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).

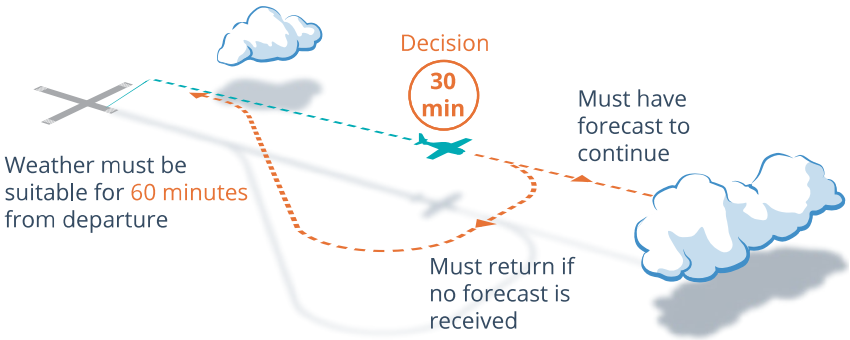
An authorised weather forecast in Australia means, a weather forecast made by the BOM for aviation purposes.

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.

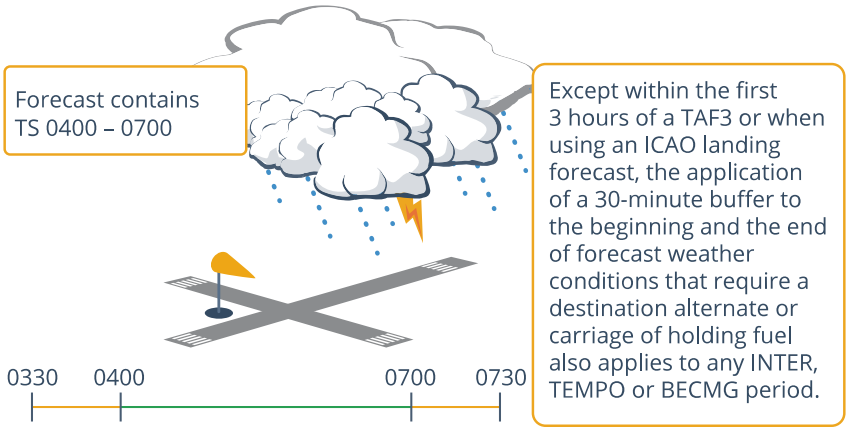
A forecast including the change indicator 'becoming' (BECMG)

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



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 45° 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 30° angle to the direction of the runway indicates that half of the total windspeed will be crosswind.
- A windsock at a 45° 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.

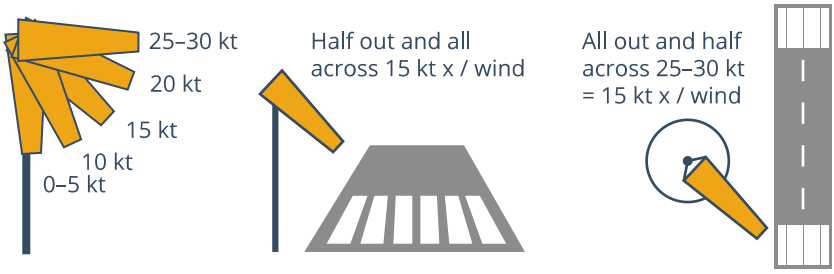
Note: It is recommended you consider both the possibility and effects of windshear, and whether the conditions remain within the maximum crosswind limit of the aircraft.

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.

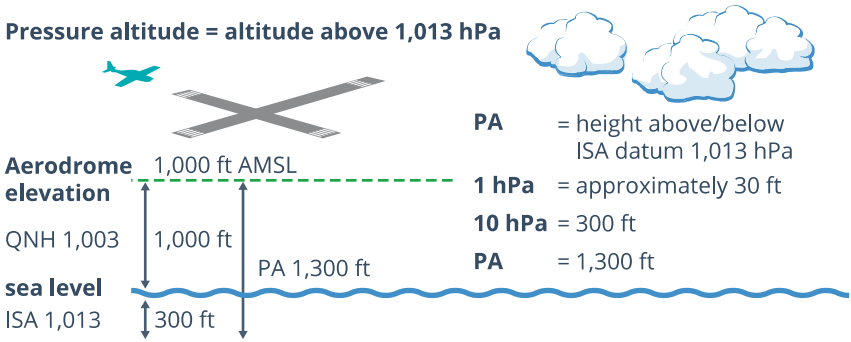
  » The indicated altitude read is the pressure altitude.

