Australian Government
Civil Aviation Safety Authority

CASR PART

91

GENERAL OPERATING AND FLIGHT RULES

PLAIN ENGLISH GUIDE

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About this guide

The Civil Aviation Safety Authority's (CASA's) *Part 91 Plain English Guide* summarises and restates Part 91 of the Civil Aviation Safety Regulations (CASR) and the Part 91 Manual of Standards (MOS) in plain English. Further, this guide reorders the information contained in the regulations and the MOS to make it easier for pilots and operators to understand and apply the general operating and flight rules.

By following this guide, it is expected you will comply with the general operating and flight rules.

The guide provides references to the corresponding legislation so you can easily refer to the full text of the CASR and the MOS if you wish. The current legislation can be found on the Federal Register of Legislation website.

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

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

For further information, visit CASA's website casa.gov.au

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How to use this guide

In this guide, certain words have been defined to avoid repetition and improve readability. The most important of these is the use of *you* in the second person to refer to the pilot in command or more simply as the pilot. Where we have referred to a pilot, this means any flight crew member who is not necessarily the pilot in command.

Where we do not define a word, you should consider its meaning to be that given in CASR Part 1 Dictionary, other specific regulations or the Macquarie Dictionary.

Regulations specify offence provisions that may apply solely or jointly to the pilot, a pilot, a person or an operator. Where a regulation states that the pilot in command and operator each contravene a regulation, this guide expresses the responsibility as being that of the pilot **and/or** the operator. A MOS provision associated with a regulation may provide more detail on who is responsible to do or not do certain things.

For improved understanding, the guide includes *Exceptions*, *Notes* and *Comments*.

Exceptions – certain regulations set out a principal legal requirement that in certain circumstances can be varied, or in some cases ignored. You must read these exceptions to understand the requirements fully.

Notes – these are included as they appear in the regulations.

Comments – for certain regulations you will find additional comments to assist in explaining the requirement. This commentary is not intended to introduce any new requirement, but to provide a more detailed explanation. The comments are generally based on CASA's Advisory Circulars (AC) and Guidance Material (GM).

In addition, many defined terms are new so the reader must make reference to the dictionary. For example, authorised aeronautical information (AAI) has a more expansive meaning than the term Aeronautical Information Package (AIP) with which readers may be familiar.

The following terminology table has been created to improve readability:

Term	Meaning
aircraft	the term aircraft refers to fixed-wing and rotary-wing powered aircraft and balloons
approval/ approved	an approval provided in writing by CASA under Part 91.045 For a foreign-registered aircraft operating in Australian territory, approval means that given under the laws of the state of the registry of the operator of the aircraft. Contact your closest CASA regional office for guidance on approvals. See the CASA website for regional office contact details.
equipment	any reference to equipment being required, fitted, carried or accessible means equipment which is operative or serviceable
may	indicates an option in the context of the requirement
MOS	refers to the Part 91 MOS unless otherwise specified
must	indicates an obligation or necessity (i.e. a mandatory requirement)
operations manual	this guide only uses the term *operations manual;* however the actual Part 91 regulations use the terms *operations manual* or *exposition* – the terms are synonymous
Part	unless otherwise specified refers to a part of the CASR
person	refers to a third person who is not a pilot or crew member (e.g. a passenger or support person)
a pilot	refers to any flight crew member (not necessarily the pilot in command)
the pilot	refers only to the pilot in command

Term	Meaning
qualified	a qualification or authorisation issued under Part 61, Part 64, Part 65, Part 103 approved self-administering organisation (ASAO) or Part 131 pilot authorisation as it applies unless otherwise stated for a foreign-registered aircraft operating in Australian territory, qualified means a qualification attained, or authorisation under, the laws of the state of registry of the aircraft operator
radio	as with other equipment required to be fitted or carried, a reference to radio or a radio communications system means one that is operative. Where a radio is required, the pilot must be qualified to use it (see 91.625)
regulation/ regulations	in general, this refers to the Australian civil aviation legislation specific reference is made to the Federal Aviation Authority (FAA) (United States), and European Aviation Safety Agency (EASA) (European) regulations where necessary where Part 91 refers to international regulation it means the international regulations for preventing collisions at sea, 1972
Subpart	unless otherwise specified refers to a Subpart of Part 91
you	refers only to the pilot in command

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What Part 91 covers

Part 91 of the Civil Aviation Safety Regulations (CASR) – General operating and flight rules, sets out the general operating rules for all pilots and operators.

The rules cover:

- documentation
- light crew and operator obligations
- training
- crew member obligations
- safety of persons and cargo
- classifications of operation
- rules to prevent collision
- communication
- fuel
- pre-flight planning and preparation
- ground operations
- aircraft performance and weight and balance
- take-off and landing
- low visibility operations
- cruising levels and minimum heights
- navigation
- non-controlled aerodromes
- icing
- special flight operations
- aircraft equipment
- special certificates and permits
- foreign aircraft
- minimum equipment list
- equipment.

Part 91 applies to all aviation operations except drones.

There are additional rules for pilots operating under an Air Operator's Certificate (AOC) or other certificate, or those conducting defined activities such as aerial work, aerial application and some recreational aviation activities. These rules are in other CASR Parts and may add to or turn off some Part 91 requirements – either completely or partially.

This guide integrates Part 91 of Civil Aviation Safety Regulations, its associated MOS and related exemptions.

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Application of Part 91 – Australian aircraft in Australian territory (91.005)

Part 91 applies to the operation of an Australian aircraft in Australian territory.

Application of Part 91 – Australian aircraft over the high seas (91.015)

Part 91 and Annex 2 of the Chicago Convention apply to the operation of an Australian aircraft over the high seas. Where there is an inconsistency, you and the operator must comply with the relevant Annex 2 requirement.

Application of Part 91 – Australian aircraft in foreign countries (91.010)

Part 91 and the aviation laws of the foreign country apply to the operation of an Australian aircraft in a foreign country. Where there is an inconsistency, you and the operator must comply with the relevant law of the foreign country.

Application of Part 91 – foreign-registered aircraft (91.020)

Part 91 (other than Division 91.C.3 and Subparts 91.P and 91.T) applies to the operation of a foreign-registered aircraft in Australian territory.

> **Exception:** *Part 91 does not apply to aircraft flown under a foreign or New Zealand air transport AOC with privileges under the Australia-New Zealand Mutual Recognition Arrangement.*

Application of Part 91 – foreign-state aircraft (91.025)

Part 91 only applies to the operation of a state aircraft (for example, military aircraft) of a foreign country in Australian territory if a Part 91 provision states that it applies to such aircraft.

Disapplication of Part 91 to Part 101 aircraft (91.030)

The Part 91 regulations do not apply to Part 101 – unmanned aircraft, rockets and airships.

Application of Part 91 to Part 103 operations (91.030)

Certain regulations in Part 91 apply to Part 103 operations – Recreational and sports aircraft. The Part 91 regulations that do not apply to Part 103 are set out in table 1.

Table 1: Part 103 – Sport and recreational operations

Provision number	Provision title
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Provision number	Provision title
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Certain regulations in Part 91 also apply to Part 131 operations – Balloons and hot air airships. The Part 91 regulations that do not apply to Part 131 operations are set out in table 2.

Table 2: Part 131 – Manned free balloons

Provision number	Provision title
Division 91.C.3	Flight related documents
91.190	Dropping things from aircraft
Division 91.D.2	Flight preparation
Division 91.D.3	Flight notifications and pre-flight checks
91.255	Air traffic services – prescribed requirements
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91.480	Fuelling aircraft – electrical bonding
91.510	Fuelling aircraft – persons on aircraft, boarding or disembarking
91.515	Fuelling aircraft if fuel vapour detected
Division 91.D.7, other than: 91.520 – Crew members to be fit for duty 91.525 – Offensive or disorderly behaviour on aircraft. 91.600 – Carriage of cargo – general 91.620 – Carriage of animals	Safety of persons on aircraft and cargo requirements
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Subpart 91.F	Performance
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Application of Part 91 – certain provisions of this Part do not apply if provisions of Parts 105, 121, 133, 135 or 138 apply (91.035)

The following tables detail the provision of Part 91 that do not apply because a corresponding provision in Parts 105, 121, 133, 135 and 138 takes precedence

Table 3: Part 105 – Parachuting from aircraft

Provisions of Part 91	Provisions of Part 105
Passengers – safety directions by pilot in command (91.570)	Regulation 105.105
Passengers – compliance with safety directions (91.575)	Regulation 105.110

Table 4: Part 121 – Australian air transport operations – larger aeroplanes

Provisions of Part 91	Provisions of Part 121
Flight preparation (alternate aerodromes) requirements (91.235)	Regulation 121.170
Use of aerodromes (91.410)	Regulation 121.205
Fuel requirements (91.455) Oil requirements (91.460)	Division 121.D.6
Fuelling aircraft – persons on aircraft boarding or disembarking (91.510)	Regulation 121.240
Passengers – safety briefings and instructions (91.565)	Regulation 121.285
Restraint and stowage of carry-on baggage (91.590) Restraint and stowage of certain aircraft equipment (91.595)	Regulation 121.265
Performance (Subpart 91.F)	Subpart 121.F
Weight and balance (Subpart 91.J)	Subpart 121.J
Equipment (Subpart 91.K)	Subpart 121.K
Cabin crew (Subpart 91.P)	Subpart 121.P

Refer to CASA EX69/24 for additional exemptions from Part 91 and related directions for Part 121 operators.

