicle tow, self-propulsion and winch launch. In all cases, vehicles and people may be operating on, or in the vicinity of, the runways in use.

A double white cross displayed adjacent to the windsock indicates that gliding operations are in progress. Aeronautical charts also use the double cross to indicate areas where glider operations take place. Some gliders operating adjacent to the CTAF area may use a different frequency to the CTAF or area frequency.

Winch operations may occur at any aerodrome and launch gliders to 4,000 ft AGL, although the typical height is between 1,500 and 2,000 ft AGL. Pilots should be aware of winch wires up to these levels, particularly when overflying the aerodrome, and check ERSA and the latest NOTAMs for current, specific operational information.

Gliders landing on the preferred runway may not be able to give way to other aircraft. At aerodromes with both glider and helicopter operations, helicopter pilots should follow the standard traffic patterns to avoid gliders which may be flying modified circuit patterns.

See Sport and recreational aviation section in this Chapter.

Parachuting operations – Aeronautical charts depict parachute symbols at aerodromes where known parachute operations occur. ERSA also details the aerodromes where parachute operations take place. Pilots should consult the latest NOTAMs for any additional information.

In Australia, parachuting operations are permitted through cloud in certain circumstances.

Pilots flying parachuting operations will broadcast on all relevant frequencies. For example, if the jump commences in Class G airspace and will land at a non-controlled aerodrome, advisory calls will be made on both the area frequency and the CTAF.

Parachutists in free-fall are almost impossible to see, so pilots are advised to avoid overflying an aerodrome with an active drop zone. Communication with the parachuting drop aircraft is essential to avoid flying into a drop zone area.

See Sport and recreational aviation section in this Chapter.

Helicopters and gyroplanes operations – Helicopters can arrive at and depart aerodromes in various directions. Helicopter pilots can choose to fly a circuit similar to a fixed-wing aircraft, but may also fly a circuit either in or contra to the circuit direction at a height of at least 500 ft above the aerodrome elevation and closer to the runway. This can only be done if the associated landing site is outside the runway strip in use; the non-standard circuit does not cross the extended centreline of the runway in use and pilots broadcast their intentions. Check the relevant ERSA entry for any noise abatement procedures.

Helicopters may turn on to their departure heading at any height after take-off, provided it is safe to do so. When approaching to land at a marked helipad or suitable clear area, helicopter pilots should avoid the flow of fixed-wing aircraft. Helicopters must avoid other circuit traffic at all times.

Other pilots should be aware that, for some helicopter operations, the only suitable landing area is the runway.

Helicopters and gyroplanes fly more slowly than fixed-wing aircraft and approach to land at steeper angles. Both helicopters and gyroplanes can be expected to practise power-off landings (autorotations) which involve a very steep approach and high rate of descent.

As helicopter and gyroplane operations can be varied and flexible, pilots need to ensure that they monitor and advise other aircraft of their position and intentions by radio.

See Sport and recreational aviation section in this Chapter.

Ultralight aircraft – The term ‘ultralight’ aircraft, although they are part of the sport and recreational category of aircraft, is often used to describe aircraft with a maximum take-off weight of up to 355 kg with stall speeds that might be as low as 35 kts or for some aircraft even lower.

These sport and recreational aircraft types include trikes, powered parachutes, gyroplanes and other small fixed-wing aircraft that cruise at maximum speeds of about 55 kt. Pilots of these aircraft should conduct their standard circuit at 500 ft above aerodrome elevation.

Entry to the circuit should be at 500 ft above aerodrome elevation as it is normally impractical to overfly the field above all other circuit traffic. Joining the circuit at 500 ft above aerodrome elevation will ensure adequate separation from higher and faster traffic.

Pilots of these aircraft who choose to use the overfly procedure above the circuit altitude should be aware that:

› Ultralight aircraft are difficult to see, particularly by pilots of faster, larger aircraft.
› Faster, larger aircraft create significant wake turbulence that can be extremely hazardous to ultralight aircraft.
› Faster, larger aircraft will not be able to slow to the speeds of an ultralight aircraft to follow the ultralight.
› Faster, larger aircraft – before arriving in the circuit and when below 10,000 ft – can be operating at speeds up to 250 kt. Although aircraft should be operating at a maximum of 200 kt in the circuit, such an aircraft reporting at 20 NM from an aerodrome could be in the vicinity of the circuit within five minutes.

Ultralight pilots should consult the AIP, ERSA, relevant charts and the latest NOTAMs to obtain the most up-to-date information and procedures at their aerodrome.

See Sport and recreational aviation section in this Chapter.

Aerial application operations – Pilots should be aware that aerial application operations are conducted from some non-controlled aerodromes.

Aerial application operations frequently involve low-level manoeuvring after take-off and before landing. At non controlled aerodromes low-level manoeuvres do not have to conform to the standard traffic circuit. However, pilots of other aircraft can expect aerial application aircraft to:

- be fitted with a radio
- maintain a listening watch and broadcast their intentions on the CTAF
- give priority to other traffic.

Balloons – Aerodromes at which hot air balloons operate are marked on charts with the balloon symbol. Balloons, cannot of course, fly a circuit. Powered aircraft must give way to balloons.

A balloon can operate below 2000 ft AGL at or within 3 NM of a non-controlled aerodrome only if the PIC holds either:

- a current commercial pilot (balloon) licence (CP(B)L)
- a private pilot (balloon) permit issued by CASA with a non-controlled aerodrome endorsement
- a current CAR certificate of validation.

Balloons may approach the aerodrome on a different track to the one they intend for landing to take advantage of changing wind directions at different altitudes. Not all landings are from straight-in approaches and other pilots should be aware that the balloon may change direction quite quickly as it descends.

See Sport and recreational aviation section in this Chapter.

Remotely piloted aircraft (RPA)

Pilots should be aware that RPA operations may be conducted from controlled and non-controlled aerodromes.

RPA operations frequently involve low-level manoeuvring after take-off and before landing. These low-level manoeuvres do not have to conform to the standard traffic circuit. However, pilots of other aircraft can expect RPA to separate from other traffic.

RPA may maintain a listening watch and broadcast their intentions on the CTAF.

RPA may be equipped with surveillance equipment.

The rules governing these operations including provisions for aircraft separation are set out in CASR 101 and MOS 101.

Hazards (AC 91-10)

Aircraft size and performance – General aviation pilots should be aware that aerodromes with runways of 1,400 m or more in length can accommodate jet or large turboprop aircraft operations. Runway lengths are published in ERSA.

For aerodromes with high-performance traffic in the circuit, the overfly height should be no lower than 2,000 ft above aerodrome elevation.

Downwind take-offs and landings – Take-off or landing downwind is not recommended as a standard procedure. Pilots should use the runway most closely aligned into wind (the active runway), wherever possible.

Pilots must operate within the limitations prescribed in the AFM (CASR 91.095).

In accordance with CASR 91.410, pilots should consider the following hazards if planning to take off or land downwind:

- Wind strength just above ground level may be significantly higher than indicated by the windsock.
- Windshear (for take-off) may result in:
  - higher groundspeed at lift-off
  - a longer take-off distance required
  - a shallower angle of climb
  - degraded obstacle clearance
  - in the event of an emergency, (landing straight ahead) touchdown will be at a higher groundspeed.
- Windshear (for landing) may result in:
  - higher groundspeed at touchdown
  - a longer landing distance required.

Wake turbulence and windshear – Wake turbulence is produced by all aircraft and can be extremely hazardous. Smaller aircraft should be aware that large aircraft produce strong/severe wake turbulence, with large jet aircraft producing extreme wake turbulence.

In calm conditions, wake turbulence may not dissipate for several minutes. Pilots should position their aircraft with sufficient spacing in the traffic circuit to avoid encountering wake turbulence.

On take-off, smaller aircraft will normally require increased separation time before departing behind a larger aircraft.

Helicopters of all sizes produce, in forward flight, vortices similar to those produced by fixed-wing aircraft. A hovering or slow air-taxiing helicopter creates a rotor downwash that can be a hazard to all nearby aircraft. Therefore, pilots of small aircraft should avoid operating close to helicopters. Equally, helicopter pilots should operate at a safe distance from parked or taxiing aircraft.

Windshear can occur anywhere in the traffic circuit but is most dangerous when close to terrain. Dust devils ('willy willies') are visible windshear and common at outback aerodromes. Pilots encountering windshear should consider an immediate maximum-performance climb to fly out of the situation.

Collision avoidance at non-controlled aerodromes

The most hazardous area for collisions is within a space bounded by a cylinder of airspace 5 NM in diameter and up to 3,000 ft elevation above a non-controlled aerodrome. All pilots must maintain good situational awareness within this high-risk area.

Inbound pilots should minimise distractions within the cockpit. Passengers should be briefed not to distract the pilot unless there is imminent danger.

Pilots should be familiar with the aerodrome layout and have radio frequencies set, so their attention can be directed outside the aircraft. Pilots should be alert, looking for other traffic, maintaining a listening watch and responding appropriately to applicable transmissions. Pilots should broadcast their intentions by making the standard positional broadcasts and other broadcasts as necessary in the interests of safety.

Most collisions occur on downwind or on final approach. There are many distractions during this time, including configuring the aircraft, completing checklists, setting equipment and communicating. Early completion of checklists and configuration changes will help to minimise distractions at this critical time.

Good height and speed control (including use of flaps) is essential for maintaining separation during the approach. If adequate separation cannot be maintained, a go-around should be initiated sooner rather than later.

Pilots should have a sound understanding of the rules for establishing the right of way and preventing collisions. Refer Chapter 1 – know your rules and responsibilities for more detail.

The CASRs are published at **www.legislation.gov.au**

At aerodromes with both glider and helicopter operations, helicopter pilots should follow the standard traffic patterns to avoid gliders flying modified circuit patterns.

Maintaining separation in the vicinity of a non-controlled aerodrome

Increased collision risks exist at non-controlled aerodromes if instrument approaches are conducted at a time when visibility is reduced (by cloud, smoke or haze) but VFR conditions exist below the low-visibility layer.

In these situations, it is possible for a pilot flying an instrument approach through cloud to become visual and suddenly encounter a VFR aircraft in the circuit. Diligent radio broadcasting and continuous visual scanning are essential to avoid an airprox.

VFR pilots, on hearing IFR pilots broadcasting their intention to make an instrument approach, are expected to respond promptly to establish situational awareness with the IFR aircraft. Information that would be useful to the IFR pilot includes aircraft type, position and flight intentions.

VFR pilots should remember their responsibility to remain clear of cloud and maintain in-flight visibility in accordance with the criteria for VMC.

Practise instrument approaches. Pilots who wish to practise instrument approaches in VMC should be particularly alert for other aircraft in the circuit, so as to avoid impeding the flow of traffic.

Pilots flying IFR should give position reports in plain English so as to be easily understood by VFR pilots, who generally have no knowledge of IFR approach points or procedures. In general, positions should include altitude, distance and direction from the aerodrome. Details such as the outbound/inbound legs of an instrument approach, or area navigation fixes, will generally be of little assistance to VFR pilots in establishing situational awareness.

Surveillance information service (AIP GEN 3.3) (ENR1.4)

SIS is available, on request, to VFR flights in Class E and G airspace within ATS surveillance system coverage, subject to ATC workload. The SIS is available to improve situational awareness and assist pilots in avoiding collisions with other aircraft.

VFR pilots receiving a SIS will be provided with traffic information and, upon request, position or navigation information.

Note: All information is advisory in nature, and you remain responsible for the safe operation of the aircraft. Terrain clearance, aircraft-to-aircraft separation, and obtaining clearances into controlled airspace remain your responsibility.

Pilots wishing to receive a SIS must be in direct VHF communications with ATC and equipped with a serviceable SSR transponder or ADS-B transmitter. The pilot must maintain a continuous listening watch with ATC, advise ATC prior to any changes to track or level and advise prior to leaving the frequency.

VFR flights entering Class E airspace do not require a clearance, but may receive a SIS, where available, on request.

ATC will provide an alerting service for flights receiving an SIS.

On initial contact with ATC, you must advise the ATS surveillance service required and, if an ongoing service is requested, include the phrase **'Request flight following**'.

When ATC responds to this request, you must advise position, level and intentions.

The SIS commences on ATC notification of identification, and ATC may also assign a specific transponder code prior to, or during, the provision of the SIS.

If ATC is unable to provide a SIS, you will be advised **'Surveillance not available'**. Requests for emergency assistance should be prefixed by **'Mayday'** (three times) or **'Pan Pan'** (three times) and will receive priority.

If, the radar and/or ADS-B service is terminated, ATC will advise **'Identification terminated'** to indicate that the surveillance service is terminated.

Note: When an ATS surveillance service to a VFR flights is terminated, the pilot should monitor the ATS frequency appropriate to the area of operation.

If you have requested flight following, the SIS will be provided on an ongoing basis, generally limited to within the controller's area of responsibility. However, the SIS may be terminated at any time by the controller, or by your advice.
While receiving an SIS, the pilot must:

- maintain a continuous listening watch with ATC and advise prior to leaving the frequency
- advise ATC prior to any changes to track or level.

Approaching the boundary of the controller's area of responsibility, you will generally be advised **'identification terminated, frequency change approved'**. If a continued service is requested, you must advise **'request hand-off for flight following'** and, subject to the approval of the adjacent ATC unit, you will be instructed to change frequency for continuation of the SIS.

Alerting service (AIP GEN 3.3)

An alerting service will be provided:

- for all aircraft provided with ATC service
- in so far as practicable, to all other aircraft that have filed a flight plan or are otherwise known to the air traffic services.

Class E airspace procedures

In Class E airspace, the following traffic services are provided by ATC:

- IFR flights provided with an ATC service are separated from other IFR flights.
- IFR flights receive information about VFR flights as far as practicable.
- VFR flights receive SIS where available on request.
- Hazard alerts will be directed to pilots of known VFR flights.

Traffic information services provided by ATC do not relieve pilots of their responsibilities for continued vigilance to see and avoid other aircraft.

VFR flights in Class E airspace (AIP ENR1.1)

VFR flights entering Class E airspace do not require a clearance. VFR flights entering and operating in Class E airspace should:

- avoid published IFR routes, where possible
- monitor the appropriate Class E frequency and announce if in potential conflict
- take appropriate action to avoid potential conflict
- avoid IFR holding patterns.

Controlled aerodromes and controlled airspace

When operating at a controlled aerodrome (when ATC is active) you must obtain ATC clearance when:

- taxiing on any part of the manoeuvring area
- entering, crossing, or backtracking on, a runway
- taking off
- landing.

When taxiing on the manoeuvring area of a controlled aerodrome, you must stop and hold at all illuminated stop bars. You may only proceed beyond the stop bars when the stop bar lights are switched off.

Exception: *You may proceed beyond a lighted stop bar if ATC advises you that stop bar contingency measures are in effect for the lighted stop bar, and ATC has identified the relevant lighted stop bar to you by reference to the specific holding position and instructs you to cross it.*

Control zones and areas – entry into Class A, C or E airspace (CASR 91 MOS 11.14)

You must not enter a control zone or a control area that is Class A, C or E airspace without ATC clearance. You must not fly under the VFR in Class A airspace unless you hold an approval (CASR 91.285).

Exception: *VFR flights do not require clearance to enter Class E airspace.*

Exception: *A clearance is not required when an ATC service is not in operation for a control zone.*

Control zones and areas – entry into Class D airspace (CASR 91 MOS 11.15)

You must establish communication with the relevant ATC tower, if ATC is active, before you enter Class D airspace.

Control zones and control areas – operating in Class A, C, D or E airspace (CASR 91 MOS 11.16)

When flying in a control zone or a control area, you must fly in accordance with the following procedures and as published in the AIP and take positive action to regain the cleared track as soon as you recognise a deviation.

You must also notify ATC if the aircraft's deviation from track exceeds any of the following tolerances:

- for PBN operations – 1 x the required navigation performance (RNP) value for the route or route segment being flown
- VOR, or non-directional beacon (NDB)-based operations – ± 5° from the specified bearing
- for localiser (LOC)-based operations – full-scale deflection of the course deviation indicator
- for distance measuring equipment (DME)-based operations – ± 2 NM from the required arc
- for operations based on visual navigation – 1 NM from the cleared track.

Relevant procedures and navigational requirements for operations in a control area or control zone are published in the AIP. These publications are available through the Airservices Australia website: **www.airservicesaustralia.com**.

Clearances for entry into a controlled area

All flights operating in Class E or G airspace requesting a clearance to operate in Class C or D airspace must advise position, level, flight conditions if appropriate and receipt of ATIS (code) when making first contact with ATC.

Within VHF radio coverage, pilots must maintain continuous communications with ATC when operating in Class C and D airspace. Further, when in Class E airspace, pilots of VFR flights should monitor the ATS frequency appropriate to their area of operation.

When communication facilities permit, clearances will be passed directly to you by ATC .

When direct communication on the published frequency is not possible you should request a clearance through the ATS unit providing services in the preceding non-controlled airspace.

If proposing to fly into a control area from an aerodrome located so close to the entry point that making a full position report before entry is not practicable, you should request a clearance:

- prior to entering the runway, where direct communication is available
- after take-off, provided that the aircraft does not enter a control area until cleared, or
- prior to landing, when intending to depart for controlled airspace shortly after landing.

Clearance amendments

An air traffic clearance provided by ATC does not relieve you from responsibility for the ultimate safety of the aircraft. If considered necessary, you should request a different clearance from that issued.

In an emergency, you may act without a clearance and where possible you must advise ATC.

A pilot must advise ATC if issued a clearance which requires the use of navigation aids not available to the aircraft, or that the pilot is not qualified to use.

ATC is responsible for issuing clearances that will enable an aircraft to remain within controlled airspace if the pilot has planned to do so. If a pilot is in doubt that the clearance will keep the aircraft in controlled airspace, ATC should be advised, and an alternative clearance may be requested.

For operations within Class C, D or E airspace, maintaining 500 ft above the lower limit of the CTA steps will provide a vertical buffer with aircraft operating in the adjoining airspace.

A control instruction issued after a clearance is obtained amends the appropriate item in the clearance. When there is any change in the clearance limit and/or route specified in the initial clearance, a completely new clearance will be issued.

Whenever a clearance restriction has been imposed, and a further restriction is subsequently issued, the subsequent instruction will cancel all previous clearance restrictions.

At a controlled aerodrome, clearance for operation in an adjoining control area is given before departure.

If proposing to fly into a control area from an aerodrome located so close to the entry point that making a full position report before entry is not practicable, a clearance should be requested:

- at a convenient time before entering the runway for take-off at an aerodrome where communication can readily be established before take-off, or
- after take-off, if not available or obtainable before take-off, provided that the aircraft does not enter the control area until cleared.

If landing at an aerodrome with the intention of departing for a control area shortly after landing, any revision of notified details relevant to the clearance, including estimated off-blocks time (EOBT), should be advised to ATC, and a clearance requested before landing.

Pilots should submit details required for flight in controlled airspace at least 30 minutes before the expected time of entry. Flight details submitted with less than 30 minutes notification will be processed on a 'controller workload permitting' basis and may be subject to delay.

Within a Class D CTR, a clearance to take off is a clearance to operate within the CTR.

Separation in controlled airspace (AIP ENR 1.4)

In Class C airspace, ATC provides separation as follows:

- between IFR flights
- between IFR and VFR flights
- between IFR and special VFR flights
- between special VFR flights when the visibility is less than VMC.

Additionally, in Class C and Class D airspace:

- appropriate runway separation is applied to all aircraft at controlled aerodromes
- ATC provides VFR flights with traffic information on other VFR flights.

Furthermore, when requested, and as far as is practicable, ATC will provide VFR flights in Class C airspace with a suggested course of action to avoid other VFR flights.

Special provisions (AIP ENR 1.4)

The separation of aircraft taxiing on the manoeuvring area (which does not include apron and parking areas) is a joint pilot and controller responsibility. The pilot must maintain separation while complying with clearances and instructions.

In the traffic circuit, pilots must position their aircraft so that, while complying with clearances and instructions from ATC, they maintain the necessary separation from other traffic.

Separation is not normally provided within a training area in controlled airspace.

Under certain conditions, the pilot of one aircraft may be given responsibility for separation with other aircraft. In this circumstance:

- The pilot is also responsible for the provision of wake turbulence separation.
- The pilot must advise ATC when they are unable to maintain, or have lost, sight of other aircraft.
- Where an aircraft has been instructed to maintain separation from, an IFR aircraft, ATC will issue traffic information to the pilot of the IFR aircraft, including advice that responsibility for separation has been assigned to the other aircraft.
- Aircraft flying in formation will not be provided with separation in respect to other aircraft of the same formation, including for take-off and landing.
- Aircraft flying as part of an in-company flight will not be provided with separation in respect to other aircraft of the same in-company flight while airborne. Runway separation will continue to be provided.

Traffic information in controlled airspace (AIP GEN 3.3)

In controlled airspace when a separation standard does not exist, ATC will provide traffic information to the aircraft concerned when, in the opinion of the air traffic controller, the proximity of the aircraft warrants this information.

The traffic information provided will contain as much information as is known and is necessary to assist the pilot in identifying the other aircraft. For example:

- type
- altitude
- position, either by:
  - clock reference
  - bearing and distance
  - relation to a geographical point, or
  - reported position and estimate, and
- intentions or direction of flight.

ATC provides relevant traffic information to aerodrome traffic to enable pilots, while complying with ATC instructions, to maintain separation from other aircraft.

At military aerodromes traffic conditions may preclude the transmission of a complete traffic information service to individual aircraft.

Engine start and taxi (AIP ENR 1.1)

You must request approval to start engines when the requirement is notified by:

- ATIS
- NOTAM
- AIP Supplement
- ATC, or
- ERSA.

Taxi clearance

Where ATIS is in operation at a controlled aerodrome, you must obtain the ATIS prior to taxiing, and advise ATC of the ATIS code when requesting taxi clearance.

Pilots of civil VFR training flights should advise ‘dual’ or ‘solo’ as appropriate when requesting clearance.

You must obtain a taxi clearance before moving on the manoeuvring area.

The taxi clearance regulates movement on the manoeuvring area. The separation of aircraft taxiing on the manoeuvring area is a joint responsibility between you and the controller. Taxi clearances will contain concise instructions and adequate information so you can:

- follow the correct taxi routes
- avoid collision with other aircraft and objects, and
- minimise the potential for the aircraft inadvertently entering a runway.

When vacating a holding bay, you are to give way to aircraft on the taxiway.

Avoidance of collision on apron areas is a joint responsibility between you and any assisting company ground personnel. Information about other aircraft moving on the same apron area will be provided by the ATC (where it exists as a discrete service).

A taxi instruction which contains a taxi limit beyond a runway must include a **‘cross runway (number)’** instruction to cross that runway. When an aircraft is required to hold short of a runway intersecting the taxi route, ATC will issue a taxi instruction limit of the holding point associated with the intersecting runway.

An aircraft which has been issued with a taxi instruction limit of the holding point of a runway intersecting the taxi route, or which has been issued with an instruction to ‘**hold short’** of that runway must subsequently be issued with an instruction to **‘cross runway (number)’**.

Aircraft required to hold short of a runway must hold at the appropriate runway holding position or the runway strip edge at the intersection of a crossing runway.

You must stop and hold at all illuminated stop bars. You may only proceed beyond the stop bars when the stop bar lights are switched off.

However, you may proceed beyond a lighted stop bar if ATC advises you that stop bar contingency measures are in effect for the lighted stop bar, and ATC has identified the relevant lighted stop bar to you by reference to the specific holding position and instructs you to cross it (Part 91 MOS 11.13).

If you wish to use less than the full length of the runway available, you should nominate the intention when requesting your taxi clearance.

ATC may offer an intersection departure and will advise the remaining runway length, if required.

If you are unfamiliar with the aerodrome, you should **‘request detailed taxi instructions'**.

VFR aircraft wishing to depart without submitting flight notification must provide the following information on first contact with ATC:

- aircraft callsign and ‘details’ (wait for a response from ATC)
- destination and first tracking point
- preferred level
- identification of ATIS code received.

Provision of operational information

ATC will supply the following information for take-off:

- runway or direction
- wind direction and speed, QNH and, if required, temperature and/or dew point
- a time check to the nearest half-minute, upon commencing taxi from the apron before take-off
- the crosswind component on the runway to be used, if this equals or exceeds 8 kt for single-engine aircraft or 12 kt for multi-engine aircraft
- the tailwind component
- aerodrome surface conditions significant to the operation
- known weather information
- birds that may be a hazard to the operation
- maintenance work within 23 m of the runway side-stripe marking.

Nomination of runways

ATC will nominate the runway, preferred runway or take-off direction. Where noise abatement procedures are prescribed and ATC traffic management permits, the provisions of DAP noise abatement procedures (NAP) will be applied. ATC shall not nominate a particular runway for use if an alternate runway is available, when:

- the alternate runway would be preferable due to low cloud, thunderstorms and/or poor visibility
- for runways that are completely dry:
  - the crosswind component, including gusts, exceeds 20 kt, or
  - the downwind component, including gusts, exceeds 5 kt, and
- for runways that are not completely dry:
  - the crosswind component, including gusts, exceeds 20 kt, or
  - there is a downwind component.

Take-off (AIP ENR 1.1)

Selection of take-off direction

You must ensure that the runway is suitable for your operation. If not suitable, you must advise ATC before taxiing or when requesting an airways clearance by using the phrase **'Require runway (number)'**.

Such a request will not result in a loss of priority, provided it is made on first contact with clearance delivery or before taxiing. The decision to take off rests solely with you as the pilot in command.

Selection of circuit direction

Circuit directions and turns will be specified or authorised by ATC. You must notify ATC if a particular turn or circuit is essential to the safe operation of your aircraft by use of the word **'Require'**.

Departure instructions

Departure instructions may contain the following, as required:

- aircraft identification
- direction of turn and heading instructions*
- altitude restrictions
- tracking points, and
- any other instructions.

*For an assigned heading (including runway heading) you must not compensate for wind effect.

When a heading is assigned as a departure instruction, you must read back the heading and the direction of the turn.

Change to tower frequency

Domestic aircraft should change to tower frequency:

- close to, or at, the holding point of the nominated runway, when ready for take-off, or
- in the holding bay if directed.

At Class D aerodromes at which parallel runway operations are in progress, you must identify the departure runway when reporting ready, for example: **'(Callsign) ready, runway right'**.

For operations wholly within a Class D CTR you must report ready with intentions, for example: circuits, training area north, etc. Additionally, for aircraft not in receipt of airways clearance that will depart the Class D CTR, advise tracking details, for example: **'Departing via (location) for (location), departure procedure, etc.'**

Runway entry

You must not enter a runway unless you have received a specific clearance to:

- take-off
- line up, or
- backtrack, or
- cross; or
- a clearance to enter for other purposes has been received from ATC and the stop bar lights, where fitted, have been switched off.

An ATC clearance to line up does not authorise you to backtrack on the runway. When a backtrack on the runway for take-off is required, you must indicate your intention to ATC and obtain a clearance to backtrack prior to entering the runway. When a backtrack on the runway will involve crossing an intersecting runway, the backtrack instruction must include either a **'Cross runway (number)'** instruction or an instruction to **'Hold short'** of that runway.

Aircraft required to hold short of a runway must hold at the appropriate holding point, or the runway strip edge at the intersection of a crossing runway.

An aircraft which has been issued with an instruction to **'Hold short'** of an intersecting runway must subsequently be issued with an instruction to **'Cross runway (number)'**.

Holding on the runway

You must not hold on the runway in use unless permission to do so has been obtained from ATC.

Clearance required

You must not take off unless the specific clearance **'Cleared for take-off'** has been received.

A clearance for immediate take-off may be issued to an aircraft before it enters the runway. On acceptance of such clearance the aircraft should taxi out to the runway and take off in one continuous movement.

After take-off

Airborne report – Class C control zones (AIP ENR 1.1)

In Class C and Class D control zones where an ATS surveillance service is provided, on your first contact with centre, approach or departures, you must report:

- if assigned an initial heading – the direction of turn and assigned heading
- the altitude passing, to the nearest 100 ft
- the last assigned level.

Frequency change

When frequency change instructions are issued immediately preceding the take-off clearance, you must change frequency automatically from the tower frequency as soon as practicable after take-off, preferably within one nautical mile of becoming airborne.

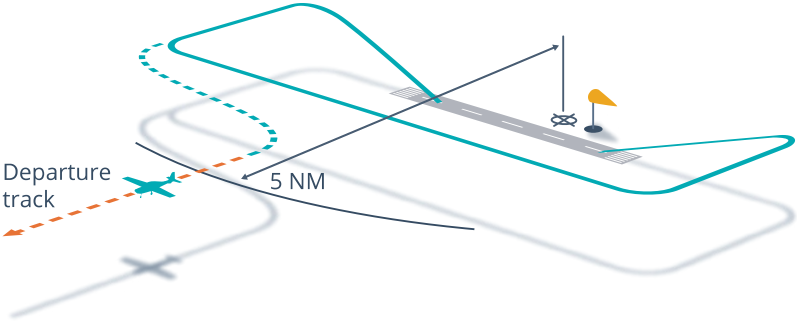
In all other situations, when departing you must remain on tower frequency until specific frequency change instructions are issued. You can generally expect an instruction to contact departures control before reaching 2,000 ft and should, when advised, effect the change as soon as possible.

When contacting area control, you must advise the last assigned level and, if not maintaining the assigned level, the level you are maintaining or the last vacated level.

Note: The 'last vacated level' may be omitted by identified aircraft squawking pressure altitude derived level information.

Establishment on track

Unless otherwise instructed by ATC, you must remain within 5 NM of the departure aerodrome to establish flight on the departure track as soon as practicable after take-off.



Deviations from route or track

In controlled airspace, any deviation from route or track requires prior clearance from ATC, except in an emergency. The values given in previous paragraphs must not be interpreted as tolerances within which deviations from route or track without clearance are permitted.

Deviations due to weather

In controlled airspace, any diversion from route or track due to weather requires prior clearance from ATC. If unable to obtain a clearance (for example, due to being out of radio contact) and you consider that the deviation is necessary (see AIP ENR 2.2), a PAN call specifying details of the deviation must be broadcast on the appropriate frequencies.

> **'Pan Pan, Pan Pan, Pan Pan, Zulu Foxtrot Romeo, 15 nautical miles south of Normanton, 8500, is descending immediately to 500 feet to avoid cloud'.**

You must be aware that the declaration of an emergency does not guarantee the aircraft safe passage, especially if the deviation is into an active restricted area.

Completed deviations from cleared route

When clearance has been issued to deviate from a cleared route, you must advise ATC when the weather deviation is no longer required, or when the weather deviation has been completed and the aircraft has returned to its cleared route. Further deviations from route will require a new clearance.

Change of level in controlled airspace (AIP ENR 1.7)

You must commence a change of level as soon as possible, but no later than one minute after receiving that instruction from ATC, unless that instruction specifies a later time or place. ATC may require that an assigned level must be reached by a specific time, distance or place. If you doubt that the requirement can be met, advise ATC immediately.

A requirement to report at a time or place given in the same clearance as a descent/climb instruction does not require the new level to be reached by the specified time or place.

When operating in controlled airspace you must report:

- when the aircraft has left a level at which level flight has been conducted in the course of a climb, cruise or descent
- when the aircraft leaves a level for which ATC has requested a report.

ATC may provide vertical separation between two climbing aircraft, not otherwise separated, by means of a step-climb. Pilots, who are subjected to a step-climb, must adopt the following procedure:

- The pilot of the lower aircraft must report approaching each assigned level in the sequence.

  and

- The pilot of the higher aircraft, on hearing the lower aircraft report approaching each assigned level, must report the last vacated level.

Step-descents are the reverse of the above paragraphs. ATC may specify a rate of climb or descent. Other considerations are as follows:

- The phrase 'STANDARD RATE' when included in a clearance, specifies a rate of climb or descent of not less than 500 ft per minute, except that the last 1,000 ft to an assigned level must be made at 500 ft per minute.
- In the case of a step-climb or descent, the specified rate will be applicable to all level clearances issued during the step-climb or descent. If unable to comply with the prescribed rate, the pilot in command must advise ATC.

Block levels (AIP ENR 1.7)

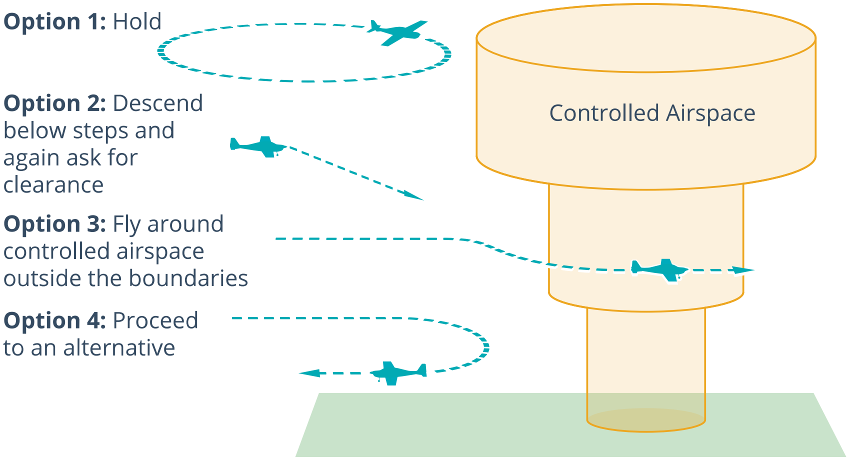
At the pilot's request, a flight may be cleared to operate within controlled airspace within a block level—provided that other aircraft are not denied the use of airspace within that block. A glider or balloon cleared to operate in controlled airspace will be assigned block levels.

The pilot has complete freedom to change levels within the block, provided that the upper and lower levels are not exceeded. However, a clearance to operate within a block level will be cancelled or amended if another aircraft requests the use of a level within the block.

When cancelling or amending a block level clearance, the aircraft operating in a block level will be instructed to climb or descend to an appropriate level or block level to provide vertical separation from other aircraft requesting one of the levels. Aircraft at standard flight levels will be afforded priority over aircraft using non-standard flight levels.

Holding (AIP ENR 1.5)

Pilots awaiting clearance to enter controlled airspace may choose one of the options below.



When instructed to hold in accordance with an ATC clearance, ATC will normally assign aircraft estimated to arrive first over a holding fix, or first able to commence an approach, the lowest available level for assignment.

Where a delay of six minutes or more is expected, ATC will advise an expected approach time or expected landing time.

When operationally necessary, if you are holding you must advise ATC of the latest divert time.

When you are holding because weather conditions are worse than the prescribed landing minima, ATC will nominate scheduled reporting times, normally at 15-minute intervals.

At the time or position advised, you must depart from the hold. You should leave the holding fix on time, or up to one minute ahead of time, and unless identified, report leaving the holding fix.

Arrival (AIP ENR 1.1)

VFR flights entering Class C airspace

Before reaching the boundary of Class C airspace, you must establish two-way communications with ATC on the frequency notified on the chart, in ERSA, or AIP Supplement or NOTAM, and obtain a clearance.

When advance notification has not been provided, you must advise, before the point of entry, the following to ATC:

- '(Aircraft callsign) inbound/transit details' – wait for ATC to respond with your callsign, and then advise:
  - flight rules and aircraft type
  - position
  - route and next estimate
  - preferred level.

If landing at an ATIS-provided aerodrome, you should obtain the ATIS before the first contact on the approach frequency. On first contact, advise ATIS received.

The clearance to enter will specify the altitude, track and any holding instructions. Some of these items may be combined with the clearance **'Cleared for visual approach'**.

Visual approach (AIP ENR 1.1)

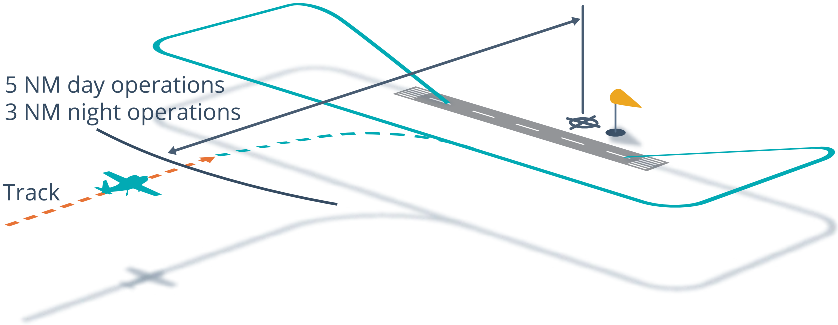
ATC authorisation

For a VFR flight by day or night ATC may give you a visual approach when you are within 30 NM of the aerodrome.

Tracking requirements

Tracking requirements for a visual approach include the following:

- you must maintain track/heading on the route progressively authorised by ATC until:
  - by day – within 5 NM of the aerodrome, or
  - by night – for a VFR flight, within 3 NM of the aerodrome and the aerodrome is in sight
- from this position you must join the circuit as directed by ATC for an approach to the nominated runway.



Minimum altitude requirements (CASR 91.265 and 91.277)

For VFR flights during a visual approach, you must descend as necessary to:

- by day – not operate below the lowest altitude permissible for VFR flight (CASR 91.265)
- by night – maintain not less than the lowest altitude permissible for VFR flight (CASR 91.277) until the aircraft is within 3 NM of the aerodrome and the aerodrome is in sight.

When you are making a visual approach, you must not climb above an altitude reported to ATC as having been reached or left, unless authorised to do so.

You may be assigned the responsibility to follow another arriving aircraft which you have reported sighting. You must maintain separation from and not overtake that aircraft. In this circumstance, you are also responsible for providing your own wake turbulence separation. You must advise ATC immediately, if you lose sight of the other arriving aircraft.

Landing (AIP ENR 1.1)

Provision of operational information

ATC will supply the following information for landing operations:

- runway or direction
- wind direction and speed, QNH and, if required, temperature and/or dew point
- known significant weather information, including low cloud and visibility or runway visual range (RVR)
- a time check (to the nearest half minute), whenever a time to commence final is specified by ATC
- the crosswind component on the runway to be used, if this equals or exceeds 8 kt for single-engine aircraft or 12 kt for multi-engine aircraft
- the tailwind component
- aerodrome surface conditions significant to the operation, including maintenance work within 23 m of the runway sidestrip marking
- birds and other hazards to aircraft, and
- cautionary advice of wake turbulence.

Selection of landing direction

You must ensure that the nominated runway or direction is operationally suitable. If it is not suitable, you must advise ATC using the phrase **'Require runway (number)'**. Such a request will not result in of loss of priority provided that it is made:

- before reaching 80 NM (120 NM for jets) from a capital city aerodrome (including Essendon) or 30 NM from other controlled aerodromes, for arriving aircraft wholly within controlled airspace, or
- on first contact with ATC for arriving aircraft entering controlled airspace within the distance specified above or a control area step or a control zone.

The decision to land rests solely with you as the pilot in command.

Selection of circuit direction

You must notify ATC if a particular turn or circuit is essential to the safe operation of the aircraft. The word **'require'** must be used to enable ATC to identify the safety requirement.

Unless otherwise instructed by ATC, if you are arriving or circuit training you must report **'downwind'** when starting or entering the downwind leg of the traffic circuit. If frequency congestion prevents the call being made when starting the downwind leg, you must report **'mid-downwind'** or **'late-downwind'** as appropriate.

Landing clearances

You must not land unless you receive specific clearance **'Cleared to land'**.

Go-around procedure in VMC

Except as specified in ERSA for specific aerodromes, if an aircraft is required to go around from a visual approach in VMC, the aircraft must initially climb on the runway track, remain visual and await ATC instructions. If the aircraft cannot clear obstacles on runway track, the aircraft may turn.

At Class D aerodromes with parallel runways where contra-rotating circuit operations are in progress, if ATC instructs, or you initiate a go-around, you must:

- commence climbing to circuit altitude
- position the aircraft on the active side and parallel to the nominated duty runway, while maintaining separation from other aircraft
- follow ATC instructions or re-enter the circuit from upwind.

Taxiing after landing

You must not hold on the runway in use unless ATC has cleared you to do so.

After landing, unless specified otherwise by ATC, you must comply with the following requirements:

- promptly vacate the runway without backtracking
- change from the aerodrome frequency to the surface movement control (SMC) frequency (where established) when vacating the runway strip and obtain an ATC taxi instruction
- not cross any runway that intersects the taxi route unless in receipt of a taxi instruction and a 'Cross runway (number)' instruction from ATC
- taxi to the destination via the most direct taxiway(s) available, and
- where an apron service is provided on a discrete frequency (see ERSA), change to that frequency on entering the apron.

A taxi instruction which contains a taxi limit beyond a runway must include a **'Cross runway (number)'** instruction to cross that runway. When an aircraft is required to hold short of a runway intersecting the taxi route, ATC will issue a taxi instruction limit of the holding point associated with the intersecting runway.

When you have been issued with a taxi instruction limit of the holding point of a runway intersecting the taxi route or have been issued with an instruction to 'Hold short' of that runway, you must subsequently be issued with an instruction to **'Cross runway (number)'**.

When you are required to hold short of a runway you must hold at the appropriate holding point for that runway, or the runway strip edge at the intersection of a crossing runway.

When separate frequencies for aerodrome control and surface movement control are in use, on landing, you must change from the aerodrome control frequency to the SMC frequency on vacating the runway strip, and then transmit the aircraft callsign and, if applicable, parking bay number. You may **'Request detailed taxi instructions to (location)'**.

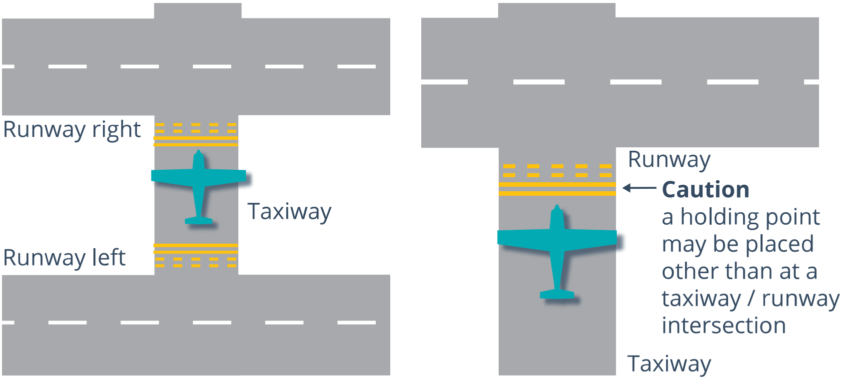
The taxi clearance regulates movement on the manoeuvring area.

The separation of aircraft taxiing on the manoeuvring area is a joint responsibility between you and the controller. A taxi clearance shall contain concise instructions and adequate information to assist you to follow the correct taxi routes, to avoid collision with other aircraft and objects and to minimise the potential for the aircraft inadvertently entering a runway.

A taxi clearance will not relate to movement on the apron areas. However, available essential information referring to other aircraft entering or leaving the same apron area will be provided.

Radio watch must be maintained on the SMC or tower frequency (where no SMC frequency is provided) until parked.

Figure: Taxiing aircraft holding short



Class D operations (AIP ENR 1.1)

Class D airspace is controlled airspace where an air traffic control service is provided to aerodrome traffic. The service is procedure-based.

You should read the procedures outlined in this chapter in conjunction with the controlled airspace procedures. There are some minor differences to procedures in Class D airspace.

An air traffic control service will be provided.

Except in an emergency, a clearance is required for all flights in Class D airspace.

When Class C and D airspace adjoin laterally, flights at the common boundary will be given services applicable to Class D airspace.

Consult ERSA, NOTAM and CASA's interactive guide to operations in controlled airspace – OnTrack, for procedures specific to a Class D aerodrome.

Class D aerodromes have a high traffic density that includes a wide variety of aircraft types and performance capabilities. Typical users of these aerodromes include private, aerial work and air transport aircraft, with a mix of circuit training as well as arrivals and departures. You should ensure you maintain a good lookout while flying in, and before reaching, Class D airspace. You should also maintain a good listening watch on the relevant radio frequency to ensure you receive aircraft and ATC communications, to maintain situational awareness of other traffic.

For entry into Class D airspace, establishment of two-way communications between the aircraft and ATC constitutes a clearance for you to enter Class D airspace (AIP ENR 1.1).

- You should plan your entry to the aerodrome in Class D airspace via the VFR reporting point identified on the visual terminal chart (VTC).
- When flying from an aerodrome in Class D airspace delays might be incurred because clearances must be coordinated between different ATC sectors.