› 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.

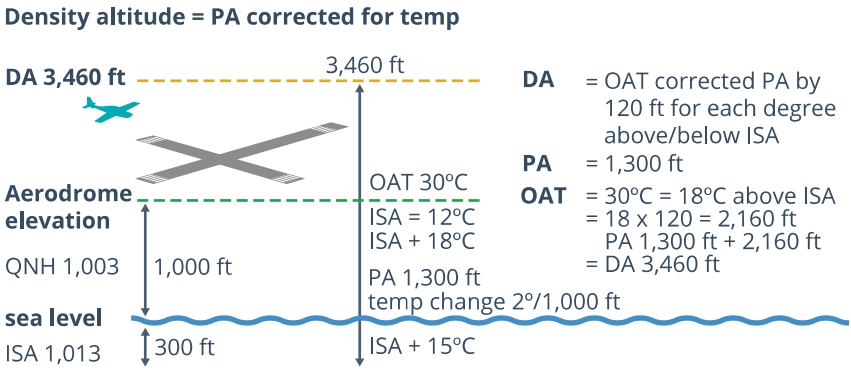
Density altitude can be determined by correcting the outside air temperature (OAT) compared to the ISA temperature value against the aerodrome elevation. With a higher-than-normal ambient temperature, the aircraft performance will be less than that at a standard ISA temperature. Conversely, if it is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

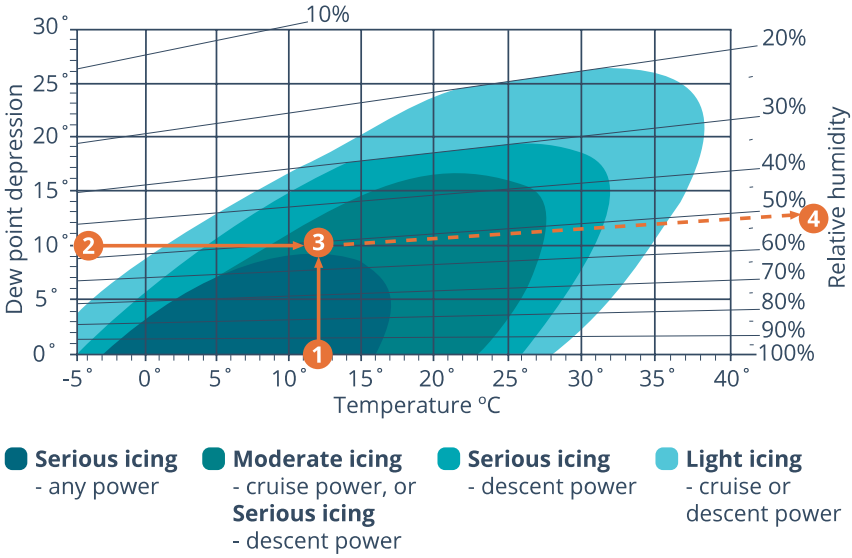
› Find the intersection of 12 (horizontal axis) and 10 (vertical axis) and note the shading indicates:

  » 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.

Civil Aviation Safety Authority

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)

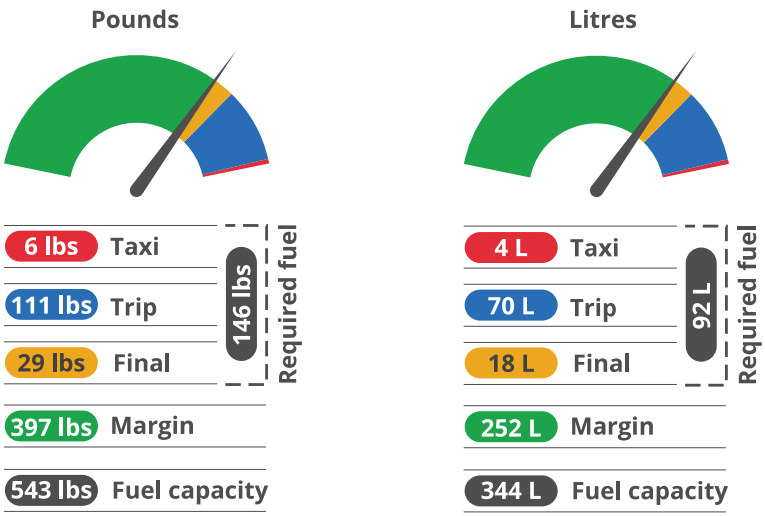
The final reserve fuel for this operation is fuel to fly for 30 minutes (0.5 hr), calculated at the anticipated weight at holding speed 1,500 ft above the planned destination aerodrome in ISA conditions.