Table 5: Part 133 – Australian air transport operations – rotorcraft

Provisions of Part 91	Provisions of Part 133
Night vision imaging system (NVIS) flights (91.085)	Regulation 133.265 (also see Appendix B of this guide)
Compliance with Flight manual (91.095)	Regulation 133.030
Minimum height rules populous areas and public gatherings (91.265) Minimum height rules other areas (91.267) Minimum Heights visual flight rules (VFR) at night (91.277) Minimum heights instrument flight rules (IFR) flights (91.305)	Regulation 133.167
Fuel requirements (91.455) Oil requirements (91.460)	Division 133.D.6
Fuelling aircraft – persons on aircraft boarding or disembarking (91.510)	Regulation 133.195
Passengers – safety briefings and instructions (91.565)	Regulation 133.240
Performance (Subpart 91.F)	Subpart 133.F
Weight and balance (Subpart 91.J)	Subpart 133.J
Equipment (Subpart 91.K)	Subpart 133.K
Cabin crew (Subpart 91.P)	Subpart 133.P

Refer to CASA EX70/24 for additional Exemptions from Part 91 and related Directions for Part 133 operators.

For information about Part 131, refer to the Guide for balloons and hot air airships.

Table 6: Part 135 – Australian air transport operations – smaller aeroplanes

Provisions of Part 91	Provisions of Part 135
Fuel requirements (91.455) Oil requirements (91.460)	Division 135.D.6
Fuelling aircraft – persons on aircraft boarding or disembarking (91.510)	Regulation 135.220
Passengers – safety briefings and instructions (91.565)	Regulation 135.280
Performance (Subpart 91.F)	Subpart 135.F
Weight and balance (Subpart 91.J)	Subpart 135.J
Equipment (Subpart 91.K)	Subpart 135.K
Cabin crew (Subpart 91.P)	Subpart 135.P

Refer to CASA EX71/24 for additional Exemptions from Part 91 and related Directions for Part 135 operators.

Table 7: Part 138 – Aerial work operations

Provisions of Part 91	Provisions of Part 138
NVIS flights (91.085)	Regulation 138.350 (also see Appendix B of this guide)
Compliance with Flight manual (91.095)	Regulation 138.210
Picking up or setting down people or things during flight (91.195) Persons not to be carried in certain parts of aircraft (91.200)	Regulation 138.410
Possessing firearms on aircraft (91.160) Discharging firearms on aircraft (91.165) Dropping things from aircraft (91.190)	Regulation 138.432

Provisions of Part 91	Provisions of Part 138
Minimum height rules populous areas and public gatherings (91.265) Minimum height rules other areas (91.267) Minimum heights VFR at night (91.277) Minimum heights IFR flights (91.305)	Regulation 138.275
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Fuelling aircraft – persons on aircraft boarding or disembarking (91.510)	Regulation 138.302
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Performance (Subpart 91.F)	Subpart 138.F
Weight and balance (Subpart 91.J)	Subpart 138.J

Refer to CASA EX72/24 for additional Exemptions from Part 91 and related Directions for Part 138 operators.

Issue of Manual of Standards for Part 91 (91.040)

CASA may prescribe standards in a Manual of Standards (MOS) for Part 91 where either:

› it is required or permitted by the regulations

› it is necessary or giving effect to Part 91.

Note: A Manual of Standards is a legislative instrument; see subsection 98(5AA) of the Act.

A MOS allows CASA the ability to keep the standards up-to-date in a timely manner to meet the demands of the ever-changing environment while retaining the legislated change process that includes general and industry consultation.

Approvals by CASA for Part 91 (91.045)

You or an operator may apply to CASA in writing for an approval as described in Part 91 or the relevant MOS. The approval must be granted provided the applicant meets the requirements of regulation 11.055.

For regulations 91.200, 91.320, 91.510,91.600, 91.655 and 91.745, the operator is approved without a separate application to CASA if the activity is authorised under either:

› an AOC or another civil aviation authorisation held by an operator

› the operations, if required by the regulations.

For regulations 91.860, 91.865, 91.870, 91.875, 91.885 and 91.920, the operator is approved without a separate application to CASA if the activity is authorised under another civil aviation authorisation held by the operator.

GENERAL RULES

1. Documentation

Carriage of documents (91.105)

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

- for each flight crew member:
  - medical certificate
  - flight crew licence or certificate of validation
  - passport or photographic ID as issued by a Commonwealth state or territory authority or agency that is current and been issued within 10 years of the day of your flight (CASA EX67/24)
- the aircraft's flight manual
- the operating instructions for any computerised navigation systems fitted to the aircraft
- the minimum equipment list for the aircraft (if any).

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

You will meet the requirement to carry photographic ID by carrying your state issued driver's licence or your aviation security identification card (ASIC).

CASA EX68/24 – Part 119 of CASR – Supplementary Exemptions and Directions Instrument 2021 requires air transport operators to have their electronic flight bags approved by CASA. Some exceptions apply.

AC 11-03 Electronically formatted certifications and records management systems provides guidance on using electronic documents.

Carriage of documents for certain flights (91.110)

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

> **Exception:** *You do not need to carry these documents if you are operating:*
>
> - under the visual flight rules (VFR) by day within 50 nautical miles (NM) of your departure aerodrome, or
> - inside a flying training area for an aerodrome, or
> - on a route to or from a flying training area which is not adjacent to its associated aerodrome.

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

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

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

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

Electronic documents (91.100)

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

Journey logs – flights that begin or end outside Australian territory (91.120)

When a flight begins or ends outside Australia (an international flight), you and the operator must ensure that the information below is recorded in a journey log.

Journey log information before an international flight begins (MOS 5.02)

The following information must be recorded on the journey log as soon as practical after the flight begins:

- aircraft registration mark or flight number (if any)
- date of the flight
- for each flight crew member (FCM) assigned to the flight, the FCM's name, and their assigned duties
- place of departure
- amount of fuel added to the aircraft's fuel tanks before the flight begins (if any)
- amount of fuel in the aircraft's fuel tanks when the flight begins.

Journey log information after an international flight ends (MOS 5.03)

The following information must be recorded on the journey log as soon as practical after the flight ends:

- place of arrival
- time the flight began
- time the flight ended
- duration of the flight
- amount of fuel in the aircraft's fuel tanks when the flight began
- the amount of fuel in the aircraft tanks at the end of the flight
- incidents and observations (if any) that may have been relevant in any way to the safety of the flight.

A General Declaration or other document carried on a flight which captures the necessary information, can be a journey log. Refer International Civil Aviation Organization (ICAO) Annex 9.

Compliance with flight manual (91.095)

You must operate an aircraft in accordance with the aircraft flight manual (AFM) instructions and any condition in the certificate of airworthiness or special flight permit from:

- the earlier of the time the aircraft's doors are closed before take-off or the aircraft moves under its own power for take-off, to
- the later of the time the aircraft's doors are opened after landing or the aircraft comes to a rest after being airborne.

You must also ensure that any activity in relation to the flight or operation, whether occurring before during or after the flight, is conducted in a way that meets each requirement or limitation for the activity in the AFM (CASA EX67/24).

Exception: *For CASR Part 137 Aerial application operators see* CASA EX92/22 *for directions and exemption that apply.*

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

Reporting and recording defects and incidents (Division 91.C.4)

This Division is reserved for future use.

2. Flight crew and operator obligations

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

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

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

Requirements to be met before Australian aircraft may fly (91.145)

Before you commence a flight, you must ensure:

- the aircraft is registered
- the aircraft has a nationality mark and a registration mark painted on or affixed to it, in accordance with Part 45
- the aircraft has a certificate of airworthiness or special flight permit, where required by the regulations
- you comply with any condition set out or referred to in the maintenance release, or in any other document approved for use as an alternative to the maintenance release
- you have all required pilots onboard.

A registered aircraft is one registered under Part 47.

A special flight permit may be issued under Part 21 to allow an aircraft to be flown for the purpose of:

- maintenance or storage
- delivery or export
- testing for production
- removal from danger
- demonstration to a customer (for aircraft that have completed flight production flight tests)
- assisting in search and rescue
- assisting in a state of emergency
- operating above maximum certificated take-off weight for long-range flights in specific circumstances.