Class D airspace requirement

Map depiction

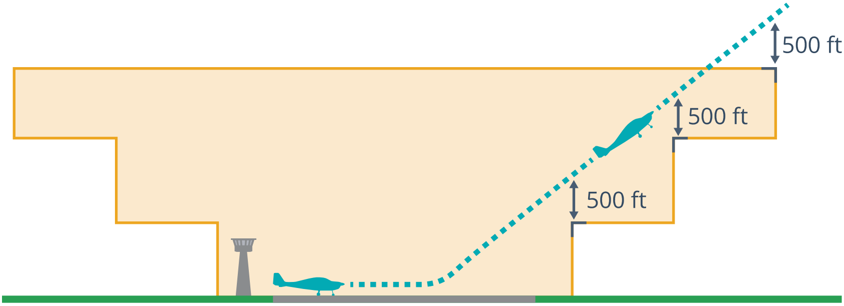
The lateral limits of Class D control area steps are depicted with blue lines and a blue tint. The vertical limits of Class D are shown with blue labels (AIP GEN 3.2). Control zones have defined dimensions, and associated control area steps, with an upper limit of 4,500 ft (AIP ENR 1.4 (Class D)).

Radio requirements (CASR 91 MOS 21.05)

You must maintain two-way communications with the relevant ATC control tower whenever operating in Class D airspace (AIP ENR 1.4) (MOS 21.05). For entry into Class D airspace, establishing two-way communications between the aircraft and ATC constitutes a clearance for you to enter the Class D airspace (AIP ENR 1.1).

Control area protection

For operations within Class C or D airspace, maintaining 500 ft above the lower limit of the CTA steps will provide a vertical buffer with aircraft operating in the adjoining airspace (AIP ENR 1.1).



Operating requirements for transponders

If your aircraft is fitted with a serviceable Mode 3A or Mode S transponder you must always have the transponder on Code 3000 or any assigned discrete code during flight in Class D airspace. If the transponder is Mode C capable, that mode must also be operated continuously (AIP ENR 1.6).

Traffic information in controlled airspace (AIP GEN 3.3)

In controlled airspace, when a separation standard does not exist, ATC will provide traffic information to the aircraft concerned when, in the opinion of the air traffic controller, the information is warranted by the proximity of the aircraft.

The traffic information provided will contain as much information as is known and necessary to assist the pilot in identifying another aircraft, for example:

- type
- altitude
- position, either by:
    - clock reference
    - bearing and distance

  - relation to a geographical point, or
  - reported position and estimate, and
- intentions or direction of flight.

Separation (AIP ENR 1.4)

In Class D airspace

- IFR flights are separated from other IFR and special VFR flights.
- IFR flights receive traffic information in respect of VFR flights.
- VFR flights receive traffic information in respect of all other flights.
- Special VFR flights are separated from other special VFR flights when visibility is less than VMC.

Speed limitations

Aircraft operating in Class D airspace are not to exceed:

- 200 kt at or below 2,500 ft above aerodrome level (AAL) within 4 NM of the primary Class D aerodrome
- 250 kt when operating in other parts of Class D airspace.

Taxiing and manoeuvring

The separation of aircraft taxiing on the manoeuvring area is the joint responsibility of you and the controller. A taxi clearance from ATC is required before operating on the manoeuvring area (taxiways and runways of any controlled aerodrome). When ATC issues a taxi instruction, which includes a holding point, pilots must read back the words 'Holding point [holding point designator]'. Specific clearance is required to taxi, enter, cross or backtrack on a runway.

VFR flights wishing to depart without submitting flight notification must provide the following information on first contact with ATC:

- aircraft callsign and 'DETAILS' and (wait for a response from ATC)
- destination and first tracking point
- preferred level
- identification of ATIS code received.

These details may be given with the request for taxi clearance.

Within a Class D CTR, a clearance to take off is a clearance to operate within the CTR.

Change to tower frequency

Aircraft should change to tower frequency:

- in the holding bay, or
- close to, or at, the holding point of the nominated runway, when ready for take-off.

At Class D aerodromes at which parallel runway operations are in progress, you must identify the departure runway when reporting ready. For example: **‘(Callsign) ready runway right’**.

You must not hold on the runway in use unless ATC has cleared you to do so.

Departure report

At certain Class D aerodromes where the tower also provides a procedural approach control service (see ERSA), you must report on the tower frequency after take-off:

- track information, and
- the last assigned altitude.

However, this report is not required:

- for VFR aircraft departing the control zone directly into Class G airspace, or
- for aircraft that have been instructed to contact Centre, Approach or Departures once airborne—in which case an airborne report will be made on the relevant frequency.

The departure time must be calculated as follows:

- current time minus an adjustment for the distance from the aerodrome, or
- when over or abeam the aerodrome.

En route (AIP ENR 1.1)

All levels flown in Class D airspace must be assigned by ATC, except when identified, position reports are required for all aircraft in Class D airspace.

Lanes of entry (AIP ENR 1.4)

Lanes of entry are established to permit passage to and from specified Class D CTRs without entering an adjacent civil or military control zone. The vertical limits provide separation from overlying control or restricted areas.

When using these lanes, pilots must:

- operate under VFR
- conform with the general flight rules regarding terrain clearance, flight over populous areas, and low-level restricted areas
- operate not higher than the altitude specified as the upper limit in the section being flown
- keep to the right.

Aeronautical ground lights may indicate visual lanes of entry at some Class D aerodromes. If present, these lights are identified on VTCs (AIP ENR 4.5).

Automatic Terminal Information Service (ATIS) (AIP ENR1.1)

If landing or taking off at an aerodrome where ATIS is provided, the pilot should obtain the ATIS before first contact on the tower frequency. On first contact, advise ATIS received, for example: **'Received information echo'**.

ATIS

ATIS frequency or

Terminal information

Runway Wind Crosswind

TEMP/QNH Cloud/VIS

Inbound (AIP ENR 1.1)

Entry

Before entering Class D airspace, you must establish two-way radio communication with the tower on the frequency notified on the chart, in ERSA, or AIP Supplement or NOTAM. Thereafter, you must maintain those communications while in the Class D airspace.

All flights operating in Class E and G airspace requesting a clearance to operate in Class D airspace must advise position, level and tracking details when making first contact with ATC.

In establishing two-way communications, ATC may issue you with specific instructions that differ from the altitude and intentions you have already advised. You must comply with any such instructions issued by ATC.

You may be assigned the responsibility to follow another arriving aircraft which you have reported seeing. When assigned this responsibility, you must maintain separation from and not overtake that aircraft. In this circumstance, you are also responsible for providing your own wake turbulence separation. Advise ATC immediately if you lose sight of the other aircraft.

Initiating two-way communications

In initiating two-way communications, you must advise current position, altitude, intention, and any request(s).

Notes: Radio contact should be initiated far enough from the Class D airspace boundary to preclude entering the Class D airspace before two-way radio communications are established.

If the controller responds to a radio call with, '(Aircraft callsign) [(instructions)]' radio communications have been established and you may enter the Class D airspace.

If workload or traffic conditions prevent immediate entry to Class D airspace, the controller will tell you to remain outside the Class D airspace until conditions permit entry. For example: '(Aircraft callsign) remain outside Class D airspace'.

It is important to understand that if the controller responds to the initial radio call without using the aircraft callsign, radio communications have not been established and you may not enter the Class D airspace. For example, you may receive: 'Aircraft calling Archer tower, standby', or 'Aircraft calling Rocky tower, say again'.

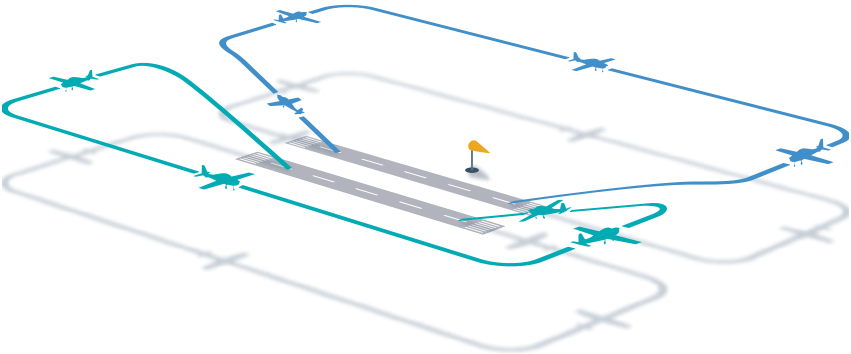
Track deviations

You must not deviate from the track, level and intentions stated during the establishment of two-way communications or the instructions issued by ATC (if these instructions modify the stated track, level and intentions), unless authorised by ATC (AIP ENR 1.1).

Unless ATC specifically instructs otherwise, establishing two-way communications permits you, when intending to land at an aerodrome within Class D airspace, to descend as necessary to join the aerodrome traffic circuit.

Parallel runway operations

Where a Class D aerodrome is equipped with parallel runways, ATC may sequence aircraft for simultaneous contra-circuits and may conduct these operations using separate tower frequencies for each runway. Operations will be regulated independently in each circuit, with an ATC clearance required to enter the opposite circuit or airspace (AIP ENR 1.1).



Clearances

You must not land unless the specific clearance **'Cleared to land'** (or **'Cleared touch and go'** or **'Cleared for the [option]'**) has been received (AIP ENR 1.1).

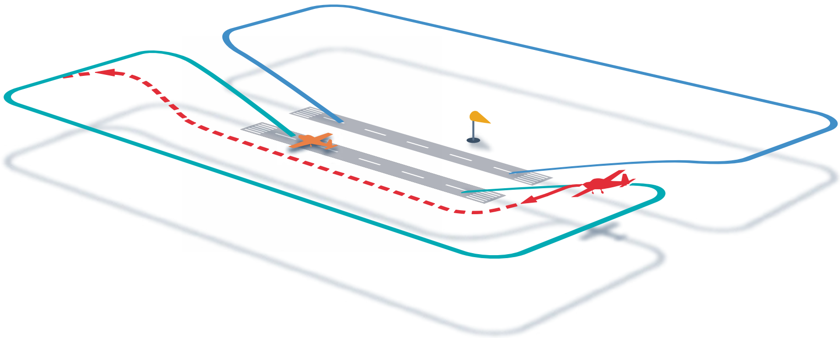
Note: ATC approval must be obtained if asymmetric training is to be carried out within 5 NM of a controlled aerodrome.

Go-around

At Class D aerodromes with parallel runways where contra-circuit operations are in progress, if ATC instructs, or you initiate a go-around, you must (AIP ENR 1.1):

- commence climbing to circuit altitude
- position the aircraft on the active side and parallel to the nominated duty runway, while maintaining separation from other aircraft
- follow ATC instructions or re-enter the circuit from upwind.

Figure: Go-around procedure for parallel runways



After landing

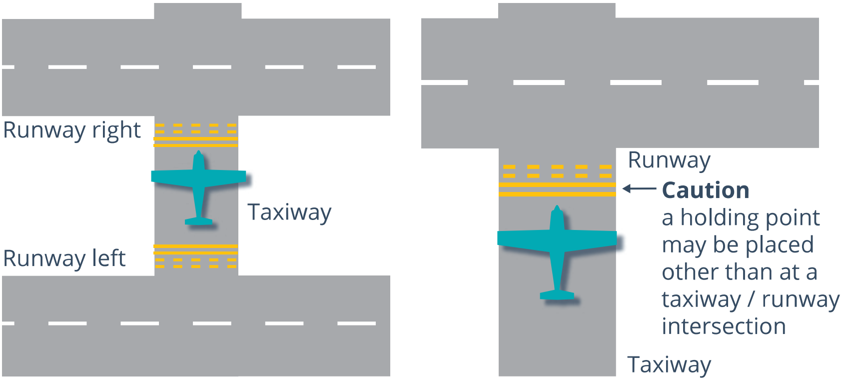
After landing, unless specified otherwise by ATC, you must comply with the following (AIP ENR 1.1):

- promptly vacate the runway without backtracking
- change from the aerodrome frequency to the SMC frequency (where established) when vacating the runway strip, and obtain an ATC taxi instruction
- not cross any runway that intersects the taxi route unless in receipt of a taxi instruction and a 'Cross runway (number)' instruction from ATC
- taxi to the destination via the most direct taxiway(s) available, and
- where an apron service is provided on a discrete frequency (see ERSA), change to that frequency on entering the apron.

A taxi instruction which contains a taxi limit beyond a runway must include a **'Cross runway (number)'** instruction to cross that runway. When an aircraft is required to hold short of a runway intersecting the taxi route, ATC will issue a taxi instruction limit of the holding point associated with the intersecting runway.

An aircraft which has been issued with a taxi instruction limit of the holding point of a runway intersecting the taxi route, or which has been issued with an instruction to **'Hold short'** of that runway, must subsequently be issued with an instruction to **'Cross runway (number)'**.

Figure: Taxiing aircraft holding short



Aircraft required to hold short of a runway must hold at the appropriate holding point for that runway, or the runway strip edge at the intersection of a crossing runway.

When separate frequencies for aerodrome control and surface movement control are in use, on landing, you must change from the aerodrome control frequency to the ground frequency on vacating the runway strip, and then transmit the aircraft callsign and, if applicable, parking bay number. You may **'Request detailed taxi instructions to (location)'**.

Radio watch must be maintained on the SMC or tower frequency (where no SMC frequency is provided) until parked.

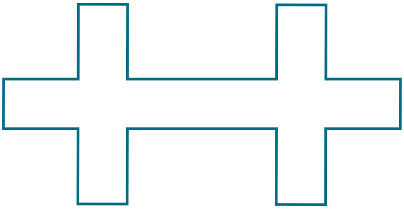
Sport and recreational aviation

Gliding operations (AIP ENR 5.5)

For rules relating to gliding operations refer to CASR Part 103 and the Part 103 MOS.

You should take extra care when operating at an aerodrome where gliding operations are in progress. Gliding operations are indicated by the gliding operations in progress ground signal displayed next to the primary wind direction indicator. You should also establish whether the gliders are being launched by wire or aero-tow, or both.

Figure: Gliding operations in progress ground signal



Where aero-towing is in progress, you should remain well clear of gliders under tow. If wire launching is used, you should establish the locations of either the winch or tow car and the cable and remain well clear. Overflying the preferred runway below 2,000 ft AGL is not advised, nor is landing without first ascertaining that the cable is on the ground and not across the landing path. Aero tow and winch launching are possible up to 4,000 ft AGL but launches to 1,500 ft or 2,000 ft AGL are normal.

In class G airspace gliding operations may be conducted without a radio, on Area very high frequency (VHF) or on frequencies 122.5 MHz, 122.7 MHz or 122.9 MHz, which have been allocated for use by gliders. Radio equipped gliders at non-controlled aerodromes make broadcast when in the vicinity of the aerodrome.

Gliding operations at certified aerodromes

Gliding operations at certified aerodromes may be carried out on:

- a glider runway strip within the runway strip (single runway), using a common circuit direction
- a glider runway strip adjacent to the existing runway strip (dual runways), using a common circuit direction
- a separate glider runway strip parallel to and spaced away from the existing runway strip (parallel runways), using contra-circuit procedures.

Details of the gliding operation are published in the ERSA entry for the aerodrome. When procedures are changed for intensive short-term gliding activity, a NOTAM will be issued.

Where dual or parallel runways are established, the glider runway strip will conform to normal movement area standards but will be marked by conspicuous markers of a colour other than white. Glider runway strips must not be used except by gliders, tug aircraft and other authorised aircraft.

Where a single runway is established and gliders operate within the runway strip, the runway strip markers may be moved outwards to incorporate the glider runway strip. Glider movement and parking areas are established outside the runway strips. When the glider runway strip is occupied by a tug aircraft or glider, the runway is deemed to be occupied. Aircraft using the runway may, however, commence their take-off run from a position ahead of a stationary glider or tug aircraft.

Except for gliders approaching to land, powered aircraft have priority in the use of runways, taxiways and aprons where a single runway or dual runway operation is established.

At the locations where parallel runways exist and contra-circuit procedures apply, operations on the two parallel runways by aircraft below 5,700 kg MTOW may be conducted independently in VMC by day. Aircraft must not operate within the opposing circuit area below 1,500 ft AGL. You should ascertain the runway direction in use as early as possible and conform to that circuit. A crossing runway should only be used when operationally necessary, and traffic using the crossing runway should avoid conflicting with the established circuit, for example, by using a long final, or not turning after take-off until well clear.

At aerodromes without prescribed contra-circuits, gliders must generally conform to the established circuit direction. However, unforeseen circumstances may occasionally compel a glider to execute a non- standard pattern, including use of the opposite circuit direction in extreme cases.

At non-controlled aerodromes a listening watch on the appropriate frequency is maintained during aero-tow launching by the tug pilot, and during wire launching by the winch or tow-vehicle driver. The tug pilot or winch/car driver may be able to advise glider traffic information to inbound or taxiing aircraft.

Where wire launching is used launching will cease, and the wire will be retracted or moved off the strip when another aircraft joins the circuit or taxis, or a radio call is received indicating this. A white strobe light is displayed by a winch, or a yellow rotating beacon by a tow-car or associated vehicle, whenever the cable is deployed.

Parachuting operations

For rules relating to parachuting operations refer to CASR Part 105.

Conflicting traffic

ATC will provide separation between parachuting and non-parachuting aircraft in Class A, C and D airspace, and provide traffic information to pilots of aircraft engaged in parachuting operations on known or observed traffic in Class E and Class G airspace.

Additional requirements in controlled airspace

ATC will base separation on the assumption that the parachutists will be dropped within one nautical mile of the target. If an extension of this area is necessary, the pilot must advise ATC of the direction and distance required.

Additional requirements for operations above 10,000 ft AMSL

Pilots should refer to sections 26.43 to 26.47 of the Part 91 MOS for the requirements relating to oxygen.

Ballooning

Types of operation

Manned hot air balloons (Part 131 aircraft) are permitted to operate in sport and recreational activities, commercial balloon flying training activities, balloon transport operations and specialised balloon operations. Balloon transport operations that carry paying passengers and commercial balloon flying training activities are conducted under an air operator's certificate (AOC). A specialised balloon operation may be commercial or non-commercial and must be operated under a CASR 131.035 approval. Sport and recreational balloon activities and private pilot balloon permits (PP(B)P) are administered and issued by CASA.

The rules that apply to Part 131 aircraft are set out in CASR Part 91 and Part 131 regulations and the MOS. Not all the Part 91 regulations are applicable to Part 131 aircraft, some because they are not relevant and some because Part 131 contains an equivalent rule.

Hot air balloons are by far the most common type of Part 131 aircraft flown in Australia, but hot air airships have occasionally made an appearance in Australian skies.

See the CASR Part 131 Guide for balloons and hot air airships plain English guide for further information.
www.casa.gov.au/guide-balloons-and-hot-air-airships.

pxhere.com

Operations in controlled airspace and in the vicinity of non-controlled aerodromes

A balloon pilot who holds a Commercial Pilot (Balloon) Licence (CP(B)L), a Civil Aviation Regulations 1988 (CAR) Part 5 certificate of validation, or a suitably endorsed PPC may operate:

- in controlled airspace subject to ATC clearance
- below 2,000 ft AGL within 3 NM of a non-controlled aerodrome.

The pilot of a balloon which is taking off within 3 NM of a non-controlled aerodrome must give way to aircraft which are landing or on final approach to land, by delaying their take-off or, if airborne, by climbing or descending to remain clear of the other aircraft's flight path.

Despite the general aircraft give-way rules, the pilot of a balloon must also give way to other traffic operating in the traffic pattern of the aerodrome when operating within 3 NM of the aerodrome.

Carriage and use of radio

Pilots of balloons who have been permitted to operate in controlled airspace and below 2,000 ft AGL within 3 NM of a non-controlled aerodrome must carry and use VHF radio for communication, as necessary, with other aircraft and with ATS.

Where several balloons are permitted to operate together in the vicinity of a CTA/CTR of a controlled aerodrome, one balloon in each group could be permitted by ATC to maintain radio communication and surveillance responsibility for the group.

All pilots of balloons must carry radio and use it in accordance with the procedures described in the AIP and the Part 131 MOS while they are operating:

- within the vicinity of a non-controlled aerodrome where carriage of a radio and its use are required
- at or above 5,000 ft above mean sea level
- within 10 NM of an aerodrome with a published instrument approach procedure, or
- at night.

Minimum height rules

Balloons may take-off from, and land at, adequate open spaces within populous areas. The minimum overflight height for a balloon over a populous area is 1,000 ft AGL unless taking off , landing or if necessary to navigate to a planned landing area.

Outside of a populous area balloon pilots do not need to maintain a minimum height AGL. However, this does not absolve pilots from any responsibility not to cause a hazard to landholders, stock, persons or property. Local balloon operators may maintain a register of sensitive areas where landholders have requested that pilots either do not land, or alternatively, observe a minimum overfly height.

Meteorological conditions for balloons

Part 131 aircraft must operate under VFR and the VMC criteria.

Night VFR

Checklist

To fly in command

1 In the last 6 months:

Completed one take-off and landing?

No ▶ **Do one take-off and landing dual**

CASR 61.965

Yes ▼

2 In the last 24 months:

Completed a flight review, test or proficiency check for a Night Visual Flight Rules (NVFR) rating or endorsement?

No ▶ **This must be completed**

CASR 61.970

Yes ▼

3 In the last 90 days, to carry passsengers:

(a) Completed three take-offs and landings dual or solo; or

(b) Completed a flight test or a relevant check, review for a NVFR rating, endorsement, or a flight including night operations as appropriate?

No ▶ **Complete (a) or (b)**

CASR 61.395

Yes ▼

LSALT

4 Published LSALT?

Yes ▼

No ▶ **Calculate LSALT by:**

(a) 10 NM either side of track

(b) Inaccurate navigation or NAVAID failure ±5 NM radius plus ±20% air distance travelled from last fix

(c) From AID ±10.3° to a max of 50 NM either side of track plus ±5 NM

(d) Dead Reckoning (DR): ±15° to a max of 50 NM either side of track plus ±5 NM

AIP GEN 3.3

Weather and NOTAMs

5 Pilot briefing from NAIPS obtained?

No ▶ **Obtain**

Yes ▼

6 GAR indicates:

Cloud > SCT below LSALT plus 1,000 ft?

Yes ▶ **Don't fly**

Due to inability to maintain VMC

No ▼

Note: methods of determining cloud amounts (AIP ENR 1.1)

Go to 7

7 TAF indicating the presence, PROB30 or PROB40 of:

(a) Cloud > SCT below 1,500 ft
(b) Visibility < 8 km
(c) Crosswind > max for aircraft?

Yes ▶ Plan for alternate

AIP ENR 1.1

No ▼

8 NAVAID:

Aerodrome served by NAVAID + aircraft equipped with NAVAID?

No ▶ Plan for alternate

Within 1 hr that has NAVAID

Yes ▼

9 Lighting:

(a) Pilot Activated Lighting (PAL) system + standby power supply + responsible person
(b) Portable with responsible person?

No ▶ Plan for alternate

Alternates with PAL do not need a responsible person if dual VHF equipped or 1 x VHF + HF + 30 min holding

Yes ▼

Aircraft equipment

10 Aircraft instruments:

(a) Airspeed indicator
(b) Altimeter
(c) Compass
(d) Clock
(e) AI
(f) DG
(g) Turn and slip
(h) Suction gauge
(i) VSI

No ▶ Don't fly

Yes ▼

11 Aircraft lighting:

(a) Instrument lights with variable illumination
(b) One landing light for private, two landing lights for commercial

No ▶ Don't fly

Yes ▼

12 Aircraft radio equipment:

(a) 1 x VHF radio
(b) 1 x NAVAID (NDB, VOR or certified GNSS)
(c) SSR transponder if operating in CTA/RADAR?

No ▶ Don't fly

Yes ▼

13 SARTIME or Flight note:

Submitted 30 mins before EOBT if travelling:
(a) Further than 120 NM
(b) Through a designated remote area or
(c) Over water

No ▶ Submit one

Yes ▶ Enjoy your flight

General flight operations

VFR flights at night (CASR 91.277) (MOS12.03)

You must not fly VFR at night along a route or route segment below:

- any published LSALT for the route or route segment
- any minimum sector altitude published in the AIP
- the LSALT for the route
- the lowest altitude for the route calculated in accordance with the method prescribed in MOS 12.03 (currently RESERVED)
- 1,000 ft above the highest obstacle on the ground or water within 10 NM ahead of, and to either side of, the aircraft at that point on the route or route segment.

Exception: *You are permitted to fly below the minimum height when:*

- *taking off or landing*
- *within 3 NM of the aerodrome when taking off or landing*
- *flying in accordance with an air traffic control clearance.*

Specific requirements are prescribed for operations under Part 121 (121.780); Part 131 (131.315); Part 133 (133.167; Part 135 (135.235) and Part 138 (138.275).

Training operations at night – aeroplane and rotorcraft

Refer to Chapter 1 – Training flight limitations regarding in-flight:

- engine shutdown
- simulated engine failure
- simulated failure of flight instruments
- simulated IMC.

For multi-engine aircraft, simulating engine failures in IMC or at night, the circling area is either:

- a prescribed IFR circling area for the aerodrome associated with an authorised instrument approach procedure, or
- if there is no prescribed IFR circling area of this kind for the aerodrome, an area within 3 NM of the aerodrome reference point, but only for an aeroplane with MTOW less than or equal to 5,700 kg.

Note: The information provided by spot heights on instrument approach and landing (IAL) charts must be treated with caution, as they do not necessarily indicate the highest terrain or all obstacles in the circling area. Pilots of flights involving simulated engine failures should risk-assess their intended flight path options against the aircraft performance capability in this situation.

Rating and endorsements

Authorisation of a night VFR rating (CASR 61.955 and 61.375)

The holder of a pilot licence and a night VFR rating is authorised to pilot an aircraft at night under the VFR, except if the operation is one of the following, for which an additional rating is required (see CASR Subpart 61.P and Subpart 61.Q):

- an operation using a night vision imaging system, or
- a night aerial application operation below 500 ft AGL.

The grant of a night VFR rating (CASR 61.975)

An applicant for a night VFR rating must:

- hold a private pilot licence, commercial pilot licence or air transport pilot licence
- meet the requirements for the grant of at least one endorsement listed in the table below
- have at least 10 hours of aeronautical experience at night in an aircraft or an approved flight simulation training device for the purpose, including at least five hours of dual cross-country flight time at night under VFR in an aircraft
- have passed the flight test mentioned in CASR 61 MOS for the night VFR rating.

The grant of a night VFR endorsement (CASR 61.990)

An applicant for an endorsement shown in the following table must hold a night VFR rating and have:

- completed flight training for the endorsement
- met the aeronautical experience requirements in the following table
- passed the flight test mentioned in Part 61 MOS for the endorsement.

Table: Night VFR endorsements

	Endorsement	Activities authorised	Requirements
1	Single-engine aeroplane night VFR endorsement	Pilot an aeroplane of the single-engine aeroplane class at night under the VFR	At least five hours of aeronautical experience at night as pilot of an aeroplane (or an approved flight simulation training device for the purpose), including at least one hour of dual flight and one hour of solo night circuits At least three hours of dual instrument time
2	Multi-engine aeroplane night VFR endorsement	Pilot an aeroplane at night under the VFR	At least five hours of aeronautical experience at night as pilot of a multi-engine aeroplane (or an approved flight simulation training device for the purpose), including at least one hour of dual flight and one hour of solo night circuits At least three hours of dual instrument time
3	Helicopter night VFR endorsement	Pilot a helicopter at night under the VFR	At least 10 hours of aeronautical experience at night as pilot of a helicopter (or an approved flight simulation training device for the purpose), including at least three hours of dual flight and one hour of solo night circuits At least three hours of dual instrument time in a helicopter (or approved flight simulation training device for the purpose)
4	Powered lift aircraft night VFR endorsement	Pilot a powered lift aircraft at night under the VFR	At least five hours of aeronautical experience at night as pilot of a helicopter or powered lift aircraft (or an approved flight simulation training device for the purpose), including at least three hours of dual flight and one hour of solo night circuits At least three hours of dual instrument time

	Endorsement	Activities authorised	Requirements
5	Gyroplane night VFR endorsement	Pilot a gyroplane at night under the VFR	At least five hours of aeronautical experience at night as pilot of a helicopter (or gyroplane or an approved flight simulation training device for the purpose), including at least three hours of dual flight and one hour of solo night circuits At least three hours of dual instrument time
6	Airship night VFR endorsement	Pilot an airship at night under the VFR	At least five hours of aeronautical experience at night as pilot of an airship (or an approved flight simulation training device for the purpose), including at least three hours of dual flight and one hour of solo night circuits

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Recent experience requirement

For night VFR flight (CASR 61.965)

The holder of a night VFR rating is authorised to exercise the privileges of the rating in an aircraft of a particular category only if the holder has, within the previous six months:

- carried out the following in an aircraft of that category while controlling the aircraft:
  - at least one night take-off, and
  - at least one night landing, or
- been assessed as competent to fly at night in an aircraft of that category by a flight instructor who holds a night VFR training endorsement.

To carry passengers at night (CASR 61.395)

The holder of a pilot licence is authorised to pilot, during take-off or landing, an aircraft of a particular category carrying a passenger at night only if the holder has, within the previous 90 days, in an aircraft of that category (or an approved flight simulator for the purpose), carried out, at night, while controlling the aircraft or flight simulator:

- at least three take-offs, and
- at least three landings.

However, the holder is taken to meet the requirement above if:

- within the previous 90 days, in an aircraft of that category or an approved flight simulator for the purpose, the holder has achieved the following where at least one take-off, and at least one landing at night was included:
  - successfully completed a relevant check or review, or
  - passed a flight test for a pilot licence or a rating on a pilot licence.

Note: A 'relevant check or review' includes either:

- an instrument proficiency check; a night vision imaging system proficiency check; an instructor proficiency check; an operator proficiency check or
- a flight review.

Flight review (CASR 61.970)

The flight review requirements in the paragraph below are applicable to either one of the following categories of aircraft, as appropriate:

- aeroplane
- helicopter
- powered-lift aircraft
- gyroplane, or
- airship.

The holder of a night VFR rating is authorised to pilot an aircraft other than a multi-engine aeroplane at night under VFR only if, within the previous 24 months, the holder:

- has successfully completed a flight review for the rating in an aircraft of the same category (or an approved flight simulator) for the flight review
- has passed a flight test for the rating in an aircraft of the same category (or an approved flight simulator) for the flight test
- has passed a flight test for the grant of a night VFR endorsement in an aircraft of the same category (or an approved flight simulator) for the flight test, but more than six months after passing the flight test for the rating
- has successfully completed an operator proficiency check that covers night VFR operations in an aircraft of the same category, or
- has successfully participated in an operator's approved cyclic training and proficiency program that covers night VFR operations in an aircraft of the same category.

The holder of a night VFR rating is authorised to pilot an aircraft that is a multi-engine aeroplane only if the relevant events mentioned in the paragraph above are completed, passed, or participated in, using a multi-engine aeroplane.

Aircraft equipment for night VFR

Radio communication systems (CASR 91.400 & 91.635 MOS 21.07)

Class	Night VFR
Airspace	Classes A, C, D, E, G
Communication requirements	VHF
Remarks	VHF communications systems must be capable of communication on all VHF frequencies required by 91.400, 91.635 and 91 MOS 21.04 21.07 and 26.18. **Note:** these requirements can also be found in AIP ENR 1.1

Radio navigation systems (CASR 91MOS 26.07 & 26.11)

Type of operation	Night VFR
System number	1
System type	Automatic direction finder (ADF), VOR or GNSS
Conditions	In this table GNSS refers to equipment certified to (E) technical standing order (TSO)- C129 (E) TSO- C145, (E) TSO- C146, (E) TSO- C196a, as determined by CASA.

Equipment listed in this section is for a Part 91 flight. Pilots operating under CASR Part 135 Air transport or CASR Part 138 Aerial work should consult the applicable MOS, and the company exposition or operations manual for additional requirements that may apply.

Cockpit and cabin lighting requirement (CASR 91 MOS 26.21)

Night

An aircraft flying at night must be fitted with, or carry:

- a cockpit lighting system that:
    - illuminates each item of equipment including checklists and flight documents a flight crew member (FCM) may use
    - is compatible with each item of equipment a pilot may use
    - is arranged in a way that each pilot from their normal sitting position can read all placards and instrument markings and their eyes are shielded from direct and reflected light
    - is adjustable, so that the intensity of the lighting for the light conditions can be varied
- a cabin lighting system that enables each occupant of the aircraft to see and use:
    - their seatbelt and oxygen facilities (if any)
    - the normal and emergency exit
- for each FCM, an independent portable light accessible to the FCM from their normal sitting position
- for each other crew member (if any), an independent portable light accessible to the crew member at their crew station.

Day

Cockpit lighting and cabin lighting is also required if, by day, natural light does not adequately illuminate the items of equipment and documents mentioned above.

An independent portable light is most commonly a flashlight or torch which is serviceable and can produce sufficient light to properly illuminate any switch control or display that the pilot may be required to use or view in normal abnormal and emergency situations.

Landing lights (CASR 91 MOS 26.23)

An aircraft operating by night must be fitted with at least 1 landing light.

Note: for operations under other CASR Parts there may be further requirements.

See Chapter 1 for requirements for anti-collision lights.

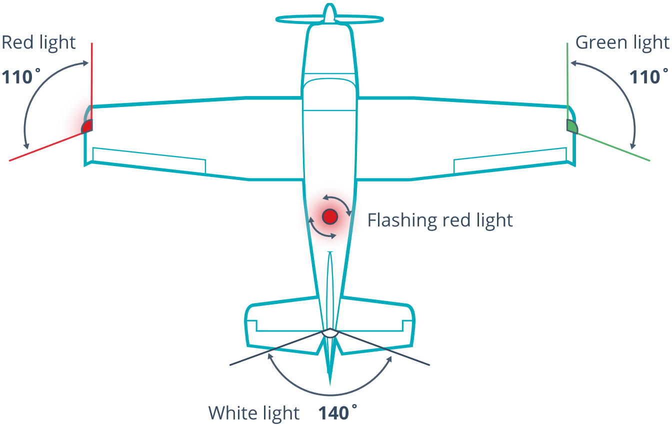
Navigation lights (CASR 91 MOS 26.24)

An aircraft operating by night or in poor visibility must be fitted with navigation lights.

Navigation lights, where required to be fitted, must be displayed on the aerodrome movement area.

Exception: *Navigation lights do not need to be displayed if permitted by another MOS provision such as section 12.09 of the Part 138 MOS: Display of exterior lighting in an NVIS operation that is an aerial work operation. See also section 3.08 of the Part 91 MOS.*

Figure: Aircraft navigation lights



Aeroplane instruments (CASR 91 MOS 26.07)

An aeroplane for VFR flight at night must be fitted with:

- an approved GNSS, or
- automatic direction finding (ADF) equipment or VOR.

If an approved GNSS has automatic barometric aiding options as specified in the standards below, they must be connected:

- (E)TSO-C129a
- (E)TSO-C145a
- (E)TSO-C146a
- (E)TSO-C196a.

An aeroplane flying under night VFR must have equipment for measuring and displaying the flight information, as shown in the following Table.

For light sport aircraft see CASR 91 MOS 26.13; for experimental aircraft see MOS 26.14; for certain registered aircraft see MOS 26.16.

Table: Requirements for equipment – aeroplane VFR flight by night

Flight information	Requirements
Indicated airspeed	The equipment must be capable of being connected to: › an alternate source of static pressure that: » a pilot can select » includes a selector that can open or block the aeroplane's static source and alternative static source simultaneously, or › a balanced pair of flush static ports.
Mach number	Only for an aeroplane with operating limitations expressed as a Mach number
Pressure altitude	The equipment must: › have an adjustable datum scale calibrated in millibars or hPa, and › be calibrated in ft except » if a flight is conducted in a foreign country which measures FLs or altitudes in metres, it must be calibrated in metres or fitted with a conversion placard or device › be capable of being connected to an alternate source of static pressure that a pilot can select, or » a balanced pair of flush static ports.

Flight information	Requirements
Magnetic heading	› a direct reading magnetic compass, or › both a remote indicating compass and a standby direct reading magnetic compass
Time	The equipment must display accurate time in hours, minutes and seconds, and be either: › fitted to the aircraft, or › worn by, or immediately accessible to, the pilot for the duration of the flight.
Turn and slip	The equipment must display turn-and-slip information, except when a second independent source of attitude information is available, in which case only the display of slip information is required.
Attitude	No additional requirements
Vertical speed	The equipment must be capable of being connected to: › an alternate source of static pressure that a pilot can select, or › a balanced pair of flush static ports.
Stabilised heading	The equipment must indicate whether the power supply to the gyroscopic instruments is working satisfactorily. **Note:** A gyro-magnetic type of remote indicating compass meets this requirement if it has a primary and an alternate power supply.
Outside air temperature	No additional requirements

Note: For gyroscopic instruments (if any), equipment that indicates whether the power supply is adequate must be fitted.

Equipment listed in this section is for a Part 91 flight. Pilots operating under CASR Part 135 Air transport or CASR Part 138 Aerial work should consult the applicable MOS, and the company exposition or operations manual for additional requirements that may apply.

Emergency equipment (CASR 91 MOS 26.03)

Emergency equipment that is required, to be fitted to, or carried on, an aircraft must be easily accessible for immediate use in the event of an emergency. (MOS 26.03).

Lowest safe altitude

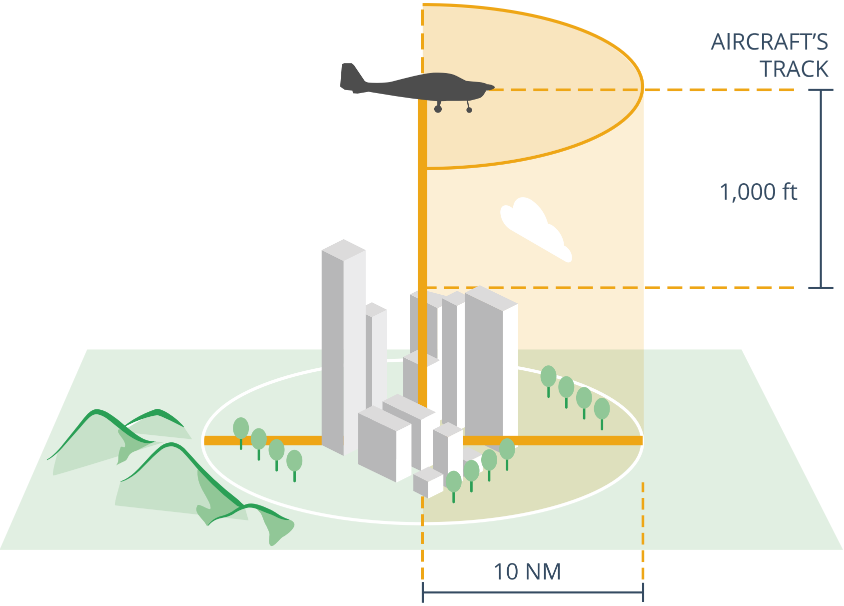
Operational requirements (CASR 91.277) (MOS 12.03)

You must not fly VFR at night along a route or route segment below one of the following:

- any published LSALT for the route or route segment
- any minimum sector altitude published in the AIP
- any calculated LSALT for the route or the route segment prescribed in the MOS (Note: MOS 12.03 is RESERVED)
- 1,000 ft above the highest obstacle on the ground or water within 10 NM ahead of, and to either side of, the aircraft at that point on the route or route segment

***Exception:** You are permitted to fly below the minimum height when:*

- *taking off or landing*
- *within 3 NM of the aerodrome when taking off or landing*
- *flying in accordance with an air traffic control clearance.*



Lowest safe altitude (LSALT) published on aeronautical charts (AIP GEN 3.3)

Grid LSALTs have been determined for en route charts (ERCs) and terminal area charts (TACs). On ERC-H (high), the grid for each LSALT is a square with the dimensions of four degrees of latitude by four degrees of longitude. On ERC-L (low) and TAC, the grid squares comprise one degree of latitude by one degree of longitude. The grid LSALT is normally displayed in the centre of the grid square.

If you use grid LSALT for obstacle clearance you are responsible for determining the allowance for navigation error that should be applied, considering the limitations of the navigation aids or method of navigation being used for position fixing. This navigation error allowance must be applied to the proposed track. The highest grid LSALT falling within the area covered by the determined navigation error must be used.

LSALT details for RNAV routes are shown in each grid square formed by the parallels and meridians.

On IFR charts, some LSALTs on one-way air routes have an associated direction arrow. This arrow indicates that the LSALT is only applicable in the direction of the one-way route, and an LSALT has not been calculated for the opposite direction.

An LSALT without a direction arrow on any air route indicates that the LSALT is the same in both directions. However, one-way routes should only be flown, in controlled airspace, in the direction indicated by the route designator box.

On ERCs, the LSALT figure is always attached adjacent to the distance 'bubble' of the route to which the LSALT applies. In areas of chart clutter, these LSALT figures may sometimes cross adjacent route tracks.

LSALT not published on aeronautical charts (AIP GEN 3.3)

The LSALT specified for a route segment is that for IFR procedures. Where an NDB or VOR mark the segment, the tolerances applicable to the NDB are used. Unreported obstacles up to 360 ft may exist in navigation tolerance areas. Unpublished LSALTs must be calculated using the following method:

- where the highest obstacle is more than 360 ft above the height determined for terrain, the LSALT must be 1,000 ft above the highest obstacle or
- where the highest obstacle is less than 360 ft above the terrain, or there is no charted obstacle, the LSALT must be 1,360 ft above the elevation determined for terrain, except
- where the elevation of the highest terrain or obstacle in the tolerance area is not above 500 ft, the LSALT must not be less than 1,500 ft.

If the navigation of the aircraft is inaccurate, or the aircraft is deliberately flown off track, or whenever there is failure of any radio navigation aid normally available, the pilot in command must ensure that the aircraft is flown not lower than 1,000 ft above the highest terrain or obstacle within a circle, centred on the DR position, with a radius of 5 NM plus 20% of the air distance flown from the last positive fix.

For routes defined by radio navigation aids or to be navigated by DR:

- the area to be considered must be within an area of 5 NM surrounding and including an area defined by lines drawn from the departure point or en route radio aid, 10.3 degrees each side of the nominated track (where the track `guidance is provided by a radio navigation aid), or
- 15 degrees each side of the nominal track (where no track guidance is provided) to a limit of 50 NM each side of the track, and thence paralleling track to abeam the destination and then converging by a semicircle of 50 NM radius centred on the destination.

On shorter routes, where these lines are displaced by less than 50 NM abeam the destination, they shall converge by a radius based on the lesser distance. Where the lines thus drawn at any time come within the coverage of an en route or destination radio aid the aircraft is equipped to use, they will converge by straight lines to that aid. The minimum angle of convergence which must be used in this case is 10.3 degrees each side of track (AIP GEN 3.3).

Rated coverage (AIP GEN 1.5)

The following ranges are quoted for planning purposes:

- using an NDB - see ERSA FAC (aerodromes) for information about the availability of NDB facilities and their rated coverage
- using a VOR and/or DME:

Aircraft altitude	Range
Below 5,000 ft	60 NM
5,000 ft to below 10,000 ft	90 NM
10,000 ft to below 15,000 ft	120 NM
15,000 ft to below 20,000 ft	150 NM
20,000 ft and above	180 NM

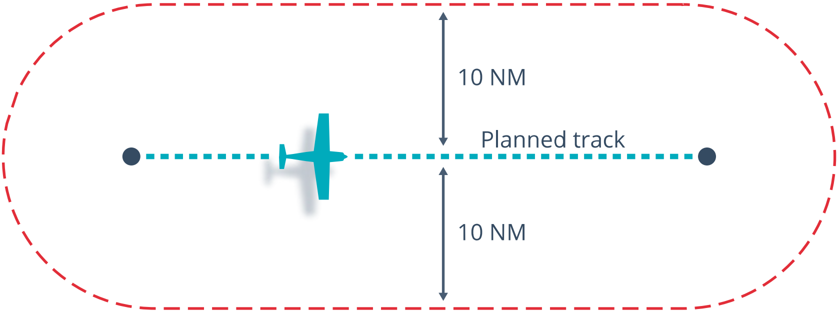
- using a localiser

Aircraft altitude	Range
At 2,000 ft AGL within ±10° of course line	25 NM
Below 5,000 ft	30 NM
5,000 ft and above	50 NM

Note: The localiser ranges are for installations that have been nominated for position fixing at ranges beyond 25 NM.