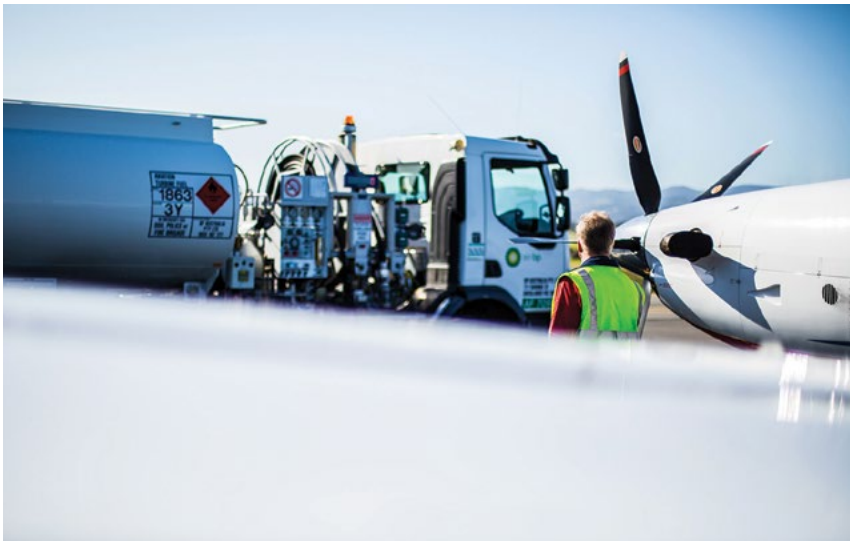
While it does not provide fuel consumption rates for holding, the C210 POH does suggest that holding be conducted using 45% power.

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





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.

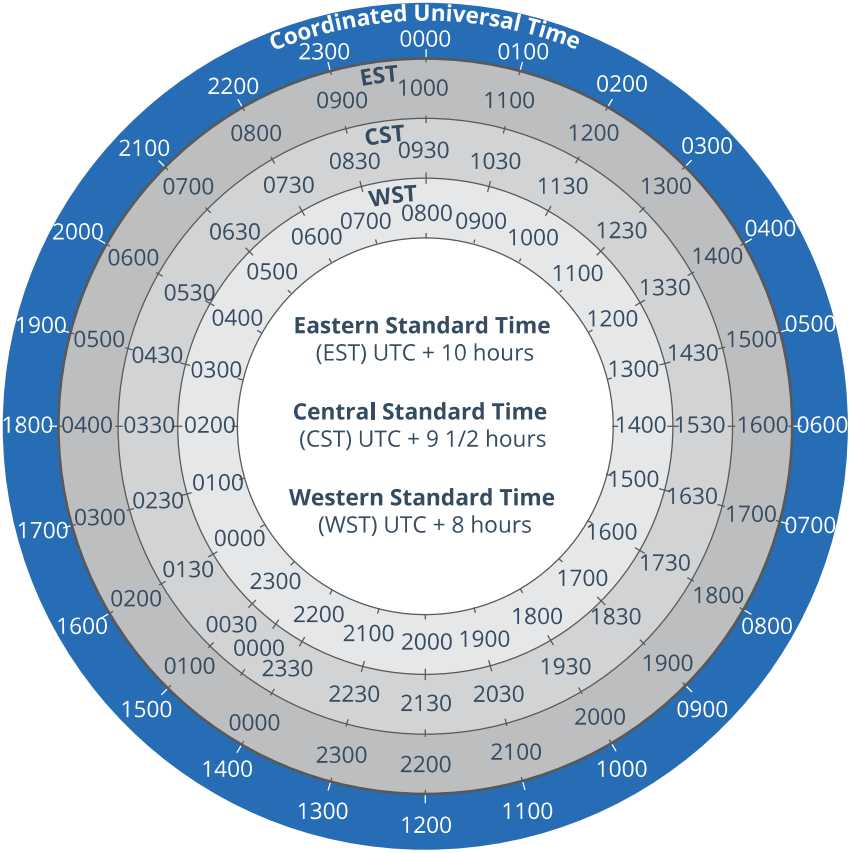
Control towers will state time to the nearest half minute when issuing a taxi clearance to a departing aircraft. For example:

› 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

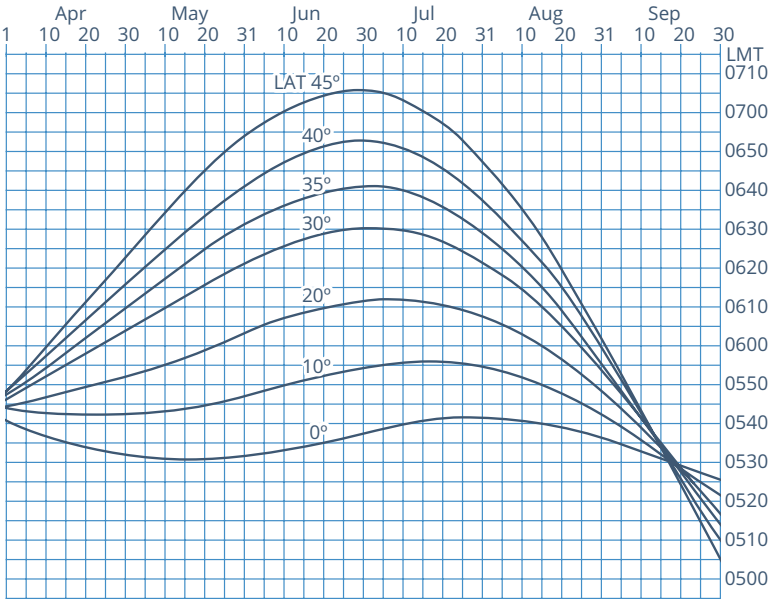
Find the time of last light at Echuca (360900S 1444600E) on 20 November.

Solution

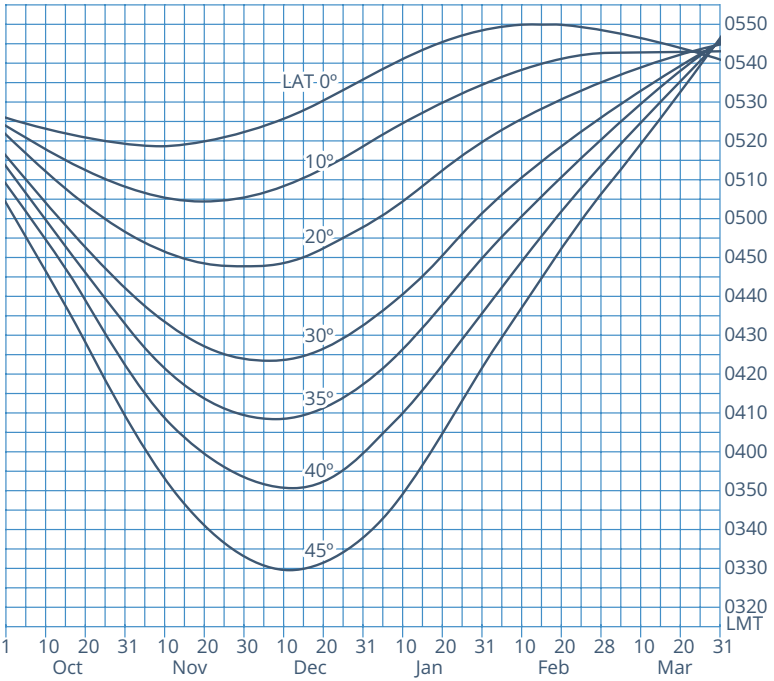
Use the Time of last light October to March chart and Arc to time conversion table (below):

- 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.