Authority and responsibilities of pilot in command (91.215)

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

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

Although this regulation identifies the period your authority begins and ends, you will have to undertake duties outside this period to ensure the safety of the flight. You may discharge your responsibilities by delegating certain tasks to others (such as crew members).

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

If it is necessary for the safety of the aircraft, or a person on the aircraft, or a person or property on the ground or water, you and the operator may:

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

A person must comply with a direction you or the operator give.

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

Operating an Australian aircraft outside Australia (91.140)

When operating an Australian aircraft outside Australia you and the operator must comply with:

- any applicable law of a foreign country
- any applicable requirements of Annex 2 of the Chicago Convention when over the high seas.

Australia is substantially ICAO compliant and aviation law around the world is becoming more standardised. However, there are notable differences between some countries – for example in the use of metric units or the height of the transition level.

The common meaning of high seas is, over open ocean and not within any country's jurisdiction. Article 86 of the UN Convention on the Law of the Sea 1982 defines 'high seas' as all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a state, or in the archipelagic waters of an archipelagic state.

Australia's CASR Part 91 differs from ICAO in several areas the most pertinent of which are:

- when submitting a flight plan during flight, it must reach the relevant ATS unit 10 minutes before expected entry into their controlled airspace
- if there is a communication failure in controlled airspace, maintain heading and altitude for 20 minutes (in a non-radar environment) or for 7 minutes (in a radar environment).

For the full list of Part 91 vs. ICAO differences refer to Part 91 AMC/GM.

Operating aircraft with inoperative, equipment – placarding (91.150)

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

Aircraft equipped to fly under the VFR or IFR

Directional Indicator is inoperative – you must placard the indicator as 'inoperative' before the next the flight

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

Seating for flight crew members (91.550)

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

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

A flight crew member occupying a crew station on the flight deck (including jump seat) must keep their seatbelt securely fastened.

Manipulating flight controls (91.155)

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

Operation of portable electronic devices (91.170)

During a flight, a person may only operate a portable electronic device with your permission. You may only give permission if you have determined that operating the device will not affect the safety of the aircraft.

A person must cease to operate the device at your direction or the direction of a cabin crew member.

When giving your permission, you should consider any relevant limitation in the AFM, the aircraft manufacturer's supplementary data (if any) or your operational experience with that type of personal electronic device.

Multi-engine aircraft – pilot in command to land at nearest suitable aerodrome if emergency occurs (91.685)

If you are flying a multi-engine aircraft and an emergency occurs that threatens the safety of the aircraft or persons onboard, you must land at the nearest suitable aerodrome.

The determination of the nearest suitable aerodrome might be based on (but not limited to) the following:

- nature of malfunction and possible mechanical difficulties that may be experienced
- nature and extent of any populous area over which the aircraft is likely to fly
- availability of thrust from a malfunctioning engine
- altitude, weight and usable fuel available
- characteristics of aerodromes available
- emergency services availability
- weather conditions en route and at possible landing places
- air traffic congestion
- type of terrain, including whether flight is likely to be over water
- familiarity with the aerodrome.

Sound decision-making using a formal process will allow you to achieve a safe flight outcome in the event of an emergency. A decision should never be made solely with regard to commercial expedience; the safety of the flight must be your priority.

Air defence identification zone flights (91.263)

If you fly an aircraft in an air defence identification zone (ADIZ) you must comply with the procedures in the AIP for that zone.

> **Exception:** *For a Part 131 aircraft, if you enter an ADIZ and you are unable to comply with the ADIZ procedures, no offence is committed if you land as soon as practicable and inform the controlling authority.*

An ADIZ is airspace with defined dimensions within which identification of all aircraft is required.

Availability of instructions for flight data and combination recorders (91.645)

Where an aircraft must be fitted with a flight data recorder or combination recorder, the operator must be able to provide the instructions for the recorder immediately to the Australian Transport Safety Bureau (ATSB).

Flight recorders – preserving recordings of immediately reportable matters (91.650)

The ATSB may notify an operator of an aircraft fitted with a flight data recorder, cockpit voice recorder or combination recorder within 72 hours of an immediately reportable matter occurring that the recorders and/or recordings must be retained for an investigation.

In the event of an immediately reportable matter occurring, an operator must preserve the recorders and recordings until advised by the ATSB that they are no longer required, or in any other case, until 72 hours after the matter is reported to the ATSB.

> **Exception:** *This requirement does not apply if the recordings or recorders are not preserved, and the operator took reasonable steps in the circumstances to preserve them.*

3. Training

Audit, examination and training flight limitations (91.725)

For this regulation, a permitted person is any of the following:

› a crew member

› a person authorised by the operator of the aircraft to conduct an audit of the operation involved, or to supervise it

› an authorised officer carrying out an examination, inspection or test of the work of the aircraft's crew.

Audit, examination, operator training and record keeping (CASA EX67/24)

A permitted person may conduct an audit of the operator. A person authorised by CASA or by the operator, may conduct an examination of the crew (also referred to as a check, inspection or test).

In each case the pilot in command (PIC) and the operator must ensure that the person has:

› successfully completed training, in accordance with a written syllabus accepted by the operator for the person to audit the operation

› satisfied the operator that the person is competent to audit by possessing the skill, knowledge and experience to audit the particular activity.

The syllabus must be in either the exposition, operations manuals or the training and checking manual. If it is a syllabus devised by another operator it can be referenced in the relevant place.

The operator must ensure that, as soon as practicable after the operation, a written audit report is:

› provided by the person who conducted the audit or examination

› assessed to determine whether any changes are required for the safety of the operation.

Each audit report and its assessment must be retained by the operator for at least 3 years after the date of the assessment.

Limiting the carriage of persons during audit, examination and training

You must not permit the carriage of persons other than as set out in table 8 below.

Table 8: Carriage of persons while causing or simulating failures

Flight activity	Maximum persons that can be carried
flight training (defined term) for a flight crew member who does not hold a class rating or type rating for the aircraft	4 permitted persons
the simulation (other than verbally) of an emergency or abnormal situation that may affect the handling characteristics of the aircraft (other than rotorcraft)	3 permitted persons
the simulation (other than verbally) of an emergency or abnormal situation that may affect the handling characteristics of the aircraft (rotorcraft)	3 permitted persons including the pilot or 4 permitted persons if the PIC is satisfied that the presence of a fourth permitted person is essential for the safe conduct of the flight
below 500 ft AGL (other than training for take-off and landing)	no limit to the number of permitted persons unless another restriction within this table also applies to the flight
for a Part 61 low level rating (or aerial application rating) or the equivalent qualification under a law of a foreign country	4 permitted persons
for a Part 61 aerobatic or spinning endorsement or the equivalent qualification under a law of a foreign country	3 permitted persons
Carriage of observers	
observers may be carried in addition to crew members or flight crew members on flight tests and proficiency checks flight as expressed in CASA EX67/24 – Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2024 subject to the conditions set out in Appendix D.	

You must not permit a test of the aircraft or any of its instruments, indicators, items of equipment or systems, if a person other than a permitted person or a maintenance person (who is required, as part of their duties, to be on the aircraft), is onboard the aircraft.

Exception: *Tests of the aircraft during checks associated with the normal operations of the aircraft may be conducted.*

Training flights are associated with elevated levels of risk. For this reason, the regulations restrict the carriage of passengers on such flights and only allow the carriage of permitted persons in certain circumstances.

Causing or simulating engine failures – aeroplanes

Causing or simulating failure of flight instruments (91.715)

You may only cause or simulate a failure of the following kinds of instruments when it is for pilot training, checking or testing, and only required crew members are on the aircraft:

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

> **Exception:** *The above requirement does not apply if it is part of a maintenance test flight, or a procedure to diagnose or isolate a failure of an instrument or system.*

You must also be qualified to train, check or test, and:

- authorised to occupy a control seat fitted with a fully functioning set of flight controls
- if the flight is in instrument meteorological conditions (IMC) or at night, must have a clear view of an instrument of the same kind as the instrument that has been caused to fail or simulated to be failed.

> **Exception:** *CASA EX67/24 (28) allows observers on flight test and proficiency check flights who are not required crew members subject to the conditions set out in* Appendix D.

Simulating IMC flying (91.720)

You must not simulate IMC flight in an aircraft unless a safety pilot occupies a pilot seat with fully functioning controls, has adequate vision forward and to either side of the aircraft and is qualified to fly the aircraft.

A pilot flying under simulated IMC must also occupy a pilot seat with fully functioning controls.

Note: If the aircraft flight manual requires 2 pilots, under Part 61, both pilots must have a type rating for the aircraft.

> Whenever IMC is simulated in visual meteorological conditions (VMC) it is essential that a qualified safety pilot, with unobstructed vision, can look out for other traffic and manipulate the flight controls if an immediate avoidance manoeuvre is required. See AC 91-14 - Pilot's responsibility for collision avoidance.

Aeroplane flights in IMC or at night – engine not to be shut down (91.730)

You must ensure that the engine of an aeroplane is not shut down during a flight in IMC or at night.