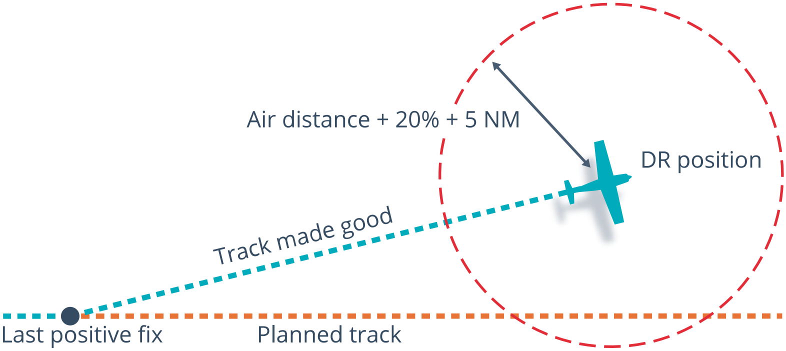
Note: Actual ranges obtained may be less than these due to facility and site variations – see ERSA FAC for individual stations.

Area to be considered for LSALT calculation

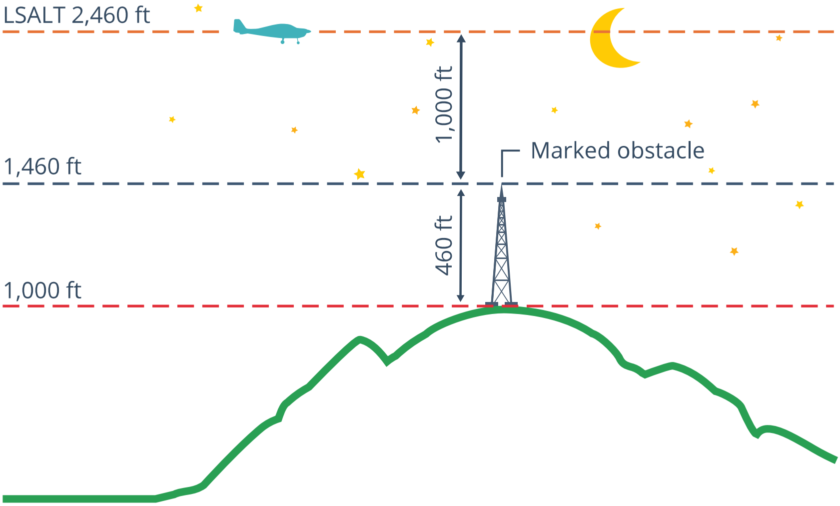


Note: refer to AIP Gen 3.3-7 for routes being operated to required navigation performance (RNP) 2 or other area navigation specifications.

Area to be considered for off-track LSALT calculation

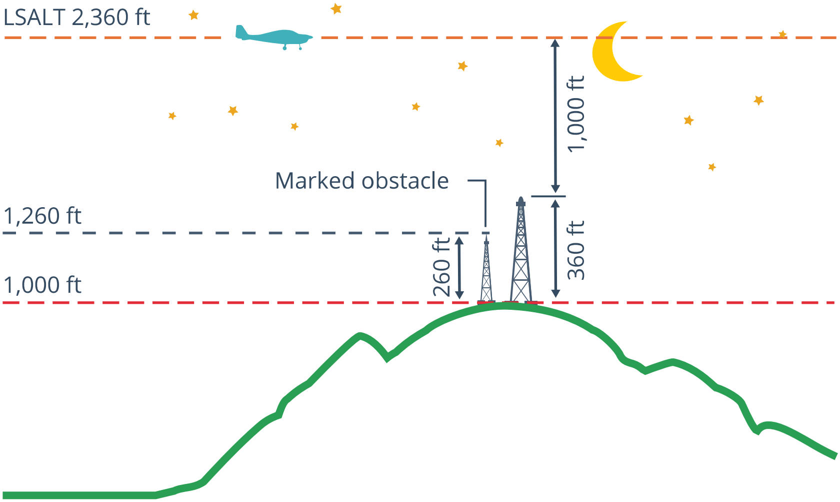


How to calculate LSALT at night



460 ft + 1,000 ft = 1460 ft + 1,000 ft = LSALT 2,460 ft

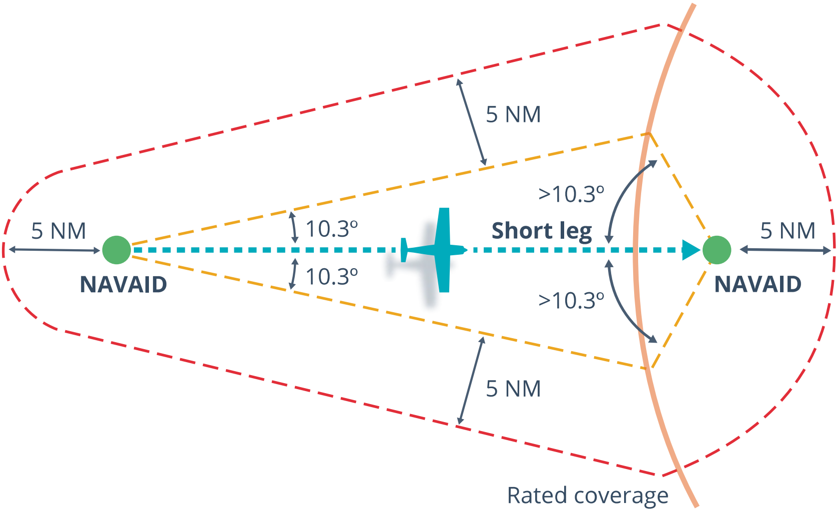
How to calculate LSALT at night – with additional unmarked obstacle



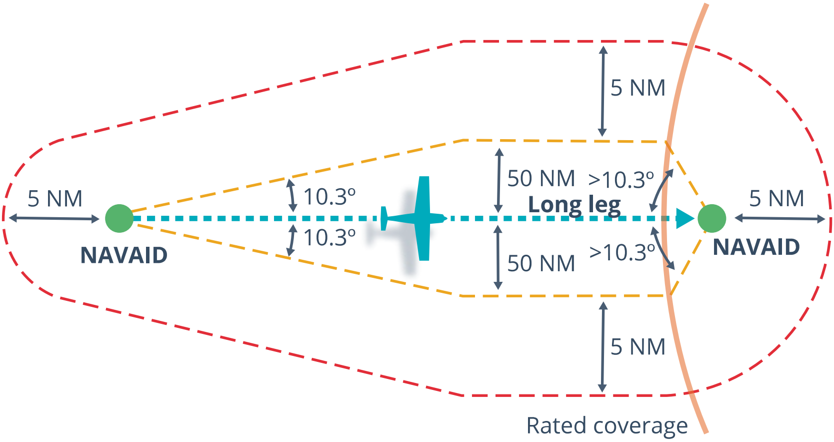
Assuming an obstacle is 360 ft beside marked obstacle

360 ft + 1,000 ft = 1,360 ft + 1,000 ft = LSALT 2,360 ft

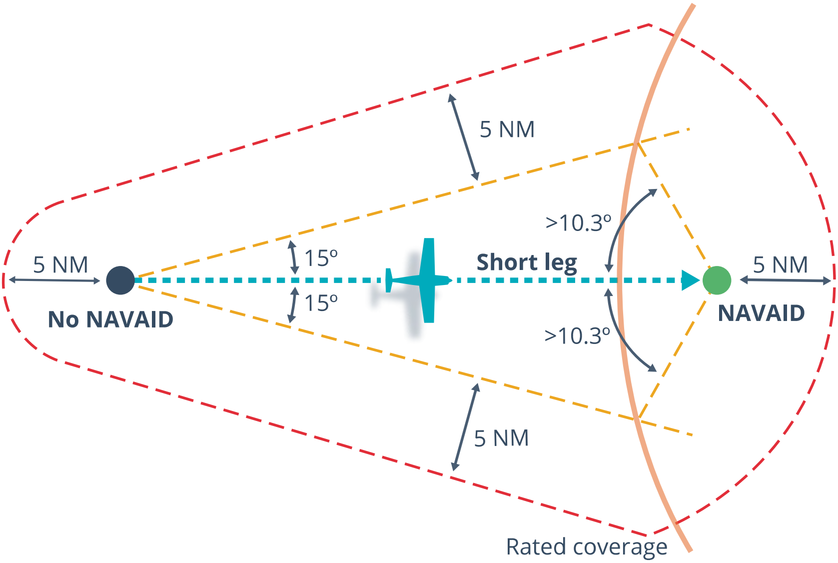
How to calculate LSALT with short leg between NAVAID and NAVAID



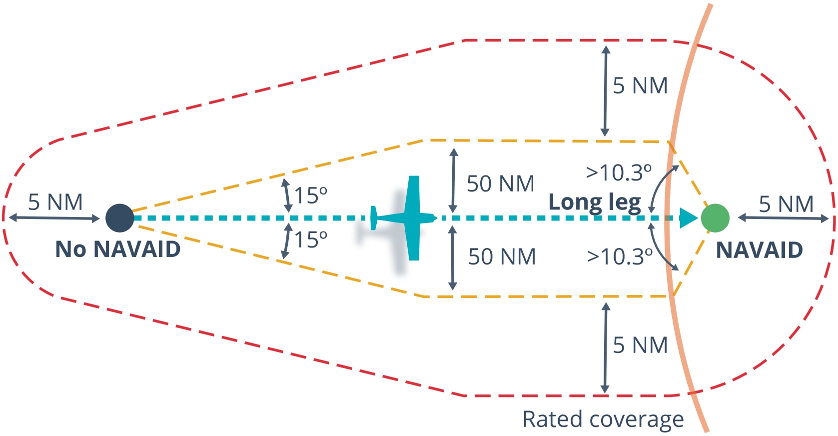
How to calculate LSALT with long leg between NAVAID and NAVAID



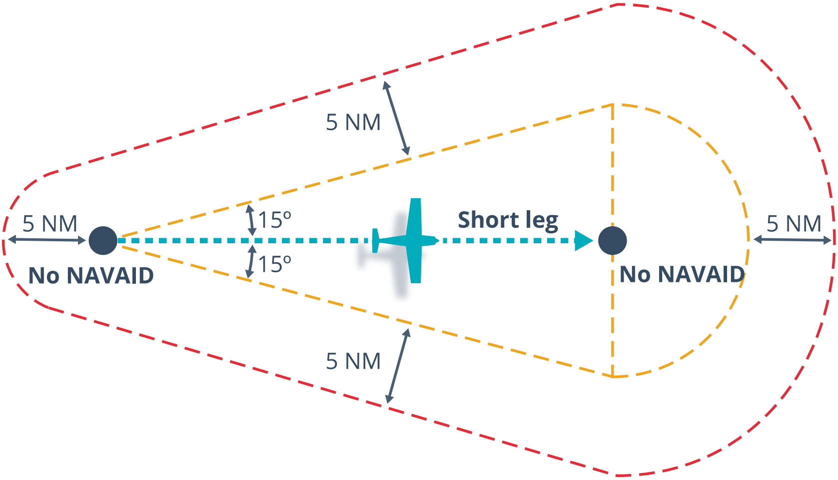
How to calculate LSALT with short leg between No NAVAID and NAVAID



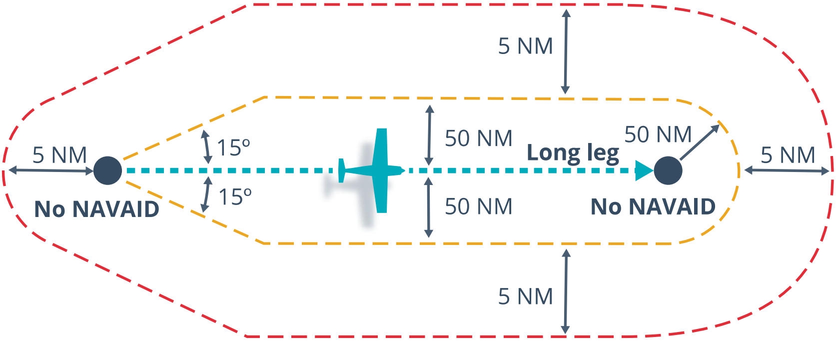
How to calculate LSALT with long leg between No NAVAID and NAVAID



How to calculate LSALT with short leg between No NAVAID and No NAVAID



How to calculate LSALT with long leg between No NAVAID and No NAVAID



Alternate aerodromes

General (CASR 91 MOS 8.07)

You must make provision for flight to an alternate aerodrome in accordance with the following paragraphs.

When a flight is required to provide for an alternate aerodrome, any aerodrome may be so nominated for that flight provided that:

- it is suitable as a destination for that flight
- it is not an aerodrome for which an alternate would also be required
- it is not a helideck.

Weather (CASR 91 MOS 8.04)

You must provide for a suitable alternate aerodrome when arrival at the destination will be during the currency of, or up to, 30 minutes before the forecast commencement of meteorological conditions falling below VFR alternate minima:

- For aeroplanes by day or night, or for helicopters by night only:
  - cloud base ceiling of 1,500 ft AGL
  - visibility of 8 km.

When an aerodrome forecast is not available, then you must make provision for a suitable alternate that has an available forecast.

Radio navigation aids (CASR 91 MOS 8.05)

For a VFR flight by night, you must nominate a destination alternate aerodrome that is within one hour’s flight time of the planned destination aerodrome unless:

- the destination is served by a ground-based radio navigation aid and the appropriate radio navigation system is fitted to the aircraft and you are competent to use the aid, or
- the aircraft is fitted with an approved GNSS, and you are competent to use the GNSS.

If aircraft navigation is to be conducted using a GNSS certified only to TSO C-129, navigation to a destination alternate aerodrome must be planned to use a navigation system other than GNSS.

Destination alternate aerodromes – aerodrome lighting (CASR 91 MOS 8.06)

For this section, a qualified and responsible person means a person who is instructed in, and is competent to display, the standard runway lighting with portable lights.

If a flight is planned to land at night at an aerodrome that only has portable runway lighting, you must nominate a destination alternate aerodrome unless:

- reliable arrangements have been made for a qualified and responsible person to:
  - attend the aerodrome during the period from at least 30 minutes before the ETA to completion of landing and taxiing, and
  - display the portable lighting.

If a flight is planned to land at night at an aerodrome with electric runway lighting, but without standby power, you must nominate a destination alternate aerodrome unless:

- portable runway lights are available, and
- reliable arrangements have been made for a qualified and responsible person to:
  - attend the aerodrome during the period from at least 30 minutes before the ETA to completion of landing and taxiing, and
  - display the portable lighting.

Runway lighting (CASR 91 MOS 8.06)

Portable lighting

When a flight is planned to land at night at an aerodrome where the runway lighting is portable, an alternate is required unless arrangements are made for a qualified and responsible person to be in attendance during the arrival and departure times as specified in aerodrome lighting – times of activation, to ensure that the runway lights are switched on.

Standby power

When a flight is planned to land at night at an aerodrome with electric runway lighting, whether pilot activated or otherwise, but without standby power, an alternate is required unless portable runway lights are available and arrangements have been made for a qualified and responsible person to be in attendance during the arrival and departure times specified in aerodrome lighting – times of activation, to display the portable lights in the event of a failure of the primary lighting.

This alternate need not have standby power or standby portable runway lighting.

Pilot activated lighting (PAL)

When a flight is planned to land at night at an aerodrome with PAL and standby power, an alternate is required unless a qualified and responsible person is in attendance to switch on the aerodrome lighting manually.

This alternate need not have standby power or standby portable runway lighting. However, the alternate must meet the following conditions.

Requirements for alternate aerodrome when using PAL

An aerodrome may be nominated as an alternate provided that, if the aircraft is fitted with a single VHF communication, the alternate aerodrome must be one which is:

- served by a lighting system which is not pilot activated, or
- served by PAL, with a qualified and responsible person in attendance to manually switch on the aerodrome lighting.

Where the alternate aerodrome is served by PAL, there is no need for a responsible person on the ground to be in attendance, but the aircraft must be equipped with:

- HF radio and carry 30 minutes holding fuel to allow for the alerting of ground staff in the event of a failure of the aircraft's VHF communication.

Aerodrome lighting – times of activation (CASR 91 MOS 8.06)

If a flight is planned to land at night at an aerodrome that only has portable runway lighting, you must nominate a destination alternate aerodrome unless:

- reliable arrangements have been made for a qualified and responsible person to:
  - attend the aerodrome during the period from at least 30 minutes before the ETA, to completion of landing and taxiing, and
  - display the portable lighting.

Qualified and responsible person (CASR 91 MOS 8.06)

A responsible person referred to above in relation to portable lights, means a person who is instructed in, and is competent to display, runway lighting with portable lights.

Lighting alternate not required (first light provision)

(CASR 91 MOS 8.06)

The alternate requirements above need not be applied if the aircraft carries holding fuel for first light plus 10 minutes at the destination.

Controlled aerodrome lighting (AIP ENR 1.1)

Aerodrome lighting at an aerodrome where a control tower is operating will be activated by ATC as necessary. If you require aerodrome lighting outside the control tower's published hours you should use PAL, if available, or make appropriate arrangements with ATC. If ATC has already ceased duty, requests should be directed to the local aerodrome operator. Confirmation should be obtained that requests for lighting will be satisfied.

If you have made arrangements with ATC for night lighting you must notify any change in requirements.

Non-controlled aerodrome lighting (AIP ENR 1.1)

Aerodrome lighting at non-controlled aerodromes should be arranged directly with the aerodrome operator, or by using PAL facilities, if available.

ERSA identifies locations where selected runway lighting is routinely left switched on during the hours of darkness.

A comprehensive advisory circular (AC 61-05) on Night VFR rating can be viewed at **casa.gov.au/download/night-vfr-rating**

Chris Leipelt | unsplash.com

Air defence identification zone (ADIZ)

Air defence identification zone flights (CASR 91.263)

If you fly an aircraft in an air defence identification zone (ADIZ) you must comply with the procedures in the AIP for that zone.

Exception: *For a Part 131 aircraft, if you enter an ADIZ and you are unable to comply with the ADIZ procedures, no offence is committed if you land as soon as practicable and inform the controlling authority.*

Procedures for aircraft operating in an air defence identification zone (AIP ENR 1.12)

The following general rules and procedures apply to enable identification of air traffic entering any designated air defence identification zone under Australian control.

An ADIZ is airspace of defined dimensions within which identification of all aircraft is required. When you are intending to operate within an ADIZ, you must:

- lodge a flight notification covering flight within the ADIZ with the appropriate ATS unit at least 60 minutes before entry into the ADIZ
- report the position to ATS when passing each position reporting point within the ADIZ
- report the position to ATS at the ADIZ boundary with a geographical reference (for example: 15 NM east of (location)) or, if the departure point is within 100 NM of the ADIZ boundary, report departure
- report departure if departing from a point in the ADIZ
- maintain a continuous listening watch on the communications frequency of the appropriate ATS unit or on another frequency as directed until the flight is through the ADIZ
- not deliberately deviate from tracks and altitudes filed in the flight plan unless prior ATC clearance is obtained, or, outside controlled airspace, notification is given to the appropriate ATS unit
- activate the aircraft transponder when within 100 NM of the ADIZ and when operating within the ADIZ.

The following flights over Australia and its territorial waters are exempt from compliance with the requirements above:

- a flight originating within an ADIZ which maintains a steady outbound track
- a flight which remains within 10 NM of the point of departure
- aircraft performing published approach, holding or recovery procedures
- a flight conducted in accordance with special procedures arranged with the Regional Air Defence Commander.

Where flight plans have to be lodged, they must include details of:

- tracks and altitudes to be flown while operating in the ADIZ
- estimated elapsed times for each route segment in the ADIZ, including the segment in which the ADIZ boundary is crossed
- position reporting points, departure and landing points
- estimated time at the commencing point of the first route segment.

Reporting points published in aeronautical charts must be used in addition to those required by the Regional Air Defence Commander.

Pilots must immediately notify ATS of any deviation from flight plan beyond the following tolerances:

ATS notification for flight plan deviations	
Estimated time of commencing the ADIZ route segments	± 5 minutes
Over land area	±10 NM from track
Over oceanic areas	± 20 NM from track

Note: The five-minute limit will be used in considering an appropriate response, but you must report predicted deviations of greater than two minutes.

In the event of failure of two-way radio communication, you must proceed in accordance with the normal radio failure procedures.

Special requirements

Special requirements may be published relative to a particular ADIZ. Flights will not be exempted from the special requirements unless so specified.

Non-compliance

Significant deviations from the requirements for flight in an ADIZ must be reported immediately to ATS, and details and reasons for the deviation must be reported at the first point of landing, for transmission to the Regional Air Defence Commander.

Diversion of aircraft for defence operations

The regional Air Defence Commander may, through ATS, direct the flight of aircraft in the interests of national security. Messages initiating such requirements will be prefaced by **'military operations require...'**

Interception of civil aircraft

The following procedures and visual signals apply over the territory and the territorial waters of Australia in the event of interception of an aircraft.

Action by intercepted aircraft

An aircraft which is intercepted by another aircraft must immediately:

- follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals in accordance with the visual signals below
- notify, if possible, the appropriate ATS unit
- attempt to establish radio communication with the intercepting aircraft, or with the appropriate intercept control unit, by making a general call on the emergency VHF frequency 121.5 MHz and repeating this call on the emergency UHF frequency 243.0 MHz, if practicable, giving the identity and position of the aircraft and nature of the flight
- if equipped with SSR transponder, select code 7700, unless otherwise instructed by the appropriate ATS unit
- if equipped with ADS-B or automatic dependent surveillance-contract (ADS-C), select the appropriate emergency functionality, if available, unless otherwise instructed by the appropriate ATS unit.

If any instructions by radio from any sources conflict with those given by the intercepting aircraft by visual or radio signals, the intercepted aircraft must request immediate clarification while continuing to comply with instructions given by the intercepting aircraft.

Visual signals for use in the event of interception

Series	Intercepting aircraft signals	Meaning	Intercepted aircraft response	Meaning
Initiated by intercepting aircraft				
1	**Day or night** – Rocking aircraft and flashing navigational lights at irregular intervals (and landing lights in the case of a helicopter) from a position slightly above and ahead of, and normally to the left of, the intercepted aircraft (or to the right if the intercepted aircraft is a helicopter) and, after acknowledgement, a slow level turn, normally to the left (or to the right in the case of a helicopter) on the desired heading (see notes below)	You have been intercepted, follow me	**Day or night** – Rocking aircraft, flashing navigational lights at irregular intervals and following.	Understood, will comply
2	**Day or night** – An abrupt breakaway manoeuvre from the intercepted aircraft consisting of a climbing turn of 90° or more without crossing the line of flight of the intercepted aircraft.	You may proceed	**Day or night** – Rocking the aircraft.	Understood, will comply
3	**Day or night** – Lowering landing gear (if fitted), showing steady landing lights and overflying runway in use (or, if the intercepted aircraft is a helicopter, overflying the helicopter landing area). In the case of helicopters, the intercepting helicopter makes a landing approach, coming to hover near to the landing area.	Land at this aerodrome	**Day or night** – Lowering landing gear (if fitted), showing steady landing lights and following the intercepting aircraft and, if after overflying the runway in use or helicopter landing area landing is considered safe, proceeding to land.	Understood, will comply

Series	Intercepting aircraft signals	Meaning	Intercepted aircraft response	Meaning
4	**Day or night** – Raising landing gear (if fitted) and flashing landing lights while passing over runway in use or helicopter landing area at a height exceeding 300 m (1,000 ft) but not exceeding 600 m (2,000 ft)(or, in the case of a helicopter,at a height exceeding 50 m (170 ft) but not exceeding 100 m (330 ft)) above the aerodrome level and continuing to circle runway in use or helicopter landing area. If unable to flash landing lights, flash any other lights available.	The aerodrome you have designated is inadequate	**Day or night** – If it is desired that the intercepted aircraft follow the intercepting aircraft to an alternate aerodrome, the intercepting aircraft raises its landing gear (if fitted) and uses the Series 1 signals prescribed for intercepting aircraft.	Understood, follow me
			If it is decided to release the intercepted aircraft, the intercepting aircraft uses the Series 2 signals prescribed for intercepting aircraft.	Understood, you may proceed
5	**Day or night** – Regular switching on and off of all available lights but in such a manner as to be distinct from flashing lights.	Cannot comply	**Day or night** – Use Series 2 signals prescribed for intercepting aircraft.	Understood
6	**Day or night** – Irregular flashing of all available lights.	In distress	**Day or night** – Use Series 2 signals prescribed for intercepting aircraft.	Understood

Notes:

1. Meteorological conditions or terrain may require the intercepting aircraft to reverse the positions and direction of turn given above in Series 1.
2. If the intercepted aircraft is not able to keep pace with the intercepting aircraft, the latter is expected to fly a series of race-track patterns and to rock the aircraft each time it passes the intercepted aircraft.

Radio communications during interception

If radio contact is established during interception but communication in common language is not possible, attempts must be made to convey instruction, acknowledgement of instructions and essential information by using the following phrases and pronunciations and transmitting each phrase twice.

Phrases to be used by INTERCEPTED aircraft

Phrase	Pronunciation	Meaning
Callsign[1]	KOL SA-in (callsign)[1]	My callsign is (callsign)
Wilco	VILL-CO	Understood will comply
Can not	KANN -NOTT	Unable to comply
Repeat	REE -PEET	Repeat your instruction
Am lost	AM LOSST	Position unknown
Mayday	MAYDAY	I am in distress
Hijack	HI -JACK	I have been hijacked. Circumstances may not always permit, nor may it be desirable to use the phrase HIJACK
Land (place name)	LAAND	I request to land at (place name)
Descend	DEE-SEND	I require descent

Phrases to be used by INTERCEPTING aircraft

Phrase	Pronunciation	Meaning
Callsign	**KOL** SA-IN	What is your callsign
Follow	**FOL**-LO	Follow me
Descend	DEE-**SEND**	Descend for landing
You land	YOU LAAND	Land at this aerodrome
Proceed	PRO-**SEED**	You may proceed

[1] The callsign required to be given is that used in radiotelephony communications with ATS units and corresponding to the aircraft identification in the flight notification.

CHAPTER 4

FLYING YOUR HELICOPTER

Requirements

General competency and recent experience

General competency requirement (CASR 61.385)

You are only authorised to exercise the privileges of your licence for a class or type rating for the aircraft, including any operational rating or endorsement, if you are competent in operating it to the standards mentioned in the CASR Part 61 MOS, in all of the following areas:

- operating the aircraft's navigation and operating systems
- conducting all normal, abnormal and emergency flight procedures for the aircraft
- applying operating limitations
- weight and balance requirements
- applying aircraft performance data, including take-off and landing performance data, for the aircraft.

You may only operate an airborne collision avoidance system if you are competent in its use to the standards mentioned in the CASR Part 61 MOS.

Flight reviews (CASR 61.400)

Similar to aeroplanes, you must undertake a flight review every 2 years to continue to exercise the privileges of your licence. Please refer to Part 61 and related exemption for more details.

Carrying passengers and recency (CASR 61.395)

Similar to aeroplanes, you must undertake 3 take-offs and landings within 90 days, to carry passengers. See **Chapter 1** for information regarding carrying of passengers under a Private Pilot Licence (PPL).

Equipment

Equipment listed in this section is limited to the requirements of a Part 91 flight. Pilots operating under CASR Part 133 Air transport and CASR Part 138 should consult the relevant MOS associated to that Part, including the company exposition or operations manual for additional requirements that may apply.

Equipment for day visual flight rules (VFR) flights

(CASR 91 MOS 26.10)

A helicopter flying under day VFR must be fitted with equipment for measuring and displaying the flight information as shown in the following Table.

Table: Requirements for equipment – helicopter VFR flight by day

Flight information	Requirements
Indicated airspeed	No additional requirements.
Pressure altitude	The equipment must: › have an adjustable datum scale calibrated in millibars or hPa, and › be calibrated in ft except that if a flight is conducted in a foreign country which measures flight levels (FLs), or altitudes in metres – must be calibrated in metres or fitted with a conversion placard or device.
Magnetic heading	› a direct reading magnetic compass, or › both a remote indicating compass and a standby direct reading magnetic compass.
Time	The equipment must display accurate time in hours, minutes and seconds, and be either: › fitted to the aircraft, or › worn by, or immediately accessible to, the pilot for the duration of the flight.
Slip	Only for an aerial work operation.
Outside air temperature	Only for aerial work operations from an aerodrome at which ambient temperature is not available from ground-based instruments.

For light sport aircraft see CASR 91 MOS 26.13; for experimental aircraft see MOS 26.15; for certain registered aircraft see MOS 26.16.

The equipment required in the previous table, for light sport or experimental aircraft, can be substituted for equipment which will provide the pilot with the same flight and navigation information. For certain Australian registered aircraft equipment, standards under CASR Part 21 do not apply, where CASA has considered the views of equivalence of the type certifying authority of a recognised country, if the aircraft is fitted with equipment, that provides an equivalent level of safety (see CASR 91 MOS 26.13, MOS 26.15 and MOS 26.16).

Equipment for night VFR flights (CASR 91 MOS 26.11)

A helicopter flying under night VFR must have equipment fitted for measuring and displaying the flight information as shown in the Table below.

A helicopter for a VFR flight at night must also be fitted with:

- an approved global navigation satellite system (GNSS), or
- an automatic direction finder (ADF) or a VHF omni-directional radio range (VOR).

If an approved GNSS has automatic barometric aiding options as specified in the standards below, they must be connected:

- (E)TSO-C129a
- (E)TSO-C145a
- (E)TSO-C146a
- (E)TSO-C196a.

If you are a single pilot, flying a helicopter VFR by night over land or water you must be able to:

- maintain attitude by using visual external cues from lights on the ground, celestial illumination or by lighting fitted to the helicopter, or
- the helicopter must be fitted with an automatic pilot system or an automatic stabilisation system.

Table: Requirements for equipment – helicopter VFR flight by night

Flight information	Requirements
Indicated airspeed	No additional requirements
Pressure altitude	The equipment must: › have an adjustable datum scale calibrated in millibars or hPa, and › be calibrated in ft except that if a flight is conducted in a foreign country which measures FLs or altitudes in metres – must be calibrated in metres or fitted with a conversion placard or device.
Magnetic heading	The equipment must be either a: › a direct reading magnetic compass, or › both a remote indicating compass and a standby direct reading magnetic compass.
Time	The equipment must display accurate time in hours, minutes and seconds, and be either: › fitted to the aircraft, or › worn by, or immediately accessible to, the pilot for the duration of the flight.
Slip	No additional requirements
Attitude	The equipment must have a primary power supply and an alternate power supply.

Flight information	Requirements
Stand-by attitude or turn indicator	Not required for agricultural operations. The equipment power supply must be independent of the power source for the attitude information.
Vertical speed	If the helicopter operates onto vessels or platforms at sea by night, the equipment must: › be an instantaneous vertical speed indicator (IVSI), or › meet performance requirements for acceleration sensitivity equivalent to an IVSI.
Stabilised heading	Not required for agricultural operations. **Note:** A gyro-magnetic type of remote indicating compass meets this requirement if it has a primary power supply and an alternate power supply.
Outside air temperature	No additional requirements.

Note: For gyroscopic instruments (if any), equipment that indicates whether the power supply is adequate must be fitted.

The equipment required in the table above, for light sport, experimental, or certain Australian registered aircraft, can be substituted by equipment which will provide the pilot with the same flight and navigation information (see CASR 91 MOS 26.13, MOS 26.15 and MOS 26.16).

Hot fuelling (CASR 91.495 , 91.500, 91.505, 91.510, 91.515)

'Hot fuelling' means the fuelling of an aircraft with its engine or engines running.

For flights under the Part 91 rules, hot fuelling is limited to turbine engine aircraft.

Hot fuelling is generally associated with a commercial operation and requires compliance with an operation's manual and an aircraft flight manual (AFM). Refer to **Part 91 PEG** for further information. For aerial work operations see CASR Part 138, the MOS and associated guidance material.

Special VFR (CASR 91 MOS 2.01)

By day, when visual meteorological conditions (VMC) do not exist, at your request, air traffic control (ATC) may issue you a 'special VFR clearance' in a control area (CTA) or next to the control zone (CTR) for the purpose of entering or leaving the CTR, provided that:

- the special VFR flight will not unduly delay an instrument flight rules (IFR) flight
- the flight can be conducted clear of cloud
- the visibility is not less than 800 m (for helicopters)
- a helicopter is operated at such a speed that the pilot has adequate opportunity to observe any obstructions or other traffic in sufficient time to avoid collisions.

Upon your request, special VFR is often available at ATC discretion, when you are departing or arriving at a controlled zone into or from class G airspace when you can meet the VMC criteria for helicopters that applies in class G airspace.

Alternate landing sites (CASR 91 MOS 8.08)

For general information regarding alternate requirements for VFR flights day or night, see **Chapter 2**.

When operating a helicopter under VFR you must provide for a suitable alternate aerodrome when either of the following weather conditions is forecast at the destination:

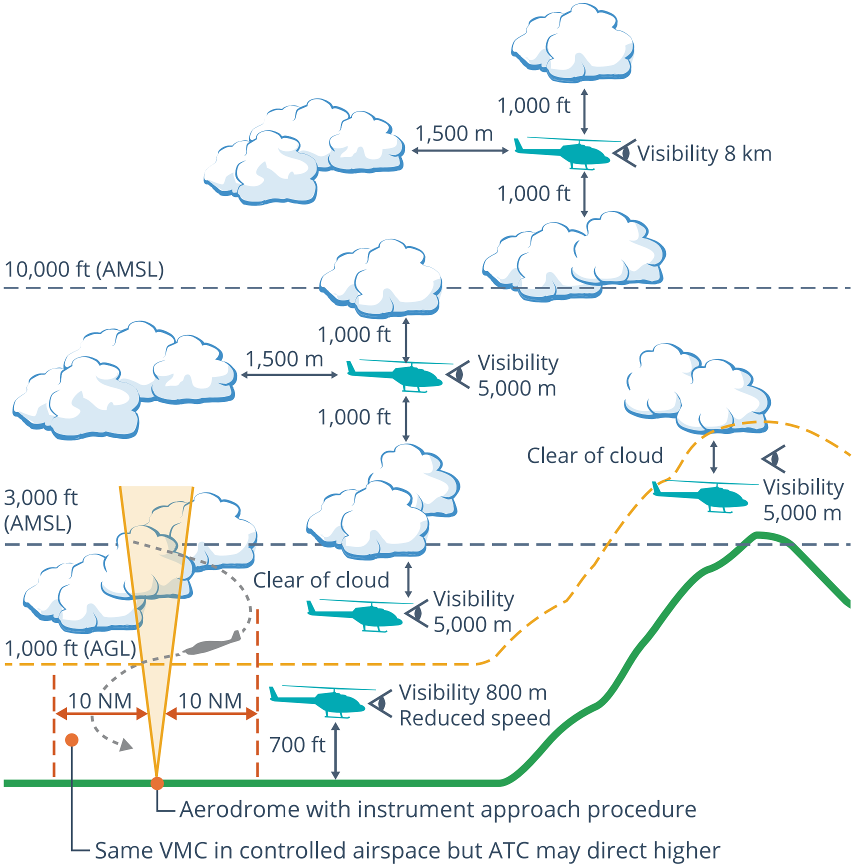
- By night:
  - cloud–more than scattered (SCT) below a ceiling of 1,500 ft or
  - visibility – less than 8 km.
- By day:
  - the same as night (above) unless you are in Class G airspace and you are meeting the helicopter VMC requirements for Class G airspace (below), then you can use the following meteorological conditions:
    - cloud–more than SCT below a ceiling of 1,000 ft, or
    - visibility – less than 3,000 m.

Procedures

Visual meteorological conditions

Figure: VMC criteria for helicopter – Class A, C, E and G

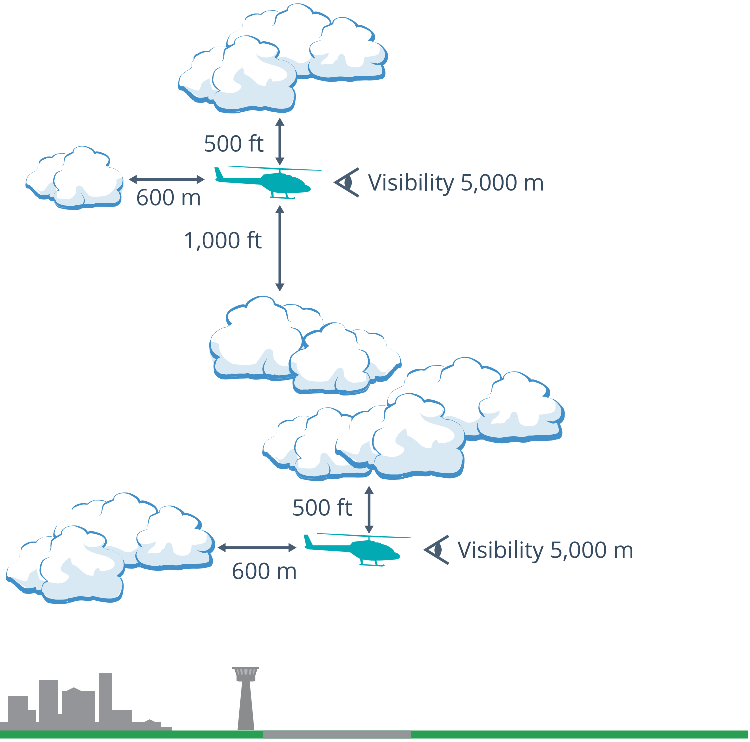
VMC criteria means, the meteorological conditions expressed in terms of flight visibility and the horizontal and vertical distance from cloud. See the following Figures for the application of VMC criteria in various airspace classifications.



Same VMC in controlled airspace but ATC may direct higher conditions, or permit VFR flight in lower conditions.

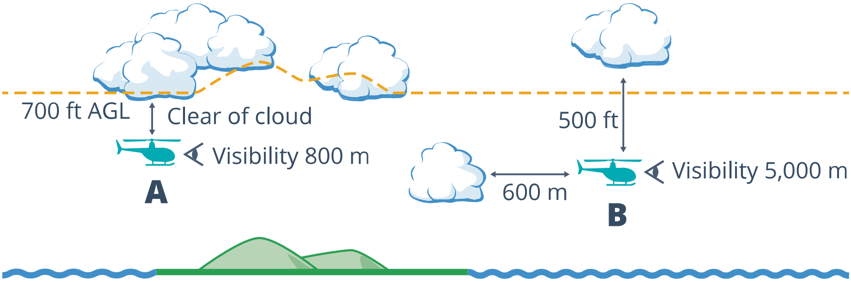
Aircraft may take off or land if flight at the minimum altitude permissible on the proposed flight path can be made in VMC.

Figure: VMC criteria all helicopters for Class D controlled airspace



Class of airspace	Height	Flight visibility	Distance from cloud	Operational requirements
D	All heights	5,000 m (5 km)	600 m horizontal 1,000 ft vertical above cloud 500 ft vertical below cloud	

Figure: VMC criteria for helicopter in Class G non-controlled airspace (MOS Table 2.07)



A. Overland with/without track guidance or overwater with track guidance from navigation system.

B. Overwater without track guidance from navigation system.

Class of airspace	Height	Flight visibility	Distance from cloud	Operational requirements
G	**Helicopter A** Below 700 ft over land Below 700 ft over water with track guidance from navigation system	800 m	Clear of cloud	Applicable only if the helicopter is operated: › by day › at a speed that allows the pilot to see obstructions or other traffic in sufficient time to avoid collision, and › if within 10 NM of an aerodrome with an instrument approach, in a way that ensures the flight maintains separation of at least 500 ft vertically from any IFR aircraft that is also within 10 NM of the aerodrome.
	Helicopter B Below 700 ft over water without track guidance from navigation system	5,000 (5 km)	600 m horizontal and 500 ft vertical	

Aerodromes

The procedures in this section apply to all helicopters operating in the vicinity of aerodromes and in helicopter access corridors and lanes.

Use of aerodromes (CASR 91.410)

You may only take off or land if you can do so safely considering all the circumstances, including the prevailing weather conditions, at one of the following places:

- a certified aerodrome
- a military aerodrome
- a place suitable to take off or land from.

Before operating to, from or at a military aerodrome the operator must obtain permission from the relevant military authority.

The operator and pilot must comply with any conditions of the permission that are not contrary to the civil aviation legislation.

When operating at a joint military/civilian aerodrome, the operator and pilot, must each comply with the AAI, unless those requirements are contrary to the civil aviation legislation.

Safety when operating helicopter on ground (CASR 91.430)

For other than maintenance or maintenance training, only a qualified pilot may operate a helicopter on the ground.

The MOS may prescribe another person who may also operate a helicopter on the ground for other than maintenance or maintenance training provided they secure the helicopter from moving.

***Exception:** For foreign registered aircraft refer CASA EX67/24.*

Taxiing (AIP ENR1.1)

You should make the maximum use of 'air transit' procedures to expedite traffic movement and flow at an aerodrome. You can use air taxiing procedures as required. However, for wheeled helicopters, where practicable, you are encouraged to ground taxi on prepared surfaces to minimise rotor wash and its effects.

At night you should taxi via routes which meet the physical dimensions and lighting requirements specified in Advisory Circular (AC) 139.R-01.

Take-off/departure (AIP ENR 1.1)

Take-off/departure – controlled aerodrome

At locations within controlled airspace, a helicopter may be granted a take-off clearance or instructed to report airborne, from any area nominated by ATC or yourself, if you have assessed the area as being suitable as a helicopter landing site (HLS).

When taking off or departing you must proceed in accordance with ATC instructions.

Subject to clearance, a turn after take-off may be commenced when you consider that the helicopter is at a safe height to do so.

Unless you have made a request, a take-off clearance will not be issued for a helicopter if the tailwind component exceeds 5 kt.

Prescribed exit 'gates' and associated standard routes and/or altitudes may be provided to facilitate the flow of helicopter traffic. Procedures for their use will be promulgated in En Route Supplement Australia (ERSA). Use of these gates is not mandatory. Helicopters may, subject to an ATC clearance, revert to the standard traffic procedures applicable to aeroplanes. This option may be more appropriate when operating larger helicopters.

At night a helicopter should not take-off from other than a site which conforms with the requirements specified in AC 139.R-01.

Take-off/departure – non-controlled aerodromes

At a non-controlled aerodrome, you may take off from any area which is assessed as being suitable as a HLS.

When you elect to conduct the take-off from outside the flight strip of the runway in use by aeroplanes, the helicopter take-off path must be outside that flight strip.

Before take-off, you are to position the helicopter to the left or right side of the runway in use as appropriate so that the turn after take-off does not cross the extended centre line of that runway. The pre-take-off positioning of the helicopter can be by air transit or taxiing as appropriate.

The turn after take-off onto the desired departure track may be commenced when you consider that the helicopter is at a safe height to do so. If the resultant departure track conflicts with the aeroplane traffic pattern, you should remain at 500 ft above the surface until clear of that circuit pattern. Where this procedure is not practicable on environmental grounds, you are to adopt the standard departure procedure applicable to aeroplanes.

If your helicopter is radio-equipped, you must broadcast your intentions on the appropriate frequency before take-off.

Helicopter access corridors and lanes (AIP ENR 1.1)

When you are flying within promulgated helicopter access corridors and lanes the following procedures apply:

- The maximum indicated air speed (IAS) is 120 kt.
- You must operate under VFR, usually not below 500 ft above the surface by day, subject to flight over populous area restrictions and the limitations published in ERSA for authorised corridors by night.
- 'See-and-avoid' procedures must be used.
- Formation flights are restricted to line astern with the lead aircraft responsible for maintaining separation from other traffic as per the see-and-avoid procedures.
- A traffic advisory service is available in access corridors.
- An air traffic service (ATS) Surveillance System advisory service may be given at designated aerodromes.
- A continuous listening watch on the appropriate ATS frequency in access corridors or broadcast frequency in lanes is mandatory.
- Two-way operations are conducted with all traffic keeping to the right of the central geographical/topographical feature(s) as detailed in ERSA.
- The pilot in command has the responsibility to ensure that operations are confined within the boundaries of the corridor or lane.
- The limits of corridors and lanes must be adhered to, with any transitional altitude requirements maintained within an accuracy of ±100 ft.
- A helicopter not confining its operations to an access corridor will require ATC clearance and, while outside the corridor, will be subject to separation standards as applied by ATC.