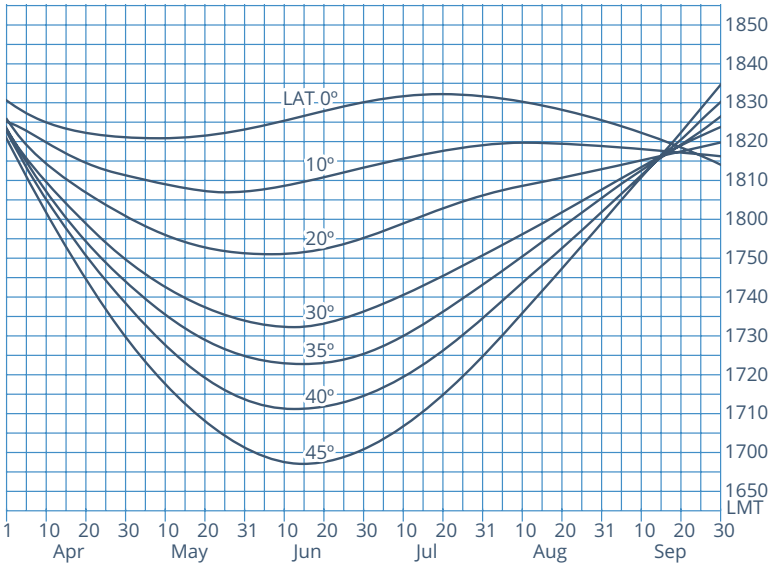
Time of first light April to September



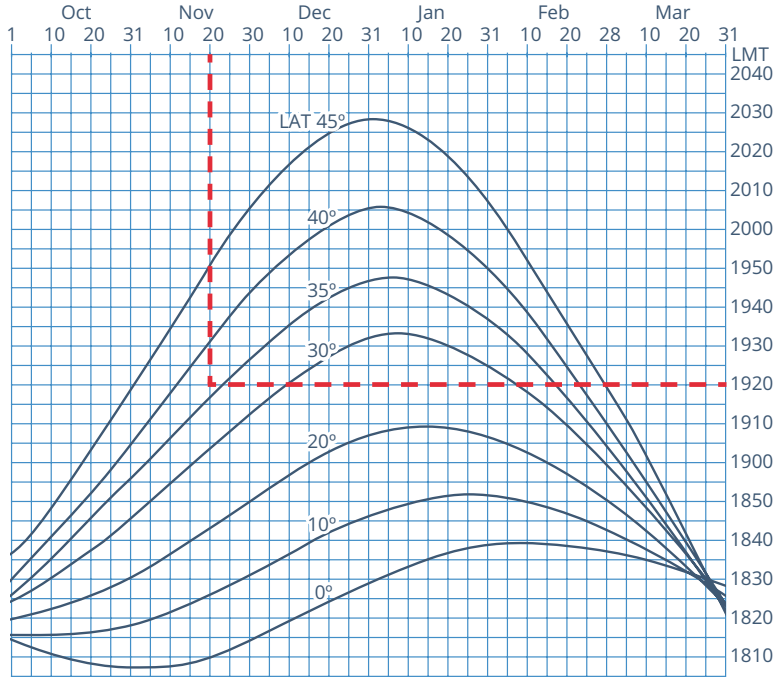
Time of first light October to March



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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Civil Aviation Safety Authority

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).

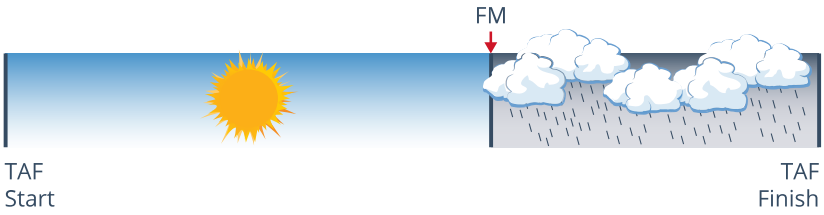
The change groups FM (from) and BECMG (becoming) are used for significant changes (both deteriorations and improvements) from the preceding information that are more lasting in nature.