> Nothing prevents you from shutting down an engine in an emergency.

Single-engine aeroplane – VFR flights by day – engine not to be shut down (91.735)

You may only shut down an engine during a day VFR flight if the flight is for pilot training and you hold a flight instructor rating, an examiner rating, or other authorisation.

Only flight crew members may be carried, and the aeroplane must remain within gliding distance of a safe forced landing area.

CASA EX67/24 (30) allows observers on flight test and proficiency check flights who are not flight crew members subject to the conditions set out in Appendix D.

> For training purposes an engine shutdown should be simulated. An engine should not actually be shut down in-flight for other than a type specific training requirement such as an in-flight air start.

> Nothing prevents you from shutting down an engine in an emergency.

Single-engine aeroplane – simulating engine failure in IMC or at night (91.740)

An engine failure in flight may only be simulated at night or in IMC, providing:

- it is for pilot training, checking or testing
- the pilot holds a flight instructor rating, flight examiner rating or other authorisation that allows the simulation of an engine failure.

Only flight crew members may be carried.
You must hold a flight instructor rating, flight examiner rating or authorisation that authorises you to simulate an engine failure.

In addition, for a flight:

- at night, the simulation must commence above 1,000 ft above ground level (AGL) and the aeroplane must remain within gliding distance of a runway that is lit and is available for landing
- in IMC, the simulation must commence above the lowest safe altitude (LSALT) for the route or route segment, and visual meteorological conditions (VMC) conditions must exist below that altitude.

Exception: *CASA EX67/24 (31) allows observers on flight test and proficiency check flights who are not flight crew members subject to the conditions set out in* Appendix D.

Simulation of an engine failure is where the engine controls are set to a position where there is zero forward thrust, but the engine remains running so that power can be applied without first starting the engine.

Multi-engine aeroplane – simulating engine failure – general (91.745)

You may only simulate an engine failure in a multi-engine aeroplane in flight in the following circumstances:

- the aeroplane is type certified to carry 9 passengers or less and has a maximum take-off weight (MTOW) 8,618 kg or less
- for an aeroplane that is type certified to carry more than 9 passengers but less than 19 passengers – if there is no simulator for the type in Australia or, if there is a simulator for the type in Australia, the operator holds an approval
- for an aeroplane that is type certified to carry more than 19 passengers – if there is no simulator in Australia or no simulator approved by a recognised national aviation authority (NAA) anywhere in the world or, if there is such a simulator for the type, the operator holds an approval.

For flights conducted in accordance with 91T, (operations under certain special certificates of airworthiness and special flight permits), an engine failure may only be simulated in a multi-engine aeroplane if it is for one of the following:

- test flight of a provisionally certified aircraft
- flight under a special flight permit – where a special flight permit allows engine failure simulation
- flight under an experimental certificate – where the experimental certificate allows engine failure simulation.

An application for an approval must include a safety risk management plan.

Multi-engine aeroplane – simulating engine failure in IMC or at night (91.750)

You may only simulate an engine failure in a multi-engine aeroplane in IMC or at night if you hold a flight instructor rating, a flight examiner rating, or other authorisation that allows engine failure simulation. The flight must be limited to pilot training, checking or testing and only flight crew members can be carried. The pilot under instruction must be briefed before the simulation and then supervised during the simulation.

Any simulation is to be carried out in accordance with procedures in the AFM (if any) and/or the operations manual.

In addition:

- when you are in IMC and not conducting an asymmetric instrument approach procedure (IAP), the aeroplane must be at or above the minimum height specified in regulation 91.305 Minimum heights - IFR flights
- when you are in IMC and are conducting an asymmetric IAP, the simulation must be initiated above the IAP initial approach altitude and you must have continual visual reference to the terrain when less than 1,000 ft above the relevant IAP minima
- when operating at night in VMC, the aeroplane must be:
  - » above the minimum height mentioned in reg 91.305 or 91.277 (minimum heights – VFR flights at night) as the case requires if:
    - – the aeroplane is not conducting an approach to land, or
    - – is not within the circling area of an aerodrome
  - » flown in accordance with an instrument approach procedure if:
    - – the aeroplane is on approach to land, and is not within the circling area of an aerodrome, or
    - – flown within the circling area of an aerodrome as determined in accordance with the method specified in the AAI.
- any simulated failure at night in VMC must be initiated at or above circuit height, and not below 1,000 ft AGL.

Exception: *CASA EX67/24 (31) allows observers on flight test and proficiency check flights who are not flight crew members subject to the conditions set out in* Appendix D.

Causing or simulating engine failures – rotorcraft

Single-engine rotorcraft – engine not to be shut down (91.755)

You must ensure the engine of a single-engine rotorcraft is not shut down during a flight.

Single-engine rotorcraft – engine failure not to be simulated and autorotation of main rotor system not to be initiated in IMC (91.760)

You must ensure that the simulation of an engine failure or the initiation of an autorotation is not carried out during a flight in IMC.

Single-engine rotorcraft – simulating engine failure or initiating autorotation of main rotor system at night (91.765)

You may only simulate an engine failure or initiate an autorotation at night when taxiing or hovering below the hover height for the surface specified in the rotorcraft's flight manual, or when at 1,000 ft AGL or above. The following requirements also apply:

- you hold a flight instructor rating, flight examiner rating or other authorisation which allows you to simulate an engine failure or initiate autorotation
- the flight is for pilot training, checking or testing
- only flight crew members are carried
- you brief a pilot under instruction before the simulation or autorotation and then supervise the simulation or autorotation
- the simulation or autorotation is in VMC
- the power termination of the autorotation is initiated so that full power is available before the rotorcraft goes below 100 ft AGL
- the autorotation is terminated using a power recovery termination or a baulked approach and climb out
- the simulation or autorotation is at an aerodrome with omnidirectional runway lighting.

> **Exception:** *CASA EX67/24 (33) allows observers on flight test and proficiency check flights who are not flight crew members subject to the conditions set out in* Appendix D.

Multi-engine rotorcraft – engine not to be shut down at certain altitudes in IMC or at night (91.770)

You must ensure an engine is not shut down in a multi-engine rotorcraft, during a flight in IMC or at night unless the rotorcraft is at or above the LSALT for the route or route segment.

Nothing prevents the shutting down of an engine in an emergency.

Multi-engine rotorcraft – simulating engine failure in IMC or at night (91.775)

You must not simulate an engine failure in a multi-engine rotorcraft during a flight in IMC or at night unless:

- you hold a flight instructor rating, flight examiner rating, or other authorisation for simulating an engine failure
- the flight is for pilot training, checking or testing
- only flight crew members are carried, and
  - you brief a pilot under instruction before the simulation and then supervise the simulation
  - the simulation is carried out in accordance with the procedures specified in the rotorcraft's flight manual (if any)
  - if the AFM does not specify procedures, and the regulations require the rotorcraft operator to have an operation's manual, then the simulation must be in accordance with those instructions.

A rotorcraft flown in IMC, must be established at or above the lowest safe altitude for the route or route segment.

For a rotorcraft flown at night in VMC:

- the aircraft must be flown within the circling area of an aerodrome determined in accordance with the method specified in the AAI
- in the climb during take-off, the simulation must be initiated before the take-off decision point, or above 500 ft AGL
- after the climb during take-off, the simulation must be initiated at or above 1,000 ft AGL.

Exception: *An engine failure can be simulated in a multi engine rotorcraft at night outside the circling area of an aerodrome if:*

- NVIS is being used as the primary means of terrain avoidance by you and any pilot undergoing training
- the NVIS is used in accordance with the NVIS regulations
- only crew members necessary for the flight are on board – this includes sufficient crew members if more than one kind of crew member is undergoing training, checking or testing CASA EX67/24.

Exception: CASA EX67/24 *(34) allows observers, who are not members of the flight crew, to be on board during flight tests and proficiency check flights provided the conditions set out in* Appendix D *are met.*

4. Crew member obligations

Crew members to be fit for duty (91.520)

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

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

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

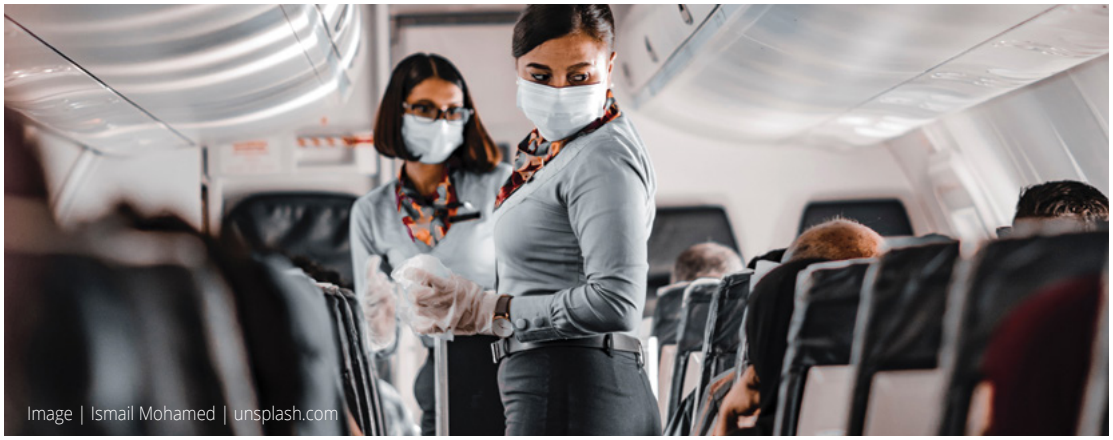
The permitted level of alcohol is less than 0.02 grams of alcohol in 210 litres of breath.