Note: Subject to environmental noise considerations, the imposition of limitations on helicopters which exceed the noise limits specified in International Civil Aviation Organization (ICAO) Annex 16 Vol 1 may be necessary.

Arrivals (AIP ENR 1.1)

Arrivals – controlled aerodromes

At a controlled aerodrome, prescribed entry gates and associated standard routes and/or altitudes may be provided to facilitate the flow of helicopter traffic. Procedures for their use will be publicised in ERSA. Use of these gates is not mandatory. Subject to the receipt of an ATC clearance, helicopters may, if required, conform to the standard traffic procedures applicable to aeroplanes. This option may be more appropriate when operating larger helicopters.

At locations within controlled airspace, helicopters may be granted a landing clearance or be instructed to report on the ground, as appropriate, at any area nominated by ATC or yourself, if you have assessed the area as being suitable as a HLS.

Unless you have requested one, a landing clearance will not be issued for a helicopter if the tailwind component exceeds 5 kt.

At night you should not land at a site other than one which conforms with the requirements specified in the latest issue of AC 139.R-01.

Arrivals – non-controlled aerodromes

At a non-controlled aerodrome in VMC by day, at your discretion, you do not need to join the circuit via standard aeroplane entry procedures.

As an alternative, you may join the circuit area at 500 ft above the surface from any direction, subject to the normal restrictions of flight over populous areas. You must avoid other circuit traffic and descend to land at any location, once you have assessed the area as being suitable for use as a HLS, provided:

- the intended landing point is located outside the flight strip of the runway in use
- the final approach is clear of the extended centreline of the runway in use
- post-landing positioning of the helicopter is by air transit or by taxiing as appropriate.

If your helicopter is radio-equipped, you must broadcast your intentions on the appropriate frequency as specified in AIP ENR 1.1.

Circuit procedures (AIP ENR 1.1)

At controlled aerodromes any specific operating procedures applicable to the helicopter traffic pattern will be detailed in ERSA.

Either of the following generally applies:

- Where possible, helicopter circuit traffic will be separated from the aeroplane traffic pattern using contra-direction circuits, outside and parallel to the flight strip of the runway in use, and at a lower altitude than other traffic, but not below 500 ft above the aerodrome elevation, or
- When separate circuit patterns are not practicable, helicopters may use the same traffic pattern direction as other traffic and will normally operate inside and at a lower altitude than that traffic, but not below 500 ft above the aerodrome elevation.

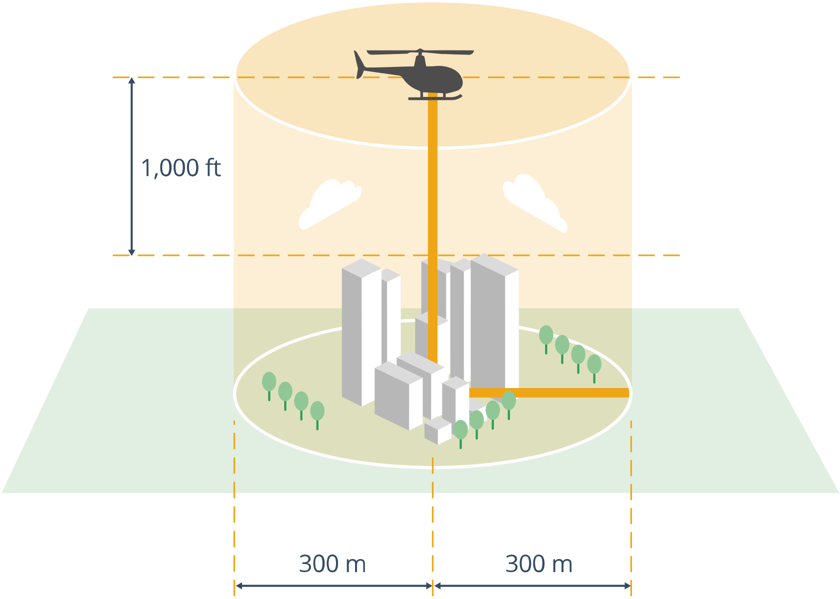
At non-controlled aerodromes the following circuit operating procedures apply:

- Helicopters may be operated in contra-direction circuits and parallel to the aeroplane traffic pattern at a lower altitude than that traffic, but not below 500 ft above the aerodrome elevation. The landing site associated with the helicopter circuit is to be positioned outside the flight strip of the runway in use so that helicopter circuit traffic does not cross the extended centre line of that runway.
- If the procedure outlined in the paragraph above is not practicable:
  - the helicopter circuit pattern should be flown inside and parallel to the aeroplane traffic, and at a lower altitude, but not below 500 ft above the aerodrome elevation. The landing site associated with the helicopter circuit must be positioned outside the flight strip of the runway in use so that helicopter circuit traffic does not cross the extended centre line of that runway, or
  - the helicopter must follow the standard aeroplane traffic pattern and, in this case, may use the flight strip area of the runway in use, and
- The pilots of radio-equipped helicopters must broadcast their intentions and listen out for other traffic on the appropriate frequency.

Minimum height (CASR 91.265) (MOS 12.12)

You must not fly a helicopter over a populous area or public gathering below 1,000 ft above the highest feature or obstacle within a horizontal radius of 300 m of the point on the ground or water immediately below the helicopter.

Figure: Minimum height populous areas and public gatherings for helicopter



Exception: *This rule does not apply in the following circumstances:*

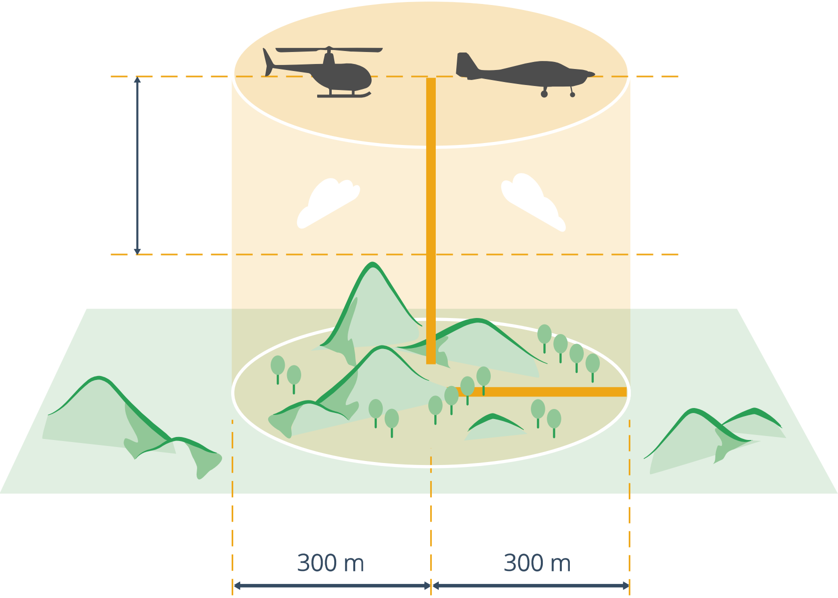
- *taking off or landing:*
    - *for take-off – when the point of lift off and climb to the planned cruising level is in accordance with the normal procedures for the aircraft type*
    - *for landing – when the landing is conducted in a continuous descent from the cruising level or circuit height to the landing threshold using rates of descent and flight manoeuvres which are normal for the aircraft type*
- *engaging in a missed approach*
- *practising emergency procedures at an aerodrome-without passengers onboard*
- *circuit training at an aerodrome*
- *carrying out air display activities for which you hold an approval*

- *for a helicopter – hovering, air transiting, air taxiing or ground taxiing at an aerodrome*
- *for a helicopter, seaplane or amphibian – flying within an access lane used by aircraft taking off from, or landing at, a particular place, and details of which are published in the Aeronautical Information Publication (AIP) book*
- *for a single-engine seaplane or a single-engine amphibian operating over water and within safe gliding distance of open water suitable for a forced landing, and not flown below 1,000 ft above the highest feature or obstacle within a horizontal radius of 300 m of the point on the water immediately below the aeroplane*
- *engaging in a procedure to determine the suitability of an aerodrome for a landing*
- *engaging in the validation of a terminal instrument flight procedure that is conducted in accordance with a terminal instrument flight procedure under regulation 173.095 of CASR and the Part 173 MOS. EX81/21*

Minimum height rules – other areas (CASR 91.267 MOS 12.02)

When flying over an area that is not a populous area or public gathering (CASR 91.265), you must not fly an aircraft below 500 ft above the highest feature or obstacle within a horizontal radius of 300 m of the point on the ground or water immediately below the aircraft.

Figure: Minimum heights for other areas



Exception: *This rule does not apply in the following circumstances:*

- *taking off or landing:*
    - *for take-off – when the point of lift-off and climb to the planned cruising level is in accordance with the normal procedures for the aircraft type*
    - *for landing – when you are conducting a circling manoeuvre as part of an instrument approach procedure (IAP) using rates of descent and flight manoeuvres which are normal for the aircraft type*
    - *for landing – when the landing is conducted in a continuous descent from the cruising level or circuit height to the landing threshold using rates of descent and flight manoeuvres which are normal for the aircraft type*
- *engaging in a missed approach*
- *not carrying passengers and practicing emergency procedures at an aerodrome*
- *not carrying passengers and practicing a forced landing procedure with the consent of the person or authority having control over the land or water above which the procedure is carried out*
- *low-flying training by a CASR Part 141 operator, or a low-flying activity by a CASR Part 142 operator, and the aircraft:*
    - *is not carrying passengers, and*
    - *is being flown over an area that, with the consent of the person or authority with control of the area, has been determined by the operator to be suitable as a flight training area and the pilot has surveyed it for obstacles before the flight*
- *performing training circuits at an aerodrome*
- *to determine the suitability of an aerodrome for a landing*
- *carrying out air display activities for which you hold an approval*
- *all of the following apply:*
    - *you hold a low-flying authorisation under CASR Part 61, or*
    - *you hold an approval, provided the point on the ground or water vertically below the aircraft is not within a 150 m of a person, vessel, vehicle, structure or livestock, and you conduct a risk assessment of the area to be flown over*
- *for a helicopter – when the helicopter is hovering, air transiting, air taxiing or ground taxiing at an aerodrome*
- *for a helicopter, seaplane or amphibian – when flying within an access lane used by aircraft taking off from, or landing at, a place, and the details are published in the AIP*
- *engaging in the validation of a terminal instrument flight procedure that is conducted in accordance with a terminal instrument flight procedure under regulation 173.095 of CASR and the Part 173 MOS. (CASA EX67/24)*

Helicopter operations – radio phraseology

Circumstance	Phraseology
Air taxi or air transit for departure and arrival	**Pilot:** REQUEST AIR TAXI (or AIR TRANSIT or GROUND TAXI) FROM (or VIA) TO (location or routing as appropriate)
	Air traffic control: Air taxi (or air transit or ground taxi) to (or via) (Location, parking position, stand, or routing as appropriate) [caution (dust, loose debris, taxiing light aircraft, personnel, wake turbulence, etc)]

For the complete radio phraseology refer to **Chapter 5 – Radio communication procedures**.

Over-water flights

Wearing life jackets – helicopter – special provision

(CASR 91 MOS 26.59)

When a helicopter is taking off or landing at an aerodrome in a populous area, and an area of water is the only reasonably available forced landing area, each person (other than an infant) must wear a life jacket, while the helicopter, after take-off or on descent, is below the minimum height at which the helicopter is required to be flown under CASR 91.265.

Determination of the minimum height is set out in CASR 91.265 and in most circumstances, outside access lanes, will be 1,000 ft above the highest obstacle.

A single-engine aircraft flown over water beyond the distance it could reach an area of land suitable for a forced landing following an engine failure, must carry a survival emergency locator transmitter (ELT).

For a VFR flight under CASR Part 91, if you intend to fly at a distance from land greater than that which would allow the aircraft to reach land with an engine inoperative, you must submit flight notification as per the AIP procedures. Your flight notification must include a nominated time that search action is required (SARTIME) (CASR 91.240, CASR 91 MOS 09.02).

You are reminded of the requirement to not operate an aircraft in a manner which creates a hazard to a person or property (CASR 91.055).

Further requirements such as the carriage and wearing of lifejackets or carriage of rafts and survival equipment related to flight over water can be found in the **Part 91 PEG**.

Certain CASR Parts relevant to the flights being conducted contain additional requirements. For example, for flights under CASR Part 133, helicopters must be fitted with an approved emergency flotation system (see Chapter 11 of the CASR Part 133 MOS).

The transponder Mode A code of 4000 is to be used in Class G airspace when flying over water and more than 15 NM from the shore (CASR 91 MOS 26.69).

Search and rescue (SAR) alerting (CASR 91.240) (MOS 9.02)

Pilots of VFR flights are required to submit a SARTIME flight notification to ATS, or leave a flight note with a responsible person.

VFR flights may choose to operate on reporting schedules (SKEDs) for the over-water stages of a flight. Schedules may be arranged before commencing the over-water stage and terminate on completion of the crossing. Contact the Airservices Australia Help Desk (details below).

AIRSERVICES AUSTRALIA HELP DESK

t: 1800 801 960

Note: Events that will initiate SAR action are described in AIP-GEN 3.6.

CHAPTER 5

RADIO COMMUNICATION PROCEDURES

Radio communication procedures and phrases contained in this section have been selected from **AIP GEN 3.4 and ENR 1.1**.

Use of standard phrases for radio communication between aircraft and ground stations is essential to avoid misunderstanding the intent of messages and to reduce the time required for communication.

Generally, communication procedures and phrases that are used in Australia are in harmony with ICAO and international practices.

Where circumstances warrant, if a standard phrase is not available, clear, concise and plain language should be used.

General communication phrases

English language (CASR 61.255 to 61.270)

The English language must be used for all air–ground radio telephony (RTF) communications within Australian flight information regions (FIRs) unless use of an alternative language has been arranged with ATS prior to a specific flight.

Phonetic alphabet

Radio telephony pronunciation of the phonetic alphabet is as follows:

Character	Word	Pronunciation
A	Alpha	**al** fah
B	Bravo	**brah** voh
C	Charlie	**char** lee or **shar** lee
D	Delta	**dell** tah
E	Echo	**eck** ho
F	Foxtrot	**foks** trot
G	Golf	golf
H	Hotel	hoh **tel**
I	India	**in** dee **a**
J	Juliet	jew lee ett
K	Kilo	**key** loh
L	Lima	**lee** mah
M	Mike	mike

Character	Word	Pronunciation
N	November	no **vem** bar
O	Oscar	**oss** cah
P	Papa	pah **pah**
Q	Quebec	keh **beck**
R	Romeo	**row** me oh
S	Sierra	see **air** rah
T	Tango	tang go
U	Uniform	**you** nee form or **oo** nee form
V	Victor	**vik** tah
W	Whiskey	**wiss** key
X	X-ray	**ecks** ray
Y	Yankee	**yang** key
Z	Zulu	**zoo** loo

Note: For pronunciation, syllables to be emphasised are in bold.

Numerals

Radio telephony pronunciation of numbers shall be in the phonetic form as follows:

Number	Pronunciation	Number	Pronunciation	Word	Pronunciation
0	ZE-RO	**5**	FIFE	Decimal	DAY SEE MAL
1	WUN	**6**	SIX	Hundred	**HUN** dred
2	TOO	**7**	**SEV** en	Thousand	TOU SAND
3	TREE	**8**	AIT		
4	**FOW** er	**9**	**NIN** er		

Note: The syllables printed in bold in the above list are to be stressed.

Transmission of numbers

All numbers used in the transmission of altitude, cloud height, visibility and runway visual range (RVR) information, which contain whole hundreds and whole thousands, must be transmitted by pronouncing each digit in the numbers of hundreds or thousands followed by the word '**hundred**' or '**thousand**' as shown below.

Element	Transmission
Altitudes	
800	eight hundred
1,500	one thousand five hundred
10,000	one zero thousand
FL180	Flight level one eight zero
FL200	Flight level two hundred
Cloud height	
2,200	two thousand two hundred
4,300	four thousand three hundred
Visibility	
200	two hundred
1,500	one thousand five hundred
3,000	three thousand
Runway visual range	
700	seven hundred
Headings	
150	Heading one five zero
80	Heading zero eight zero
300	Heading three zero zero

Element	Transmission
Wind direction	
020°	Wind zero two zero degrees
100°	Wind one zero zero degrees
210°	Wind two one zero degrees
Wind speeds	
20 kt	two zero knots
18 kt, gusting 30	one eight knots gusting three zero
Mach number	
0.84	Mach decimal eight four
Altimeter setting	
1,000	QNH one thousand
1,027	QNH one zero two seven
Transponder code	
2,400	Squawk two four zero zero
2,000	Squawk two thousand
Time	
0920	Time zero nine two zero or two zero (if the hour is the same as the current hour)
1643	Time one six four three or four three

Note: A QNH or transponder (Squawk) codes in whole thousands (e.g. QNH 1,000 hPa or code 2000) are to be expressed as whole numbers. For other than those the digits must be pronounced separately.

Altimetry phrases

Heights measured from a QNH or area QNH datum must be expressed in full, for example: 3,000 ft as '**three thousand**' and 1,800 ft as '**one thousand eight hundred**' adding, if necessary, '**on (QNH)**'.

Expressions of height measured from the 1,013.2 hPa datum must always include the words '**flight level**'.

Other standard words and phrases

The following other words and phrases are to be used in radiotelephony communications, as appropriate.

Word/phrase	Meaning
Acknowledge	Let me know that you have received and understood the message.
Affirm	Yes.
Approved	Permission for proposed action is granted.
Break	I hereby indicate the separation between portions of the message (to be used where there is no clear distinction between the text and other portions of the message).
Break break	I hereby indicate separation between messages transmitted to different aircraft (in a very busy environment).
Cancel	Annul the previously transmitted clearance.
Check	Examine a system or procedure (no answer is normally expected).
Cleared	You are authorised to proceed under the conditions specified.
Confirm	Have you correctly received the following…?
	Did you correctly receive this message?
Contact	Establish radio contact with….
Correct	That is correct.
Correction	An error has been made in this transmission (or message indicated). The correct version is….

Word/phrase	Meaning
Disregard	Consider that transmission as not sent.
I say again	Repeat for clarity or emphasis.
Maintain	Continue in accordance with the condition(s) specified, or in its literal sense, for example: 'Maintain VFR'.
Mayday	My aircraft and its occupants are threatened by grave and imminent danger and/or I require immediate assistance.
Monitor	Listen out on (frequency).
Negative	No.
	Permission is not granted.
	That is not correct.
Out	My transmission is ended, and I expect no response from you (not normally used in VHF communication).
Over	My transmission is ended, and I expect a response from you (not normally used in VHF communication).
Pan Pan	I have an urgent message to transmit concerning the safety of my aircraft, or other vehicle or of some person on board, or within sight, but I do not require immediate assistance.
Readback	Repeat all, or the specified part, of this message back to me exactly as received.
Recleared	A change has been made to your last clearance and this new clearance supersedes your previous clearance or part thereof.
Report	Pass me the following information...
Request	I should like to know or I wish to obtain...
Roger	I have received all of your last transmission. **Note:** Under no circumstances is this to be used in reply to a question requiring read back or a direct answer in the affirmative or negative.
Say again	Repeat all or the following part of your last transmission.
Speak slower	Reduce your rate of speech.
Standby	Wait and I will call you.

Word/phrase	Meaning
Unable	I cannot comply with your request instruction or clearance (reason).
Verify	Check and confirm with originator.
Wilco	I understand your message and will comply with it.
Words twice	**As a request:** Communication is difficult. Please send every word or group of words twice.
	As information: Since communication is difficult every word or group of words in this message will be sent twice.

Transmission readability

Where your aircraft radio transmission readability is advised by ATS or another station it will be given on a scale of 1 to 5. Transmission readability is as follows:

5 – Perfectly readable

4 – Readable

3 – Readable but with difficulty

2 – Readable now and then

1 – Unreadable

Aircraft callsigns (AIP ENR 3.4)

Pilots should be aware that there are various radio callsigns in addition to the phonetic alphabet used to identify certain operations.

Aircraft callsign examples	
Passenger transport **(Qantas link 2719)**	'Q-link Twenty-seven nineteen'
Recreational **(Jabiru 5234)**	'Jabiru fifty-two thirty-four'
Military	'Stallion'
Law enforcement **Police**	'Polair'
Foreign-registered **US (N 35826)**	'November three fifty-eight twenty-six'
Australian registered **VH-ZTQ**	'Zulu Tango Quebec'

The aircraft type should precede the callsign when making initial calls on the common traffic advisory frequency (CTAF).

Examples:

Parkes traffic Cessna 172 Zulu Tango Quebec

The prefix 'helicopter' before the callsign must be used by rotary-wing aircraft when first establishing contact on any frequency. For example:

VH-ZTQ – 'helicopter zulu tango quebec'

The prefix 'unmanned' must be used by remotely piloted aircraft (RPA). The RPA should be identified based on the manufacturer or model using a maximum of three syllables. For example, unmanned DJI or 'unmanned Mavic'. Numbers may be added to the callsign as required.

Non-controlled airspace and non-controlled aerodromes

Listening to other pilots' broadcasts increases situation awareness and helps you to see and avoid other aircraft.

It is essential to maintain a diligent lookout because other traffic may not be able to communicate on the radio for various reasons—they might be tuned to the wrong frequency, have selected the wrong radio, have a microphone failure or have the volume turned down.

Make calls as clearly and concisely as possible using the standard phrases. Speak at a normal pace, as rapid speech can make transmissions difficult for other pilots to understand. Be careful not to 'clip' your transmission when stating your location as confusion can arise at aerodromes that are close together and share the same CTAF.

Ideally, pilots should make circuit broadcasts before making a turn because banking aircraft are easier to see.

A simple strategy to remember when flying in the circuit is 'look', 'talk' and 'turn'.

Make broadcast calls brief and clear. Think about what to say before transmitting. Make positional and other broadcasts necessary to minimise traffic conflict using standard phrases, for example: joining circuit, base, and vacating the runway. Effective communication and increased traffic awareness will help prevent a collision or an airprox.

If you are flying a higher performance aircraft, or operating at a busy aerodrome,you are encouraged to monitor/broadcast on the CTAF earlier to allow sufficient time to gain situational awareness of the traffic.

The responsibility for collision avoidance, sequencing, and knowledge of local procedures lies solely with you. Aircraft overflying a non-controlled aerodrome should avoid the circuit area, and the routes commonly flown by arriving and departing traffic.

Avoid the use of local terminology in position reports, for example: use 'Bundaberg' instead of 'Bundy'.

When an aerodrome frequency response unit (AFRU) is in operation, be careful not to break your transmission momentarily as the AFRU will automatically over-transmit your subsequent broadcast.

Carrying a radio in non-controlled airspace

(CASR 91 MOS 26.18)

A VFR aircraft must carry a radio when:

- at or above 5,000 ft in class G airspace
- in the vicinity of an aerodrome that is a certified or military aerodrome
- in any area when below 3,000 ft AMSL or 1,000 ft AGL (whichever is the higher) in reduced VMC.

Frequency management

When operating in the vicinity of a non-controlled aerodrome published on aeronautical charts, you are to use 126.7 MHz or the discrete CTAF frequency as published.

Where a number of non-controlled aerodromes are in close proximity, a single discrete CTAF may be allocated to those aerodromes. Where a discrete CTAF is prescribed, these frequencies are shown in ERSA and VTC, VNC, ERC Low charts.

Anywhere within a broadcast area, you are to use the dedicated Broadcast Area CTAF.

Outside the vicinity of a non-controlled aerodrome, you should use the Area VHF. This frequency may provide the best means of gaining assistance from ATC or other pilots in the event of an emergency.

In the vicinity of uncharted aerodromes, you have discretion to use the most appropriate frequency that ensures safe operation. This may be 126.7 MHz. However, you should be aware that transiting aircraft may be monitoring Area VHF. To ensure mutual traffic awareness, it is recommended that when you are using an alternative frequency you also monitor Area VHF.

You are 'in the vicinity' of an aerodrome if you are flying:

- within 10 NM of an aerodrome
- at a height above the aerodrome that could result in conflict with operations at the aerodrome (CASR 91.360).

In the vicinity of an aerodrome, the most hazardous area for a collision is within a cylinder of airspace 5 NM in diameter and up to 3,000 ft above the aerodrome.

When a UNICOM service is provided at a non-controlled aerodrome and the UNICOM is the CTAF, ERSA identifies the frequency as CTAF/UNICOM.

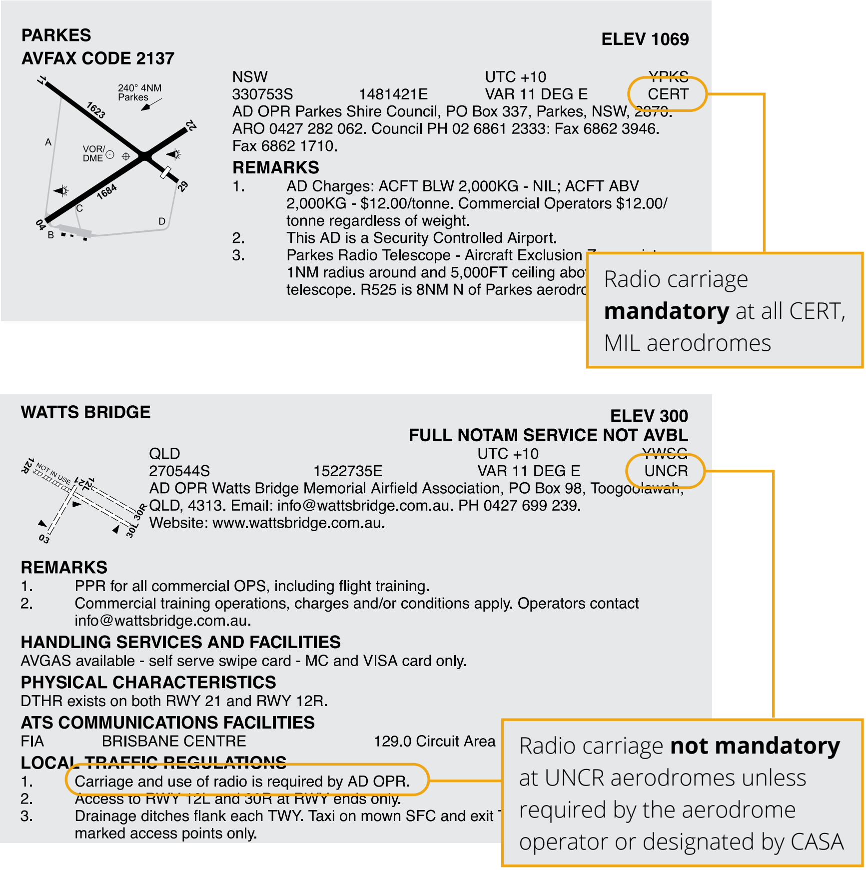
How to determine where radio carriage is required (CASR 91.625)(MOS 21.02)

An aircraft must have a VHF radio when operating on the manoeuvring area, or in the vicinity of a non-controlled aerodrome that is:

- certified, or
- military, or
- prescribed as a designated non-controlled aerodrome by the MOS.

You can determine the aerodromes where you must carry and use a radio by referring to ERSA and checking the status of the aerodrome you intending to fly to, from or over which will put you in the vicinity (see Figure below).

Figure: Sample extract from ERSA aerodrome chart for Parkes and Noosa



PARKES **ELEV 1069**
AVFAX CODE 2137

NSW UTC +10 YPKS
330753S 1481421E VAR 11 DEG E CERT
AD OPR Parkes Shire Council, PO Box 337, Parkes, NSW, 2870.
ARO 0427 282 062. Council PH 02 6861 2333: Fax 6862 3946.
Fax 6862 1710.

REMARKS

1. AD Charges: ACFT BLW 2,000KG - NIL; ACFT ABV 2,000KG - $12.00/tonne. Commercial Operators $12.00/ tonne regardless of weight.
2. This AD is a Security Controlled Airport.
3. Parkes Radio Telescope - Aircraft Exclusion
1NM radius around and 5,000FT ceiling abo
telescope. R525 is 8NM N of Parkes aerodr

Radio carriage **mandatory** at all CERT, MIL aerodromes

WATTS BRIDGE **ELEV 300**
FULL NOTAM SERVICE NOT AVBL

QLD UTC +10 YWSG
270544S 1522735E VAR 11 DEG E UNCR
AD OPR Watts Bridge Memorial Airfield Association, PO Box 98, Toogoolawah, QLD, 4313. Email: info@wattsbridge.com.au. PH 0427 699 239.
Website: www.wattsbridge.com.au.

REMARKS

1. PPR for all commercial OPS, including flight training.
2. Commercial training operations, charges and/or conditions apply. Operators contact info@wattsbridge.com.au.

HANDLING SERVICES AND FACILITIES

AVGAS available - self serve swipe card - MC and VISA card only.

PHYSICAL CHARACTERISTICS

DTHR exists on both RWY 21 and RWY 12R.

ATS COMMUNICATIONS FACILITIES

FIA	BRISBANE CENTRE	129.0 Circuit Area

LOCAL TRAFFIC REGULATIONS

1. Carriage and use of radio is required by AD OPR.
2. Access to RWY 12L and 30R at RWY ends only.
3. Drainage ditches flank each TWY. Taxi on mown SFC and exit
marked access points only.

Radio carriage **not mandatory** at UNCR aerodromes unless required by the aerodrome operator or designated by CASA

Listening watch of radio transmissions (CASR 91.640) (MOS 21.04)

When operating outside controlled airspace in an aircraft with a radio, you must ensure that any radio transmissions are monitored continuously by you or another qualified pilot.

Gliders and manned free balloons which carry a radio will maintain a listening watch on the following frequencies:

- in controlled airspace – the relevant ATC frequency
- in Class G airspace, above 5,000 ft AMSL – the relevant area frequency or one of the following glider specific frequencies (122.5; 122.7; 122.9 MHz)
- in Class G airspace, below 5,000 ft AMSL – 126.7 MHz
- in the vicinity of a non-controlled aerodrome – the common traffic advisory frequency (CTAF) or 126.7 MHz if no CTAF is specified.

The use of a handheld radio (CASR 91 MOS 26.02)

For a light sport or an experimental aircraft, the radio that is required does not have to be a radio that complies with CASR Part 21 (a certified radio) provided the radio has the same capability as if it were certified. Therefore, if you are qualified to use a radio (MOS 21.01), a licensed handheld radio can meet this requirement.

Flight with inoperative radio (CASR 91 MOS 26.19)

When in the vicinity of an aerodrome, if the radio has become inoperative, or the purpose of the flight is to take the radio to a place for repairs, you must join the circuit on either the crosswind or downwind leg, and if the aircraft is equipped, ensure the:

- landing lights are switched on
- anti-collision lights are switched on
- a transponder is switched on.

An aircraft required to carry a radio may only begin a flight with the radio inoperative if:

- the flight is from an aerodrome with no facility for the radio to be repaired or replaced, and
- the flight is to the nearest facility where the radio can be repaired or replaced

- the flight is in an MBA or class G airspace above 5000 ft AMSL and
  - the flight is in day VMC or
  - the aircraft is in company with another aircraft carrying an operative radio for which the pilot is qualified and the required radio broadcasts and reports are made for both aircraft
- for a flight conducted in controlled airspace:
  - ATS is informed, before the flight begins, of the inoperative radio
  - clearance is obtained from ATS for the flight.

Pilot not radio-qualified or aircraft without radio (CASR 91 MOS 26.19)

In exceptional circumstances, the regulations make provision for a pilot who is not qualified to use an aircraft radio, or where the aircraft is not equipped with a radio, to operate in the vicinity of a non-controlled certified, military or designated aerodrome.

An aircraft without a radio must be operated:

- VMC by day
- to arrive or depart under the escort of another aircraft that is radio-equipped and flown by a radio-qualified pilot. This will allow the escorting pilot to make radio calls on behalf of both aircraft.

The radio-equipped aircraft should be manoeuvred to always keep the non-radio aircraft at a safe distance (CASR 91.400) and in sight in order to accurately report its position.

Radio failure en route in Class G or E airspace

(CASR 91 MOS 11.10)

If you are flying under the VFR in Class G or Class E airspace and your radio fails you should:

- select code 7600 on the transponder (if fitted)
- remain outside controlled airspace
- assume the radio is broadcasting and broadcast position and intentions on the frequency appropriate to the area of operation
- as soon as practicable, descend below 5,000 ft to continue flight under the VFR.

Radio broadcasts in CTAF (CASR 91.630) (MOS 21.02 to 21.04)

When you consider it reasonably necessary to avoid collision with another aircraft, you must make broadcasts on a CTAF when:

- you are operating in the vicinity of a non-controlled aerodrome, including a certified or military aerodrome, and
- the aircraft is equipped with a very high frequency (VHF) radio.

Note: For an aircraft that must be equipped with a VHF radio, see MOS Chapter 26.

The regulation requires you, when flying an aircraft that is fitted with or carries a radio, to make broadcasts or reports relating to the flight.

You should make the following broadcasts as described below when you are in the vicinity of any non-controlled aerodrome.

Table: Recommended calls in all circumstances

Situation	Broadcast
When you intend to take-off	Immediately before, or during taxiing
When you are inbound to an aerodrome	10 NM from the aerodrome, or earlier, commensurate with aeroplane performance and your workload, with an estimated time of arrival (ETA) for the aerodrome
If you intend to fly through the vicinity of, but not land at, a non-controlled aerodrome	10 NM from the aerodrome, or earlier, commensurate with aeroplane performance and your workload, with an estimated time of arrival over the aerodrome.

Table: Recommended calls dependent on traffic

Situation	Broadcast
You intend to enter a runway.	Immediately before entering a runway
You are ready to join the circuit.	Immediately before joining the circuit
You intend to make a straight-in approach.	On final approach at not less than 3 NM from the threshold (See Note)
During an Instrument approach when you are: › departing final approach fix (FAF) or established on final approach segment inbound › terminating the approach and commencing the missed approach procedure.	Including details of position and intentions that are clear to all pilots (both IFR and VFR)
You are clear of the runway(s).	Once established outside the runway strip

Note: Some distances above refer to the runway threshold and others to the aerodrome reference point (ARP). You should be aware that a global positioning system (GPS) indication of 3 NM from an aerodrome may not be 3 NM from the runway threshold.

You must also report any hazard that you become aware of, that is not published in the AIP when circumstances permit, to air traffic services (ATS), or the aerodrome operator if the hazard is on the aerodrome. Although required, if you are reasonably sure that the hazard has already been reported you do not need to make the report (CASR 91.675).

Standard broadcast format (AC 91-10)

The standard broadcast format is as follows:	
(Location traffic)	Parkes traffic
(Aircraft type)	Cessna 172
(Callsign)	zulu tango quebec
(Flight rules)	(Only if IFR)
(Position/ intentions)	One-zero miles north, passing four thousand two hundred, on descent, inbound circuit three-six
(Location)	Parkes

Where more than one aerodrome is used on a CTAF frequency, prefixing the message with the location followed by the word '**traffic**' (for example: '**Caboolture traffic**') and then adding the location again on its own at the end of the message (for example: '**Caboolture**') helps to confirm the location.

VFR aircraft in Class E or G airspace – prescribed reports (CASR 91 MOS 21.07)

When flying under the VFR in Class E or G airspace, you must report and broadcast to ATS according to the following Table.

Table: VFR aircraft in Classes E and G airspace

Situation	Frequency	Report
Requiring clearance into controlled airspace	ATS	Report the situation
Before, and on completion of, over-water stage	ATS	Report in accordance with search and rescue (SAR) reporting schedules if arranged before the over-water stage

Mandatory broadcast area (MBA)

A broadcast area that is a mandatory broadcast area is a volume of airspace of defined horizontal and vertical limits in which broadcast and other requirements apply. They are located in Class G airspace and are depicted on the VTC, VNC and ERC-low charts.

There is usually more than one aerodrome within a mandatory broadcast area, and pilots operating within the area must be monitoring the published CTAF for the mandatory broadcast area.

Mandatory broadcast areas are:

- Ayers Rock Broadcast Area (BA)
- Ballina/Byron Gateway BA
- Port Hedland BA.

For a flight in an MBA your aircraft must be fitted with a radio and you must broadcast and listen while you are flying in that area.

The requirement to have a radio in a BA is contained in CASR 91 and MOS 26.18.

Radio broadcast and report requirements are contained in the Table below (CASR 91 MOS 21.09.)

Table: Mandatory broadcasts

Situation	Broadcast
Prior to, or immediately entering an MBA	Your intentions when entering the MBA
Joining the circuit	The leg of the circuit you intend to join
Conducting a straight-in approach	No later than 3NM from the runway threshold, broadcast you are conducting a straight-in approach
Passing the final approach fix of an instrument approach	That you are passing the final approach fix
Commencing a missed approach	That you are commencing a missed approach procedure
After landing and clear of the runways	That you are clear of the runways
Starting to taxi	You must broadcast the following information: › you are IFR if your flight is under the IFR › your planned destination aerodrome, or › direction in which you intend to fly from the aerodrome, or › nature of operation (e.g. circuits), and › runway you intend to take-off from.
Immediately before entering the runway for take-off	That you are entering the runway, with the runway identifier

Surveillance flight information service (SFIS)

SFIS is the amalgamation of two existing services Flight Information Services (FIS) and Surveillance Information Service (SIS).

SFIS provides a flight information service to VFR and IFR aircraft flying at non-controlled aerodromes that are designated, mandated broadcast areas that use the discrete CTAF.

During prescribed hours of operation, a SFIS will be provided from the surface to the upper limit of the broadcast area. Pilots are required broadcast and report to the SFIS on the CTAF when operating in the broadcast area.

SFIS will provide full traffic information and alerting service premised on available surveillance data and pilot reports using the aerodrome's discrete CTAF.

SFIS is not a separation service, it doesn't provide clearances, or sequence aircraft into an aerodrome.

All aircraft operating within the designated, mandatory broadcast area will receive a traffic Information on conflicting traffic. This will enable SFIS to provide enhanced traffic information to all pilots when surveillance and/or other information warrants.

Flight information Service and Flightwatch

An on-request flight information service (FIS) is available to aircraft in all classes of airspace on ATC VHF or HF (domestic and international) frequencies. The FIS is subject to ATC workload.

You must prefix any request for FIS on ATC VHF frequencies with the callsign of the appropriate ATC unit and the generic callsign **'Flightwatch'**, for example:

'Melbourne centre flightwatch zulu tango quebec request actual weather (location)'

Due to workload considerations, ATC may redirect your requests for FIS to an alternative VHF frequency or FLIGHTWATCH HF.

When operating on domestic HF (callsign **'Flightwatch'**) and international HF (callsign **'Brisbane'**), you must include the frequency on which you are calling. For example,

'(Flightwatch Brisbane), zulu tango quebec, six five four one, request actual weather (location)'.

Information will be provided in an abbreviated form, paraphrased into brief statements of significance. The full text of messages will be provided on request.

Air-to-air communication between pilots

In accordance with regional agreements, 123.45 MHz is the designated air-to-air VHF communications channel. Use of this channel will enable aircraft engaged in flights over remote and oceanic areas out of range of VHF ground stations, and not in the vicinity of a non-controlled aerodrome depicted on an aeronautical chart, to exchange necessary operational information and facilitate the resolution of operational problems.

Aerodrome frequency response unit (AFRU)

To assist all pilots' awareness of inadvertent selection of an incorrect VHF frequency when operating into non-controlled aerodromes, a device known as an aerodrome frequency response unit (AFRU) may be installed. An AFRU will provide an automatic response when you transmit on the CTAF for the aerodrome at which it is installed.

The features of the AFRU are as follows:

- When the aerodrome traffic frequency has not been used for the previous five minutes, the next transmission over 2 seconds long will cause a voice identification to be transmitted in response, for example: 'Goulburn CTAF'.
- When the aerodrome traffic frequency has been used within the previous 5 minutes, a 300 millisecond tone will be generated after each transmission over 2 seconds long.

A series of 3 microphone clicks within a period of 5 seconds will also cause the AFRU to transmit a voice identification for the particular aerodrome.

If the transmitter in the AFRU is jammed for a period of more than one minute, the unit will automatically shut down.

The AFRU improves safety by confirming the operation of your aircraft's transmitter and receiver, the volume setting, and that you have selected the correct frequency for use at that aerodrome.

Certified air/ground radio service (CA/GRS)

A certified air/ground radio service (CA/GRS) is an aerodrome-based radio information service, which may operate at non-controlled aerodromes. The service provides pilots with operational information relevant to the aerodrome. The service is operated by or for the aerodrome operator within the published hours, on the CTAF assigned to the aerodrome. It is not an Airservices Australia or Royal Australian Air Force (RAAF)-provided air traffic service.

The CA/GRS does not provide any separation service.

The callsign of the service is the aerodrome location followed by **'radio'**; for example: **'Ayers Rock radio'**. The radio operators of the service have been certified to meet a CASA standard of communication technique and aviation knowledge appropriate to the service being provided.

The CA/GRS is provided to all aircraft operating within the designated broadcast area for the specific location. Refer to ERSA for the location-specific designated broadcast areas.

When a CA/GRS is operating, pilot procedures are unchanged from the standard non-controlled operating and communication procedures. ERSA includes location-specific information related to procedures.

The CA/GRS information helps pilots to make informed operational decisions. Pilots retain authority and responsibility for the acceptance and use of the information provided.

Aircraft making the normal inbound or taxiing broadcast receive a responding broadcast from the CA/GRS operator, conveying the following information:

- confirmation of correct CTAF
- current known, relevant traffic in the vicinity of the aerodrome and on its manoeuvring area. Traffic information may include some or all of the following information:
  - the aircraft type, callsign, position and intention
  - where circuit flying is in operation, general advice on the number of aircraft in the circuit and position in the circuit if relevant

Note: This information is provided to assist pilots in arranging traffic separation.

- weather conditions and operational information for the aerodrome.
  This may include:
    - runway favoured by wind or noise abatement
    - runway surface conditions
    - wind direction and speed
    - visibility and present weather
    - estimated cloud base
    - aerodrome surface temperature
    - aerodrome QNH.

This information will be provided by means of an automatic aerodrome information service (AAIS) broadcast on a discrete published frequency (similar to ATIS) during CA/GRS operating hours, or on request to the CA/GRS operator. Pilots should monitor the published AAIS frequency before making a taxiing or inbound broadcast.

Other local operational information, relevant to the safety of operations at the aerodrome, will also be broadcast.

The CA/GRS will provide emergency services call-out if requested by the pilot in an emergency or, if in the opinion of the operator, a call-out is warranted.

The weather information provided by the service is derived from approved measuring equipment, which meets Bureau of Meteorology (BoM) aeronautical precision standards. QNH provided by a CA/GRS or AAIS may be used to reduce landing, circling and alternate minima in accordance with AIP ENR 1.5 (QNH Sources).

The CA/GRS operator may act as a representative of an air operator (where formal agreement with the operator has been established) for the purposes of holding SARWATCH.

UNICOM

Universal communications (UNICOM) is a non-ATS communications service to improve the information normally available about a non-controlled aerodrome.

The primary function of the frequency used for UNICOM services where the frequency is the CTAF is to give pilots the means to make standard positional broadcasts when operating in the vicinity of the aerodrome. Participation in UNICOM services must not inhibit the transmission of standard positional broadcasts.

Participation in UNICOM services relates to the exchange of messages concerning:

- fuel requirements
- estimated times of arrival and departure
- aerodrome information
- maintenance and servicing of aircraft, including the ordering of parts and materials urgently required
- passenger requirements
- unscheduled landings to be made by aircraft
- general weather reports
- basic information on traffic.

This information is available to all aircraft during the times when the UNICOM is operating.

Weather reports, other than simple factual statements about the weather, may not be provided by UNICOM operators unless they are properly authorised to make weather observations under CAR 120.

The UNICOM operator is solely responsible for the accuracy of any information passed to an aircraft, while the use of information obtained from a UNICOM is at the discretion of the pilot in command.