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)

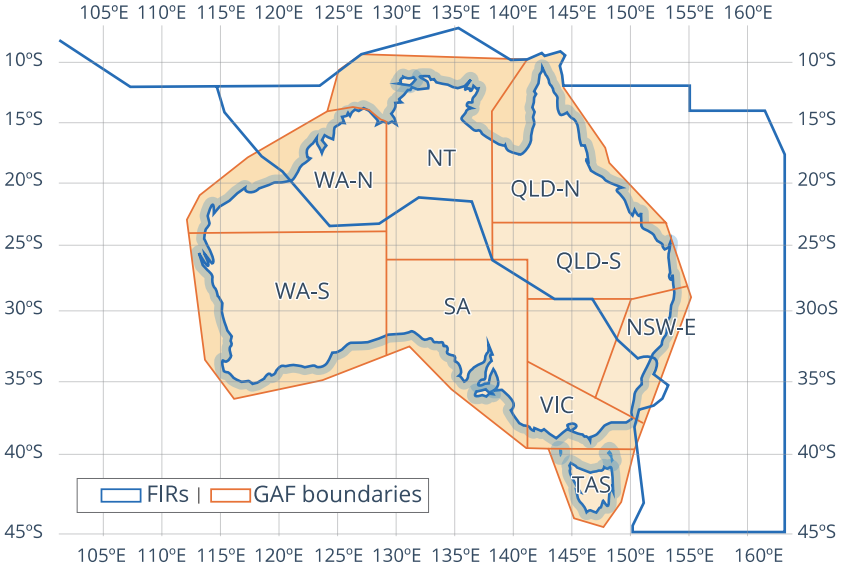
GAF forecasts for operations surface to 10,000 ft (AIP GEN 3.5)

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.

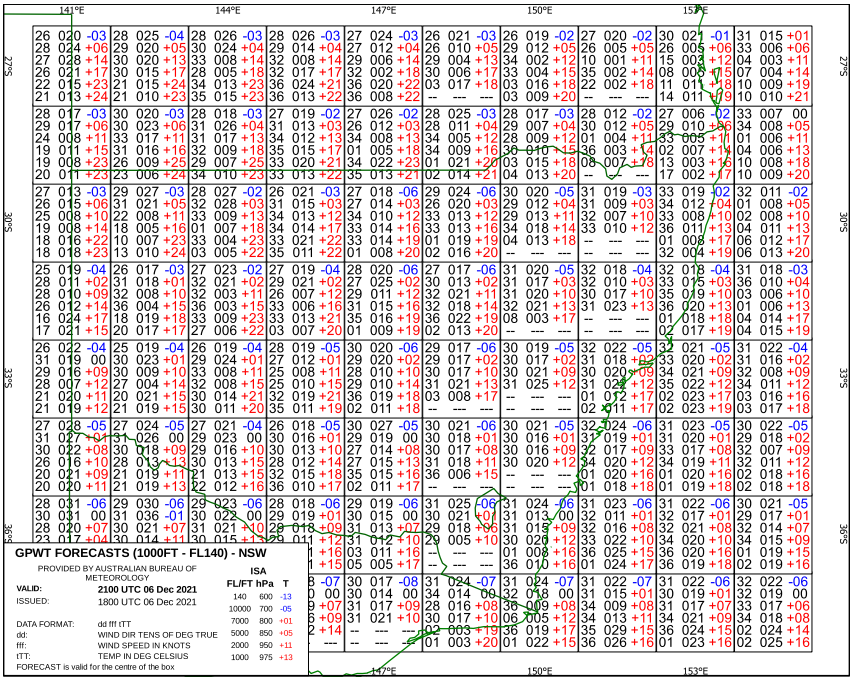
GWPT Example:			
25035−63	dd	fff	tTT
	25	035	−63

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



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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.