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

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

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

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



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

Crew safety during turbulence (91.535)

Before flight, for other than flight crew, you must implement procedures to protect the crew and limit (or stop) their duties in turbulence or whenever turbulence is expected.

A pre-flight briefing of the crew to set out the procedures for crew safety in turbulence would satisfy this requirement. AOC or certificate holders would be expected to also set out their procedures in their operating manuals.

Seating for crew members other than flight crew members (91.555)

A crew member (other than flight crew members) must occupy a crew station and wear and securely fasten the seatbelt and shoulder harness provided during take-off, landing and at any other time you direct.

Exception: *Where the pilot gives a direction during turbulence, a crew member may occupy a seat other than a crew member's seat (this could be a passenger seat) provided any seatbelt or shoulder harness at that seat is worn and securely fastened.*

Cabin crew – when required (91.820)

An aircraft carrying 20 or more passengers must carry a cabin crew member. However, if the flight crew includes 2 pilots, then an aircraft may carry up to 22 passengers without a cabin crew member, provided there are no more than either 19 adults or 19 children.

Exception: *Parachuting activity flights (to which Part 105 applies) do not have to carry a cabin crew member.*

Cabin crew – number (91.825)

If a cabin crew member is required under 91.820, then the aircraft must carry one cabin crew member for each 50, or part of 50, passengers carried on the flight.

Cabin crew – knowledge of emergency and safety equipment and procedures (91.830)

If a cabin crew is required to be carried, they must be competent to:

- operate and use the emergency and safety equipment on the aircraft relevant to their duties
- implement emergency evacuation procedures.

If a cabin crew member is carried when not required and their duty is to provide hospitality to the passengers, they do not have to have knowledge of the emergency and safety equipment procedures. However, operators may choose to train cabin crew members and assess their knowledge of and competence in carrying out the emergency procedures.

Operation of portable electronic devices by crew members (91.175)

A crew member must not operate a portable electronic device at any time during a flight if it is likely to distract them from performing their duties.

Crew – provision of alcohol (91.785)

A crew member must not provide alcohol to a passenger if they reasonably believe the passenger is affected by one or more psychoactive substances to the extent that their behaviour may present a hazard to the aircraft, or to a person onboard.

Crew members – power of arrest (91.225)

You, or a crew member you authorise, may without a warrant, arrest a person on the aircraft to ensure the safety of the aircraft, its passengers, crew or cargo (or otherwise for the purposes of the Act or the regulations).

This is subject to your belief or a crew member's belief that the person is committing, attempting to commit, is about to commit, has committed or has attempted to commit, an offence against the Act or the regulations in relation to the aircraft.

You must ensure that, as soon as practicable after the flight ends, the arrested person is delivered into the custody of the police. If the flight ends overseas, you must deliver the person arrested to that country's equivalent law enforcement agency.

Note: See also sections 3ZC (use of force in making arrest) and 3ZD (persons to be informed of grounds of arrest) of the *Crimes Act 1914*.

This regulation provides power to a crew member to arrest a person with your authority. However, the power must be used only within the prescribed limitations of the regulation.

5. Safety of persons and cargo

Offensive or disorderly behaviour on aircraft (91.525)

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

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

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

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

When smoking is not permitted (91.530) (s37 Air Navigation Regulations 2016)

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

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

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

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

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

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

Smoke or smoking includes using electronic cigarettes.

Means of passenger communication (91.540)

You and the operator must ensure that where the design or configuration of the aircraft will not allow all seats (and berths) to be seen from your seat, the aircraft is be fitted with a means to communicate with all passengers during all phases of the flight, including emergencies.

Persons not to be carried in certain parts of aircraft (91.200)

Unless you or the operator hold an approval to do so, a person must not be carried ***on or in either:***

- a part of an aircraft that is not designed to carry crew members or passengers
- anything attached to an aircraft.

> **Exception:** *This does not apply to:*
>
> - the temporary carriage of a crew member in a part of the aircraft not designed to accommodate crew members or passengers provided either:
> - it is for doing things for the safety of the aircraft, or any persons or cargo carried in it
> - goods or stores are carried in that part of the aircraft and there are proper means of access for crew members to the goods or stores
> - an aircraft being used to make a parachute descent and the requirements detailed in the Part 105 MOS are met.

Seating for persons on aircraft (91.545)

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

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

Medical transport operations, rescue operations and certain police operations (MOS 20.01)

For a medical transport operation, a rescue operation or a special operations group (SOG) operation, the following persons must wear a safety harness and restraint strap during flight:

- crew members
- medical patients
- SOG members
- persons who have been rescued.

> **Exception:** *If it is not practicable in the following circumstances for a person to wear a safety harness and restraint strap they can be restrained as described below.*
>
> - If the patient is an infant and the medical or nursing authority responsible for conducting the transport considers that wearing a safety harness or restraint strap is detrimental to the child's medical condition or the general situation inside the aircraft. They may be carried inside an incubator, humidicrib, or other neonatal transport unit in accordance with the procedures in the operations manual.
> - If the patient is an infant or a child aged 5 years old or less, and the medical or nursing authority responsible for conducting the transport considers that wearing a safety harness or restraint strap is detrimental to the child's medical condition or the general situation inside the aircraft the child may be carried in the arms or on the lap of an adult occupying a seat in accordance with the procedures in the operations manual.
> - If a person has been rescued, they need to be restrained by a rescue harness or other rescue device that is compliant with, or approved under, Part 21 of CASR. This must be in accordance with the procedures in the operations manual.
> - If the person is a SOG member, where it is considered by the police or Australian Defence Force authority, responsible for the SOG operation, that it is detrimental to the operation, they can be otherwise safely restrained, in accordance with the procedures in the operations manual, considering the nature and characteristics of the operation.

You must be satisfied the conditions have been complied with as described under the exceptions.


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Restraint of infants and children (91.560)

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

Infant and child seatbelts as restraints (MOS 20.03)

An infant is restrained if they are carried in the arms or on the lap of an adult and the infant is restrained for example, using a supplemental loop belt also referred to as an infant seatbelt.

The adult passenger's seatbelt is not to be fastened around the infant.

A child is restrained if they occupy a seat of their own and are restrained by the seatbelt.

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

A child who has not reached their 13th birthday and weighs less than 16kg may be restrained as an infant as described above provided:

- it is at your request or that of the operator or CASA
- the adult responsible for the child produces a signed and dated certificate from a registered medical doctor that states the child has serious medical condition which prevents the child from sitting upright unaided and is fit to travel.

A supplemental loop belt provides an additional seatbelt with a stitched loop through which the adult lap belt is passed. The seatbelt is fastened around the adult, and the supplemental loop belt is then separately fastened around the infant (see Figure 2). See also AC 91-18 Restraint of infants and children.

Figure 2: Supplemental loop belt

Child restraint systems that are not seatbelts (MOS 20.04)

An infant or child (person) is restrained when:

- they are restrained by an approved child restraint system
- the age, height and weight of the person using the system, is within the range specified by the manufacturer of the system
- the system is used in accordance with the manufacturer's instruction and secured so as not to be a hazard to the person using the system, or to any other person
- a suitable adult is responsible for the person using the system
- the suitable adult is seated in the seat closest to the seat on which the person restraint system is installed, and is competent to install the system, and secure and release the person.

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

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

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

Note: To avoid doubt, an infant sling is not a suitable child restraint system.

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

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

Note: See definitions for how the AS/NZS dating system applies.

Note: Operators and pilots should note that in securing a child restraint system in accordance with the manufacturer's instructions, particular attention must be paid to whether the system requires securing by a lap belt, or a shoulder belt, or a combination of both. Many aircraft have only lap belts fitted to the aircraft seats, but some child restraint systems are required by the manufacturer to be secured by both a lap belt and shoulder belt. In such aircraft, the system may not be able to be properly secured.

Passengers – safety briefings and instructions (91.565)

Before take-off, you must ensure that all passengers are given a safety briefing and instructions.