Stations providing a UNICOM service must be licensed by the Australian Communications and Media Authority (ACMA). Detailed information regarding the licensing and use of equipment may be obtained by contacting ACMA in the appropriate state or territory capital city.

UNICOM operators must comply with the requirements of CASR 91.625.

Controlled airspace and controlled aerodromes

Controlled airspace is a volume of airspace of horizontal and vertical dimensions in which an air traffic control clearance must be obtained before entering or flying within the airspace or at the associated controlled aerodrome.

Precise radio phrasing between the air traffic controller and the pilot, as described below, is essential to achieve efficient navigation and traffic separation.

Controlled airspace and controlled aerodromes areas are depicted on the charts: VTC, VNC and ERC-low and ERC-high. They are not depicted on the WAC.

ATS callsigns

When initiating a transmission to ATS, pilots will commence the transmission with the callsign of the unit being addressed followed by the aircraft callsign.

> **‘Canberra ground – zulu tango quebec’**

The ATS unit will respond using the station’s callsign followed by their callsign. In the absence of an instruction to 'STAND BY', this response by the ATS unit is an invitation for the aircraft calling to pass their message.

> **‘zulu tango quebec – Canberra ground’**

A readback of an ATS message will be terminated with the aircraft’s callsign.

> **‘turn right heading three three zero – zulu tango quebec‘**

Callsigns should never be abbreviated on initial contact, or at any time when other aircraft callsigns have similar numbers/sounds or identical letters/numbers. For example:

> **‘charlie whisky zulu’ and ‘whisky charlie zulu’.**

Pilots must be certain that their aircraft identification is complete and clearly identified before taking action on an ATC clearance.

Pilots should use the phrase ‘verify clearance for (complete callsign)’ if doubt exists concerning proper identity.

ATS units are identified by the name of the location followed by the service available, as follows:

Station	Service
Centre	En route area control, including SIS and FIS
Approach	Approach control, where provided as a separate function
Departure	Departure control, where provided as a separate function
Final/director	Radar control providing vectors onto final approach
Tower	Aerodrome control or aerodrome and approach control, where these services are provided from an aerodrome control tower, for example at Coffs Harbour
Ground	Surface movement control
Delivery	Clearance delivery to departing aircraft
Flightwatch	Flight information service. When initiating a transmission to ATS, pilots must commence the transmission with the callsign of the unit being addressed, followed by the aircraft's callsign.

The name of the location or the service may be omitted providing that satisfactory communication has been established.

Communication monitoring in controlled airspace

(CASR 91.635, 91.405) (MOS 11.13)

When flying in controlled airspace, you or another pilot occupying a pilot seat must continuously monitor the primary communications medium used by ATC.

When operating at a controlled aerodrome you must:

- have an ATS clearance to taxi, land or take-off
- maintain a continuous listening watch on the ATS frequency for the aerodrome, or
- when you cannot maintain a continuous listening watch you must continuously watch for any visual signals given by ATS.

Unless you are complying with an ATS clearance or instruction, or flying in accordance with an instrument departure or approach procedure, you must:

- maintain runway track from the take-off until you reach 500 ft AGL unless a change to the track is necessary to avoid terrain
- make all turns in the direction of the circuit pattern when joining the circuit for a landing or when taking off for the purpose of conducting a circuit.

You would only need to watch for visual signals if your radio failed, or if ATS had approved your aircraft operation without a radio. Standard visual signals would be used (see CASA regulation 91.670 Standard visual signals).

You are responsible for obtaining an airways clearance and, once it has been obtained, you must not change or deviate from your cleared route/track, , or change level without first obtaining ATC clearance to do so.

You must request your airways clearance:

- on the clearance delivery frequency, preferably immediately before starting engines, otherwise as soon as possible thereafter, or
- where a clearance delivery frequency is not available, before entering the departure runway
- before entering controlled airspace.

Airways clearances normally contain the following items:

- aircraft identification
- destination, area of operation, position or clearance limit
- route of the flight
- assigned level
- SSR code
- frequency requirements.

If your aircraft is cleared only to an intermediate point, and flight beyond that point will be in controlled airspace, you must obtain a further clearance before proceeding beyond the intermediate clearance point.

When an aircraft leaves controlled airspace, a further clearance must be obtained for any subsequent flight in controlled airspace.

You must obtain ATC clearance when:

- taxiing on any part of the manoeuvring area
- entering, crossing, or backtracking on a runway
- taking off
- landing.

When taxiing on the manoeuvring area of a controlled aerodrome, you must stop and hold at all illuminated stop bars. You may only proceed beyond the stop bars when the stop bar lights are switched off.

***Exception:** You may proceed beyond a lighted stop bar if ATC advises you that stop bar contingency measures are in effect for the lighted stop bar, and ATC has identified the relevant lighted stop bar to you by reference to the specific holding position and instructs you to cross it.*

Control zones and areas – entry into Class A, C or E airspace (CASR 91 MOS 11.14)

You must not enter a control zone or a control area that is Class A, C or E airspace without ATC clearance.

***Exception:** VFR flights do not require clearance to enter Class E airspace.*

***Exception:** A clearance is not required when an ATC service is not in operation for a control zone.*

Broadcasts and reports general (CASR 91 MOS 21.03)

You must make broadcasts and reports on the relevant published radio frequency unless ATS agrees to the use of a different frequency for special flight circumstances.

Note: Special flight circumstances include, for example, descent from controlled to non-controlled airspace, formation flights, and search and rescue, police and security operations. You may initiate a request to ATS to agree to a changed radio frequency for special flight circumstances.

You must not fly under the VFR in Class A airspace unless you hold an approval (CASR 91.285).

Prescribed reports in controlled airspace

(CASR 91 MOS 21.05)

When flying in Class A, C or D airspace, or IFR in Class E airspace, you must report and broadcast to ATS according to the following table as applicable.

The Australian flight information region (FIR) does not have Class B airspace.

Table: An aircraft in Class A, C or D airspace, or an IFR aircraft in Class E airspace

Situation	Frequency	Report
Ready to taxi	ATS	Report the situation.
Airborne	ATS	Report the situation.
Departure	ATS	Report the situation.
Position report as per ATS, or route, reporting requirements	ATS	Report the situation.
Previously reported position estimate is more than 2 minutes in error	ATS	Report the corrected position estimate.
Sustained variation of more than 10 kt or Mach 0.02 from any previously notified speed or any standard descent profile agreed between the aircraft operator and ATS	ATS	Report the situation.
Aircraft performance degraded below: the level required for the airspace in which it is operating, or the capability reported in the flight notification	ATS	Report the situation.
Leaving a level or reaching an assigned level	ATS	Report the situation.
Unable to comply with an ATC clearance or instructions	ATS	Report the situation.
Arrival	ATS	If cancelling SARWATCH: report cancellation.
Runway braking action encountered not as good as reported by ATC	ATS	Report actual braking action with prefix AIREP SPECIAL.

Read-back requirements

You must read back correctly ATC clearances, instructions and information which are transmitted by voice. Apart from the first item of the list below, only key elements of the following clearances, instructions, or information must be read back. Ensure you include sufficient detail to indicate compliance (that you have adequately understood the message).

Read back the following:

- an ATC route clearance in its entirety, and any amendments (**'rest of clearance unchanged'** is not required to be read-back)
- en route holding instructions
- any route and holding point specified in a taxi clearance
- any clearances, conditional clearances or instructions to do any of the following manoeuvres on any runway:
  - hold short of
  - enter
  - land on
  - line up on
  - wait
  - take off from
  - cross
  - taxi
  - backtrack on any runway or helicopter landing site (HLS)
- any approach clearance
- assigned runway, altimeter settings, directions to specific aircraft, and radio and radio navigation aid frequency instructions (an **'expectation'** of the runway to be used is not to be read back)
- secondary surveillance radar (SSR) codes and data link logon codes
- level instructions, direction of turn, heading and speed instructions.

The controller will listen to the read-back to ascertain that the clearance or instruction has been correctly acknowledged and will take immediate action to correct any discrepancies revealed by the read-back. Reported level figures for an aircraft must be preceded by the words **'flight level'** when related to standard pressure and may be followed by the word **'feet'** when related to QNH.

Conditional clearances

In all cases a conditional clearance will be given in the following order and consist of:

- identification (callsign)
- the condition (including position of the subject of the condition)
- the clearance
- brief reiteration of the condition.

Example of an exchange:

> **ATS: 'zulu tango quebec behind Cessna on short final line up runway 29 right'.**
>
> **Pilot: 'Behind the Cessna, line up runway 29 right zulu tango quebec'.** (See AIP ENR 1.1.)

Route terminology

The phrase 'flight planned route' may be used to describe any route or portion thereof that is identical to that filed in the flight notification with sufficient routing details given to definitely establish the aircraft on its route.

Amended route or level

Whenever ATS provides an initial airways clearance that is not in accordance with the flight details currently held by the ATC system, they will prefix the route and/or level details with the term 'amended'. For example:

> **ATS:** '(aircraft callsign) cleared to (destination) [amended route] (route clearance details) [amended level] (level)'.

When an issued airways clearance needs to be changed, ATS will prefix the new route and/or level details with the term 'recleared'. The level will be stated in all clearance changes regardless of whether a change to the initially cleared level is made or not. For example:

> **ATS:** '(aircraft callsign) recleared [to (destination)] [(route clearance details)] (level)'.

The prefixes AMENDED and RECLEARED will not be used:

- for standard instrument departure (SID) or standard arrival route (STAR) clearances, or
- during normal progressive climb/descent instructions.

Limited radio or no radio in CTA

If total or partial failure of mandatory radio communications equipment occurs before flight commences and repair facilities are available, repairs must be made before the flight proceeds. Where repair facilities are not available, and flight to the nearest appropriate repair facility entails flight in controlled airspace, the flight may proceed providing that for flight in controlled airspace ATS is advised of the radio failure and a clearance for the flight is obtained from ATC.

Radio failure in controlled airspace

When flying under the VFR in Class A, C or D airspace or in a restricted area: select code 7600 on the transponder, and:

- assume the radio is functioning and broadcast position and intentions on the frequency prescribed in the AIP
- remain in VMC and land at the most suitable aerodrome
- if on departure remain in VMC, and
  - maintain the last assigned altitude or level for 3 minutes
  - maintain the last assigned vector for 2 minutes
  - after complying with the above two points, proceed in accordance with the latest ATC route clearance acknowledged
  - commence descent in accordance with the latest ATC route clearance acknowledged.

Class D airspace

Entry and departure – Class D airspace (CASR 91 MOS 11.15)

You must establish communication with the relevant Class D ATC tower, if ATC is active, before you enter the airspace.

Two-way communications established between a pilot and ATC constitutes a clearance for the aircraft to enter Class D airspace.

To established two-way communications, you must:

- advise current position, altitude, intention, ATIS received and any request(s), and
- to enter Class D airspace once you have established communication you must:
  - fly the track, maintain the level and intentions (eg inbound) you stated
  - comply with any subsequent ATC instructions.

When no level instruction is issued, descend as necessary to join the aerodrome traffic circuit.

If ATC responds to your initial radio call without using the aircraft callsign, e.g. AIRCRAFT CALLING ARCHER TOWER, STANDBY, or AIRCRAFT CALLING ROCKY TOWER, SAY AGAIN, you must remain outside Class D airspace.

Taxiing and manoeuvring

The separation of aircraft taxiing on the manoeuvring area is the joint responsibility of you and the controller. A taxi clearance from ATC is required before operating on the manoeuvring area (taxiways and runways of any controlled aerodrome). When ATC issues a taxi instruction, which includes a holding point, pilots must read back the words 'Holding point [holding point designator]'. Specific clearance is required to taxi, enter, cross or backtrack on a runway.

VFR flights wishing to depart without submitting flight notification must provide the following information on first contact with ATC:

- aircraft callsign and 'DETAILS' and (wait for a response from ATC)
- destination and first tracking point
- preferred level
- identification of ATIS code received.

These details may be given with the request for taxi clearance.

Change to tower frequency

You should change to tower frequency:

- in the holding bay, or
- close to, or at, the holding point of the nominated runway, when ready for take-off.

Take -off

A clearance to take-off is a clearance to operate within or depart the CTR into Class G airspace in accordance with the ready report.

You must include the following information when you report ready:

- the departure runway when parallel runway operations are in progress
- your intentions when operating wholly within a Class D CTR, and
- your tracking details when departing the Class D CTR and not in receipt of an airways clearance.

At Class D aerodromes where parallel runway operations are in progress, you must identify the departure runway when reporting ready. For example: **'(Callsign) ready runway right'**.

You must not hold on the runway in use unless ATC has cleared you to do so.

Departure report

At certain Class D aerodromes where the tower also provides a procedural approach control service (see ERSA), you must report on the tower frequency after take-off:

- track information, and
- the last assigned altitude.

However, this report is not required:

- for VFR aircraft departing the control zone directly into Class G airspace, or
- for aircraft that have been instructed to contact Centre, Approach or Departures once airborne—in which case an airborne report will be made on the relevant frequency.

The departure time must be calculated as follows:

- current time minus an adjustment for the distance from the aerodrome, or
- when over or abeam the aerodrome.

Example of radio calls – VFR aircraft in Class D airspace (AIP ENR 1.1)

Aircraft Callsign VH – ZTQ

Situation	Aircraft radio call	ATC
Ready to taxi	Bankstown ground (Aircraft type) (Callsign) [persons on board (POB) (number) (aircraft location) INFORMATION (ATIS identification) [TO (aerodrome of destination)] REQUEST TAXI [intentions] Bankstown Ground Cessna C172 ZTQ 2POB taxiway mike received information Alpha for Cowra Request taxi clearance	ZTQ clear to taxi report when ready
Ready for take-off	Bankstown Tower ZTQ ready holding point Alpha 7 runway 29 right for upwind/downwind departure for Cowra	ZTQ line up and hold runway 29 right
	Line up and hold 29 right ZTQ	ZTQ runway 29 right clear for take-off
	RWY 29 right clear for take -off ZTQ	
Inbound	Bankstown Tower Cessna 172 ZTQ Prospect Reservoir inbound received Alpha Report joining downwind for 29 right ZTQ	ZTQ report joining right downwind for runway 29 right
Downwind call	ZTQ right downwind runway 29 right	ZTQ continue approach
Aircraft is on final	Clear to land runway 29 right ZTQ	ZTQ clear to land runway 29 right
Aircraft turns off runway and calls SMC	Bankstown ground ZTQ	ZTQ

Standard phrases

The following tables set out the standard phrases that should be used by air traffic controllers and pilots. For the VFR pilot, some of the phrases shown in the tables might not apply. However, a VFR pilot may share the same airspace as an IFR pilot. If the VFR pilot has a basic understanding of the phrasing that might apply to an IFR or large aircraft air transport pilot, they will be in a better position to understand air traffic control, aircraft traffic management and separation communications.

In the tables below, the standard phrases show the text of message components without callsigns. They are not intended to be exhaustive, and when circumstances differ, pilots, ATS, air defence and ground personnel will be expected to use appropriate subsidiary phrases. These should be clear, concise and designed to avoid any possible confusion.

For convenience the phrases are grouped according to types of air traffic service. However, users should be familiar with, and use as necessary, phrases from groups other than those referring specifically to the type of air traffic service being provided. All phrases must be used in conjunction with callsigns (aircraft, ground vehicle, ATC or other), as appropriate.

General phrases

Circumstance	ATC phraseology	Pilot phraseology
Tracking instructions		
When instructing an aircraft to turn 180° or more when tracking instructions follow	Turn left (or right)—I say again—left (or right) [tracking instructions]	
Level instructions		
When there is an expectation that the aircraft will maintain the level or to eliminate confusion, the instruction 'and maintain' shall be included	Climb (or descend) followed as necessary by: › to (level) › to and maintain (level) › to reach (level) at (or by) (time or significant point) › to (level) report leaving (or reaching or passing or approaching) (level) › at (number) feet per minute [minimum (or maximum)]	
When rate is required to be in accordance with 'standard rate' specifications	At standard rate	

Circumstance	ATC phraseology	Pilot phraseology
When advising expectation of a level requirement	Expect a restriction to reach (level) by (time or position) climb/ descend…	
	Step climb (or descent) (aircraft identification) above (or beneath) you	
	Request level change from (name or unit) at (time or significant point)	
	Stop climb (or descent) at (level)	
	Continue climb (or descent) to [and maintain] (level)	
	Expedite climb (or descent) [until passing (level)]	
	Expect climb (or descent) at (time or location)	
Pilot requesting a change of level		(REQUEST CLIMB (or descent) [at (time or location)]
To require action at a specific time or place	Immediately	
	After passing (significant point)	
	At (time or significant point)	
To require action when convenient	When ready (instruction)	
When a pilot is unable to comply with the clearance or instruction		UNABLE TO COMPLY

Circumstance	ATC phraseology	Pilot phraseology
When a descent clearance is issued in relation to the DME (or GNSS) steps	Descend to (level) not below DME (or GNSS) steps	
When a pilot is assigned and required to maintain separation with a sighted aircraft	Maintain separation with (or pass behind or follow) (aircraft type or identification) [instructions or restriction]	
Night vision imaging system (NVIS) operations		
Pilot request to operate at or not above a published or pilot calculated LSALT using NVIS		REQUEST (altitude) NVIS
		REQUEST NOT ABOVE (altitude) NVIS
Maintenance of specified levels		
Note: the term 'maintain' must not be used in lieu of 'descend' or 'climb' when instructing an aircraft to change level.	Maintain (level) [to (significant point)] [condition]	
Requesting block level		REQUEST BLOCK LEVEL (level) to (level)
When approved		CLIMB (or descend) TO AND MAINTAIN BLOCK (level) TO (level)
When established	Maintain block (level) to (level)	
When block clearance cancelled	Cancel block clearance. Climb (or descend) to and maintain (level)	

Circumstance	ATC phraseology	Pilot phraseology
Specification of cruising level	Cross (significant point) at (or above, or below) (level)	
	Cross (significant point) at (time) or later (or before) at (level)	
Reply to cruise climb request	Cruise climb not available (reason)	
Where an aircraft operation requires random climb and descent at and below (or at and above) a specified level	Operation not above (or below) (level)	

Frequency management

Circumstance	ATC phraseology	Pilot phraseology
Transfer of control and/or frequency change **Note:** An aircraft may be requested to 'standby' on a frequency when the intention is that the ATS unit will initiate communication, and to 'monitor' a frequency when information is being broadcast thereon.	Contact (unit callsign) (frequency)	
		(frequency)
	At (or over) (time or place) contact (unit callsign)	
		(frequency)
	If no contact (instructions)	
		REQUEST CHANGE TO (frequency) (service)
	Frequency change approved	

Circumstance	ATC phraseology	Pilot phraseology
Pilot request to maintain radio silence for a specific time or event (e.g. fuel dump)		REQUEST TO MAINTAIN RADIO SILENCE DUE (reason) [UNTIL (time)]
	Monitor (unit callsign) (frequency)	
		MONITORING (frequency)
	Remain this frequency	
Nominating scheduled reporting times	Report › (at time) › (by time)	
	Stand by for (unit callsign) (frequency)	
Changing to the CTAF (as applicable)		CHANGING TO (location) CTAF (frequency)
A pilot contacting next frequency when on a heading		HEADING (as previously assigned)
When a pilot/ATC broadcasts general information		ALL STATIONS (appropriate information)
When a pilot broadcasts location-specific general information		(Location) TRAFFIC (appropriate information) (location)

Circumstance	ATC phraseology	Pilot phraseology
Flights contacting approach control Not a radar-identified or procedural tower		(Distance) MILES (GNSS or DME) from (aerodrome) (bearing degrees) or (VOR radial) MAINTAINING/ DESCENDING TO (level) VISUAL (if visual approach can be made) INFORMATION (ATIS identification)
After landing	When vacated contact ground (frequency)	
To request a station, relay a clearance or information to a third party	For [relay to] (third party callsign) (clearance or information)	
Termination of control services	Control service terminated [due (reason)]	

Speed control

Circumstance	ATC phraseology	Pilot phraseology
Speed **Note:** All speed communications shall relate to indicated airspeed unless otherwise stipulated. Where applicable, Mach number may be nominated as the unit of speed statement.		SPEED (number) KNOTS (or Mach number)
	Report speed or ([climb or cruise] Mach number)	
	Maintain (number) knots [or Mach [number)] [or greater (or less)] [until (location)]	
	Maintain present speed	
	Increase (or reduce) speed to (or by) (number) knots	
	Reduce to minimum approach speed	
	Cross (significant point) [at (time)] [at (number) knots]	
When aircraft is required to reduce speed to the minimum position in a clean configuration	Reduce to minimum clean speed	
When ATC speed restrictions no longer apply, and the aircraft is required to resume profile speeds in accordance with published procedural requirements	Resume published speed	
When ATC speed restrictions no longer apply the aircraft can resume its 'normal' speed while complying with airspace and other speed restrictions that would apply in the absence of an ATC speed restriction.	Resume normal speed	

Circumstance	ATC phraseology	Pilot phraseology
ATC speed restrictions cancelled speed at pilot's discretion while complying with airspace speed limitations	No ATC speed restrictions	
All ATC and airspace speed restrictions cancelled	No speed restrictions	

Traffic information in a radar or surveillance environment

Circumstance	ATC phraseology	Pilot phraseology
Traffic Pilot request		REQUEST TRAFFIC (details)
Following pilot request or initiated by ATS	Traffic (number) o'clock (distance) (direction of flight) [any other pertinent information] › unknown › slow moving › fast moving › closing › opposite (or same) direction › overtaking › crossing left to right (or right to left) › (type) › (level) › climbing (or descending)	
When clear of traffic	Clear of traffic [appropriate instructions]	

Traffic information

Circumstance	**ATC phraseology**	**Pilot phraseology**
Traffic information Pilot request for traffic information		REQUEST TRAFFIC
To pass traffic information	No reported [IFR] traffic	
	[IFR] traffic (relevant information) [report sighting]	
	[additional] [IFR] traffic (direction) bound (type of aircraft) [level] estimated (or over [significant point]) at (time)	
To acknowledge traffic information		LOOKING TRAFFIC IN SIGHT NEGATIVE CONTACT [reasons]
Interception of relevant traffic information transmitted by other aircraft or ATS facility		COPIED (callsign of sender of traffic information intercepted)
Advice of military aircraft conducting abrupt vertical manoeuvres	Abrupt vertical manoeuvres at (position) up to (level)	
Advice of military low jet operations known to be taking place	Military low jet operations (relevant information)	

Meteorological information

Circumstance	ATC phraseology	Pilot phraseology
Request aerodrome data (if no ATIS available)		REQUEST WEATHER INFORMATION AT (the aerodrome)
	Runway (number) wind (vector) QNH (detail) temperature (detail) [visibility for take-off (detail) (or RVR detail)]	
Meteorological conditions **Note:** Wind is always expressed by giving the mean direction and speed and any significant variations **Note:** For complete RVR phrasing refer AIP GEN 3.4 **Note:** runway visibility may be indicated either by Runway visual range (RVR) or runway visibility (RV) **Note:** When visibility, cloud and present weather are better than prescribed values or conditions, the meteorological conditions may be described as CAVOK (cloud and visibility OK)	[Threshold] wind (number) degrees (number) knots	
	Wind at (height/altitude/flight level) (number) degrees (number) knots	
	Wind at up-wind end (number) degrees (number) knots	
	Visibility (distance) (direction)	
	Runway visual range or runway visibility [runway (number)] (distance) (for RV assessments – assessed at time (minutes))	
	Present weather (details)	
	Cloud (amount, [type] and height of base) (or sky clear)	
	CAVOK (pronounced cav-oh-kay)	
	Temperature [minus] (number) (and/or dewpoint [minus] (number))	
	QNH (number) [units]	
	Moderate (or severe) icing (or turbulence) [in cloud] (area)	

Circumstance	ATC phraseology	Pilot phraseology
During RVR / RV operations where an assessment is not available or not reported	Runway visual range or runway visibility (runway (number)) not available (or not reported)	
When responding to a request for flight conditions (excluding turbulence or icing information)	Report flight conditions	
		IMC (or VMC)

Reports and information

Circumstance	ATC phraseology	Pilot phraseology
Position reporting	Next report at (significant point)	
Additional reports	Report passing (significant point)	
To request a report at a specified place or distance	Report [GNSS] (distance) from (name of DME station) DME (or reference point)	
	Report passing (three digits) radial (name of VOR) VOR	
To request a report of present position	Report distance from (significant point)	
	Report distance from (name of DME station) DME	
When descending a non-DME equipped aircraft to LSALT above CTA steps	Report passing control area steps for further descent	
GNSS tracking	Confirm (or report) established on the (three digits) GNSS track (between (significant point) and (significant point))	

Circumstance	ATC phraseology	Pilot phraseology
GNSS navigation (unavailability) (resumption)	Confirm GNSS navigation	AFFIRM GNSS NAVIGATION or UNAVAILABLE (due to (reason e.g. loss of RAIM))
	GNSS available (due to (reason))	
Pilot report when satisfied that the CTA steps have been passed, allowing for navigational tolerances		INSIDE (distance of a CTA step as shown on ERC) miles
Aerodrome information	Runway (number) (condition)	
	Landing surface (condition)	
	Caution (work in progress) (obstruction) (position and any necessary advice)	
	Braking action reported by (aircraft type) at (time) good (or medium to good; or medium; or medium to poor; or poor; or less than poor)	
	Runway (or taxiway) dry (or wet; or standing water) depth (in millimetres or not reported)	
Information to aircraft		
Wake turbulence	Caution – wake turbulence	
Jet blast on apron or taxiway	Caution – jet blast	
Propeller-driven aircraft slipstream	Caution – slipstream	
Helicopter downwash	Caution – downwash	

Starting and initial clearance issues

Circumstance	ATC phraseology	Pilot phraseology
To request permission to start engines		[Aircraft location] REQUEST START
		[Aircraft location] REQUEST START INFORMATION (ATIS identification)
ATC response	Start approved	
	Start at (time)	
	Expect start at (time)	
	Expect departure (time) start at own discretion	
When clearance delivery is in operation		(Flight number, if any) TO (aerodrome of first intended landing), REQUEST CLEARANCE
If runway other than runway nominated is required		REQUIRE RUNWAY (number)
When no ATIS broadcast is available	Runway (number), wind (direction and speed), QNH (detail) temperature (detail) [visibility for take-off (detail (or RVR) (detail)]	REQUEST DEPARTURE INFORMATION

Clearances

Circumstance	ATC phraseology	Pilot phraseology
Inflight clearances		REQUEST CLEARANCE
	Cleared to (details)	
If the route and/or level issued in the initial airways clearance is not in accordance with the flight plan.	Cleared to (destination) [amended route] (route clearance details) [amended level] (level)	
If an airways clearance is amended en route	Recleared (amended route portion) to (significant point of original route) [rest of clearance unchanged] [(level)]	
Where the clearance is relayed by a third party, for example pilot/flight watch (ATC excepted)	(Name of unit) clears (aircraft identification)	
When clearance will be issued subject to a delay	Remain outside class (airspace class) [and (airspace class)] airspace and standby	
When clearance will be issued at a specified time or place	Remain outside class (airspace class) [and (airspace class)] airspace, expect clearance at (time/place)	
When clearance will not be available	Clearance not available, remain outside class (airspace class) [and (airspace class)] airspace	
When requesting a deviation from cleared route		REQUEST TO DEVIATE UP TO (distance) MILES LEFT (or RIGHT) OF ROUTE DUE (reason)

Circumstance	ATC phraseology	Pilot phraseology
When requesting a deviation from cleared track		REQUEST TO DEVIATE UP TO (distance) MILES LEFT (or RIGHT) OF TRACK DUE (reason)
When a request for deviation from cleared route or track is given	Deviate up to (distance) miles left (or right) of route (or track)	
When clearance cannot be issued	Unable, traffic (direction) inbound (type of aircraft) (level) estimated (or over) (significant point) at (time) callsign (callsign) advise intentions	
When a weather deviation has been completed and onwards clearance is requested		CLEAR OF WEATHER [request (route clearance)]
When a weather deviation has been completed and the aircraft has returned to its cleared route		BACK ON ROUTE (or TRACK)
When subsequent restrictions/requirements are imposed in addition to previous restrictions/ requirements to be complied with.	Further restriction	
	[Re]enter control area (or zone) [via (significant point)] at (level) [at (time)]	
	Leave control area (or zone) at (level) (or climbing or descending)	
	Leave and re-enter-controlled airspace at (level) (or climbing/ descending to (level) or on (type of approach))	
	Join (specify) at (significant point) at (level) at (time)	

Circumstance	ATC phraseology	Pilot phraseology
Indication of route and clearance limit	From (place) to (place) followed as necessary by: › direct › via (route and/or reporting points) › via flight planned route	
	(Level or route) not available due (reason) alternative(s) is/are (levels or routes) advise	
Issuing a specific clearance limit	Clearance limit (places/NAVAID)	
When pilot requests, or ATC anticipates, a visual departure in lieu of a SID	[Clearance details] visual departure	
When a clearance has been cancelled	Cancel clearance	
		CANCEL CLEARANCE
Change of flight rules		
Cancelling IFR		CANCEL IFR
Changing from VFR to IFR		CHANGE OF FLIGHT RULES REQUEST IFR

Circumstance	ATC phraseology	Pilot phraseology
Requesting clearance		
When notification of flight details had not been submitted to ATS	Go ahead flight details	FLIGHT DETAILS (INBOUND) or FOR (DEPARTURE or transit)]
Flight details to be passed after ATS response		(Aircraft type) (position) (route in controlled airspace and next estimated) (preferred level)
If clearance cannot be issued immediately (upon request)	Expect clearance at (time or place)	
If giving warning of clearance requirement		EXPECT CLEARANCE REQUEST (aircraft type) VFR (if appropriate) FOR (destination) VIA (point outside controlled airspace at which clearance will be requested) ESTIMATE (estimate at destination) at (altitude proposed for entry to controlled airspace)

Taxi procedures

Circumstance	ATC phraseology	Pilot phraseology
Taxi procedures		
For departure at a controlled aerodrome		(Aircraft type) [persons on board (POB) (number)] [DUAL(or SOLO)] INFORMATION (ATIS identification) [SQUAWK (SSR code)] [aircraft location] [flight rules, if IFR] [TO (aerodrome of destination)] REQUEST TAXI (intentions)
For departure at a non-controlled aerodrome		(Aircraft type) [POB (number)] [IFR (if operating IFR)] TAXIING (location) FOR (destination or intentions) RUNWAY (number)
Where detailed taxi instructions are required		[Aircraft type] REQUEST DETAILED TAXI INSTRUCTIONS
	Taxi via (specific routine to be followed) to holding point [identifier] [runway (number)] [time (minutes)]	
		HOLDING POINT (identifier), RUNWAY (number)

Circumstance	ATC phraseology	Pilot phraseology
Where aerodrome information is not available from an alternative source such as ATIS		Taxi to holding point [identifier] (followed by aerodrome information as applicable) [time (minutes)]
		HOLDING POINT (identifier)
For arrival at a controlled aerodrome		(Aircraft callsign) [parking area or bay number]
	Taxi to [terminal or other location [for example, general aviation area] [stand (number)]	
Intersection departures		
When a pilot requests an intersection departure		REQUEST INTERSECTION DEPARTURE FROM (taxiway identifier)
	Taxi to holding point (taxiway identifier) [runway (number)]	
When a pilot is offered an intersection departure	Intersection departure available from (taxiway identifier) (distance) remaining – if this information is not readily available to the pilot	
	Taxi to holding point (taxi identifier) [runway (number)]	

Circumstance	ATC phraseology	Pilot phraseology
Specific routing	Take (or turn) first (or second) left (or right)	
	Taxi via (identification of taxiway)	
	Taxi via runway (number)	
Manoeuvring on aerodrome **Note:** The pilot must, when requested, report 'runway vacated' when the aircraft is well clear of the runway.	Backtrack approved	REQUEST BACKTRACK
	Backtrack runway (number)	
		[Aircraft location] REQUEST TAXI TO (destination on aerodrome)
	Taxi straight ahead	
	Taxi with caution (reason)	
	Give way to (description and position of other aircraft or vehicle)	
		GIVING WAY TO (traffic)
	Taxi into holding bay	
	Follow (description of other aircraft or vehicle)	
	Vacate runway	
		RUNWAY VACATED
	Expedite taxi [reason]	
		EXPEDITING

Aerodrome movements

Circumstance	ATC phraseology	Pilot phraseology
Holding **Note:** The procedure words 'roger' and 'wilco' are insufficient acknowledgment of the instructions 'hold', 'hold position' and 'hold short of' (position). In each case, the acknowledgment must be 'holding' or 'holding short', as appropriate.	Hold (direction) of (position, runway number, etc)	
	Hold position	
	Hold short of (position)	
		HOLDING
		HOLDING SHORT
To cross a runway **Note:** If the control tower is unable to see the crossing aircraft (for example at night or in low visibility) the instruction should always be accompanied by a request to report when the aircraft has vacated and is clear of the runway.		AT (or ON) (location)] REQUEST CROSS RUNWAY (number)
	[At (or on) (location)] cross runway (number) [report vacated]	
		AT (or ON) (location) CROSSING RUNWAY (number)
	Expedite crossing runway (number) traffic (aircraft type) (distance) miles final	

Runway operations

Note: During multiple runway operations where the possibility of confusion exists, the runway number will be stated. The runway number may be stated if the caller wishes to emphasise the runway to be used. For parallel runway operations on discrete frequencies, at Class D aerodromes, the runway number may be omitted.

Circumstance	ATC phraseology	Pilot phraseology
Preparation for take-off		
When reporting ready for take off	Report when ready [for departure] ready [for circuits] via (published departure route, circuit leg for departure or first tracking point)	
	Are you ready for immediate departure?	
		READY
		READY, RUNWAY (runway identifier) **Note:** For operation at Class D aerodromes with parallel runway operations

Circumstance	ATC phraseology	Pilot phraseology
Clearance to enter runway and await take-off		
When the pilot desires to enter the runway and assume take-off position for checks before departure		REQUEST LINE-UP [require (required number of seconds delay in lined-up position before departure) SECONDS ON RUNWAY]
	Line up [and wait] [runway (number)] [be ready for immediate departure]	
Conditional clearances	(Condition) line up [runway (number)] (brief reiteration of condition)	

Circumstance	ATC phraseology	Pilot phraseology
Acknowledgment of a conditional clearance		(Condition) LINE UP [RUNWAY (number)] [AND WAIT]
Take-off clearance		
	Cleared for take-off [report airborne]	
		CLEARED FOR TAKE OFF
Multiple runway operations, other than Class D aerodromes where aircraft are operating on parallel runways using discrete frequencies	Runway (number) cleared for take-off	CLEARED FOR TAKE OFF RUNWAY (number)
When take-off clearance has not been complied with.	Take off immediately or vacate runway	
	Take off immediately or hold short of the runway	
When land and hold short operations (LAHSO) are in use		(Aircraft type) LANDING ON CROSSING RUNWAY WILL HOLD SHORT — RUNWAY (number) CLEARED FOR TAKE-OFF
Radar departure	Assigned heading (left or right) (three digits) (altitude restriction) [runway (number)] cleared for take-off	
Visual departure	(Instruction) (runway number) cleared for take-off (left or right turn)	

Circumstance	ATC phraseology	Pilot phraseology
Radar instructions during visual departure	(instructions) maintain runway heading (or turn left or right) heading (three digits) visual (altitude restriction) runway (number) cleared for take-off.	
		(instructions) MAINTAIN RUNWAY HEADING (or TURN LEFT or RIGHT) HEADING (three digits) VISUAL (altitude restriction) RUNWAY (number) CLEARED FOR TAKE OFF
Take-off clearance cancellation		
To stop a take-off in emergency conditions	Hold position, cancel, I say again, cancel take-off (reason)	
	Stop immediately (repeat aircraft callsign) stop immediately (reason)	

After take-off

Note: All 'level' reports to radar must be to the nearest 100 ft.

Circumstance	ATC phraseology	Pilot phraseology
Tracking after take-off		REQUEST RIGHT (or LEFT) TURN [when airborne]
	Left (or right) turn approved	
	After passing (level) (tracking instructions)	
Instruction to make a 180-degree turn	Make (left or right), I say again (left or right) turn	
Heading to be followed	Continue on (magnetic direction of runway) (instructions)	

Circumstance	ATC phraseology	Pilot phraseology
When a specific track is to be followed	Track (magnetic direction of runway) (instructions)	
	Climb straight ahead (instructions)	
Airborne report – radar		
Where an ATS surveillance service is provided		PASSING (level) CLIMBING TO (level)
Heading specified by ATC		TURNING LEFT (or RIGHT) (three digits) PASSING (level) CLIMBING TO (level)
When assigned heading approximates runway bearing	MAINTAINING RUNWAY HEADING PASSING (level) CLIMBING TO (level)	HEADING (three digits) PASSING (level) CLIMBING to (level)
Departure report – non-radar		
When notifying departure report to a Class D control tower		TRACKING (track being flown) [FROM (reference aid used to establish track) or VIA SID (identifier)] CLIMBING TO (level)
Non-controlled aerodromes		DEPARTED (location) (time in minutes) TRACKING (track being flown) [FROM (reference aid used to establish track) or VIA SID (identifier)] CLIMBING TO (level) ESTIMATING (first reporting point) AT (time)

Approach and area control services

Circumstance	ATC phraseology	Pilot phraseology
Departure instructions	Track (three digits) degrees [magnetic] to (or from) (significant point) [until (time) (or reaching) (fix or significant point or level)]	
Approach instructions	Cleared visual approach (runway)	
		REQUEST [STRAIGHT-IN APPROACH]
	Cleared straight-in (runway)	
	Commence approach at (time)	
Pilot to advise when able to conduct a visual approach	Report visual	
	Report runway [lights] in sight	
	Report (significant point) [outbound or inbound]	
Holding instructions		
Visual	Hold visual [over] (position)	
Minimum fuel		
To advise ATC of minimum fuel status		MINIMUM FUEL
ATC acknowledgment of minimum fuel status **Note:** Advice of fuel status must be made to each ATC sector on frequency transfer.	Minimum fuel acknowledged [no delay expected or expect (delay information)]	
Expected approach time	No delays expected	
	Expected approach time (time)	

Arrival at aerodrome

Circumstance	ATC phraseology	Pilot phraseology
Entering aerodrome traffic circuit		
When arriving at non-controlled aerodrome		(Location) Aircraft type and callsign (position) (level) (intentions) (location) e.g.Port Macquarie Traffic, ZULU TANGO QUEBEC, CESSNA 172 JOINING CROSSWIND RUNWAY (IDENTIFIER) at 1,000 (ft) FOR TOUCH AND GO
When arriving at controlled aerodrome		[Aircraft type] (position) (level) INFORMATION (ATIS identification) (intentions)
	Join (instruction) runway (number) QNH (detail) [traffic (detail] [track (requirements)]	
	Overfly (circuit direction – runway (identifier) (level) (QNH) (traffic) (detail) (track [requirements])	
In the circuit Non-controlled aerodrome		(Position in circuit, for example DOWNWIND/ FINAL)
		(Position in circuit, for example DOWNWIND/ FINAL) [GLIDE APPROACH, FLAPLESS APPROACH]

Circumstance	ATC phraseology	Pilot phraseology
Controlled aerodrome	Number (sequence number) follow (aircraft type and position) [additional instructions if required]	
	Overfly (circuit direction) runway (number) (level) [QNH (detail)] [traffic (detail)] [track (requirements)]	
Nearing position at which approach must be aborted if not cleared to land		SHORT FINAL
Abnormal operations/ doubt exists **Note:** When doubt exists as to whether the gear is fully extended, or when a general aviation aircraft with retractable undercarriage has experienced abnormal operations.	Check gear down (and locked)	
		GEAR DOWN (and locked)
Approach instructions	Make short approach	
	Make long approach (or extend downwind)	
	Report base (or final or long final)	
	Continue approach	

Circumstance	ATC phraseology	Pilot phraseology
Landing		
	Cleared to land (or touch and go) (or stop and go)	CLEARED TO LAND (TOUCH AND GO) or (STOP AND GO)
Multiple runway operations, other than Class D aerodromes where aircraft are operating (or conducting stop and go) on parallel runways using discrete frequencies	Runway (number) cleared to land (or touch and go) (or stop and go)	
Where the aircraft cannot be sighted by ATC	[Runway (number)] not in sight – cleared to land	
Pilot requesting option for touch and go, full stop, stop and go, or go-around		(Position in circuit) REQUEST THE OPTION (the option)
Advising the pilot of the option to touch and go, full stop, stop and go, or overshoot	[Runway (number)] cleared for (the option)	
	Make full stop (reason) cleared to land	
Missed approach		
	Go around [track extended centreline (three digits)] degrees (or instructions)]	
To discontinue an approach		GOING AROUND
Multiple runway operations		GOING AROUND RUNWAY (number)

ATS surveillance service phrasing

General phrases

Circumstance	ATC phraseology	Pilot phraseology
Identification of aircraft	Report heading [and flight level (or altitude)]	
	For identification turn left (or right) heading (three digits)	
	Identified [(position)]	
	Not identified [reason] [resume (or continue) own navigation]	
Termination of ATS surveillance services	Identification terminated [due to (reason)] [(instructions)] [frequency changed approved]	
	Will shortly lose identification (appropriate instructions or information)	
	Identification lost [reasons] [(instructions)]	
ATS surveillance system position information		
To request traffic, position and/or navigation information from a SIS		REQUEST: ATS SURVEILLANCE ASSISTANCE (reason) POSITION [WITH REFERENCE TO (aid or location)] TRAFFIC (or POSITION or NAVIGATION) ADVISORY [BY SURVEILLANCE] (HANDOFF FOR) FLIGHT FOLLOWING

Circumstance	ATC phraseology	Pilot phraseology
To terminate an ongoing SIS		CANCEL FLIGHT FOLLOWING
	Position (distance) (direction) of (significant point) (or over or abeam (significant point))	
Where ongoing SIS is not available	ATS surveillance not available	
To request the aircraft's SSR or automatic dependent surveillance-broadcast (ADS-B) capability	Advise transponder capability	
To advise the aircraft's SSR or ADS-B capability		TRANSPONDER (ALPHA, CHARLIE or SIERRA as shown in the Flight Plan)
		ADS-B TRANSMITTER [TEN NINETY DATALINK]
		ADS-B RECEIVER [TEN NINETY DATALINK]
		NEGATIVE TRANSPONDER

ATS surveillance service communication and navigation

Circumstance	ATC phraseology	Pilot phraseology
Communications	[If] radar contact lost (instructions)	
	[If] no transmissions received for (number) minutes (or seconds) (instructions)	
	Reply not received (instructions)	
If loss of communications is suspected	If you read manoeuvre instructions or squawk (code or identification (ident))	
	(Manoeuvre or squawk) observed, position (position of aircraft), will continue to pass instructions	

ATS surveillance system manoeuvres

Circumstance	ATC phraseology	Pilot phraseology
General manoeuvres	Leave (significant point) heading (three digits) [inbound] [at (time)]	
	Continue heading (three digits)	
	Continue present heading	
	Fly heading (three digits)	
	Turn left (or right) (number) degrees (or heading (three digits) [reason])	

Circumstance	ATC phraseology	Pilot phraseology
When an aircraft is assigned a level below the minimum sector altitude (MSA)/LSALT	Climb (or descend) to (level) visual	
When instructing an aircraft to turn 180º or more and to emphasise the direction of turn	Orbit left (or right) [reason]	
	Turn left (or right) (number) degrees (or heading (three digits)) [climb (or descend) to (level)] visual	
	Stop turn heading (three digits)	
When necessary to specify a reason for a manoeuvre, the following phrasing should be used	Turn left (or right) – I say again – left (or right) heading (three digits) [reason]: › due traffic › for spacing › for delay › for downwind (or base, or final)	
Aircraft vectoring by ATS surveillance services		
Pilot or ATS initiated	Do you want vectors?	REQUEST VECTORS [to (or from) (aid, location or reason)]
To transfer responsibility to the pilot for navigation and terrain clearance (as applicable) on termination of vectoring)	Resume own navigation (position of aircraft) (specific instructions)	

Secondary surveillance radar (SSR) and ADS-B

Circumstance	ATC phraseology	Pilot phraseology
To instruct setting of transponder **Note:** The word 'code' is not used in transmissions. **Note:** ADS-B and SSR are linked in many aircraft and terminating one will terminate the other.	Squawk (code) [and ident if required]	[SQUAWK] (code) [AND IDENT if instructed by ATS]
	Squawk normal	
Reselection of the assigned mode and code	Recycle [(mode)] (code)	RECYCLING [(mode)] (code)
Reselection of aircraft identification	Re-enter Mode S (or ADS-B) aircraft identification	
Confirmation of Mode A code selection	Confirm squawk (code)	SQUAWKING (code)
Operation of the ident feature	Squawk ident	(Transmit ADS-B ident)
Temporary suspension of transponder operation	Squawk standby [transmit ADS-B only]	
Emergency code selection termination of SSR transponder or ADS-B transmitter operation	Squawk MAYDAY	
Termination of SSR transponder or ADS-B operation	Stop squawk [transmit ADS-B only]	
	Stop ADS-B transmission [squawk (code) only]	

Circumstance	ATC phraseology	Pilot phraseology
Pressure setting check and confirmation of level	Squawk Charlie Transmit ADS-B altitude	
	Check altimeter setting and confirm level	
Altitude check	Verify [level] (level)	
Confirmation of ADS-B operation	ADS-B transmissions not received, confirm ADS-B operational	
Change to secondary transponder	Select secondary transponder	
Advice on traffic level where the pressure altitude derived level information has not been verified	Unverified level (level)	

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SARTIME

Circumstance	ATC phraseology	Pilot phraseology
SARTIME nomination		SARTIME DETAILS
	Standby or (callsign)	
		SARTIME FOR DEPARTURE (or ARRIVAL) [location] (time)
SARTIME cancellation	(callsign) (position/location) SARTIME/SARWATCH Terminated	(position/location) CANCEL SARTIME
SARTIME amendment		SARTIME DETAILS
	Standby or (callsign)	
		Amend SARTIME details using the specific phrases above as applicable.