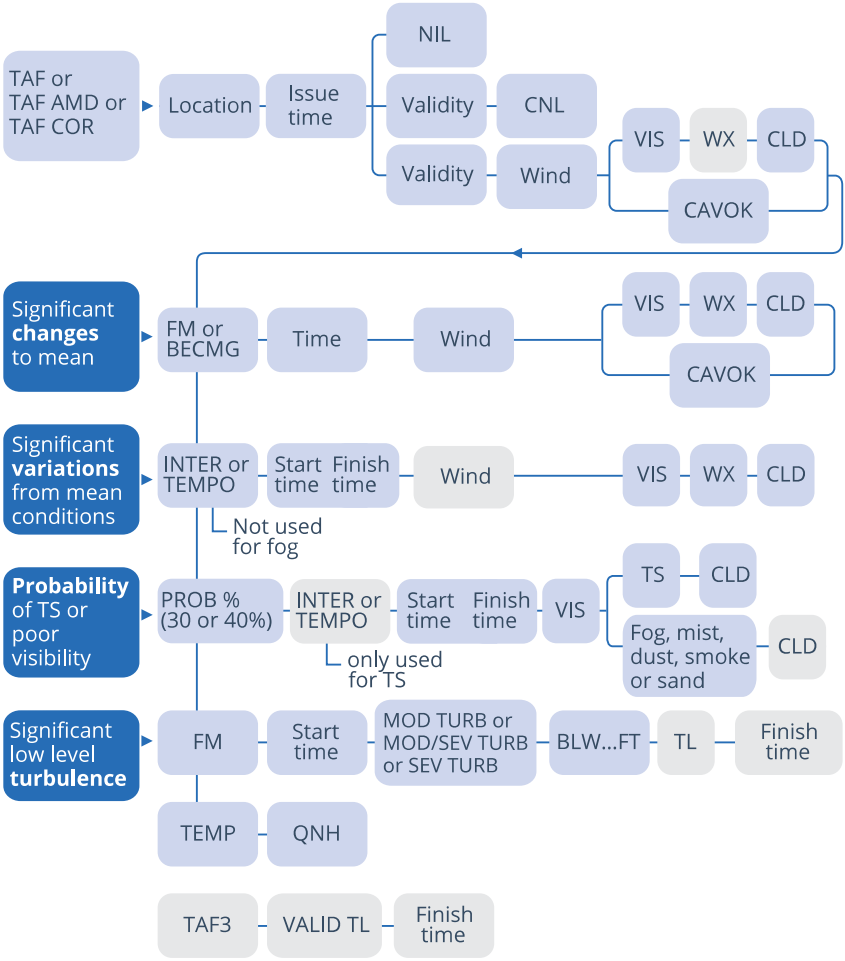
The TAF service is typically provided in accordance with the aerodrome's TAF category, determined by the aerodrome type.

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.

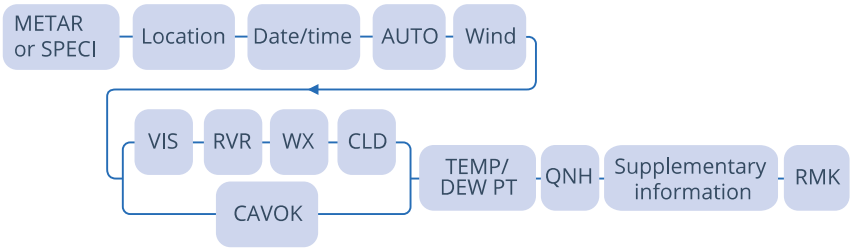
Notes: Commencement times for C and D TAFs will be one hour earlier in states using daylight saving.

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

TAF (aerodrome forecast) format (AIP GEN 3.5)



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/VVVVVVVVi 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/VVVVVVVV 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	Canberra	Nowra	Tindal
Amberley	East Sale	Oakey	Townsville
Brisbane	Gold Coast	Pearce	Williamtown
Darwin	Hobart	Perth	
Cairns	Melbourne	Sydney	

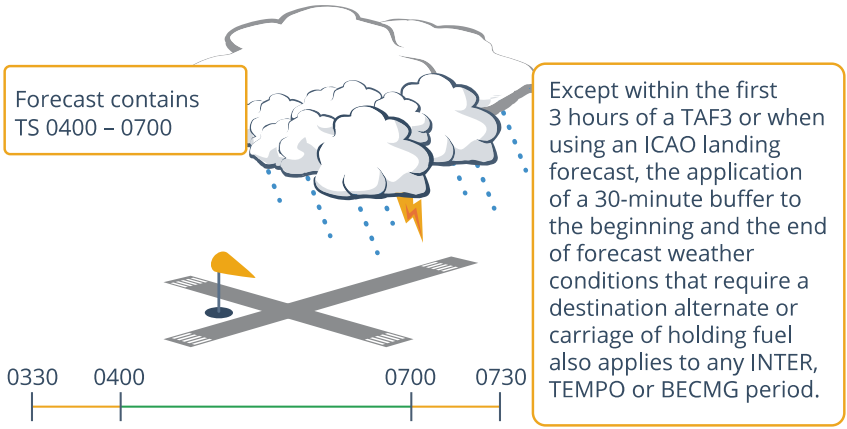
TAF3 examples

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



Authorised weather forecasts and reports

The authorised weather forecast can only be issued by the Bureau of Meteorology (BOM) for aviation.