> **Exception:** *The safety briefing and instructions may be omitted for a passenger who has been carried and briefed previously if it can be reasoned that the same safety briefing is not necessary in the circumstances.*

Passenger safety briefings and instructions (MOS 20.06)

The passenger safety briefing and instructions must cover the following:

- the rules about smoking during the flight and the places on the aircraft where smoking is prohibited
- when seatbelts must be worn and how to use them
- the requirement that seat backs must be in the upright position (or otherwise, if permitted by the AFM) during take-off and landing
- any requirement that attachments to the seat (for example, tray tables and footrests) must be stowed, during taxiing, take-off and landing
- how and when to adopt the brace position
- where the emergency exits are and how to use them
- the location of evacuation slides (if any) and how to use them
- if emergency oxygen is carried for the flight – how and when to use the emergency oxygen
- how and where to stow, or otherwise secure, carry-on baggage and personal effects, and the times during the flight when these items must be stowed or secured
- if the aircraft is fitted with escape path lighting – where the lighting is and how to use it

Refer to CASA guidance regarding passenger safety information available in AC 91-19 Passenger safety information.

- if survival equipment is carried, and it is intended that a passenger is to use the equipment – where the equipment is carried and how to use it
- if life jackets or life rafts are carried – where the jackets or rafts are located and how to use them
- the requirement that life jackets must not be inflated inside the aircraft
- the limitations imposed on the use of portable electronic devices during different stages of the flight
- the requirements that:
  - passengers seated in emergency exit rows must be willing and able to operate the exit in the event of an emergency
  - they must not have a condition that will cause them to obstruct the exit or hinder an emergency evacuation
- when a passenger is carried who requires assistance – the nature of the assistance required in the event of an emergency, which emergency exit to use and when to use it
- when a passenger is seated in a pilot seat – that they do not manipulate or interfere with the controls
- for a jump aircraft – the physical location(s) within, or on, the aircraft that the passenger must occupy during the flight to ensure the aircraft is operated within the aircraft's weight and balance limits during the flight.

The regulation provides a list of requirements that are not applicable to all aircraft types and operations. You and the operator will need to consider what is applicable for the aircraft to ensure compliance with the regulation.

Passengers – safety directions by pilot in command (91.570)

Before taxiing, taking off or landing you must direct passengers to fasten their seatbelt or shoulder harness and if:

- the back of the seat (or berth) in which the passenger is sitting is adjustable – to ensure that the seat back is in an upright position, or other position permitted by the AFM
- there are attachments to, or for, the seat (including a tray table or footrest) – to stow the attachments or position them as permitted by the AFM.

During the flight, if you believe it is necessary for the safety of the passengers, you must direct them to fasten their seatbelt or shoulder harness. Switching on an illuminated fasten seatbelt sign is a direction.

Exception:

- a direction need not be given to a person whose health may suffer by being restrained by a seatbelt if you agree the person is otherwise safely restrained
- a direction need not be given to a person who is ill or incapacitated if you agree to the passenger not adjusting their seat (or berth) and the person is otherwise safely restrained and will not affect the safety of other passengers.

Passengers – compliance with safety directions (91.575)

A passenger must comply with safety directions given by a pilot.

Passengers – compliance with safety instructions by cabin crew (91.580)

A cabin crew member may give an instruction to a passenger relating to the safety of the aircraft, or a person onboard. A passenger must comply with a cabin crew member's instruction.

Passengers – alcohol (91.780)

A passenger must not consume alcohol unless it has been provided by a crew member or a pilot.

Prohibiting person affected by psychoactive substances from boarding (91.790)

The operator or any crew member may prohibit a person from boarding if, on reasonable grounds, they believe that the person is affected by a psychoactive substance to an extent that may present a hazard to the aircraft or to a person onboard.

Restraint and stowage of cargo (91.585)

You and the operator must ensure any cargo carried is:

- restrained using approved equipment (see 21.305 or 21.305A), or
- securely stowed in a place designed and approved for that purpose, under Part 21 – *Certification and airworthiness requirements for aircraft and parts*, or
- for equipment of a foreign-registered aircraft restrained or stowed in accordance with the law of the aircraft's state of registry or state of the operator.

Exception: *This regulation does not apply in relation to the following kinds of cargo, which must be restrained or stowed in accordance with another regulation:*

- an assistance animal carried in a passenger cabin (see 91.620)
- carry-on baggage (see 91.590)
- passenger service or galley equipment (91.595)
- cargo to be dropped from the aircraft during dropping operations (see 91.190).

Restraint and stowage of carry-on baggage (91.590)

You must ensure that carry-on baggage is securely stowed when taking off, landing, or at any other time you direct.

It must be stowed in a place designed and approved under Part 21 *Certification and airworthiness requirements for aircraft and parts*, (or for a foreign aircraft, under the law of the state of registry or state of the operator) or otherwise securely restrained.

When restraining and stowing carry-on-baggage, you should consider the following:

- each item should only be stowed in a location in the cabin capable of restraining it
- under-seat stowage should not be used unless there is a restraint bar
- items must not be stowed in lavatories or against bulkheads
- items must not be placed in such a way that they prevent overhead lockers from being latched; or where they will impede access to emergency equipment
- before take-off or landing or when in turbulence, checks shall be made to ensure items will not cause injury if they fall or impede an emergency passenger evacuation.

Restraint and stowage of certain aircraft equipment (91.595)

Passenger service and galley equipment must be restrained and securely stowed when the aircraft is taking off or landing, or at any other time you direct.

Carriage of cargo – general (91.600)

You and the operator must not allow cargo to be carried in a place:

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

Carriage of cargo – cargo compartments (91.605)

You and the operator of an aircraft must ensure the cargo is loaded in a way that allows a crew member to reach all parts of the compartment with a hand-held fire extinguisher. This is only required where the AFM or regulations require more than one flight crew member, and the aircraft has a cargo compartment designed so that a crew member would need to enter the compartment to extinguish a fire.

Carriage of cargo – unoccupied seats (91.610)

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

Carriage of cargo – loading instructions (91.615)

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

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

Unauthorised travel or placing cargo on aircraft (91.060)

A person may only travel or place cargo on an aircraft if you or the operator have given consent to do so.

Carriage of animals (91.620)

A person may only bring an animal onto an aircraft with your permission.

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

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

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

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

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

When giving permission, you may need to consider:

- the type of animal
- how it is carried, contained and restrained
- its reaction to noise and being out of its natural environment
- nuisance to other passengers
- distraction to flight crew
- how excrement or fluids will be contained.

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

Possessing firearm on aircraft (91.160)

A person may only carry a firearm on a prescribed aircraft with the pilot or operator's consent. Prescribed aircraft are aircraft used in:

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

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

Exception: *The above does not apply if the firearm is being carried:*

- in an aerial work operation that complies with CASR Part 138
- in compliance with other laws of the Commonwealth that deal with firearms and aircraft. See Division 3 of Part 4 of the Aviation Transport Security Act 2004, and section 23 of the Crimes (Aviation) Act 1991.

Discharging firearm on aircraft (91.165)

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

OPERATIONAL RULES

6. Classification of operation

Aircraft to be flown under the VFR or IFR (91.270)

An aircraft may only be flown under either the visual flight rules (VFR) or the instrument flight rules (IFR).

A Part 103 aircraft may only be flown by day under the VFR.

A Part 131 aircraft may only be flown under the VFR.

All flights – airspeed limits (91.090)

You must fly an aircraft within the airspeed limits provided in the MOS 4.02.

Flight to be within indicated airspeed limits (MOS 4.02)

Unless it is required for aviation safety, you must not exceed the speed limits set out in table 9.

Note: Other sections in the MOS prescribe certain airspeed requirements in addition to those in table 9.

Table 9: Airspeed limits – all flights

Class of airspace	Flight rules	Maximum indicated airspeed
Class C	VFR	Below 10,000 ft above mean sea level (AMSL) – 250 knots
Class D	IFR or VFR	250 knots, or 200 knots if at or below 2,500 ft above aerodrome elevation within 4 NM of the primary aerodrome in that airspace
Class G or E	IFR or VFR	below 10,000 ft AMSL – 250 knots

You must advise air traffic control (ATC) if you cannot comply with an ATC speed instruction or you cannot meet an arrival or departure speed constraint; or you cannot operate within the airspeed limits tabled above.

VFR flights – aircraft not to exceed certain speeds (91.283)

You must not fly an aircraft operating under the VFR at a transonic or supersonic speed.