Emergency – distress and urgency

Circumstance	ATC phraseology	Pilot phraseology
Distress message		MAYDAY MAYDAY MAYDAY followed by: › station being addressed › aircraft identification › nature of distress › intentions › position level and heading › other useful information details
Acknowledgement of distress	Roger MAYDAY	
Acknowledgement of distress on frequency handover	MAYDAY (type) acknowledged	
Imposition of radio silence due to an emergency	Stop transmitting. MAYDAY	

Circumstance	ATC phraseology	Pilot phraseology
Urgency message		PANPAN PANPAN PANPAN followed by: › station being addressed › aircraft identification › nature of urgency › intentions › position level and heading › other useful information details
Acknowledgement of urgency	Roger PAN	
Acknowledgement of urgency on frequency handover	PAN (type) acknowledged	

CHAPTER 6
DECISION-MAKING AND HAZARDS

Many if not all outdoor activities are associated with various levels of risk. Aviation is no exception and, when analysed, the risks are generally higher than in other activities.

However, although the risk can never be eliminated, with awareness, understanding and training, many of the risks for pilots can be mitigated to an acceptable level. Where this occurs, private and general aviation can be a safe and personally rewarding activity.

Often, the factors contributing to an accident have similar themes:

- lack of fitness to fly
- lack of recency or competence
- attitudes and poor decision-making.

Fatal accidents are regularly the result of:

- loss of control
- non-VMC flight and collision with terrain
- mid-air collision.

Pilot fitness

In aviation, the importance of fitness is no different to driving a car. Many aviation accidents identify fatigue or other medical factors, including physical and mental fitness, as being a contributory factor.

The IMSAFE pneumonic is useful to determine if you are physically and mentally fit and safe to fly:

- Illness – Am I suffering any illness or symptom of an illness which might affect the safety of the flight?
- Medication – Am I taking any medication, prescription or over the counter? Most medications come with warning that should be adhered to.
- Stress – Am I suffering from stress? Undue stress from the psychological pressures of everyday living can be a powerful distraction and affect your performance.
- Alcohol – Am I, or likely to be, affected by alcohol? Know the legal limits. Aside from being required to have close to a no alcohol reading during a breath test, you must not consume any alcohol within 8 hours before you fly.
- Fatigue – Am I fatigued? Have I had sufficient sleep or rest? Insufficient sleep can affect your decision-making processes. It is your responsibility to be satisfied you are not too fatigued to fly.
- Eating – Have I eaten properly and taken sufficient fluid so I can work effectively?

Carbon Monoxide (CO) detectors: It is strongly recommended that pilots of piston engine aircraft should wear personal CO detectors. Refer AMC GM Part 91.

Illness and medication

Common ailments such as the cold, flu or hay fever can affect your performance. Common over-the-counter medications that provide temporary relief can have further effects on your performance or fitness to fly. You should check the warning that comes with the medication. Consult your doctor as they may be able to advise of an alternative medication that is safe to use.

Stress

Outdoor activities away from your normal routine of work are often used to relieve the stresses of daily life. Flying may be such an activity, in good weather conditions. However, in a cross-country flight with passengers who are unfamiliar with light aircraft, weather conditions that are turbulent or with a marginal cloud base, the effort of maintaining VFR or coping with an airsick passenger can add to your stress level.

Alcohol

Unlike driving, the permitted level of alcohol is less than 0.02 grams in 210 litres of breath when flying or working in a safety sensitive area. In effect, consumption of alcohol by persons involved in safety sensitive aviation activities is against the law. You can be subject to random tests for alcohol and other drugs. In addition, you are not to drink any alcohol up to 8 hours before your flight. Any amount of alcohol in your body can affect your fitness to fly.

Fatigue and eating

CAO 48.1 requires that a pilot must not fly either privately or for an operator if they are, or likely to be, unfit to fly due to fatigue. Therefore, it is your responsibility to be satisfied you are not, or likely to be, fatigued when you fly. An early start after late evening work should be avoided. Be aware of the cumulative effect of fatigue. Fatigue due to periods of poor sleep over several or more nights, will not be overcome by a single night's sleep.

If you are unable to obtain food or drinks during a long day of flying, take some with you. Being hungry and dehydrated can significantly increase your fatigue.

Pilot competence

Maintaining your proficiency

While some sectors which fly under the VFR account for a high number of hours flown, the average annual hours flown by a VFR pilot in private operations is regularly less than 50 hours. Proficiency in aircraft handling skills and operating procedures can deteriorate quickly when the pilot's overall experience or flight hours are low.

To exercise the privileges of your licence for a class or type rating including any operational rating or endorsements CASR 61.385 and its associated MOS requires that you remain competent in the following:

- operating the aircraft's navigation and operating systems
- conducting all normal, abnormal and emergency flight procedures for the aircraft
- applying operating limitations
- weight and balance requirements
- applying aircraft performance data, including take-off and landing performance data, for the aircraft.

Therefore, maintaining your proficiency requires a conscious effort. You should:

- Spend time reading the aircraft flight manual (AFM) and review speeds, limitations and other operating procedures for the aircraft.
- Review and refresh operating procedures, including procedure at your local aerodrome if they are complex, such as aerodromes in D airspace. Review and refresh how to complete a weight and balance check. Review other relevant subjects such as flight planning and fuel calculations. Can I still understand NOTAMs?
- Even when you are not flying, continue to study weather and read forecasts to understand how weather maps change from season to season and what different types of weather systems mean for the weather you are likely to experience. Do I understand what all the acronyms mean on a weather forecast?
- Know your recency requirements. Have I completed 3 take-offs and landings in the previous 90 days, to carry a passenger? Has my flight review been completed?
- Undertake dual instruction if you have doubt about your abilities. When did I last practise a forced landing or stall recovery?
- When converting to a new aircraft, get ahead by studying the AFM/POH in advance. Prepare and ask questions about the aircraft systems and discuss them with your flight instructor. Don't leave your conversion flight lacking understanding of all the systems in the aircraft.

CASA conducts aviation safety seminars at various locations across the country. These are listed on the CASA website.

CASA and other organisations regularly publish other guidance material on specific subjects that are topical. Such organisations include:

- Aircraft Owners and Operators Association
- Recreational Aviation Association of Australia
- Gliding Federation of Australia
- Australian Sport Rotorcraft Association
- Sport Aircraft Association of Australia.

Attitude

Attitude plays an important role in maintaining your proficiency. A thoughtful and cautious attitude to the hazards encountered in flying is imperative for safe flight. An indifferent attitude that results in poor decision-making has often been identified as a contributory factor to an accident.

It is important to remember:

Follow the Rules – they are usually right: The Part 91 General and operating flight rules set out the minimum limits to safety. While they may not guarantee safety, breaking them is most likely to increase your exposure to unsafe events. CASA has developed a *Plain English Guide* to help you understand and follow the rules. The guide is available from the CASA website and the online store.

Think first: Avoid impulsive actions and think before you act. Impulsive or spontaneous actions have led to actions that caused an incident or accident.

It could happen to me: Avoid complacency and be meticulous about pre-flight checks, NOTAMS and weather reports. An untold truth about aviation is that hazards treat experienced and less experienced participants equally.

Taking chances is foolish: Taking risks to impress others is foolish. Low flying over a friend's property, a take-off in poor weather or at night without the qualification has led to disaster.

Just because someone else is doing it, does that make it OK for me to do it? Many a pilot has copied other pilots' actions. Know you own mind and your own limitations. Exceeding aircraft limitations or breaking a rule is unacceptable behaviour that can lead to unsafe flight or worst, a tragedy. Please refer to the personal minimums checklist **Personal minimums checklist card – CASA Online store** for mor information.

Decision-making

Decision-making is the act of choosing between alternatives under conditions of uncertainty. The very nature of flying and the environment means we are subject to continuous monitoring and re- evaluating. Decisions may have to be made within a tight timeframe. In every stage of the flight you must consider weather, airspace, aerodrome conditions, fuel management, expected time of arrival and so forth. Good decision-making involves risk assessment, the consideration of options that are available and acting on those options accordingly.

Knowledge and information

- Obtain and review all the information relating to the flight. This not only includes weather and NOTAMs, but a study of the route, and aerodromes along the route.
- Regulatory compliance does not guarantee safety but is an essential baseline for decision-making, so it is important to know the regulations relevant to your flight.
- Develop a good understanding of your aircraft's capabilities, performance, and limitations.
- Prepare and understand the procedures for aerodrome operations, air traffic services and airspace.
- Consider the characteristics of different weather systems and what the implications are for your flight.
- Identify alternative options to your plan, so early planning of possible diversion is possible if need be.
- Re-evaluate situations when new information is available or when new factors emerge.
- Do not discount information, just because it contradicts your existing understanding of a situation.
- Understand the limitations of your skills and capabilities.

Mercy flights: There may be times when it is necessary for pilots to not follow aviation safety rules in order to respond to a sudden or extraordinary emergency. You are required to report such breaches to CASA. Please refer to **www.casa.gov.au/operations-safety-and-travel/safety-advice/mercy-fights-and-operating-emergency**.

External influences

- Ensure you are fit to fly. Good decisions are more likely if you are not distracted by being fatigued, unwell, hungry, or dehydrated, any of which might cause you to lose concentration.
- Unsafe situations emerge when you expose yourself to pressure to complete a flight, commonly known as 'get-there-itis'. Avoid planning a flight where such delays due to weather or aircraft serviceability would place you in a difficult situation such as needing to return for an important work meeting.
- You need to understand the limitations of flying in light aircraft and why it is sometimes not safe to fly due to weather or aircraft serviceability issues.

Avoiding distractions

Being distracted during a critical phase of a flight could cause you to neglect controlling the aircraft. These may include:

- Attempting to shut open doors or canopies while close to the ground soon after take-off.
- Attempting to diagnose certain cockpit warnings or other system issues during the approach and landing phase of a flight.
- Passengers talking or being disruptive through critical phases of a flight.
- Pressure from deadlines you need to meet.

Issues such as open doors or warning lights, except for a landing gear warning light, can normally wait until the aircraft is at a safe altitude when your attention can be given to resolving them.

In the case of landing gear warning lights, go around and resolve the issue at a safe altitude and out of the circuit area.

Time and capacity

- Give yourself time to review information free from distractions when making pre-flight decisions. Give yourself extra time to account for things such as passengers or potential aerodrome-related delays. Avoid flying under time pressure.
- Make decisions in good time. Be wary of delaying decisions such as whether to divert due to weather on the basis that you can wait and see what happens. You may miss the window of opportunity to ensure a safe outcome.
- In the air, think ahead of the position of the aircraft so that you can anticipate what decisions will have to be made, such as what type of circuit to join to conduct at your destination or whether to ask for a transit of controlled airspace.
- Anticipate and control developments in the flight rather than simply reacting to them. For example, use time in the cruise phase of the flight, to think something through, when you have less issues to cope with.

Experience

- As you broaden your experience, your understanding of how to interpret situations should improve. As you take on more challenging flights you will need to balance this with an appropriately cautious attitude and take advice if you are unsure of something.
- As you gain experience you will need to avoid the traps of experience such as complacency or the reinforcement of risky behaviour.
- Close calls can be intimidating. You may be able to get away with flying in bad weather or using a short runway; however, you need to reflect on the fact that you may not be so lucky next time.
- Always keep learning from the experiences and mistakes of others. The ATSB publishes experiences and mistakes of others as part of their accident investigation reports. These reports and other research material can be found on their website: **www.atsb.gov.au**.
- CASA produces **Flight Safety Australia** magazine that features articles on decision-making scenarios and other matters of aviation safety.

Improving your decision-making

If you are aware of common decision-making traps you can fall into it can help mitigate error. Some of these traps are:

- jumping to assumptions or conclusions
- not considering all available options
- not communicating with others
- complacency
- assuming you don't have time
- failing to consult
- failing to evaluate and review.

You cannot improvise a good decision; you must prepare for it. You will make better timelier final decisions if you have considered all the options in advance.

In summary:

- Give yourself time to review information free from distractions when making pre-flight decisions. Give yourself extra time to account for factors such as passengers or potential aerodrome-related delays. Avoid flying under time pressure.
- In the air, think ahead of the position of the aircraft so you can anticipate what decisions will have to be made, such as obtaining weather from the AWIS, considering what type of circuit join to conduct at your destination and completing checklists.
- Anticipate and control developments in the flight rather than simply reacting to them. For example, use time in the cruise phase of the flight, when you have less pressure, to review the aerodrome information and weather as you prepare for landing.
- In the event of an emergency, land at the nearest suitable aerodrome, avoid deviating from the trained procedures and follow the aircraft emergency checklist and procedures. Don't delay in calling ATS for assistance.
- Where possible advise others of your plans before you act. This increases the chances of successful follow through on your decision and ensures people are not caught unawares.
- When time is not so critical, involve others in the decision-making. That way everybody is more invested in the decision and therefore likely to be more motivated to support it.

Hazards

Loss of control

Loss of control accidents that occur during the approach and landing, take-off and initial climb phases of flight are often the result of the unrecognised stall and subsequent spin. Any uncontrolled flight, even from a low altitude to the ground, will generally result in a fatal accident.

Poor speed control and turning back to the runway in the event of an engine failure are consistent themes leading to these accidents.

Turbulence and crosswinds during take-off or landing can be challenging and can lead to the aircraft departing the runway. These incidents or accidents are generally the result of poor handling technique and speed control.

To fly the aircraft safely, you will need to remain proficient, know the aircraft and understand its limitations. You must:

- remain proficient in slow flight and stall recognition and recovery techniques
- understand that landing in crosswinds and/or turbulent conditions requires proficiency. Undertake training with an instructor if you feel your proficiency is not being maintained.
- know the Pilot Operating Handbook limitations, including the correct speeds in all phases of flight, including stall (clean and with flap) and best glide
- remember the stall speed increases as the G-loading increases. An aircraft that stalls at 50 kts in level flight will stall at approximately 70 kts in a 60-degree turn.
- know your aircraft's performance limitations to ensure you have sufficient runway available and obstacle clearance during approach or climb out
- apply a safety buffer or margin to the determined take-off or landing distances from the Pilot Operating Handbook to allow for pilot performance, runway conditions, slope or other factors
- understand the amount of turbulence or crosswind that can make speed control and touchdown precision much more challenging
- know that judging height and distance when the sun is low can often make touchdown challenging.

VFR flight into IMC

The dangers of VFR pilots flying into IMC have been recognised for a very long time, yet they still fly into deteriorating weather and IMC.

Pilot decision-making, particularly regarding weather and flight, is often complex; however, the solution to avoiding VFR into IMC when weather is marginal before take-off is not to depart. During flight, it is to turn back or divert before it becomes impossible to do so.

Accidental flight into cloud can be prevented by always ensuring you have a defined horizon above the terrain and below the cloud and, when this is not the case, deciding early to turn back or divert.

Mid-air collisions

Unfortunately, there is at least one mid-air collision in Australia every 10 years. Almost all mid-air collisions occur in good weather and visibility at relatively low level. Around half of mid-air collisions happen near aerodromes, with many in the circuit.

As aviation developed, with increasing aircraft performance, traffic density and flight in non-visual conditions, it became apparent that unalerted see-and-avoid had significant limitations. The need to enhance a pilot's situational awareness led to the principle of 'alerted see-and-avoid'.

The primary tool of alerted see-and-avoid that is common across aviation—from sport and recreational to air transport—is radio communication. Radio allows for the communication of information (in this instance traffic information) to the pilot from the ground (Air Traffic Services) or from other aircraft.

See CASA AC 91.14 – Pilots' responsibility for collision avoidance – which provides detailed guidance on the limitation of see-and-avoid and AC 91.10 – Operations at non-controlled aerodromes. These ACs provide practical information about collision avoidance when flying in the vicinity of a non-controlled aerodrome.

Further reading

Safety Behaviours: Human Factors for Engineers resource kit | Civil Aviation Safety Authority (casa.gov.au)

casa.gov.au/spin-avoidance-and-stall-recovery-training

casa.gov.au/guidelines-aeroplanes-mtow-not-exceeding-5-700-kg-suitable-places-take-and-land Guidelines for aeroplanes with MTOW not exceeding 5,700 kg – suitable places to take-off and land

casa.gov.au/download/operations-vicinity-non-controlled-aerodromes-0 Operations in the vicinity of non-controlled aerodromes

casa.gov.au/download/pilots-responsibility-collision-avoidance Pilots' responsibility for collision avoidance

casa.gov.au/guidelines-aircraft-fuel-requirements-0 Guidelines for aircraft fuel requirements

CASA Search Centre **casa.gov.au/search-centre**

casa.gov.au/fuel-and-oil-safety Fuel and oil safety

casa.gov.au/guidelines-helicopters-suitable-places-take-and-land Guidelines for helicopters – suitable places to take-off and land

casa.gov.au/wake-turbulence Wake turbulence

CHAPTER 7

DEALING WITH EMERGENCY SITUATIONS

When considering your responsibilities for the safe outcome of a flight (CASR 91.215), there should be no compromise when it comes to safety. If at any time, during your flight, you become aware of a situation that has occurred or is occurring that puts the aircraft and persons on board in danger or at risk you should take immediate action to avoid such danger or risk.

Planning

The Australian Maritime Safety Authority (AMSA) is responsible for aviation and maritime search and rescue (SAR) in Australia and, each year, hundreds of lives are saved by SAR efforts. Many pilots have discovered that the comforting phrase 'it can't happen to me' is far from correct. If you prepare adequately for all eventualities, you will improve your ability to deal with any emergency, therefore enabling AMSA to offer you better assistance.

To help you prepare, the following actions are recommended:

- Select the route which gives you short legs (for example, every 15–20 minutes) between the best visual fixes rather than featureless land areas and avoid extensive areas of inhospitable, rugged terrain. Make sure that your maps cover the entire route. Remember that external navigation aids, such as global positioning system (GPS), should be cross-checked using other navigational methods to ensure their accuracy.
- Always wear a watch.
- If your planned flight crosses high country or large water expanses, plan alternative routes that could be used in adverse weather. Remember the problems of rising ground in deteriorating meteorological conditions.
- When you get your weather forecast, take special note of, the freezing level, significant cloud cover and expected visibility, as well as fog, thunderstorm or turbulence predictions. Relate the forecast to your planned route and the nature of the terrain.
- Always tell someone what you are doing – either by lodging a flight plan or leaving a flight note. If the weather is not suitable, consider using an alternate route or postponing the flight. Discuss the situation with someone else with aviation experience.
- If you are making a day visual flight rules (VFR) flight, plan to arrive at least 10 minutes before the end of daylight, or earlier if your flight time is more than one hour, or if the terrain or the weather could reduce the light. If you are delayed, make sure that your departure is not too late to meet this requirement.

- Break your flight into route segments, measure distances carefully and use a computer to find time intervals. Do not guess or give just one time interval. Either lodge a flight plan or leave a flight note with a responsible person. Plan a realistic time that search action is required (SARTIME) and don't forget to amend it if you are delayed for any reason. Provide a destination telephone and or mobile number on your flight plan or flight note. Make sure you have sufficient fuel for the flight and unforeseen contingencies.

Helping search and rescue

Should you have to make a forced landing, many of the planning hints mentioned previously will help AMSA find you quickly. This is because SAR operations may involve the following:

- The search will be planned according to the forecast and actual weather conditions.
- The search will be based on the information you gave in your flight notification form or flight note, plus, (if necessary) the performance capabilities of your aircraft.
- The search pattern will be based on track-spacing, which is determined during SAR operation briefings or by the assessed visual range of the day (for example, a search pattern may start 10 NM either side of your planned route).

Other things which you can do to help yourself and AMSA in emergency situations are:

- If practicable, for drawing the attention of SAR personnel, remain near your aircraft after evacuating. Otherwise move to an area where SAR agencies will see your visual signals more easily (see also 'Hints for survival' in this Chapter).
- When moving, carry location aids for SAR, such as the following items (ERSA EMERG):
  - survival radios/beacons
  - heliograph or mirror to signal search aircraft by day (heliographs are available at most army disposal stores or camping stores)
  - day/night flares
  - rockets
  - strobes or electric torches for use at night
  - signal panels
  - sea dye markers.

- For making improvised aids, carry matches or a cigarette lighter, a pocket compass, knife and first aid kit, and wear warm clothing in winter (a space blanket is a cheap lightweight alternative to a blanket).
- Always carry water and take extra supplies if you are flying over hot arid areas.
- Carry a survival food kit of high calorie food items packed in a small waterproof container.

Survival kits may be purchased or homemade. Research the most appropriate contents for your survival kit for the flight you are planning.

A pilot who does not hold an instrument rating, or who is flying an aircraft not equipped for instrument flight, has no place in adverse weather. A well-prepared VFR pilot should never find themselves in adverse weather conditions if they have undertaken a careful study of the weather forecast.

Flight into marginal or non-visual meteorological conditions (VMC), generally is the result of poor planning or not deciding early enough to turn back or divert. Lack of preparedness and failure to make such decisions has all too frequently ended in tragedy.

Flying under the VFR or below the non-VMC criteria (CASR 91.280) is high risk and should not be undertaken or continued. History shows that flight in non-VMC has resulted in many non-survivable accidents. To avoid such conditions, you should decide to divert or turn back, and this decision must be made early.

VFR flight in weather which is below VMC is not permitted.

Make your decisions early

When you become aware that any element of the weather is about to fall below the VMC minima—do not hesitate, turn back immediately. Broadcast your intentions. Do not leave your decision until the weather has already fallen below VMC minima.

Plan your immediate flight path so that you can always remain in VMC. There have been many occasions when pilots have not intended to fly into cloud but, through inadequate planning or poor decision-making, their flight path has taken them into cloud.

Certified, uncertified aerodromes and some other suitable places available to take off or land are shown on world aeronautical charts (WACs), visual terminal charts (VTCs) and visual navigation charts (VNCs). Note which aerodromes lie close to your track and which might be suitable for a precautionary landing.

Where weather conditions deteriorate or become less than ideal, determine a critical point along your route where you will make a firm decision to continue, turn back, or divert to an alternate route or aerodrome. In the worst case, conduct a precautionary landing on a suitable nearby field if other options cannot be safely executed.

When weather begins to deteriorate, monitor the changes carefully. Weather conditions can deteriorate quickly. Make sure you have a clear discernible horizon between the cloud base and terrain. Thunderstorms can be unpredictable and generate heavy rain or hail and severe turbulence even in clear air miles from the cloud. Keep foremost in your mind your alternative actions, time limits and critical points for decision-making.

Know you own limits. Never succumb to 'I must get through or get home'. There is nothing that cannot be put off until tomorrow. Changes in conditions can happen quickly. Always have an out.

Distress beacons

A distress beacon is a small electronic device that, when activated in a life-threatening situation, assists rescue authorities in their search to locate those in distress. Distress beacons save lives and, moreover, carriage of distress beacons on certain aircraft and flights is required by law.

The following information will give you an understanding of how to use distress beacons and the different types available.

Carriage of emergency locator transmitters (ELTs)

(CASR 91 MOS 26.48 to 26.52)

As a minimum, all aircraft other than single-seat aircraft must be fitted with an automatic ELT or carry a survival ELT.

Exception: *This requirement does not apply if an aircraft is not flown more than 50 NM from its place of departure or is a flight for a purpose related to:*

- *the aircraft's manufacture*
- *the preparation or delivery of the aircraft following its purchase or transfer of operator*
- *the positioning of an Australian aircraft from a location outside Australia to the place at which any ELTs required to be fitted to the aircraft will be registered with AMSA.*

Single-engine aircraft over water

For a single-engine aircraft—including single-seat aircraft flown over water further than the distance from which, with the engine inoperative, the aircraft could reach an area of land that is suitable for a forced landing—the aircraft must carry a survival ELT.

Location of carriage

If the ELT carried is a survival ELT, then you must ensure that the ELT is carried in one of the following locations on the aircraft:

- on the person of a crew member, or
- in, or adjacent to, a life raft, or
- adjacent to an emergency exit used for evacuation of the aircraft in an emergency.

ELT – basic technical requirements

An ELT is a transmitter that must:

- when activated, transmit simultaneously on 121.5 MHz and 406 MHz
- when fitted to, or carried on, an Australian aircraft, be registered solely with AMSA
- when fitted to, or carried on, a foreign-registered aircraft, be registered with the authority of the aircraft's state of registry responsible for search and rescue services, and not with AMSA
- for identification purposes, be coded in accordance with the requirements for the transmitter in Appendix 1 to Chapter 5 of Part II, Voice Communications, in Volume III of the International Civil Aviation Organization (ICAO) Annex 10, Aeronautical Telecommunications
- where fitted with a lithium-sulphur dioxide battery, the battery must be authorised by the Federal Aviation Administration (FAA) or the European Aviation Safety Authority (EASA) in accordance with (E) technical standard order (TSO)-C142a.

Automatic ELT

An automatic ELT is one that meets the criteria of CASR 91 and MOS 26.49 above and must automatically activate on impact and be one of the following types:

- authorised by the FAA or EASA in accordance with (E)TSO-C126, or
- authorised by EASA in accordance with:
    - ETSO-2C91a for operation on 121.5 MHz
    - ETSO-2C126 for operation on 406 MHz, or
- approved under CASR Part 21 as having a level of performance equivalent to a type of transmitter mentioned above.

Survival ELT

A survival ELT is one that meets the criteria of CASR 91 and MOS 26.49 and can be removed from the aircraft, and is one of the following types:

- an emergency position-indicating radio beacon that meets the requirements of Australian New Zealand Standard (AS/NZS) 4280.1:2003, or
- a personal locator beacon that meets the requirements of AS/NZS 4280.2:2003, or
- authorised by the FAA or EASA in accordance with (E)TSO-C126, or
- authorised by EASA in accordance with:
  - ETSO-2C91a for operation on 121.5 MHz
  - ETSO-2C126 for operation on 406 MHz, or
- approved under CASR Part 21 as having a level of performance equivalent to a type mentioned above.

Aircraft flown with inoperative ELT

An aircraft required to carry either an automatic ELT, or a survival ELT but which is not required to carry a life raft, may begin a flight with either being inoperative if the purpose of the flight is to ferry the aircraft to have the ELT repaired or maintained.

An aircraft may be flown without an automatic or survival ELT if:

- the ELT has been temporarily removed for maintenance; and there is an entry in the aircraft's flight technical log, stating:
  - the ELT make, model and serial number
  - the date on which the ELT was removed from the aircraft
  - the reason for the removal of the ELT
- a placard stating 'Emergency locator transmitter not installed or carried' has been placed in the aircraft in a position where the pilot can see it
- no more than 90 days have passed since the ELT was temporarily removed for maintenance.

For a period not exceeding 90 days, an aircraft with an inoperative automatic ELT that has been removed is not required to carry a survival ELT. Conversely an aircraft with an inoperative survival ELT that has been removed, is not required to carry an automatic ELT.

ELT switches

If the ELT carried is an automatic ELT that has a switch marked (however described) as 'armed', then you must ensure that the switch is set to this position at the time the flight begins.

Types of beacons

Beacons of type 406 MHz are either GPS or non-GPS capable. GPS 406 MHz beacons provide an encoded GPS location that enables the COSPAS-SARSAT satellite-based system to calculate the beacon's location much faster than for that of a non-GPS 406 MHz beacon.

There are three types of distress beacons:

- emergency locator transmitter (ELT) – either automatic or survival (see above) for use in aircraft
- personal locator beacon (PLB) – used by bushwalkers, drivers of cross-country vehicles, and other adventurers on the ground, as well as employees working in remote areas and crew in watercraft and aircraft
- emergency position indicating radio beacons (EPIRB) – normally used in ships and boats but also used in life rafts.

ELTs must operate continuously for at least 24 hours once activated. ELTs are usually fixed in the aircraft and are designed to activate on impact. PLBs/survival ELTs or EPIRBs can be carried in an aircraft as an alternative to an automatic ELT that is fixed to the aircraft.

PLBs are designed for personal use in both land and marine environments. This type of beacon is becoming a multi-environment beacon. PLBs must also operate for a minimum of 24 hours once activated.

EPIRBs are designed to float in the water to optimise the signal to the satellite. An EPIRB must operate for a minimum of 48 hours continuously once activated. An EPIRB has a lanyard that is used to secure it to something that is not going to sink. There have been a number of incidents where vessels have sunk quickly, and crew have not been able to deploy an EPIRB. In such incidents, float-free EPIRBs could have reduced response times and saved lives. Float-free EPIRBs are held in a bracket and fitted with a water-activated hydrostatic release, deploying the beacon automatically if the vessel sinks. If the vessel continues to float the EPIRB can be manually deployed.

The COSPAS-SARSAT search and rescue satellite system

Operational use of the COSPAS-SARSAT system by SAR agencies started with the crash of a light aircraft in Canada on 10 September 1982, from which three people were rescued. Since then, the system has been instrumental in the rescue of over 35,000 people worldwide.

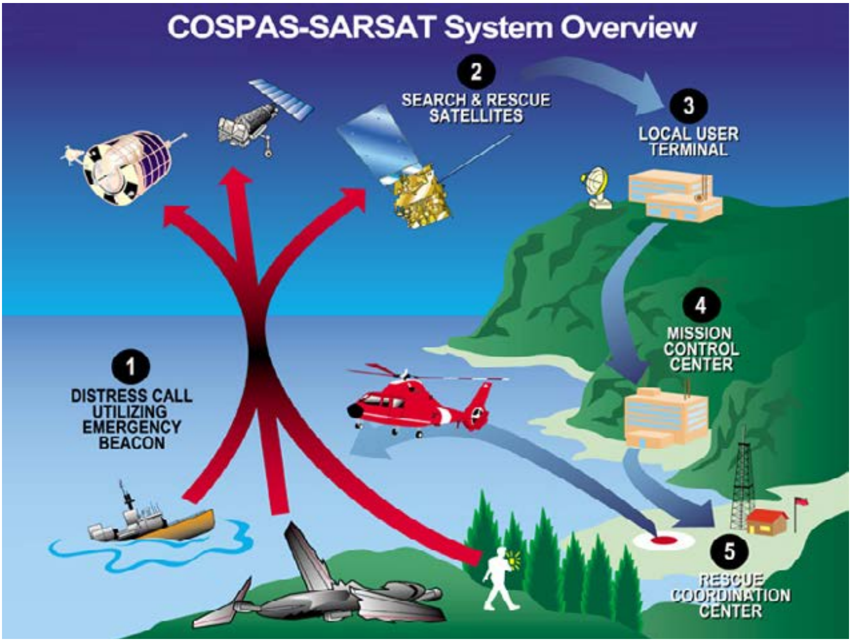
The COSPAS-SARSAT system is divided into space segments comprising distress beacon receivers on Polar-orbiting satellites and on satellites in geo-stationary orbit over the Equator. The ground segment is made up of a network of local user terminals (LUTs) that are the ground receiving stations for the satellite transmissions with mission control centres (MCCs) that analyse and pass the distress alerts to responsible rescue coordination centres (RCCs).

In the Australian search and rescue region there are three LUTs – located at Albany (WA), Bundaberg (QLD) and Wellington (NZ – that are controlled by the MCC located within the Australian Joint Rescue Coordination Centre (JRCC) in Canberra.

Alerts from 406 MHz distress beacons may be received and processed by geo-stationary satellites and passed to JRCC-Australia within minutes. If the beacon has GPS capability, then a very accurate position may be transmitted with the alert. Non-GPS beacons require detection by a Polar-orbiting satellite before a position can be obtained.

Note: Do not turn off your distress beacon until advised by rescue services.

Figure: COSPAS-SARSAT system



Source: www.cospas-sarsat.int

When should a distress beacon be used?

Distress beacons should only be used when there is a threat of grave and imminent danger. In the event of an emergency, communication should first be attempted with others close by using radios, phones and other signalling devices. Mobile phones can be used but should not be relied upon as they can be out of range or have low batteries or water damage.

If a person has made an aviation distress signal and the reason for making the signal no longer exists, they must as soon as the circumstances permit, cancel the signal, if the aircraft's location and state of the radio allow it to be cancelled (CASR 91.700).

A distress beacon with an encoded (GPS) location is usually detected by the RCC and located within minutes. Distress beacons without the capability to provide an encoded position also provide an initial alert to the RCC within minutes, but there will be no associated position. If emergency contacts are aware of trip details or trip details have been submitted online, search operations can begin sooner.

What happens after activation

- Distress beacon is activated.

When your life is in danger and you cannot contact emergency services by phone or radio, activate your distress beacon. Your beacon can be activated from anywhere on the Earth’s surface, regardless of whether are were travelling by air, land or sea.

- Signal is received by satellite.

The international search and rescue satellite system, COSPAS-SARSAT, listens from space for distress signals. When it hears a signal, it notifies the nearest ground station.

Beacons transmit on 406 MHz which is detectable by satellite and 121.5MHz so emergency services can locate the beacon with special search and rescue equipment.

- Rescue coordination centre is notified.

Your distress call is escalated through a local user terminal, mission control centre and then the RCC responsible in that region for arranging search operations.

If your beacon is registered, the details are provided to the RCC in the country in which the beacon is both activated and registered.

- Search and rescue operations commence.

Search and rescue authorities commence search operations as soon as they can. If your beacon is registered, AMSA Search and Rescue will look up your account and ring your emergency contacts immediately. If emergency contacts are aware of trip details or trip details have been submitted online, search operations can be commenced much sooner. So, it is essential to keep your details up to date.

The time it takes for rescue will vary depending on the circumstances. Be prepared to survive. When you see or hear search personnel or aircraft in your area use flares, torches, or light a fire (if it is safe) to help them pinpoint your location.

How long does it take to be rescued?

The time it takes for search and rescue personnel to reach you depends on a number of factors, including the weather, terrain and accessibility of your location. The more remote the location of the distress incident, the longer the response time. In all instances, be prepared to survive.

Satellites cannot detect beacons through mountains, trees or buildings. If your beacon has not been deployed correctly with the aerial vertical in a clear open area or you are located in a valley, geostationary (GEO) satellites are unlikely to see you. In these cases, you must wait for polar-orbiting low earth orbit (LEO) satellites to pass overhead, which may take several hours.

Another important factor which determines how long your rescue takes is if you have a GPS beacon or a non-GPS beacon.

Source: **How distress beacons work – Beacons (amsa.gov.au)**

Accidental activation

If a beacon is inadvertently activated, the most important thing to do is to switch it off and contact JRCC as soon as possible to ensure a search and rescue operation is not commenced. There is no penalty for inadvertent activations.

JRCC Australia

t: 1800 815 257 or +61 2 6230 6899

Registration of beacons

A registered beacon allows AMSA Search and Rescue to phone your emergency contacts and look up important information to initiate a response as soon as possible. An unregistered beacon can cause a delay in the response.

Once an emergency position indicating radio beacon (EPIRB), personal locator beacon (PLB) or emergency locator transmitter (ELT) is registered a confirmation will be issued via SMS, email or letter so that you can prove registration when inspected by authorities. Beacon registration is valid for two years and must be renewed before its expiry date. Renewal can be done online on the beacon registration system or by contacting 1800 406 406.

Whenever your contact details or beacon details change, please update them online. Don’t wait for your registration to expire before doing this because incorrect contact details can also delay the response.

The seller or purchaser of a second-hand beacon must contact AMSA to update their registration details.

Owners of a lost, stolen or disposed of beacon are asked to notify AMSA so that your beacon account details can be updated.

For comprehensive details on beacon registration check the AMSA website: **Beacons (amsa.gov.au)**

There is also a facility for owners to add their trip itineraries at the AMSA website, so when a beacon is activated the RCC will have access to your current movements and be better placed to organise the most suitable response.

This does not replace advising a responsible person of your trip details.

Testing

Self-test function

All COSPAS-SARSAT type approved 406 MHz beacons include a self-test mode.

All 406 MHz distress beacons can be tested at any time using the self-test functions without any notification to RCC Australia.

The self-test function performs an internal check and indicates that radio frequency power is being emitted at 406 MHz and at 121.5 MHz, as applicable. The beacon will provide an indication of the success or failure of a GNSS self-test.

The self-test mode signal is not processed by the satellite equipment.

To test your beacon using the self-test function, follow the instructions from your beacon manual or manufacturer.

Operational testing and remote cockpit activations

While a functional test of a beacon can be performed via the beacon's self-test capability the use of the remote aircraft cockpit activation switch results in operational activation of the ELT. Remote cockpit activations are performed on initial installation and during ongoing maintenance of the ELT.

In order to comply with ELT maintenance requirements, operational testing of a 406 MHz ELT from the cockpit of an aircraft may be undertaken by maintenance personnel, provided the test duration is no longer than five seconds and is undertaken within the first five minutes of the hour. You must advise that you are conducting an operational test and the location to the JRCC and the air traffic services (ATS).

The test duration must be restricted to five seconds so that there is no potential for an operationally coded 406 MHz digital burst transmitting and thus generating a false alert. The duration of the 121.5/243 MHz homing transmission, which will also be activated as part of this test, must also be restricted so as not to generate false alerts via ATS.

Emergency activation

Activation procedures (ERSA EMERG)

If you are forced down, activate the ELT immediately.

Where an ELT is permanently installed, and you are unable to confirm that it has activated automatically, activate the ELT manually, for example, by switching to the on or active position.

Where a portable distress beacon is being used, if possible, select an elevated site, clear of trees, boulders etc, and reasonably close to the aircraft.

Place the beacon on the ground on an earth mat. If an earth mat (see blow in Land activation section for how to make an earth mat) is not available, place the ELT on the wing of the aircraft or other reflective metal surface.

Secure the ELT with rocks, sticks, tape etc, so that the antenna remains vertical. Prevent anything touching the antenna as this will degrade ELT performance.

Do not switch off the beacon unless rescue is no longer required. A beacon which is damaged or under wreckage can still transmit some signal so always activate it.

To avoid confusing COSPAS-SARSAT and direction-finding equipment on search aircraft, avoid activating two or more beacons within one NM of each other. If two or more beacons are available, their use should be rationalised to extend the alerting period.

Water activation

If you are in the water and the beacon is water buoyant, it should be activated in the water and allowed to float to the end of the lanyard with the antenna vertical.

Do not hoist the ELT up a mast. The performance of an ELT can degrade if it is raised above the water surface.

Do not attach the lanyard to the aircraft, but rather attach it to a person or life raft. Keep the distress beacon vertical, with the antenna pointing skyward.

In situations where you are forced to use a distress beacon that is not certified for use in water, ensure that the beacon is kept dry. The beacon should operate successfully from inside a plastic bag.

Land activation

For operations over land, you will get the best performance from a distress beacon operating from its permanent installation in the aircraft or on the ground on an earth mat.

A simple inexpensive earth mat can be made by taping household aluminium foil into a 120 cm square. It is suggested that, if you carry a distress beacon you make a foil earth mat, fold it and tape it to your distress beacon. To use the earth mat, unfold it and place it flat on the ground, holding the edges down with rocks or earth. Switch on your distress beacon and place in the centre of the earth mat.

Alternatively, place the distress beacon on the wing of the aircraft.

In many cases, using an earth mat will increase the effective range of your portable ELT by 50%.

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Emergency signals

If practicable and you have a means of communicating with ATS, you must inform them of any threat to the safety of the aircraft or its occupants (an emergency). If dangerous goods are carried, you must also advise ATS of the nature and state of the goods (CASR 91.680).

You must report any contraventions to the regulation relating to an emergency (CASR 91.690).

If after making a distress signal the reason no longer exists, as soon as the circumstances permit and depending on the state of the aircraft and radio, you must cancel the signal (CASR 91.700).

Distress signal

The distress signal shall be transmitted only when the aircraft occupants are threatened with grave and immediate danger and require immediate assistance.

The distress signal shall be sent:

- **by radiotelephony:** the word '**Mayday**' repeated three times, followed by '**This is**', followed by the **callsign of the aircraft** repeated three times
  - squawk transponder code 7700
- **by radiotelegraphy**: the group SOS (dot,dot,dot,dash,dash,dash,dot,dot,dot) sent three times, followed by the group DE sent once, followed by the callsign of the aircraft sent three times. The signal specified above may be followed by the automatic alarm signal which consists of a series of 12 dashes sent in one minute, the duration of each dash being four seconds, and the duration of the interval between consecutive dashes being one second; or
- by one or more of the following means:
  - the Morse signal (dot,dot,dot,dash,dash,dash,dot,dot,dot) with visual apparatus or with sound apparatus
  - a succession of pyrotechnic lights, fired at short intervals, each showing a **single red light**
  - the two-flag signal corresponding to the letters **NC** of the International Code of Signals
  - the distant signal, consisting of a square flag having, either above or below it, a ball or anything resembling a ball
  - a parachute flare showing a red light and/or
  - a gun or other explosive signal fired at intervals of approximately one minute
  - squawk transponder code 7700.

Urgency signals

The following signals, either together or separately, shall be used by an aircraft for the purpose of giving notice of difficulties which compel it to land without requiring immediate assistance:

- the repeated switching on and off of the **landing lights**
- the repeated switching on and off of the **navigation lights**, in such a manner as to be distinctive from the flashing lights described below and/or
- a succession of **white** pyrotechnic lights.

The following signals, either together or separately shall be used by an aircraft for the purpose of giving notice that the aircraft has a very urgent message to transmit concerning the safety of a ship, aircraft or vehicle, or of some person on board or within sight:

- **by radiotelegraphy**: the group XXX (–··– –··– –··–) sent three times, with the letters of each group, and the successive groups, clearly separated from each other, and sent before the transmission of the message
- **by radiotelephony**: the words 'Pan-Pan' sent three times before the transmission of the message. It is also correct to use Pan-Pan if relaying a Mayday call from another aircraft or station that is out of range, or
- by one or more of the following means:
  - a succession of green pyrotechnic lights and/or
  - a succession of green flashes with a signal apparatus.