An authorised weather report for aviation is one made by the BOM, or

- a person who holds a certificate from the BOM or
- an automatic weather station at an aerodrome that is approved by the BOM, or
- an automatic service published in the AIP, or
- a person who holds a pilot licence
- a person appointed by the aerodrome operator to make visibility assessments, or
- a person of class of person specified in the AIP.

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

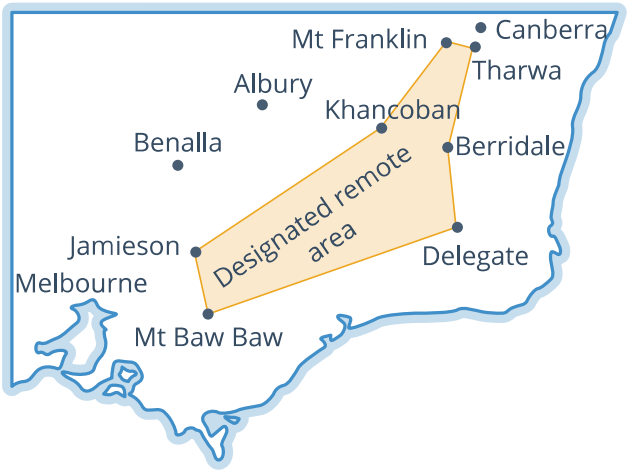
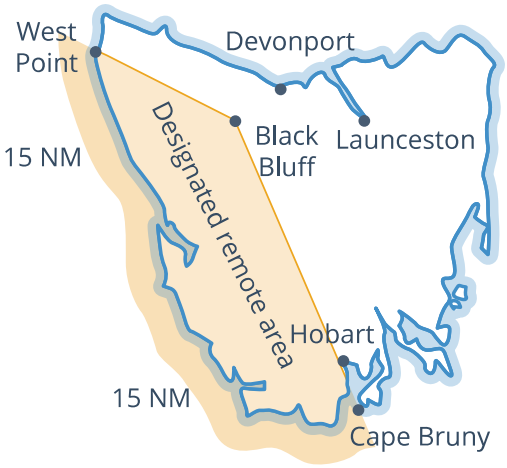


Figure: Tasmania remote area



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

Civil Aviation Safety Authority

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.

Civil Aviation Safety Authority

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: ZTQ

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) M 0105	(A) F 065	YBRK	02 HR 05 MIN	

15. Route: DCT DBO MLY TNG DCT

18.

(Stage 2)

13. DEP Aerodrome	EOBT	15. Cruising Speed	Level	16. DEST Aerodrome	Total EET	ALTN Aerodrome
YBRK	0330	(N) M 0105	(A) F 055	YBAF	02 HR 10 MIN	

8. I V Y Z

15. Route: DCT GLA MYB DBO DCT

18. (Info relevant to Stage 2)

(Stage 3)

13. DEP Aerodrome	EOBT	15. Cruising Speed	Level	16. DEST Aerodrome	Total EET	ALTN Aerodrome
		N M	A F		HR MIN	

8. I V Y Z

15. Route

18. (Info relevant to Stage 3)

18. (Information relevant to all stages)

DOF/ REG/VH ZTQ

PER/

RMK / SARTIME		To ATS Unit	Location	DEST Tel No:
Date/Time: 23 0700	Arr / Dep	CENSAR	YBAF	ORGN/ 0000 000 123

19. Supplementary Information

	Endurance HR MIN	Persons on Board	Emergency Radio: UHF VHF ELT	Dinghies: Number Capacity Cover Colour
E/	5 00	P/ 2	R/ U V (E)	D/ C
E/	5 00	P/ 2		
E/		P/	S/ P (D) M J	J/ L F U V

Survival Equipment: Polar Desert Maritime Jungle

Jackets: Light Fluores UHF VHF

Aircraft Colour and Markings

A/ White/Red

Remarks

N/

Pilot-in-command	Phone	Mobile	FAX	Company
C/ J. Smith		0000 000 123		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

By supplying all available details below, search and rescue will be 085 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.

Civil Aviation Safety Authority

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

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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.