VFR flights – compliance with VMC criteria (91.280)

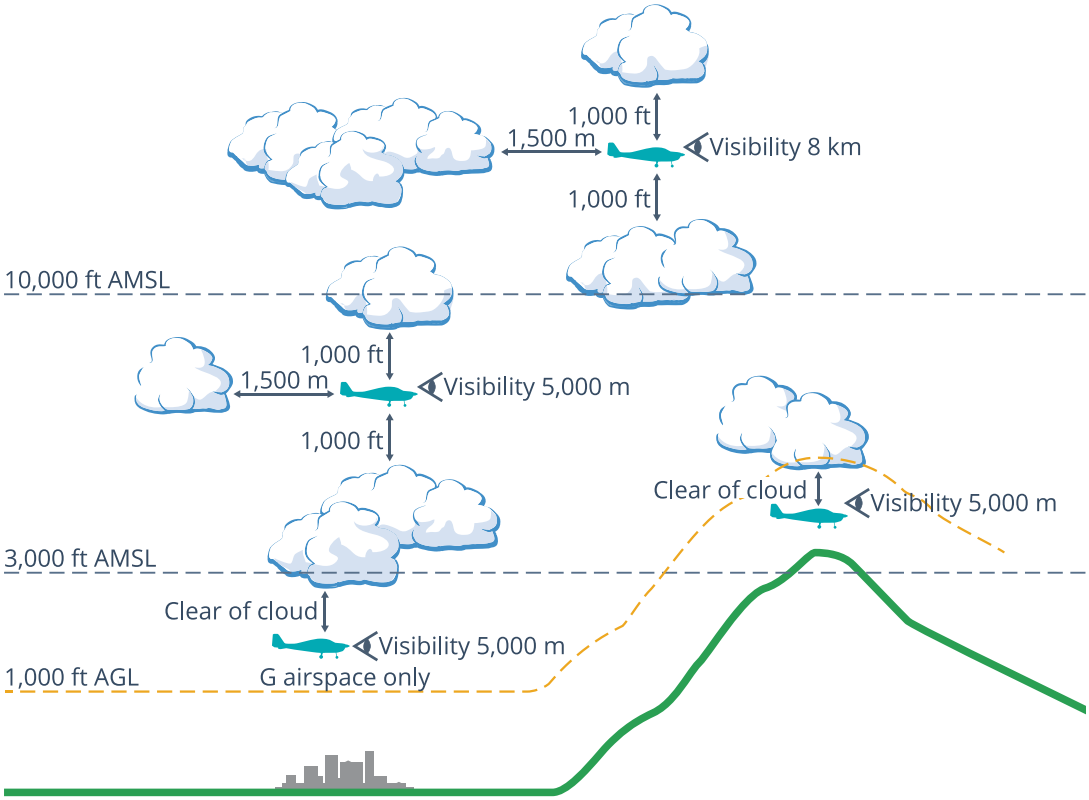
You may only fly an aircraft under the VFR in accordance with the VMC criteria for the aircraft and airspace in which you are flying.

> **Exception:** *This requirement does not apply if you have a clearance from air traffic control (ATC) to conduct the flight under the special VFR and you comply with the special VFR.*

VMC Criteria (MOS 2.07)

VMC criteria means, the meteorological conditions expressed in terms of flight visibility and the horizontal and vertical distance from cloud. See Figures 3, 4 and 5 for the application of VMC criteria in various airspace classifications.

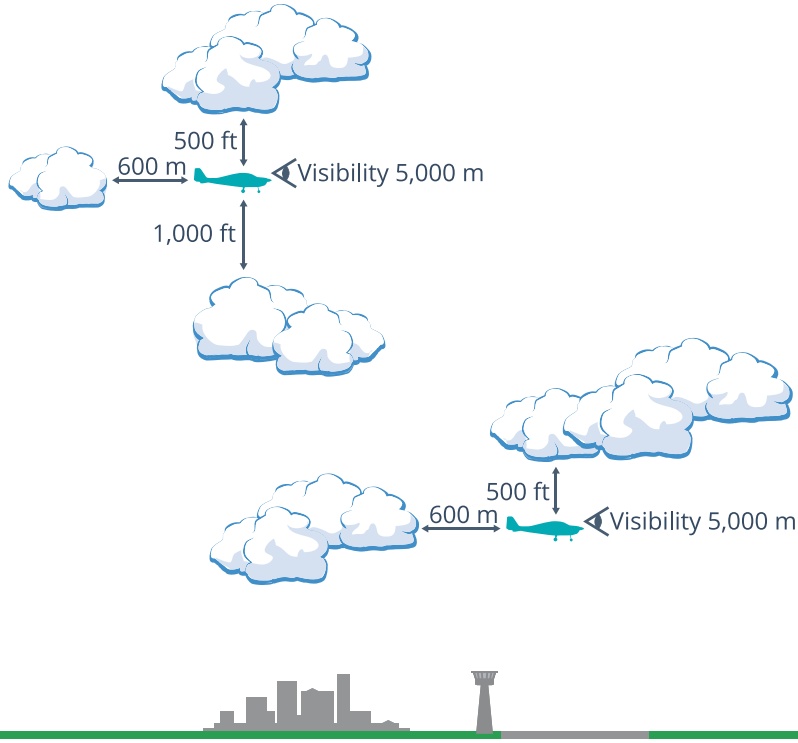
Figure 3: VMC criteria all aircraft Class A, B, C, E and G (MOS Table 2.07)



Class of airspace	Height	Flight visibility	Distance from cloud	Operational requirements
A, B , C, E or G	At or above 10,000 ft AMSL	8,000 m (8 km)	1,500 m horizontal 1,000 ft vertical	
A, B, C, E or G	Below 10,000 ft AMSL	5,000 m (5 km)	1,500 m horizontal 1,000 ft vertical	
G	At or below whichever is the higher of: › 3,000 ft AMSL › 1,000 ft AGL	5,000 m (5 km)	Clear of cloud	In sight of ground or water Radio must be carried and used on appropriate frequency (MOS 26.18)

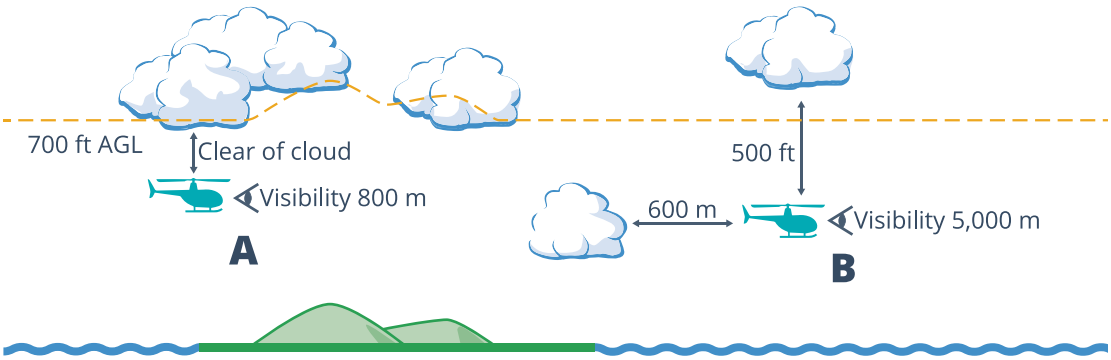
For VMC criteria limitations and conditions that apply to NVIS flights (91.085) see Chapter 18 of this guide and Appendix B.

Figure 4: VMC criteria all aircraft for Class D controlled airspace (MOS Table 2.07)



Class of airspace	Height	Flight visibility	Distance from cloud	Operational requirements
D	All heights	5,000 m (5 km)	600 m horizontal 1,000 ft vertical above cloud 500 ft vertical below cloud	

Figure 5: VMC criteria for rotorcraft in Class G uncontrolled airspace (MOS Table 2.07)



A. Overland with/without track guidance or overwater with track guidance from navigation system.

B. Overwater without track guidance from navigation system.

Class of airspace	Height	Flight visibility	Distance from cloud	Operational requirements
G	Rotorcraft A Below 700 ft over land Below 700 ft over water with track guidance from navigation system	800 m	Clear of cloud	Applicable only if the rotorcraft is operated: › by day › at a speed that allows the pilot to see obstructions or other traffic in sufficient time to avoid collision › if within 10 NM of an aerodrome with an instrument approach, in a way that ensures the flight maintains separation of at least 500 ft vertically from any aircraft flying under the IFR that is also within 10 NM of the aerodrome
	Rotorcraft B Below 700 ft over water without track guidance from navigation system	5,000 (5 km)	600 m horizontal and 500 ft vertical	

Special VFR (MOS 2.01)

By day only, on request, ATC may issue you with a 'special VFR clearance' that will allow you to fly below the VMC criteria provided:

› you keep clear of cloud

› the flight visibility is at least:

» for an aeroplane – 1,600 m

» for a rotorcraft – 800 m and you operate at a speed that allows you to see obstructions or other traffic in sufficient time to avoid a collision.

VFR flights – flights in Class A airspace (91.285)

You must not fly under the VFR in Class A airspace unless you hold an approval.

Under the ICAO airspace classification, Class A airspace is designed for the traffic management of aircraft flying under the IFR only. However, there are occasions where the pilot of an aircraft flying under the VFR may wish to fly in Class A airspace; therefore, the regulation allows for an approval in limited or certain circumstances. For example, gliders may be approved to fly in Class A airspace in special circumstances.