Forced landings

Initial action

1 Initial check

Altitude	Hold
Speed	Best glide speed
Mixture	Rich
Carb	Full hot
Fuel	On
	Pump on
	Change tanks
Trim	To best glide speed

2 Field selection

Wind	Determine direction
Surroundings	Power lines, trees
Size and shape	In relation to wind
Surface and slope	
Civilisation	Close proximity if possible

3 FMOST

Fuel	Check contents
	Pump on
	Primer locked
Mixture	Up and down range, leave rich
Oil	Temps green
	Pressures green
(mags) Switch	Left then right back to both
Throttle	Up and down range, then close

4 Mayday call and squawk 7700

Mayday Mayday Mayday

Melbourne Centre

This is ZTQ ZTQ ZTQ

Engine failure

3 NM west of Picton
4,500 ft

Landing in paddock

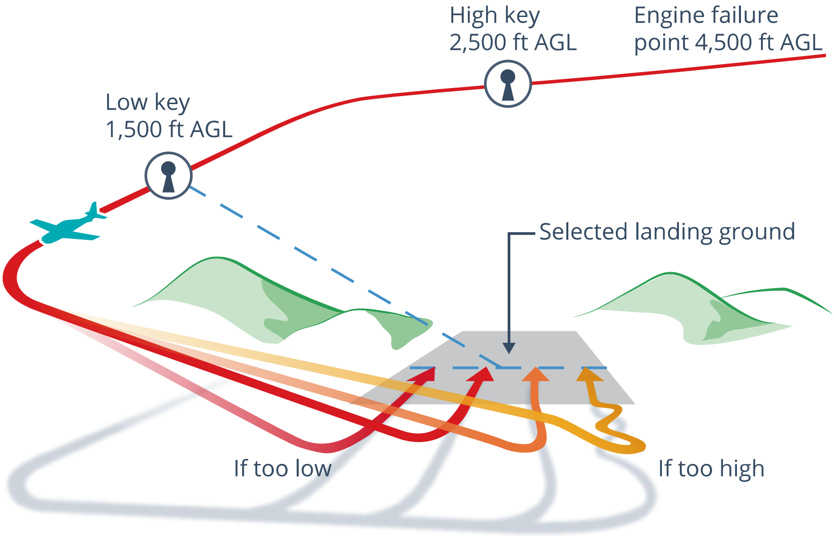
Plus any other useful information such as POB

5 Brief your passengers

6 Final actions

Fuel	Off
Mixture	Closed
Mags	Off
Harness	Tight
Door	As required
Master switch	Off **Caution if flaps are electrically operated**

Forced landing procedure



Emergency landing – multi-engine aircraft (CASR 91.685)

If you are flying a multi-engine aircraft and an emergency occurs that threatens the safety of the aircraft or persons onboard, you must land at the nearest suitable aerodrome.

The determination of the nearest suitable aerodrome might be based on—but not limited to—the following:

- nature of malfunction and possible mechanical difficulties that may be experienced
- nature and extent of any populous area over which the aircraft is likely to fly
- availability of thrust from a malfunctioning engine
- altitude, weight and usable fuel available
- characteristics of aerodromes available
- emergency services availability
- weather conditions en route and at possible landing places
- air traffic congestion
- type of terrain, including whether flight is likely to be over water
- familiarity with the aerodrome.

Sound decision-making using a formal process will allow you to achieve a safe flight outcome in the event of an emergency. A decision should never be made about commercial expedience; the safety of the flight must be your first and only priority.

Hints for survival

People have survived in almost impossible circumstances. The determination to beat the situation and the will to survive is the survivor's strongest weapon.

Being prepared when flying in remote areas by careful flight preparation, that includes carrying an ELT, a first aid kit, adequate clothing, additional water and rations is the best way to provide for a good outcome in the event of an emergency and forced landing.

Remote area survival

It is much easier for an aerial search to spot an aircraft than a walking survivor, and this applies whether your aircraft is still in one piece or not.

However, there are two exceptions to this rule:

- If your aircraft is completely hidden from sight by trees or undergrowth, try to find a clearing where you can set up signals for search aircraft.
- If you are absolutely certain that a town, settlement, road or homestead is within reasonable distance, you could walk out—but if you do, leave notes for a land search party telling them what you are doing and leave a trail which they can follow (see Signalling below).

Water

In a survival situation, salvage your water supply, conserve it as much as possible and augment it if you can, by rain, dew, river water or any other means. For example, dig down in the middle of the sandy bed of a watercourse to locate a soak, or distil salt water by holding a cloth in the steam of boiling water and wringing it into a container.

Some indicators for where ground water may be found include, terrain, birdlife, animal tracks and insects. Water may exist in pools in hills as well as underground in low lying creek areas.

Water is more important to survival than food – you can comfortably do without food for 48 hours or more, but lack of water causes dehydration, and you can lose no more than one-fifth of the body's fluids (about 11 litres) if you are to survive.

Under desert survival conditions, the preferred method after a forced landing is to wait until you are extremely thirsty before drinking at all, and then to drink at the rate at which sweating is taking place. This method ensures there is little impairment in efficiency and wastes no water. You can also save water by reducing sweating; for example, by keeping in the shade, not exposing the skin to sun or hot winds and resting during the day. If water supplies have to be restricted, do not take salt or eat salty foods.

Minimum water requirements

Mean temperature*	35 °C	32 °C	30 °C	< 27 °C
Litres per 24 hours†	5	3.5	2.5	1

* Mean temperature is usually about 8 °C below daily maximum.

† Minimum water requirements per person to maintain the correct balance of body fluid, when resting in the shade

If you decide to walk out, you will double your body's need for water.

In desert or semi-desert areas, walk or exercise only at night or in the early morning.

For every 4.5 L of water carried, you should be able to walk 32 km at night in these types of terrain.

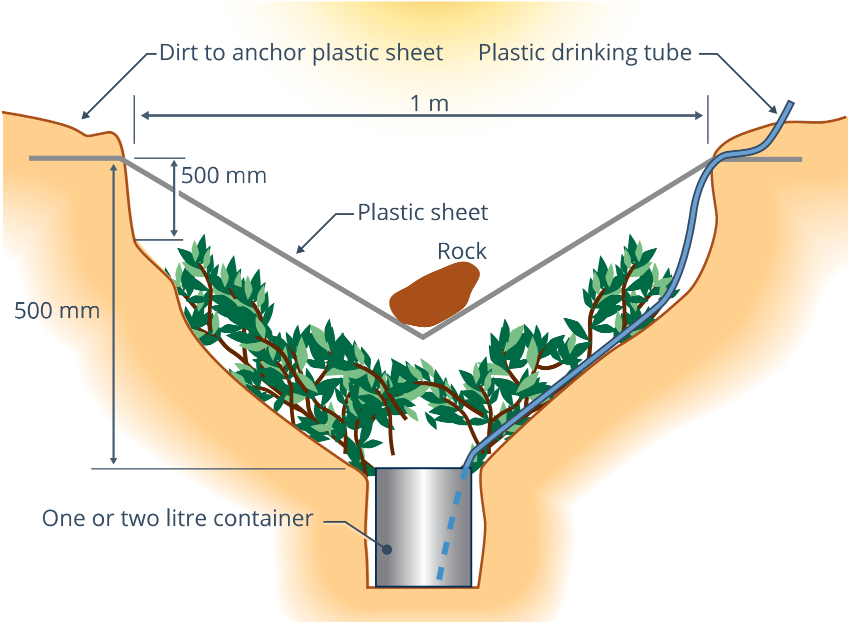
It is strongly recommended that you do not leave your aircraft or attempt to walk out unless you are certain there is help nearby. It is recommended that you stay with the aircraft until you are rescued. The discussion is about conserving water as it is the most critical substance for your survival. Any physical activity will increase your body's need for water The aircraft is much more easily seen that a person on their own. Do not drink urine or salt water.

Emergency water still

To supplement supplies, you can carry some basic equipment to setup an emergency water still, which can extract small amounts of water even from soil that looks quite dry.

Foliage (if available) should be placed as illustrated below around the container under the plastic sheet. Clear polythene, which 'wets' easily is best for the purpose but ordinary clear kitchen polythene sheet (or preferably the thicker 100 µm variety such as is laid down before concrete floors etc. are poured) is satisfactory, particularly if its surface is roughened so that the droplets of water will cling to it more easily and will not be wasted by dropping off before they run down to the point of the cone. It is wise to cut the sheets to size and roughen them with sandpaper before you store them in the aircraft, rather than waiting until you are stranded somewhere in the outback. If a 'nesting' set of containers is obtained and the sheets and tubing rolled inside them, a very compact bundle can be made. But see that it is very well wrapped—it may lie around in the luggage compartment for a long time before it is needed.

Figure: Emergency water still



Signalling

If you have a locator beacon, operate it as described in the COSPAS-SARSAT system section above.

Collect wood, grass, etc and build several signalling fires – preferably in the form of a triangle. Use oil from the engine and tyres to make black smoke. Unless there is ample firewood in the area, do not light fires until you hear or see search aircraft, or until desperate. Be careful to have a fire break between the fires and your aircraft. Try to have the fires downwind from the aircraft.

Conserve your batteries if the aircraft radio is undamaged. After one attempt to contact an airways operations unit, do not use your transmitter until you hear or see search aircraft. Maintain a listening watch, as search aircraft may broadcast information or instructions in the hope that you can receive. Make a note of (and call on) the overlying controlled airspace frequency. Watch for contrails.

Make signals on the ground using the SAR ground signals below and in ERSA-EMERG.

Aircraft may fly over your notified route on the first or second night. Light the fires as soon as you hear them and, if possible, keep them burning all night.

If you do not have a heliograph or a mirror, try to remove some bright metal fittings from your aircraft for signalling—any flash seen by searching aircraft will be investigated.

Ground–Air visual signal code

Message		Code signal
For use by survivors		
1	Require assistance	V
2	Require medical assistance	X
3	Proceeding in this direction	>
4	Yes or affirmative	Y
5	No or negative	N
If in doubt use international symbol		SOS
For use in civil emergencies		
1	Require fodder	FF
2	Require evacuation	III
3	Power failure	VI

Hygiene

To remain in reasonable condition, you should take as much care as possible to avoid accidents or illness. The following hints may help:

- Keep your body and clothes as clean as possible.
- Always wash your hands before eating.
- Properly dispose of body wastes, garbage, etc., in trenches.
- If possible, sterilise or boil water and cook food to avoid gastric troubles.
- Avoid activities which may lead to injury.
- Keep your clothing dry.
- Keep your head covered when in the sun.
- Do not sleep on the ground; make a raised bed with aircraft seats, wood, dry leaves etc.

Shelter

Some type of shelter is essential regardless of the type of terrain in which you find yourself.

If your aircraft is not badly damaged, it can be used as a shelter. Otherwise, you should use whatever is available from the aircraft or the environment. For example, use trees to rig up a temporary tent as protection against the weather.

Fires

You may find that a fire is essential for warmth, cooking, drying clothes, or for distilling or purifying water. If there is plenty of wood available, this should prove no problem. Otherwise, you may have to improvise a stove from a can or other container.

Snakebite

Snakebite is an unlikely event. In Australia there are both venomous and non-venomous snakes. Snakes are not naturally aggressive and will always prefer to retreat. They will only attack humans if they are hurt or provoked. Most snake bites occur when people try to kill or capture them. If you encounter a snake do not approach it; stay back and slowly retreat.

If a person is bitten always assume the snake is venomous. If you are able, seek help immediately.

The following immediate actions should be undertaken:

- The victim must remain calm – sit quietly this will reduce the speed that the venom will move around the body. It is a myth that snake venom gets straight into your blood stream after a bite. Instead, it moves through your lymphatic system. Lymph is a fluid in your body that contains white blood cells. Unlike blood, which is pumped around your body continuously, your lymph moves when you move your limbs. If you can stay still and calm, you can prevent the venom in your lymph traveling further into your body.
- Firmly bandage the whole limb. Start atop the bite site then bandage the limb upwards.

- Bandage firmly but not so tight as to cut off the circulation—if you don't have bandage any stretchy material will do (torn up T shirt, stockings or other fabric can be used as a bandage.
- Do not allow the victim to move; they must remain still.
- Splint the limb, immobilising as you would a fracture.
- Monitor the consciousness of the victim and circulation to the effected limb.

Don't wash, suck, cut or torniquet the bite. There are a lot of old methods of treating snake bites that are now known to cause more harm than good.

Washing the snake bite site can wash off venom that the hospital staff may be able to use to identify the type of snake that bit you. You should also keep clothing from around the bite site, because additional movement can cause venom to more readily move into the blood stream.

See also **Outback Survival: Snakes and Snakebites | Royal Flying Doctor Service** for more information.

Sea survival

Ditching into the sea is a rare event; however, in the unlikely event of this happening, you will normally have some time for preparation. Ensure seat belts are tightly fastened. Brief passengers to brace for impact. Try and ditch into the wind as much as possible and touch down along and on the crest of the swell. Avoid leaving your aircraft without your life jacket—only inflate your life jacket once you have left the aircraft.

Immediate actions

- Secure and deploy your life raft.
- Activate your ELT immediately.
- Gather useful equipment on and board raft (remain dry if possible).
- Roll call – locate missing passengers.
- Cut your raft adrift – if you have more than one raft tie rafts together on an 8 m line.
- Read the instructions contained in the raft.
- Check raft, adjust sea anchor length to half distance between waves, and in cold weather inflate floor and canopy.
- Retrieve and secure inventory equipment (to prevent loss if capsized).

A fully loaded life raft is cramped and uncomfortable

- If applicable rotate duties; duties should include look out with location aids, raft maintenance, maintaining water devices and procuring food.
- Exercise, keep occupied and work as a team and to avoid discomfort.
- Plan pyrotechnic operations to avoid damaging the raft or injury to persons.

Essential rules for sea survival – in short water

- Ration water and stay hydrated. Dehydration impairs general performance and does not decrease water consumption. Hold reliable water sources in reserve.
- In hot areas wear clothes dampened during the day and remain in the shade. This will halve water loss by minimising sweating. Protect eyes and skin against the sun. Do not exit the raft to swim.
- Fish should be eaten if short of water, sun dried until rain provides sufficient water. Fish that have an unusual shape or features of skin instead of scales should not be eaten.
- Avoid sea sickness. Use sea sickness tablets; seasickness will wear off.
- Do not drink sea water, urine, or blood from sea birds.

Keep raft dry

- Avoid immersion, foot and raft sores by regularly changing position.

Discourage predators

- Do not trail attractive items.
- Discard waste well away from the raft at night.

A small amount of control is possible by adjusting the raft for wind or currents. Deploy the sea anchor to travel with the current or retrieve it to travel with the wind.

Radio communication failure

Procedures

If VFR in G or E airspace (CASR 91 MOS 11.10)

If you are flying under the VFR in Class G or Class E airspace and your radio fails, you should:

- select code 7600 on the transponder (if fitted)
- remain outside controlled airspace
- assume the radio is broadcasting and broadcast position and intentions on the frequency appropriate to the area of operation
- as soon as practicable, descend below 5,000 ft to continue flight under the VFR.

You should not forget to report your arrival to ATS if on a SARTIME to **CENSAR 1800 814 931.**

If in controlled/restricted airspace (ERSA EMERG)

In the event of radio failure:

- maintain terrain clearance throughout all procedures, and
- squawk 7600 on your transponder
- transmit intentions and make normal position reports (assume transmitter is operating and prefix calls with 'Transmitting blind'), and then
- listen out on ATIS and/or voice modulated navigation aid (NAVAID)
- land at the most suitable aerodrome (note the special procedures if you are proceeding to a Class D aerodrome)
- report arrival to ATS.

Class D aerodrome – special procedures

- When flying into a class D aerodrome you should follow the procedures above. In addition, you should consult the ERSA – FAC for the procedures that apply at individual aerodromes. In all situation when landing, watch for standard light signals.

Indications by an aircraft (ERSA EMERG):

In flight:

- during the hours of daylight – by rocking the aircraft wings

Note: This signal should not be expected on the base and final legs of the approach.

- during the hours of darkness – by flashing the aircraft's landing lights on and off twice or, by switching its navigation lights on and off twice.

On the ground:

- during the hours of daylight – by moving the aircraft's ailerons or rudder
- during the hours of darkness – by flashing the aircraft's landing lights on and off twice or, by switching its navigation lights on and off twice.

If in VMC and certain of maintaining VMC:

- stay in VMC and land at the most suitable aerodrome (note special procedures if proceeding to a Class D aerodrome)
- report arrival to ATS.

Notes:

1. Initial and subsequent actions by the pilot at the time of loss of communications will depend largely on the pilot's knowledge of the destination aids, the air traffic/air space situation and meteorological conditions en route and at the destination. It is not possible to publish procedures that cover all radio failure circumstances. The following procedures ensure that air traffic services and other traffic should be aware of the pilot's most likely actions. Pilots should follow these procedures unless strong reasons dictate otherwise.
2. In determining the final level to which a pilot will climb after radio failure, air traffic control (ATC) will use the level provided on the flight notification, or the last level requested by the pilot and acknowledged by ATC.

Initial actions

If no clearance limit received and acknowledged:

- proceed in accordance with the latest ATC route clearance acknowledged and climb to planned level, or

If a clearance limit involving an altitude or route restriction has been received and acknowledged:

- maintain last assigned level (or minimum safe altitude if higher), for 3 minutes and/or
- hold at nominated location for three minutes, and then
  - proceed in accordance with the latest ATC route clearance acknowledged and climb to the planned level.

If being radar vectored:

- climb if necessary to minimum safe altitude, to maintain terrain clearance, and
- maintain the last assigned vector for 2 minutes, and then
  - proceed in accordance with the latest ATC route clearance acknowledged.

If holding:

- fly one more complete holding pattern, and then
  - proceed in accordance with the latest ATC clearance acknowledged.

Destination procedures

If no NAVAID:

- track to the destination in accordance with the flight plan (amended by the latest ATC clearance acknowledged, if applicable)
- commence descent in accordance with standard operating procedures or the flight plan
- proceed to overhead the aerodrome at that altitude
- ascertain the landing direction
- descend to join the desired circuit at circuit altitude via the downwind entry point (remain clear of other circuits)
- proceed with the normal circuit and land, maintaining separation from other aircraft
- watch the tower for light signals (below) (MOS 2.04).

If your aircraft is fitted with NAVAID:

- if possible, select the appropriate frequency and listen for instructions (this is one of the most effective ways of proceeding safely)
- when the control tower is active, follow normal procedure
- watch the tower for light signals (see below).

Light signals

Light signals

On ground	Light mode	In flight
Authorised to **take off** if pilot is satisfied that no collision risk exists	🟢 Green	Authorised to **land** if pilot is satisfied that no collision risk exists
Authorised to **taxi** if pilot is satisfied that no collision risk exists	🟢 Green flashing	**Return** for landing
Stop	🔴 Red	**Give way** to other aircraft **and continue** circling
Taxi clear of landing area in use	🔴 Red flashing	**Do not land** Aerodrome unsafe
Return to starting point on aerodrome	○ White flashing	

Communication and NAVAID failure

In the event of complete failure of communications and navigation aids, maintain terrain clearance throughout all procedures and proceed as follows:

If VFR in G or E airspace (CASR 91 MOS 11.10):

If you are flying under the VFR in Class G or Class E airspace and your radio fails you should:

- select code 7600 on the transponder (if fitted)
- remain outside controlled airspace
- assume the radio is broadcasting and broadcast position and intentions on the frequency appropriate to the area of operation
- as soon as practicable, descend below 5,000 ft to continue flight under the VFR.

You should not forget to report your arrival to ATS if on a SARTIME.

If in controlled/restricted airspace or if IFR in any airspace:

- squawk 7600 if possible
- listen out on ATIS and/or voice-modulated NAVAIDS
- transmit intentions and normal position reports (assume transmitter is operating and prefix calls with 'Transmitting blind')
- if practicable leave/avoid controlled/restricted airspace and areas of dense traffic
- as soon as possible establish visual navigation
- land at the nearest suitable aerodrome
- report to ATS on arrival.

Emergency change of level in controlled airspace procedures

When it is necessary for an aircraft in controlled airspace to make a rapid change of flight level or altitude because of technical trouble, severe weather conditions, or other reasons, the change will be made as follows, using urgency message format, stating level changes involved and diversions, if applicable:

- squawk SSR code 7700
- transmit:
  'Pan-Pan, Pan-Pan, Pan-Pan'
  [agency being called]
  [aircraft identification]
  [nature of urgency problem]
  [intention of person in command]
  [present position flight level or altitude and heading]
  [any other useful information]

CHAPTER 8
APPENDICES

Abbreviations and acronyms

Term	Meaning
AAC	aviation advisory circular
AACC	area approach control centre
AAI	Authorised Aeronautical Information
AAIS	automatic aerodrome information service
AAL	above aerodrome level
ABV	above
AC	advisory circular
ACARS	aircraft communication addressing and reporting system
ACAS	airborne collision avoidance system
ACMA	Australian Communications and Media Authority
AD	airworthiness directive (occasionally used for aerodrome)
ADIZ	air defence identification zone
ADF	automatic direction finder
ADF	Australian Defence Force
ADS-B	automatic dependent surveillance-broadcast
ADS-C	automatic dependent surveillance-contract
AERIS	automatic en route information service
AFC	aviation forecasting centre
AFIS	aerodrome flight information service
AFRU	aerodrome frequency response unit
AFTN	aeronautical fixed telecommunication network
AGL	above ground level
AFIL	flight notification filed in the air
AFM	aircraft flight manual
AIC	Aeronautical Information Circular

Term	Meaning
AIP	Aeronautical Information Publication
AIP GEN	General section of the Aeronautical Information Publication
AIREP	air report
AIRMET	information in plain language concerning weather significant to light aircraft operations at or below 10,000 ft
AIRPROX	near collision proximity
AIS	Aeronautical Information Service
ALA	aircraft landing area
AMC/GM	acceptable means of compliance and guidance material
AMD	amendment
AMSA	Australian Maritime Safety Authority
AMSL	above mean sea level
AOC	air operator's certificate
APCH	RNP approach
APU	auxiliary power unit
ARFO	area forecast
ARN	aviation reference number
ARP	aerodrome reference point
ASAO	approved self-administering aviation organisation
ASIC	Aviation Security Identification Card
ASIR	air safety incident report
AS/NZ	Australian New Zealand Standard
ATC	air traffic control
ATIS	automatic terminal information service
ATN	Aeronautical Telecommunication Network

Term	Meaning
ATPL	Airline Transport Pilot Licence
ATS	air traffic services
ATSB	Australian Transport Safety Bureau
AUTO	fully automated report
AVFAX	Aviation Facsimile Service
AVGAS	aviation gasoline
AWB	airworthiness bulletin
AWIS	aerodrome weather information service
AWS	automatic weather station
BA	broadcast area
BAC	blood alcohol concentration
BASE	cloud base
BECMG	becoming
BKN	broken
BLW	below
BoM	Bureau of Meteorology
CAAP	civil aviation advisory publication
CA/GRS	certified air/ground radio service
CAO	Civil Aviation Orders
CAR	Civil Aviation Regulations 1988
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations 1998
CAVOK	cloud and visibility OK
CB	cumulonimbus (cloud)
CDI	course direction indicator

Term	Meaning
CENSAR	automated centralised SARTIME database
CLD	cloud
CNL	cancel
COBT	calculated off blocks time
COR	corrected, correction, correct
CP(B)L	Commercial Pilot (Balloon) Licence
CPL	Commercial Pilot Licence
CPDLC	controller pilot data link communications
CSF	community service flight
CTA	control area
CTAF	common traffic advisory frequency
CTR	control zone
DA	density altitude
DA/H	decision altitude/height
DAH	Designated Airspace Handbook
DAME	designated aviation medical examiner
DAP	departure and approach procedures
DAT	data
DCT	direct (in relation to flight plan clearance and type of approach)
DEP	departure, departing
DLA	delay
DME	distance measuring equipment
DR	dead reckoning
EASA	European Aviation Safety Authority
EAT	expected approach time
EET	estimated elapsed time

Term	Meaning
ELT	emergency locator transmitter
EMBD	embedded (within a cloud layer)
ENR	en route
EOBT	estimated off blocks time
EPIRB	Emergency Position Indicating Radio Beacons
ERC-H	En route chart-high
ERC-L	En route chart-low
ERR	error
ERSA	En Route Supplement Australia
ETA	estimated time of arrival
ETD	estimated time of departure
FAA	Federal Aviation Administration
FAC	facility
FAF	final approach fix
FANS	future air navigation system
FAP	final approach point
FAR	(US) Federal Aviation Regulations
FCM	flight crew member
FEW	few (cloud descriptor)
FIA	flight information area
FIC	flight information centre
FIR	flight information region
FIS	flight information service
FL	flight level
FLTIDENT	flight identification
FM	from

Term	Meaning
FPR	flight plan route
FRQ	frequent
FZLVL	height of the freezing level
GA	general aviation
GAF	graphical area forecast
GAMET	general aviation meteorological (area forecast)
GEN	general
GEO	geostationary (satellite)
GNSS	global navigation satellite system
GP	glide path
GPS	global positioning system
GPWT	grid point wind and temperature (forecast)
HF	high frequency
HLS	helicopter landing site
IAL	instrument approach and landing
IAP	instrument approach procedure
IAS	indicated air speed
ICAO	International Civil Aviation Organization
IDENT	identification
IFR	instrument flight rules
IFS	In-Flight Information Services
ILS	instrument landing system
IMC	instrument meteorological conditions
IMPR	improvement
INTER	Intermittent, intermittently
IRM	Immediately reportable matter

Term	Meaning
ISA	International Standard Atmosphere
ISOL	isolated
IVSI	instantaneous vertical speed indicator
JRCC	Joint Rescue Coordination Centre
kt	knots (speed)
LAHSO	land and hold short operations
LAME	licensed aircraft maintenance engineer
LDA	landing distance available
LEO	low earth orbit (satellite)
LLZ	localiser
LMT	local mean time
LOC	locally, location, located, local
LSA	light sport aircraft
LSALT	lowest safe altitude
LUT	Local user terminals
MBA	mandatory broadcast area
MCC	mission control centre
MET	meteorological
MET (report)	aviation routine weather report
METAR	aviation routine weather report (in aeronautical meteorological code)
METRAD	meteorological radar
MOA	military operating area
MVA	minimum vector altitude
MOS	Manual of Standards

Term	Meaning
MSA	minimum sector altitude
MTOW	maximum take-off weight
MTW	mountain waves
NAA	national aviation authority
NAIPS	National Aeronautical Information Processing System
NAP	noise abatement procedures
NAV	navigation
NAVAID	navigation aid
NCC	Network Coordination Centre
NCD	no cloud detected
NDB	non-directional beacon
NVFR	night visual flight rules
NIS	NAIPS internet service
NM	nautical miles
NOTAM	Notice to Airmen
NSC	nil significant cloud
NSW	nil significant weather
NVIS	night vision imaging system
OAT	outside air temperature
OBSC	obscured
OCNL	occasional
O/R	on request
OVC	overcast
PA	pressure altitude
PAL	pilot activated lighting
PAPI	precision approach path indicator

Term	Meaning
PBN	performance-based navigation
PCA	Planning Chart Australia
PEG	plain English guide
PF	pre-flight
PIC	pilot in command
PLB	Personal Locator Beacon
POB	persons on board (number)
POE	polar operational environmental (satellite)
POH	pilot operating handbook
PPC	private pilot certificate
PPL	Private Pilot Licence
PRD	prohibited, restricted and danger areas
PRM	precision runway monitor
PROB	probability
PROV	provisional
PSR	primary surveillance radar
QNH	an atmospheric pressure adjusted to sea level and measured in hPa or millibars so that when QNH is set the altimeter will read elevation AMSL
RA	resolution advisory (also used in weather forecasts for rain)
RAAF	Royal Australian Air Force
RAIM	receiver autonomous integrity monitoring
RAPIC	radar picture (meteorological)
RCC	Rescue Coordination Centre
RCP	required communication performance
RE	recent

Term	Meaning
REPCON	aviation confidential reporting scheme
RF	rainfall
RMK	remark
RNAV	area navigation
RNP	required navigation performance
RNP AR	required navigation performance – authorisation required
RPA	remotely piloted aircraft
RPL	Recreational Pilot Licence
RRM	routinely reportable matter
RSP	required surveillance performance
RTF	radio telephony
RV	runway visibility
RVR	runway visual range
RWY	runway
SAR	search and rescue
SARTIME	time that search action is required
SARWATCH	search and rescue watch
SCT	scattered
SFC	surface
SID	standard instrument departure
SIGMET	information concerning en route weather phenomena which may affect the safety of aircraft operations
SIGWX	significant weather (forecast)
SIL	service information letter
SIS	surveillance information service
SKC	sky clear

Term	Meaning
SKED	schedule
SMC	surface movement control
SOP	standard operating procedure
SPECI	special report of meteorological conditions (in aeronautical meteorological code)
SPFIB	specific pre-flight information bulletin
SQL	Squall line (thunderstorm)
SSR	secondary surveillance radar
STAR	standard arrival route
STS	status
SUA	Special Use Airspace
SUP	Supplement
TAC	terminal area chart
TACAN	tactical air navigation aid
TAF	terminal area forecast
TAS	true air speed
TC	tropical cyclone
TCAS	traffic collision avoidance system (pronounced 'tee-kas')
TCU	towering cumulus (cloud)
TEMPO	temporary, temporarily
THR	through
TIL	used in weather forecasts
TODA	take-off distance available
TRANS	Transmits, transmission, transmitter
TS	thunderstorm (followed by: RA = rain; SN = snow; PE = ice pellets; GR = hail; GS=small hail and/or snow pellets; or combinations thereof; for example, TSRASN = thunderstorm with rain and snow)
TSI Act	*Transport Safety Investigation Act 2003*

Term	Meaning
TSO	technical standard order
TURB	turbulence
TYPO	typographical error
UTC	Coordinated Universal Time
VASIS	visual approach slope indicator system
VC	vicinity (of the aerodrome)
VFR	visual flight rules
VFRG	Visual Flight Rules Guide
VHF	very high frequency (30 to 300 MHz)
VIS	visibility
VMC	visual meteorological conditions
VNC	visual navigation chart
VOR	VHF omni-directional radio range
VRB	variable
VS	vertical speed
VSI	vertical speed indicator
VSO	stall speed with undercarriage down and flap selected
VTC	visual terminal chart
VTOL	vertical take-off and landing
VV	vertical visibility
WAC	world aeronautical chart
WAFS	World Area Forecast System
WAT	weight altitude temperature (limitations)
WATIR	weather and terminal information reciter
WILCO	understand your message and will comply with it
WS	windshear
WX	weather

Definitions

A

Term	Definition
Act	*Civil Aviation Act 1988*.
Aerodrome	A defined area of land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and movement of aircraft.
Aerodrome beacon	An aeronautical beacon used to indicate the location of an aerodrome from the air.
Aerodrome control service	Air traffic control (ATC) service for aerodrome traffic.
Aerodrome control tower	A unit established to provide air traffic control (ATC) services to aerodrome traffic.
Aerodrome elevation	The elevation of the highest point of the landing area.
Aerodrome meteorological minima (ceiling and visibility minima)	The minimum heights of cloud base (ceiling) and minimum values of visibility which are prescribed for the purpose of determining the useability of an aerodrome either for take-off or landing.
Aerodrome meteorological office	An office designated to provide meteorological services for aerodromes serving international air navigation.
Aerodrome proprietor	Any owner, licensee, authority, corporation, or any other body which has a legal responsibility for a particular aerodrome.
Aerodrome reference point (ARP)	The designated geographical location of an aerodrome.
Aerodrome traffic	All traffic on the manoeuvring area of an aerodrome and all aircraft flying in, entering, or leaving the traffic circuit.

Term	Definition
Aerodrome traffic circuit	The specified path to be flown by aircraft flying in, entering, or leaving the traffic circuit. **Note:** At a controlled aerodrome, an aircraft is in the traffic circuit when it is within the control zone (CTR) and established on a leg of the circuit.
Aeronautical beacon	An aeronautical ground light visible at all azimuths, either continuously or intermittently, to designate a particular point on the surface of the Earth.
Aeronautical Information Circular (AIC)	A notice containing information that does not qualify for the issue of a Notice to Airmen (NOTAM), or for inclusion in the Aeronautical Information Publication (AIP), but which relates to flight safety, air navigation, technical, administrative or legislative matters.
Aeronautical Information Publication (AIP)	The AIP is a set of publications provided by Airservices Australia as part of their Aeronautical Information Service (AIS). It includes › AIP Book › Departure and Approach Procedures (DAP) › En Route Supplement Australia (ERSA) › Designated Airspace Handbook (DAH) › Maps and Charts.
AIP supplement (SUP)	Temporary changes to the information contained in the AIP which are published by means of special pages.
Aircraft classification number (ACN)	A number expressing the relative effect of an aircraft on a pavement for a specific standard sub-grade category.
Aircraft parking position taxi lane	A portion of an apron designated as a taxiway and intended to provide access to aircraft parking positions only.
Air-ground communications	Two-way communications between aircraft and stations on the surface of the Earth.

Term	Definition
Airprox	The combination of the two words, air and proximity. An occurrence in which aircraft come into such close proximity that a threat to the safety of the aircraft exists or may exist, in airspace where the aircraft are not subject to an air traffic separation standard, or where separation is a pilot responsibility.
Air report (AIREP)	A report from an aircraft in flight prepared in conformity with requirements for position and operational and/or meteorological reporting.
Air taxiing	Movement of a helicopter/vertical take-off and landing (VTOL) aircraft above the surface of an aerodrome, normally in ground effect and at a speed normally less than 20 kt.
Air traffic control clearance	Authorisation for aircraft to proceed under conditions specified by an air traffic control unit. **Note:** For convenience, the term 'Air traffic control clearance' is normally abbreviated to 'Clearance' when used in the appropriate context.
Air traffic control instructions	Directives issued by air traffic control (ATC) for the purpose of requiring a pilot to take a specific action.
Air traffic control service	A service provided for the purpose of: a) preventing collisions: » between aircraft, and » on the manoeuvring area between aircraft and obstructions, and b) expediting and maintaining an orderly flow of air traffic.
Air traffic service (ATS)	A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service, or aerodrome control service).
Air traffic service (ATS) surveillance service	Term used to indicate an air traffic service provided directly by means of an ATS surveillance system.

Term	Definition
Air traffic service (ATS) surveillance system	A generic term meaning variously, automatic dependent surveillance-broadcast (ADS-B), primary surveillance radar (PSR), secondary surveillance radar (SSR) or any comparable ground-based system that enables the identification of aircraft. **Note:** A comparable ground-based system is one that has been demonstrated, by comparative assessment or other methodology, to have a level of safety and performance equal to, or better than, monopulse SSR.
Air transit	The airborne movement of a helicopter that is: › for the quick and efficient transit from one place within an aerodrome to another place within the aerodrome › at or below 100 ft above the surface, and › at speeds greater than those used in air taxiing.
Airways clearance	A clearance, issued by air traffic control (ATC), to operate in controlled airspace along a designated track or route at a specified level to a specified point or flight-planned destination.
Alerted see-and-avoid	A procedure where flight crew, having been alerted to the existence and approximate location of other traffic in their immediate vicinity, seek to sight and avoid colliding with those aircraft.
Alerting post	An agency designated to serve as an intermediary between a person reporting an aircraft in distress and a rescue coordination centre.
Alerting service	A service provided to notify appropriate organisations regarding aircraft in need of search and rescue aid, and to assist such organisations as required.
Alternate aerodrome	An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing.

Term	Definition
Altimeter setting	A pressure datum which when set on the sub-scale of a sensitive altimeter causes the altimeter to indicate vertical displacement from that datum. A pressure-type altimeter calibrated in accordance with standard atmosphere may be used to indicate altitude, height or flight levels, as follows: › when set to **QNH** or **area QNH** it will indicate altitude › when set to **Standard Pressure** (1,013.2 hPa) it may be used to indicate **flight levels**.
Altimeter setting region	Airspace 10,000 ft and below where the sub-scale of a pressure-sensitive altimeter is set to QNH or area QNH.
Altitude	The vertical distance of a level, a point or an object, considered as a point, measured from mean sea level.
Approach control service	Air traffic control (ATC) service for arriving or departing flights.
Approach sequence	The order in which two or more aircraft are cleared to approach to land at the aerodrome.
Apron	A defined area on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail, cargo, fuelling, parking or maintenance.
Apron service	A traffic regulatory and information service provided to aircraft using the apron area of an aerodrome.
Apron taxiway	A portion of a taxiway system located on an apron and intended to provide a through taxi route across the apron.
Area control service	Air traffic control (ATC) service for controlled flights in control areas.
Area navigation (RNAV)	A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground or space-based navigation aids, or within the limits of the capability of self-contained aids, or a combination of these.

Term	Definition
Area navigation route	An air traffic service (ATS) route established for the use of aircraft capable of employing area navigation.
Area QNH	A forecast altimeter setting which is representative of the QNH of any location within a particular area.
ATS route	See: Air traffic services route.
ATS surveillance service	See: Air traffic service surveillance service.
ATS surveillance system	See: Air traffic service surveillance system
Automatic dependent surveillance – broadcast (ADS-B)	A means by which aircraft, aerodrome vehicles and other objects can automatically transmit or receive data such as identification, position and additional data, as appropriate, in a broadcast mode via a data link.
Automatic dependent surveillance – contract (ADS-C)	A means by which the terms of an ADS-C agreement will be exchanged between the ground system and the aircraft, via a data link, specifying under what conditions ADS-C reports would be initiated, and what data would be contained in the reports.
Automatic en route information service (AERIS)	The provision of operational information en route by means of continuous and repetitive broadcasts.
Automatic terminal information service (ATIS)	The provision of current, routine information to arriving and departing aircraft by means of continuous and repetitive broadcasts during the hours when the unit responsible for the service is in operation.
Aviation reference number (ARN)	A unique six-digit number used to identify a client who conducts business with the Civil Aviation Safety Authority (CASA). When CASA receives an application for a new licence, certificate, or other service, an ARN is established and all subsequent transactions for the client are recorded against that ARN. In addition to being a client number, the ARN can also be the licence or certificate number. The ARN should be quoted in all correspondence with CASA or with the Airservices publications unit.

B

Term	Definition
Base turn (Instrument approach)	A turn executed by an aircraft during the initial approach between the end of the outbound track and the beginning of the intermediate or final approach track. The tracks are not reciprocal. Base turns may be designated as being made either in level flight or while descending, according to the circumstances of each individual procedure.
Blind transmission	A transmission from one station to another station in circumstances where two-way communication cannot be established, but where it is believed that the called station is able to receive the transmission.
Block level	A section of airspace with specified upper and lower limits on a specific track, in which cleared aircraft are permitted to manoeuvre.
Break-out procedure(s)	A procedure initiated on instruction from a precision runway monitor (PRM) controller upon which a pilot is required to discontinue an instrument landing system (ILS) approach and immediately commence a turn of approximately 90 degrees from the ILS course, climbing (or descending) as instructed by air traffic control (ATC), in response to an aircraft deviating from the adjacent ILS course.
Briefing	The act of giving in advance, specific pre-flight instructions or information to aircrew.
Broadcast	A transmission of information relating to air navigation for which an acknowledgement is not expected.

C

Term	Definition
Ceiling	The height above the ground or water of the base of the lowest layer of cloud below 20,000 ft covering more than one-half of the sky.
CENSAR	An automated centralised SARTIME database software package used by air traffic services (ATS) to manage SARTIMEs. SARTIME refers to the time that search action is required.
Centre	A generic callsign used in the en route and area environment which can include air traffic control (ATC), advisory, flight Information and alerting services, depending on the classification of airspace in which the service is provided.
Certified aerodrome	A place that is certified as an aerodrome under the Civil Aviation Safety Regulations.
Circling approach	An extension of an instrument approach procedure which provides for visual circling of the aerodrome prior to landing.
Clearance expiry time	A time specified by an air traffic control (ATC) unit at which a clearance ceases to be valid.
Clearance limit	The point to which an aircraft is granted an air traffic control (ATC) clearance.
Clearway	A defined rectangular area on the ground or water under the control of the appropriate authority, selected or prepared as a suitable area over which an aeroplane may make a portion of its initial climb to a specified height.
Closely spaced runways	Runways that are parallel or near parallel and spaced less than 1,525 m but not less than 1,035 m apart.
Co-located navigation aids	En route way-points or navigation aids that are within 600 m of each other.
Common traffic advisory frequency (CTAF)	A designated frequency on which pilots make positional broadcasts when operating in the vicinity of a non-controlled aerodrome.

Term	Definition
Communicable diseases	Communicable diseases include cholera, typhus (epidemic), smallpox, yellow fever, plague, and such other diseases as the contracting states shall, from time to time, decide to designate.
Community Service Flight (CSF)	A flight that a) involves: » the transport of one or more individuals (a patient) to a destination for the purpose of each such individual receiving non-emergency medical treatment or services at the destination, or » the transport of a patient from a destination mentioned in para (i) (the treatment destination) to another treatment destination, or » the transport of a patient from a treatment destination: – back to a place from which the patient departed for a treatment destination, or – to a destination at which the patient resides, and b) is provided to a patient, and any person who accompanies the patient to provide support and assistance, without a charge being made to any of those persons for their carriage, and c) medical treatment is not provided on board the aircraft for the flight, other than the administering of medication or in response to an unexpected medical emergency, and d) is coordinated, arranged or facilitated by an entity for a charitable purpose or community service purpose.
Company operations representative	The representative of an operating agency who is authorised to act in the capacity of liaison officer between air traffic control (ATC) and the operating agency in respect of the control of an aircraft of that agency.
Control area (CTA)	A controlled airspace extending upwards from a specified limit above the Earth.

Term	Definition
Controlled aerodrome	An aerodrome at which air traffic control (ATC) service is provided to aerodrome traffic.
Controlled airspace	Airspace of defined dimensions within which ATC service is provided in accordance with the airspace classification.
Controller	An air traffic controller, operating within an organisation approved under Civil Aviation Safety Regulations 1998 (CASR) Part 172 and qualified in accordance with CASR Part 65.
Controller pilot data link communications (CPDLC)	A means of communication between controller and pilot using data link for air traffic control (ATC) communications.
Control zone (CTR)	A controlled airspace extending upwards from the surface of the Earth to a specified upper limit.
Cruise climb	An aeroplane cruising technique resulting in a nett increase in altitude as the aeroplane weight decreases.
Cruising level	A level maintained during a significant portion of a flight.

D

Term	Definition
Danger area	An airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times.
Day	That period of time from the beginning of morning civil twilight to the end of evening civil twilight.
Dead reckoning (DR) navigation	The estimating or determining of position by advancing an earlier known position by the application of direction, time and speed data.

Term	Definition
Decision altitude/ height (DA/H)	A specified altitude or height in the precision approach at which a missed approach must be initiated if the required visual reference to continue the approach has not been established. **Notes** 1. Decision altitude (DA) is referenced to mean sea level (MSL) and Decision height (DH) is referenced to the threshold elevation. 2. The 'required visual reference' means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path.
Density altitude	Density altitude is pressure altitude corrected for temperature. The higher the density altitude, the lower the aircraft performance, and vice versa.
Density height	An atmospheric density expressed in terms of height which corresponds to that density in the standard atmosphere.
Dependent parallel approaches	Simultaneous instrument approaches to parallel or near-parallel instrument runways where ATS surveillance system separation minima between aircraft on adjacent extended runway centrelines are prescribed.
Distance measuring equipment (DME)	Equipment which measures in nautical miles, the slant range of an aircraft from the selected DME ground station.
DME Distance	The slant range from the source of a DME signal to the receiving antenna.
Domestic flight	A flight between two points within the Australian FIR.

E

Term	Definition
Elevation	The vertical distance of a point or a level, on or affixed to the surface of the Earth, measured from mean sea level.
Emergency phases:	a) Uncertainty phase » A situation where uncertainty exists as to the safety of an aircraft and its occupants. b) Alert phase » A situation where apprehension exists as to the safety of an aircraft and its occupants. c) Distress phase » A situation wherein there is reasonable certainty that an aircraft and its occupants are threatened by grave and imminent danger or require immediate assistance.
Equivalent single isolated wheel load	The equivalent load that would be imposed on a pavement by a single wheel if any wheel group on an aircraft were replaced by a single wheel using the same tyre pressure.
Essential radio navigation service	A radio navigation service whose disruption has a significant impact on operations in the affected airspace or aerodrome.
Estimate	The time at which it is estimated that an aircraft will be over a position reporting point or over the destination.
Estimated elapsed time (EET)	The estimated time required to proceed from one significant point to another.
Estimated off blocks time (EOBT)	The estimated time at which the aircraft will commence movement associated with departure.

Term	Definition
Estimated time of arrival (ETA)	For instrument flight rules (IFR) flights, the time at which it is estimated that the aircraft will arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the aerodrome, the time at which the aircraft will arrive over the aerodrome. For visual flight rules (VFR) flights, the time at which it is estimated that the aircraft will arrive over the aerodrome.
Expected approach time (EAT)	The time at which air traffic control (ATC) expects that an arriving aircraft, following a delay, will leave the holding fix to complete its approach for a landing. **Note:** The holding fix referred to in the EAT is that shown on the instrument approach chart from which the instrument approach is prescribed to commence.

F

Term	Definition
Final approach	That part of an instrument approach procedure which commences at the specified final approach fix or point, or where such a fix or point is not specified: › at the end of the last procedure turn, base turn or inbound turn of a racetrack procedure, if specified, or › at the point of interception of the last track specified in the approach procedure, and › ends at a point in the vicinity of an aerodrome from which a landing can be made, or a missed approach initiated.
Final approach altitude	The specified altitude at which a final approach is commenced.
Final approach fix (FAF)	A specified point on a non-precision instrument approach which identifies the commencement of the final segment.

Term	Definition
Final approach point (FAP)	A specified point on the glide path of a precision instrument approach which identifies the commencement of the final segment. **Note:** The final approach fix (FAP) is co-incident with the FAF of a localiser-based non-precision approach.
Final approach segment	That segment of an instrument approach procedure in which alignment and descent for landing are accomplished.
Final leg	The path of an aircraft in a straight line immediately preceding the landing (alighting) of the aircraft.
Fix	A geographical position of an aircraft at a specific time determined by visual reference to the surface, or by navigational aids.
Flight file	A file stored on the National Aeronautical Information Processing System (NAIPS) which contains stored briefings, or a stored flight notification. Flight files are owned by pilots and/or operators and updated at their request.
Flight following	The provision of an ongoing surveillance information service (SIS).
Flight identification (FLT IDENT)	An identification of up to 7 alpha-numeric characters entered by the pilot via a cockpit interface. Where possible, the Flight identification must match the Aircraft identification entered into Item 7 of the Flight Notification.
Flight Information	Information useful for the safe and efficient conduct of flight, including information on air traffic, meteorological conditions, aerodrome conditions and airways facilities.
Flight information area (FIA)	An airspace of defined dimensions, excluding controlled airspace, within which flight information and search and rescue (SAR) alerting services are provided by an air traffic service (ATS) unit. **Note:** FIAs may be sub divided to permit the specified ATS unit to provide its services on a discrete frequency or family of frequencies within particular areas.
Flight information centre (FIC)	A unit established to provide a flight information service and a search and rescue (SAR) alerting service.

Term	Definition
Flight information region (FIR)	An airspace of defined dimensions within which a flight information service (FIS) and a search and rescue (SAR) alerting service are provided.
Flight information service (FIS)	A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.
Flight level (FL)	A surface of constant atmospheric pressure which is related to a specific pressure datum, 1,013.2 hPa, and is separated from other such surfaces by specific pressure intervals.
Flight note	Details of the route and timing of a proposed flight provided by the pilot-in-command of an aircraft, which is other than notification submitted to Airservices Australia, and which is required to be left with a person who could be expected to notify appropriate authorities if the flight becomes overdue.
Flight notification (within Australian FIR)	Specified information provided to air traffic services units, relative to the intended flight or portion of flight of an aircraft.
Flight path monitoring	The use of air traffic services (ATS) surveillance systems for the purpose of providing aircraft with information and advice relative to significant deviations from nominal flight path including deviations from the terms of their air traffic control clearances. **Note:** Some applications may require a specific technology, for example, radar to support the function of flight path monitoring.
Flight visibility	The visibility forward from the cockpit of an aircraft in flight.
Forecast	A statement of expected meteorological conditions for a specified period, and for a specified area or portion of airspace.

Term	Definition
Formation	Two or more aircraft flown in close proximity to each other and operating as a single aircraft with regard to navigation, position reporting and control. **Note:** A CASR Part 61 flight activity endorsement is required when aeroplane or helicopter pilots are flying in formation (flying in formation is defined slightly differently to the definition of formation in the Aeronautical Information Package (AIP)). Civil Aviation Safety Regulation (CASR) 91.205 details conditions on formation flights.
Full emergency (in the context of aerodrome emergency plans)	A situation in which the response of all agencies involved in the aerodrome emergency plan will be activated. A full emergency will be declared when an aircraft approaching the airport is known or suspected to be in such trouble that there is danger of an accident. A full emergency will be initiated in response to a MAYDAY call.

G

Term	Definition
Glide path (GP)	A descent profile determined for vertical guidance during a final approach.
Global navigation satellite system (GNSS)	A satellite-based radio navigation system that uses signals from orbiting satellites to determine precise position and time. **Note:** While the term 'GNSS' covers a variety of systems such as global positioning system (GPS), global navigation satellite system (GLONASS), Galileo etc., Australia requires the use of GPS for aviation purposes.
Global positioning system (GPS)	A Global navigation satellite system (GNSS) constellation operated by the United States Government.
Gross weight	The weight of the aircraft together with the weight of all persons and goods (including fuel) on board the aircraft at that time.
Ground-based navigation aid	Refers to non-directional beacon (NDB), VHF omni-directional radio range (VOR) or distance measuring equipment (DME).
Ground taxiing	The movement of a helicopter under its own power and on its undercarriage wheels.
Ground visibility	The visibility at an aerodrome, as reported by an accredited observer.

H

Term	Definition
Hazardous conditions	Meteorological conditions which may endanger aircraft or adversely affect their safe operation, particularly those phenomena associated with volcanic ash cloud and thunderstorms – icing, hail and turbulence.
Heading (HDG)	The direction in which the longitudinal axis of an aircraft is pointed, usually expressed in degrees from north (true, magnetic, compass or grid).
Height	The vertical distance of a level, a point or an object considered as a point measured from a specified datum.
Helicopter access corridor	A corridor wholly within controlled airspace designed for the exclusive use of helicopters in visual meteorological conditions (VMC). The extent and alignment of the corridor is related to and delineated by prominent geographical/topographical features.
Helicopter landing site (HLS)	A place that is used as an aerodrome for the purposes of the landing and taking off of helicopters.
Helicopter lane	A lane, outside controlled airspace, designed for use by helicopters to facilitate traffic flow.
Helicopter movement area	The movement area for helicopters is that part of an aerodrome that can safely be used for the hovering, taxiing, take-off and landing of helicopters and consists of the manoeuvring area and aprons, but excluding those areas reserved for unrestricted use by the general public.
High capacity aircraft	An aircraft that is certified as having a maximum seating capacity exceeding 38 seats, or a maximum payload exceeding 4,200 kg.
Holding bay	A defined area where aircraft can be held, or bypassed, to facilitate efficient surface movement of aircraft.
Holding fix	A specified location identified by visual or other means in the vicinity of which the position of an aircraft in flight is maintained in accordance with air traffic control (ATC) instructions.

Term	Definition
Holding procedure	A predetermined manoeuvre which keeps an aircraft within a specified airspace whilst awaiting further clearance.
Hospital aircraft	See Medical flight.
Hot spot	A location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary.

I

Term	Definition
ICAO 24 bit aircraft address (24 bit code)	See: International Civil Aviation Organization 24-bit aircraft address (24-bit code)
Identification (IDENT)	The situation which exists when the position indication of a particular aircraft is seen on a situation display and positively identified by air traffic control (ATC).
Initial approach fix (IAF)	The fix at the commencement of an instrument approach.
Initial approach segment	That segment of an instrument approach procedure between the initial approach fix and the intermediate approach fix or, where applicable, the final approach fix or point.
Instrument approach procedure (IAP)	A series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en route obstacle clearance criteria apply.
Integrity	That quality which relates to the trust which can be placed in the correctness of information supplied by a system. It includes the ability of a system to provide timely warnings to users when the system should not be used for navigation.

Term	Definition
International Civil Aviation Organization (ICAO) 24-bit aircraft address (24-bit code)	A unique identification code which is programmed into each specific aircraft's transponder or automatic dependent surveillance-broadcast (ADS-B) transmitter during installation. This code, expressed as six alphanumeric characters, provides a digital identification of the aircraft and is used by the air traffic system to link information contained in a flight notification to aircraft position information received via ADS-B.
In the vicinity	An aircraft is in the vicinity of a non-controlled aerodrome if it is within a horizontal distance of 10 NM, and within a height above the aerodrome reference point that could result in conflict with operations at the aerodrome.

L

Term	Definition
Land and hold short operations (LAHSO)	A procedure involving dependent operations conducted on two intersecting runways whereby aircraft land and depart on one runway while aircraft landing on the other runway hold short of the intersection.
Landing area	That part of the movement area intended for the landing or take-off of aircraft.
Land rescue unit	A land party equipped to undertake a search for an aircraft within the region of its responsibility.
Level	A generic term relating to the vertical position of an aircraft in flight and meaning variously, height, altitude or flight level (FL).
Licensed aerodrome	A place that is licensed as an aerodrome under the Civil Aviation Regulations.
Local standby (in the context of aerodrome emergency plans)	A situation in which activation of only the airport-based agencies involved in an aerodrome emergency plan is warranted. A local standby will be the normal response when an aircraft approaching an airport is known or is suspected to have developed some defect, but the trouble is not such as would normally involve any serious difficulty in effecting a safe landing. A local standby will be initiated in response to a PAN call.
Lowest safe altitude (LSALT)	The lowest altitude which will provide safe terrain clearance at a given place.

M

Term	Definition
Manoeuvring area	That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.
Marker	An object displayed above ground level in order to indicate an obstacle or delineate a boundary.
Marker Beacon	A type of radio beacon, the emissions of which radiate in a vertical pattern.
Markings	A symbol or group of symbols displayed on the surface of the movement area in order to convey aeronautical information.
Maximum take-off weight (MTOW)	The maximum take-off weight of an aircraft as specified in its certificate of airworthiness.
Medical flight	A flight providing transport of medical patients, personnel, and/or equipment, prioritised as follows: › MEDEVAC: a life critical medical emergency evacuation e.g. an aircraft proceeding to pick up, or carry, a severely ill patient, or one for whom life support measures are being provided. › HOSP: a medical flight declared by medical authorities e.g. an aircraft transporting or proceeding to pick up medical personnel and/or equipment urgently required for the treatment of a severely ill patient, or returning urgently required medical personnel and/or equipment at the termination of a MEDEVAC flight.
METBRIEF	A self-help system which delivers meteorological information on the telephone using a computer-generated voice, in response to a tone-generated telephone request.
Meteorological Information	Meteorological report, analysis, forecast, and any other statement relating to existing or expected meteorological conditions.

Term	Definition
Meteorological warning	A statement or meteorological report of the occurrence or expectation of a deterioration or improvement in meteorological conditions or of any meteorological phenomenon which may seriously affect the safe operation of aircraft.
Minimum altitude	The minimum altitude for a particular instrument approach procedure is the altitude specified by AIP DAP at which an aircraft shall discontinue an instrument approach unless continual visual reference to the ground or water has been established and ground visibility is equal to or greater than that specified by the DAP for landing.
Minimum fuel	The term used to describe a situation when an aircraft's fuel supply has reached a state where having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than the fixed fuel reserve for the flight. **Note:** The minimum fuel state is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.
Minimum vector altitude	The lowest altitude which a controller may assign to a pilot in accordance with the radar terrain clearance chart.
Missed approach procedure (MAP)	The procedure to be followed if an approach cannot be continued.
Movement area	That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s).

N

N	Definition
National Aeronautical Information Processing System (NAIPS)	A system providing briefings and flight notification functions.
Navigation specification	A set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specifications: › Required navigation performance (RNP) specification: A navigation specification based on area navigation (RNAV) that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, for example RNP 4, RNP approach (APCH). › Area navigation (RNAV) specification A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, for example RNAV 5, RNAV 1. **Note**: The Performance-based Navigation Manual (doc 9613), volume II, contains detailed guidance on navigation specifications.
Night	That period of time between the end of evening civil twilight and the beginning of morning civil twilight.
Non-controlled aerodrome	An aerodrome at which air traffic control is not operating (formerly designated non-towered).
Non-directional beacon (NDB)	A special radio station, the emissions of which are intended to enable a mobile station to determine its radio bearing or direction with reference to that special radio station.
Notice to Airmen (NOTAM)	A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

O

Term	Definition
Operations manual	A manual provided by an operator for the use and guidance of operations staff, containing instructions as to the conduct of flight operations, including the responsibilities of its operations staff.
Operator	A person, organisation or enterprise engaged in or offering to engage in aircraft operation.
Overshoot shear	A wind shear occurrence which produces an initial effect of overshooting the desired approach path and/or increasing airspeed.

P

Term	Definition
Parking area	A specially prepared or selected part of an aerodrome within which aircraft may be parked.
Performance-based navigation (PBN)	Area navigation based on performance requirements for aircraft operating along an air traffic service (ATS) route, on an instrument approach procedure, or in a designated airspace. **Note:** that performance requirements are expressed in navigation specifications (area navigation (RNAV) specification or required navigation performance (RNP) specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.
Permissible all-up-weight	The weight to which an aircraft is limited by virtue of the physical characteristics of an aerodrome.
Pilot-in-command	The pilot designated by the operator, or in the case of general aviation,the owner, as being in command and charged with the safe conduct of a flight.
Preferred runway	A runway nominated by air traffic control (ATC) or listed in the Aeronautical Information Publication (AIP) as the most suitable for the prevailing wind, surface conditions or noise sensitive areas in the proximity of the aerodrome.

Term	Definition
Primary means navigation system	A navigation system that, for a given operation or phase of flight, must meet accuracy and integrity requirements, but need not meet full availability and continuity of service requirements. Safety is achieved by either limiting flights to specific time periods, or through appropriate procedural restrictions and operational requirements.
Procedural service	Term used to indicate that information derived from an air traffic service (ATS) surveillance system is not required for the provision of ATS.
Procedure altitude/ height	A specified altitude/height flown at or above the minimum altitude/height and established to accommodate a stabilised descent at a prescribed descent gradient/angle in the intermediate/final approach segment.
Prohibited area	An airspace of defined dimensions, above the land areas or territorial waters of a state, within which the flight of aircraft is prohibited. This designation is appropriate only for reasons of defence.

Q

Term	Definition
QNH altimeter setting	That pressure setting which, when placed on the pressure setting sub-scale of a sensitive altimeter of an aircraft located at the reference point of an aerodrome, will cause the altimeter to indicate the vertical displacement of the reference point above mean sea level (AMSL).

R

Term	Definition
Radar/ADS-B Information Service (RIS)	An on-request service provided to assist pilots of visual flight rules (VFR) flights, within air traffic service (ATS) surveillance system coverage in Class E and Class G airspace, to avoid other aircraft or to assist in navigation. [For ADS-B definition, see: Automatic dependent surveillance – broadcast.]
Radio altimeter (RA) height	An indication of vertical distance between a point on the normal glidepath at DA and the terrain directly beneath this point.
Radio navigation service	A service providing guidance information or position data for the efficient and safe operation of aircraft supported by one or more radio navigation aids.
Rapid exit taxiway	A taxiway connected to a runway at an acute angle and designed to allow landing aeroplanes to turn off at high relative speeds.
Receiver autonomous integrity monitoring (RAIM)	A system whereby an airborne global positioning system (GPS) receiver/processor autonomously monitors the integrity of the navigation signals from GPS satellites.
Repetitive flight plan	A flight plan referring to a series of frequently recurring, regularly operated individual flights with identical basic features, submitted by an operator for retention and repetitive use by air traffic service (ATS) units.
Reporting point	A specified geographical location in relation to which the position of an aircraft can be reported.
Required navigation performance (RNP)	A statement of the navigation performance necessary for operation within a defined airspace.
Rescue coordination centre (RCC)	A unit established for promoting efficient organisation of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

Term	Definition
Restricted area	An airspace of defined dimensions above the land areas or territorial waters of a state, within which the flight of aircraft is restricted in accordance with certain specified conditions. **Note:** This designation is normally used whenever the activities of the administering authority of the airspace are a hazard to other users; or other users constitute a hazard to the activities of the administering authority.
Route	A way to be taken in flying from a departure to a destination aerodrome, specified in terms of track and distance for each route segment.
Runway (RWY)	A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.
Runway holding position	A designated position intended to protect a runway, an obstacle limitation surface, or an instrument landing system (ILS) critical/sensitive area at which taxiing aircraft and vehicles must stop and hold, unless otherwise authorised by the aerodrome control tower. **Note:** In radiotelephony phrasing, the expression 'holding point' is used to designate the runway holding position.
Runway number	The runway identification associated with a runway direction end.
Runway strip	The defined area, including the runway (and stopway if provided), intended to reduce the risk of damage to aircraft inadvertently running off the runway and to protect aircraft flying over it during take-off, landing or missed approach.
Runway visibility (RV)	The distance along a runway over which a person can see and recognise a visibility marker or runway lights. **Note:** The term runway visibility is used by air traffic control (ATC) or ground personnel to report visibility along a runway as determined by a ground observer.

Term	Definition
Runway visual range (RVR)	The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identify its centre line. **Note:** Within Australia, the term runway visual range or RVR will be used by air traffic control (ATC) or ground personnel exclusively to report RVR determined by electronic means.

S

Term	Definition
SARTIME	The time nominated by a pilot for the initiation of search and rescue (SAR) action if an arrival report has not been received by the appropriate authority.
SARWATCH	A generic term covering search and rescue (SAR) alerting based either on full-position reporting procedures, scheduled reporting times (SKEDS), or SARTIME.
Search and rescue (SAR)	The act of finding and returning to safety, aircraft and persons involved in an emergency phase.
Search and rescue region (SRR)	The specified area within which search and rescue is coordinated by a particular rescue coordination centre.
Secondary surveillance radar (SSR) code	The number assigned to a particular multiple-pulse reply signal transmitted by a transponder in Mode A or Mode C.
Segment minimum safe altitude	The lowest altitude at which the minimum obstacle clearance is provided.
Segregated parallel operations	Simultaneous operations on parallel or near-parallel instrument runways in which one runway is used exclusively for approaches and the other runway is used exclusively for departures.

Term	Definition
Significant point	A specified geographical location used in defining an air traffic service (ATS) route or the flight path of an aircraft and for other navigation and ATS purposes. **Note:** There are three categories of significant points: › ground-based navigation aid › intersection › waypoint. In the context of this definition, intersection is a significant point expressed as radials, bearings and/or distances from ground-based navigation aids.
Significant weather	Any weather phenomenon which might affect flight visibility or present a hazard to an aircraft.
Situation display	An electronic display depicting the position and movement of aircraft and other information as required.
Sole means navigation system	A navigation system that, for a given phase of flight, must allow the aircraft to meet all four navigation system performance requirements – accuracy, integrity, availability and continuity of service.
Stall speed VS1G	The one-G stall speed at which an aeroplane can develop a lift force (normal to the flight path) equal to its weight.
Standard pressure	The pressure of 1,013.2 hPa which, if set up on the pressure sub-scale of a sensitive altimeter, will cause the latter to read zero when at mean sea level in a standard atmosphere.
Standard pressure region	Airspace above 10,000 ft where the sub-scale of a pressure-sensitive altimeter is set to 1,013.2 hPa.
Stopway	A defined rectangular area on the ground at the end of the take-off run prepared as a suitable area in which an aircraft can be stopped in the case of an abandoned take-off.
Supplemental means navigation system	A navigation system that must be used in conjunction with a sole-means navigation system.

T

Term	Definition
Tactical air navigation (TACAN)	An ultra-high frequency (UHF) navigation aid which provides a continuous indication of bearing and slant range, in nautical miles, to the selected ground station.
TAF3	An aerodrome forecast (TAF) issued every 3 hours.
Taxiway (TWY)	A defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another.
Terrain clearance	The vertical displacement of an aircraft's flight path from the terrain.
Threshold	The beginning of that portion of the runway usable for landing.
Total estimated elapsed time	For visual flight rules (VFR) flights, the estimated time required from take-off to arrival over the destination aerodrome.
Touch-and-go landing	A procedure whereby an aircraft lands and takes off without coming to a stop.
Track	The projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from north (true, magnetic or grid).
Transitional surface	An inclined plane associated with the runway strip and the approach surfaces.
Transition altitude	The altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes.
Transition layer	The airspace between the transition altitude and the transition level.
Transition level	The lowest flight level available for use above the transition altitude.
Transponder	A receiver/transmitter which will generate a reply signal upon proper interrogation, the interrogation and reply being on different frequencies.

U

Term	Definition
Unalerted see-and-avoid	A procedure where flight crew, who have no specific knowledge of other aircraft in their vicinity, rely solely on their ability to physically *see* and avoid colliding with aircraft that may be in their vicinity.
Undershoot shear	A wind shear occurrence which produces an initial effect of undershooting the desired approach path and/or decreasing air speed.
Universal Communications (UNICOM)	A non-air traffic service (ATS) communications service provided to enhance the value of information normally available about a non-controlled aerodrome.
Unserviceable area	A portion of the movement area not available for use by aircraft because of the physical condition of the surface, or because of any obstruction on the area.

V

Term	Definition
Vectoring	Provision of navigational guidance to aircraft in the form of specific headings, based on the use of an air traffic service (ATS) surveillance system.
VHF omni-directional radio range (VOR)	A very high frequency (VHF) radio navigational aid which provides a continuous indication of bearing from the selected VOR ground station.
Visibility	Visibility for aeronautical purposes is the greater of: › the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognised when observed against a bright background, or › the greatest distance at which lights of about 1,000 candelas can be seen and identified against an unlit background.
Visual approach slope indicator system (VASIS)	A system of lights so arranged as to provide visual information to pilots on approach of their position in relation to the optimum approach slope for a particular runway.

Term	Definition
Visual (ATC usage)	Used by air traffic control (ATC) to instruct a pilot to see and avoid obstacles while conducting flight below the MVA or MSA/LSALT.
Visual flight rules (VFR) climb and descent	Air traffic control (ATC) authorisation for an instrument flight rules (IFR) flight in visual meteorological conditions (VMC), at or below FL180, in Classes D and E airspace, to conduct a visual climb or descent.
Visual Flight rules VFR-on-top	Air traffic control (ATC) authorisation for an instrument flight rules (IFR) flight to operate in visual meteorological conditions (VMC), at or below FL180, in Class E airspace at any appropriate VFR altitude or flight level (in accordance with En route (ENR) 1.2 Section 2, and ENR 1.7 Section 5, and as restricted by ATC).
Visual (pilot usage)	Used by a pilot to indicate acceptance of responsibility to see and avoid obstacles while operating below the minimum vector altitude (MVA) or minimum sector altitude/lowest safe altitude (MSA/LSALT).
VMC	Visual meteorological conditions (VMC) are the meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima.
VS1G	See: Stall speed

W

Term	Definition
Way point	A specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation. Way points are identified as either: Fly-by way point – A way point which requires turn anticipation to allow tangential interception of the next segment of a route or procedure, or Flyover way point – A way point at which a turn is initiated to join the next segment of a route or procedure.

Quick reference

Are you safe to fly?

I llness	☐	Am I physically well?
M edication	☐	Am I free from the effects of drugs?
S tress	☐	Am I free from significant stress?
A lcohol	☐	Am I free from the effects of alcohol?
F atigue	☐	Am I adequately rested?
E ating	☐	Have I eaten properly so I can work effectively?

DON’T FLY IF YOU’RE NOT SAFE

Aircraft specifications

Type			
Registration number			
Climb speed	Best rate (V_y)		kt
	Best angle (V_X)		kt
	Normal		kt
Best glide speed	Heavy		kt
	Medium		kt
	Light		kt
Stall speed	0˚ flap		kt
	Full flap		kt
Take-off speed	Short field		kt
Landing speed	Short field		kt
	Flapless		kt
	Normal		kt
Maximum gear extension speed			kt
Maximum VFE flap extension speed (VFE)			kt
Fuel capacity (usable)			litres
Fuel flow	65% power		litres/hour
	75% power		litres/hour
Weight	Basic empty		kg
	Maximum take-off		kg
Maximum baggage weight			kg

Forced landing initial action

1 Initial check

Altitude	Hold
Speed	Best glide speed
Mixture	Rich
Carb	Full hot
Fuel	On
	Pump on
	Change tanks
Trim	To best glide speed

2 Field selection

Wind	Determine direction
Surroundings	Power lines, trees
Size and shape	In relation to wind
Surface and slope	
Civilisation	Close proximity if possible

3 FMOST

Fuel	Check contents
	Pump on
	Primer locked
Mixture	Up and down range, leave rich
Oil	Temps green
	Pressures green
(mags) Switch	Left then right back to both
Throttle	Up and down range, then close

4 Mayday call and squawk 7700

Mayday Mayday Mayday

Melbourne Centre

This is ZTQ ZTQ ZTQ

Engine failure

3 NM west of Picton 4,500 ft

Landing in paddock

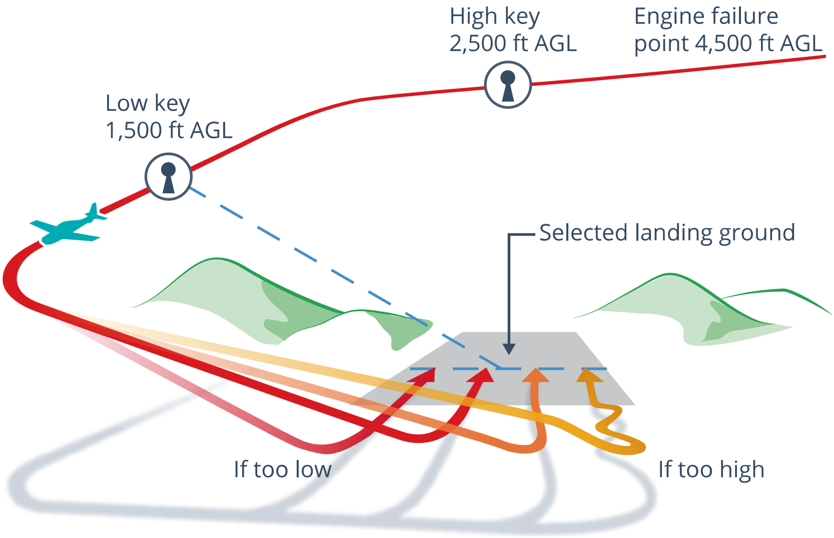
Plus any other useful information such as POB

5 Brief your passengers

6 Final actions

Fuel	Off
Mixture	Closed
Mags	Off
Harness	Tight
Door	As required
Master switch	Off **Caution if flaps are electrically operated**

Forced landing procedure



Night VFR checklist

To fly in command

1 In the last 6 months:

Completed one take-off and landing?

No ▶ Do one take-off and landing dual

CASR 61.965

Yes ▼

2 In the last 24 months:

Completed a flight review, test or proficiency check for a Night Visual Flight Rules (NVFR) rating or endorsement?

No ▶ This must be completed

CASR 61.970

Yes ▼

3 In the last 90 days, to carry passsengers:

(a) Completed three take-offs and landings dual or solo; or

(b) Completed a flight test or a relevant check, review for a NVFR rating, endorsement, or a flight including night operations as appropriate?

No ▶ Complete (a) or (b)

CASR 61.395

Yes ▼

LSALT

4 Published LSALT?

Yes ▼

No ▶ Calculate LSALT by:

(a) 10 NM either side of track

(b) Inaccurate navigation or NAVAID failure ±5 NM radius plus ±20% air distance travelled from last fix

(c) From AID ±10.3° to a max of 50 NM either side of track plus ±5 NM

(d) Dead Reckoning (DR): ±15° to a max of 50 NM either side of track plus ±5 NM

AIP GEN 3.3

Weather and NOTAMs

5 Pilot briefing from NAIPS obtained?

No ▶ Obtain

Yes ▼

6 GAR indicates:

Cloud > SCT below LSALT plus 1,000 ft?

Yes ▶ Don't fly

Due to inability to maintain VMC

Note: methods of determining cloud amounts (AIP ENR 1.1)

No ▼

Go to 7

7 **TAF indicating the presence, PROB30 or PROB40 of:**

(a) Cloud > SCT below 1,500 ft
(b) Visibility < 8 km
(c) Crosswind > max for aircraft?

Yes ▶ **Plan for alternate**

AIP ENR 1.1

No ▼

8 **NAVAID:**

Aerodrome served by NAVAID + aircraft equipped with NAVAID?

No ▶ **Plan for alternate**

Within 1 hr that has NAVAID

Yes ▼

9 **Lighting:**

(a) Pilot Activated Lighting (PAL) system + standby power supply + responsible person
(b) Portable with responsible person?

No ▶ **Plan for alternate**

Alternates with PAL do not need a responsible person if dual VHF equipped or 1 x VHF + HF + 30 min holding

Yes ▼

Aircraft equipment

10 **Aircraft instruments:**

(a) Airspeed indicator	(d) Clock	(g) Turn and slip
(b) Altimeter	(e) AI	(h) Suction gauge
(c) Compass	(f) DG	(i) VSI

No ▶ **Don’t fly**

Yes ▼

11 **Aircraft lighting:**

(a) Instrument lights with variable illumination
(b) One landing light for private, two landing lights for commercial

No ▶ **Don’t fly**

Yes ▼

12 **Aircraft radio equipment:**

(a) 1 x VHF radio
(b) 1 x NAVAID (NDB, VOR or certified GNSS)
(c) SSR transponder if operating in CTA/RADAR?

No ▶ **Don’t fly**

Yes ▼

13 **SARTIME or Flight note:**

Submitted 30 mins before EOBT if travelling:
(a) Further than 120 NM
(b) Through a designated remote area or
(c) Over water

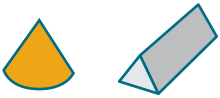
No ▶ **Submit one**

Yes ▶ **Enjoy your flight**

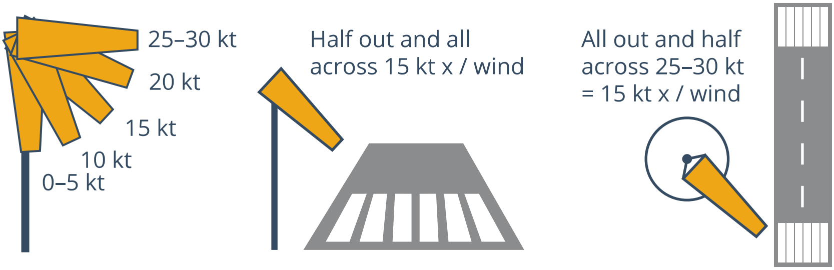
Light signals

On ground	Light mode	In flight
Authorised to **take off** if pilot is satisfied that no collision risk exists	🟢 Green	Authorised to **land** if pilot is satisfied that no collision risk exists
Authorised to **taxi** if pilot is satisfied that no collision risk exists	🟢 Green flashing	**Return** for landing
Stop	🔴 Red	**Give way** to other aircraft **and continue** circling
Taxi clear of landing area in use	🔴 Red flashing	**Do not land** Aerodrome unsafe
Return to starting point on aerodrome	○ White flashing	

Signals for the control of aerodrome traffic

Ground signal			
Description	White cross	Double white cross	Horizontal white dumbbell
Where displayed	a) Adjacent to wind direction indicator b) On manoeuvring area	Adjacent to wind direction indicator	Adjacent to wind direction indicator
Meaning	a) Aerodrome completely unserviceable b) An area marked by a cross or crosses with the limit delineated by markers is unfit for use by aircraft	Gliding operations in progress	Use only hard surface movement areas. Where there are sealed and gravel manoeuvring areas, use only the sealed surfaces. Where there are constructed gravel and natural surface manoeuvring areas, use only the gravel surfaces. (See *ERSA* FAC for any local information relating to the dumbbell signal)
Markers			
Meaning	Unserviceable area marker	Boundary markers	

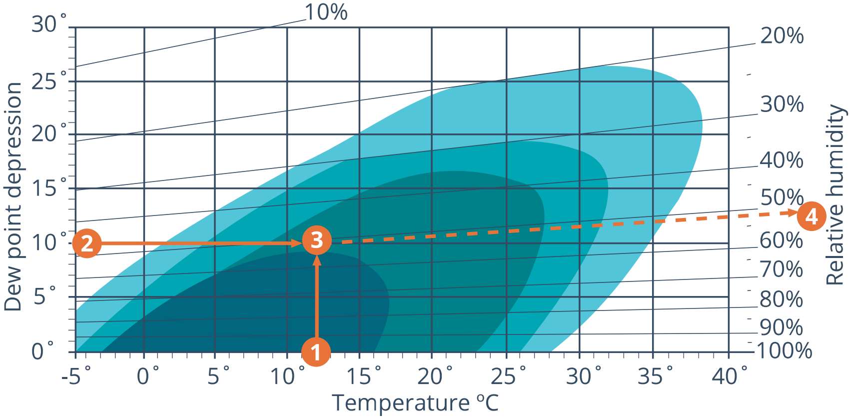
Windsock interpretation



Carburettor icing probability

To use this chart obtain the temprature and dew point

- calculate the difference between the two. This is the 'dew point depression'
- for example, if the temperature is 12ºC ① and the dew point is 2ºC the dew point depression will be 10ºC ②
- for icing probability, refer to the shading legend appropriate to the intersection of the lines ③
- for relative humidity, refer to the right hand scale ④



● **Serious icing**
- any power

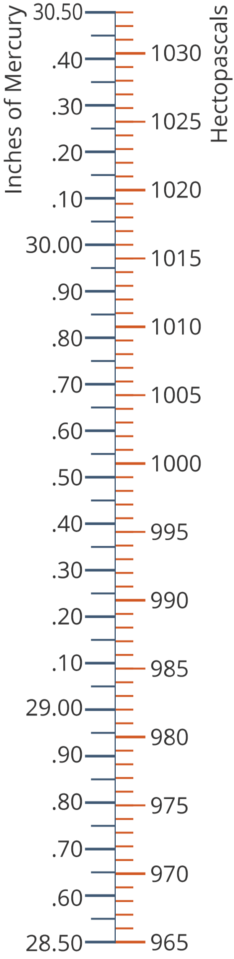
● **Moderate icing**
- cruise power, or
Serious icing
- descent power

● **Serious icing**
- descent power

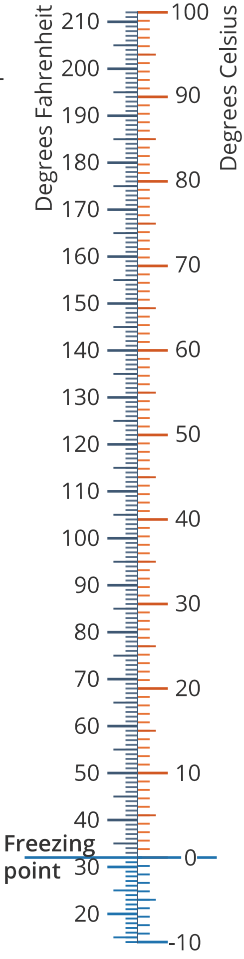
● **Light icing**
- cruise or
descent power

Conversions

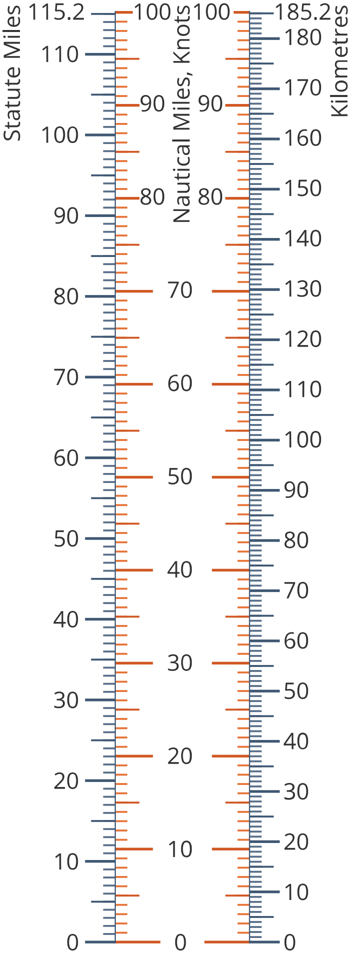
Pressure



Temperature



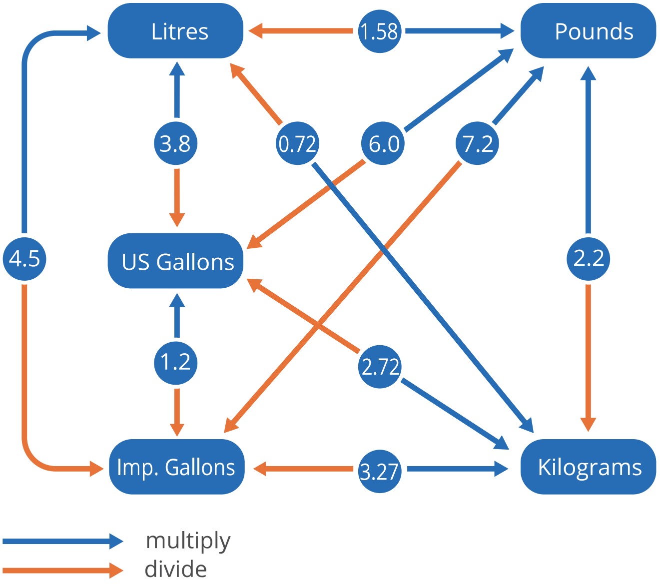
Speed



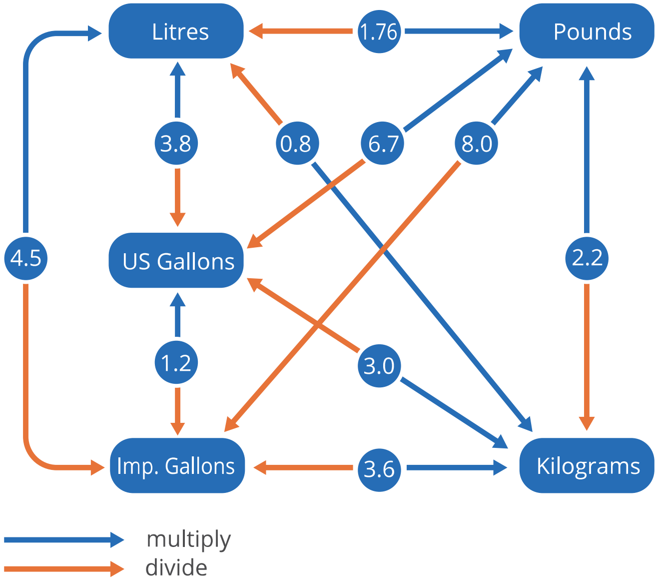
Distance, volume and mass

From	To	Multiply by
Distance		
Metres	Feet	3.281
Feet	Metres	0.3048
Volume		
Imperial gallons	Litres	4.546
Litres	Imperial gallons	0.22
Mass		
Kilograms	Pounds	2.2046
Pounds	Kilograms	0.4536

Conversion flow diagram–AVGAS specific



Conversion flow diagram–AVTUR specific



Note:

1. To convert: **multiply** by the factor in the "balloon" when moving in the direction of the arrow, or **divide** by that factor if converting in the opposite direction.
2. Fuel SG (0.8 AVTUR and 0.72 AVGAS) is based on ISA temperature at MSL. Therefore, fuel weights will be approximate for other than 150EG Celsius.

Version history: Visual Flight Rules Guide

Updated: April 2025 (Version 8.2)
Latest print version: 8.2

Version 8.2 April 2025	**Details**
Reference to repealed CASA EX81/21 – Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2021	CASA EX81/21 – Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2021 has been repealed and replaced by CASA EX67/24 – Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2024 and all instances throughout this guide have been changed.
Chapter 3 – Flying your aircraft Page 255	Second paragraph and following 3 bullet points have been amended to read: A balloon can operate below 2000 ft AGL at or within 3 NM of a non-controlled aerodrome only if the PIC holds either: › a current commercial pilot (balloon) licence (CP(B)L) › a private pilot (balloon) permit issued by CASA with a non-controlled aerodrome endorsement › a current CAR certificate of validation.
Chapter 3 – Flying your aircraft Page 295	Last sentence of the first paragraph has been deleted and replaced with: Sport and recreational balloon activities and private pilot balloon permits (PP(B)P) are administered and issued by CASA.
Chapter 3 – Flying your aircraft Page 296	Second paragraph has been amended to read: Where several balloons are permitted to operate together in the vicinity of a CTA/CTR of a controlled aerodrome, one balloon in each group could be permitted by ATC to maintain radio communication and surveillance responsibility for the group.

Version 8.2 **April 2025**	**Details**
Chapter 3 – Flying your aircraft Page 297	First paragraph has been amended to read: Balloons may take-off from, and land at, adequate open spaces within populous areas. The minimum overflight height for a balloon over a populous area is 1,000 ft AGL unless taking off, landing or if necessary to navigate to a planned landing area.
Chapter 3 – Flying your aircraft Page 313	Section on Rated coverage has been amended to read: Rated coverage (AIP GEN 1.5) The following ranges are quoted for planning purposes: › using an NDB - see ERSA FAC (aerodromes) for information about the availability of NDB facilities and their rated coverage › using a VOR and/or DME:

Aircraft altitude	**Range**
Below 5,000 ft	60 NM
5,000 ft to below 10,000 ft	90 NM
10,000 ft to below 15,000 ft	120 NM
15,000 ft to below 20,000 ft	150 NM
20,000 ft and above	180 NM

› using a localiser:

Aircraft altitude	**Range**
At 2,000 ft AGL within ± 10° of course line	25 NM
Below 5,000 ft	30 NM
5,000 ft and above	50 NM

Note: The localiser ranges are for installations that have been nominated for position fixing at ranges beyond 25 NM.

Note: Actual ranges obtained may be less than these due to facility and site variations - see ERSA FAC for individual stations.

Updated: August 2024 (version 8.1)
Latest print version: 8.1

Version 8.1 August 2024	**Details**
Chapter 3 – Flying your aircraft page 218/219	Changed two bullet points at the top of page 219 to read: If you are flying below the transition altitude, set your altimeter using either: › the current local QNH (either an accurate QNH or forecast QNH) of a station along the route within 100 NM of the aircraft › the current forecast area QNH. Added note: **Note**: QNH is available from a reporting station (AAIS, ATIS, AWIS, CA/GRS, VOLMET or WATIR), a TAF, the area QNH forecast, or from ATS (ATC or FIS). Amended graphic on page 218 to reflect the amended text. Amendment reflects the unlimited option to use the current forecast area QNH, and improves readability.

Version 8.0 March 2024	**Details**
Chapter 1 – Know your rules and responsibilities – Licensing page 11	Inserted paragraph about the Class 5 medical self declaration: **The Class 5 medical self declaration** allows recreational pilot licence holders and other licensed pilots conducting private operations to be exempt from holding a medical certificate provided they declare that they are medically fit and comply with the requirements (operational limitations) of the exemption. This declaration can be made at **www.casa.gov.au/licences-and-certificates/aviation-medicals-and-certificates/class-5-medical-self-declaration**.

Version 8.0 March 2024	**Details**
Chapter 1 – Know your rules and responsibilities – Pilot responsibilities page 24	Inserted a lightbulb regarding mercy flights: **Mercy flights**: There may be times when it is necessary for pilots to not follow aviation safety rules in order to respond to a sudden or extraordinary emergency. You are required to report such breaches to CASA. Please refer to **www.casa.gov.au/operations-safety-and-travel/safety-advice/mercy-fights-and-operating-emergency**.
Chapter 3 – Flying your aircraft page 227	Changed reference to a future rule to the past. On 15 June 2023 Australia's Airspace Regulations 2007 *were amended...*
Chapter 3 – Flying your aircraft page 229	Added to information about Military operating areas: See current aeronautical information circulars (AIC).
Chapter 3 – Flying your aircraft – Ballooning page 295	Added text: See guide for balloons and hot air airships for further information. **www.casa.gov.au/guide-balloons-and-hot-air-airships**
Chapter 5 – Radio communication procedures page 377	Added an extra line to the table of reports that need to be made to ATC: Situation: Runway braking action encountered not as good as reported by ATS Frequency: ATS Report: Report actual braking action with prefix AIREP SPECIAL.
Chapter 6 – Decision making and hazards page 430	Inserted a lightbulb regarding mercy flights: **Mercy flights**: There may be times when it is necessary for pilots to not follow aviation safety rules in order to respond to a sudden or extraordinary emergency. You are required to report such breaches to CASA. Please refer to **www.casa.gov.au/operations-safety-and-travel/safety-advice/mercy-fights-and-operating-emergency**.
Index	Entry for Mercy flight, pages 24 and 430

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