7. Rules to prevent collision

Basic rule (91.325)

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

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

Right-of-way rules (91.330)

When taking evasive action because of a collision risk with another aircraft, you must follow the right-of-way rules shown in table 10 and Figures 6, 7, 8 and 9.

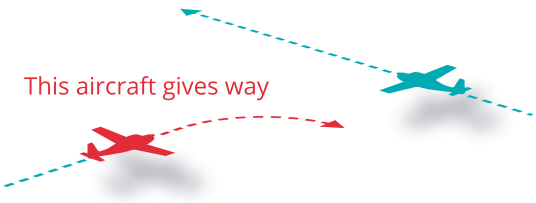
Table 10: Right-of-way rules

Circumstance	Right-of-way rule
an aircraft is in an emergency and compelled to land	all aircraft must give way to the aircraft compelled to land
an aircraft is landing	any other aircraft (whether in flight, or operating on the ground or water) must give way to the landing aircraft
two heavier-than-air aircraft are on approach to land at an aerodrome	the following rules apply: › the higher aircraft must give way to the lower aircraft › however, if the higher aircraft is in the final stages of an approach to land, the lower aircraft must not take advantage of the higher aircraft's requirement to give way to the lower aircraft and cut in front of the higher aircraft › a power-driven heavier-than-air aircraft must give way to an unpowered glider
an aircraft is overtaking another aircraft	the overtaking aircraft must give way to the aircraft being overtaken
aircraft is in the same vicinity	the following shows right-of -way in descending order: › balloon › parachute descent › unpowered glider › airship › an aircraft that is towing something (including another aircraft) › power-driven aircraft
two aircraft are on converging headings at approximately the same altitude	the aircraft that has the other aircraft on its right must give way to the other aircraft

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

Additional right-of-way rules (91.335)

Figure 6: Aircraft with right-of-way to maintain heading and speed



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

Figure 7: Overtaking aircraft to keep clear and to the right

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

Figure 8: Aircraft approaching head-on to alter heading to the right

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

Figure 9: Aircraft giving way not to create collision risk

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

> **Exception 1:** *If necessary, you may take whatever action is necessary to avoid a collision.*
>
> **Exception 2:** *The right-of-way and additional right-of-way rules do not apply if you are responding to a command of the aircraft's airborne collision avoidance system (ACAS) and manoeuvring is necessary to ensure the safety of the aircraft.*

Right-of-way rules for take-off and landing (91.340)

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

Compliance with international regulations (91.345)

An aircraft operating on water must comply with the requirements of the *International regulation for preventing collisions at sea, 1972*, except where they are inconsistent with regulation 91.355 *Giving way on water*.

Giving way to vessels (91.350)

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

Giving way on water (91.355)

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

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

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

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

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

Image | Cessna Caravan | Textron Aviation

8. Communication

Use of radio – qualifications
(91.625 and MOS 21.01)

A person must be qualified before transmitting on a radio frequency published in the AAI that is used:

- by air traffic services (ATS)
- in aeronautical emergencies
- for communication at either:
  - a certified, military aerodrome
  - an aerodrome prescribed as a designated non – controlled aerodrome by the MOS (MOS 17.01)
- at a non-controlled aerodrome – the common traffic advisory frequency (CTAF)
- in a mandatory broadcast area (MBA).

Pilots should:

- send radio messages clearly and concisely using standard phraseology, or if this is not practical, use plain English
- plan the content of their message
- listen out before transmitting to avoid interfering with other radio transmissions
- ensure their message has been correctly received.

Use of radio – broadcasts and reports
(91.630 and MOS 21.02)

When flying an aircraft that is fitted with or carries a radio, you must ensure the broadcasts or reports relating to the flight are made.

Note: 91.675 specifies that certain reports to air traffic service (ATS) or aerodrome operators may need to be made regarding hazards to air navigation.

The following should be read in conjunction with MOS 26.18 and 26.19 (see Appendix A) which describe the operational requirement for the carriage of radio and when you may fly with an inoperative radio.

Prescribed broadcasts and reports – general (MOS 21.03)

You must make broadcasts and reports on the relevant published radio frequency unless ATS agrees to the use of a different frequency for special flight circumstances.

Note: A published radio frequency is taken to include the use of a relevant datalink, ADS-C, CPDLC, or SATCOM voice communication.

Note: Special flight circumstances include, for example, descent from controlled to non-controlled airspace, formation flights, and search and rescue, police and security operations. You may initiate a request to ATS to agree to a changed radio frequency for special flight circumstances.

Non-controlled aerodromes – prescribed broadcasts (MOS 21.04)

You must ensure broadcasts are made on the CTAF according to table 11 if:

- you are flying in the vicinity of a non-controlled aerodrome, including a certified or military aerodrome, and
- the aircraft is equipped with a very high frequency (VHF) radio.

Table 11: Broadcasts – aircraft at or in the vicinity of, a non-controlled aerodrome (including a certified or military aerodrome when non-controlled) (MOS Table 21.04)

Situation	Frequency	Broadcast/ report
When you consider it reasonably necessary to broadcast to avoid the risk of a collision with another aircraft	CTAF	Broadcast

Note: See additional requirements apply for a non-controlled aerodrome in a mandatory broadcast area – see MOS 21.09.

Note: For an aircraft that must be equipped with a VHF radio, see MOS Chapter 26.

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

Mandatory broadcast area requirements MOS 11.10A

You must comply with the requirements in table 12 for an MBA in G airspace.

Note: The geographic boundaries of a MBA are specified in the AIP.

Note: This section contains MBA requirements other than the specific radio broadcasts or reports required to be made in relation to an MBA, or the radio carriage or fitment requirements for flight within an MBA. Radio broadcast and report requirements for MBA are contained in MOS 21.09. Radio carriage or fitment requirements for MBA are in MOS 26.18.

Table 11A: Broadcast area requirements

Broadcast area	Requirements
Ayers Rock BA	Nil
Ballina/Byron Gateway BA	When surveillance flight information service (SFIS) is active for this MBA, operations in the MBA, or immediately before entering the MBA, must make the calls as described in table 10B
Port Hedland BA	Nil

Flights in a mandatory broadcast area – prescribed broadcasts and reports (MOS 21.09)

If you are intending to fly in an MBA you must broadcast and report in accordance with:

- table 10B if an SFIS is not active for the MBA
- the requirements specified in the AIP if an SFIS is active for the MBA.

You must also ensure that, when making a broadcast or a report, it contains the following information, in the following order:

- the name of the relevant aerodrome followed by the word TRAFFIC
- the aircraft type and callsign
- for an MBA where an SFIS is not active immediately before entering the MBA
  - the aircraft's present altitude (where appropriate)
  - the situation-based information required by table 10B
- for an MBA where an SFIS is active immediately before to entering the MBA, the information required by the AIP for the SFIS is the name of the relevant aerodrome.

You must ensure that reports and broadcasts are made in accordance with the other applicable provisions of this section.

Note: Certain other operational requirements for MBA are contained in MOS 11.10A. The requirement to have a radio in an MBA is contained in MOS 26.18.

Table 11B: Broadcasts in relation to a MBA

Situation	Broadcast
before or immediately after entering an MBA	broadcast your intended use of the MBA
joining a circuit	broadcast the situation, and indicate the leg on which the aircraft will join
conducting a straight-in approach	no later than 3 NM from the runway threshold – broad-cast the situation
passing the final approach fix of an in-strument approach procedure	broadcast the situation
commencing a missed approach	broadcast the situation
after landing and clear of the active runway(s)	broadcast the situation
starting to taxi	broadcast the situation, and the following information: › that the flight is to be conducted under the IFR, if that is the case › for any flight, either: » the planned destination aerodrome for the flight » the direction in which you intend to fly from the aerodrome » the nature of operation (e.g. circuits) › the runway proposed to be used for take-off
immediately before entering the run-way to be used for take-off	broadcast the following: › a statement that the aircraft is entering the runway › the runway identifier

Controlled aerodromes and controlled airspace – prescribed reports (MOS 21.05)

When on the ground at a controlled aerodrome or flying in Class A, B, C or D airspace, or under the IFR in Class E airspace, you must report and broadcast to ATC according to table 12.

To ensure that you do not compromise separation with any aircraft flying near the base of controlled airspace, the required report is to be made to the ATS for the G airspace that the the aircraft will descend into after leaving controlled airspace.

The Australian flight information region (FIR) does not have Class B airspace.

Table 12: An aircraft in Class A, C or D airspace, or an IFR aircraft in Class E airspace (MOS Table 21.05 and AIP ENR 1.1)

Situation	Report
ready to taxi	report the situation
airborne	report the situation
departure	report the situation
position report when required by ATC, or route, reporting requirements in the AIP	report the situation
previously reported position estimate is more than 2 minutes in error	report the corrected position estimate
sustained variation of more than 10 knots or Mach 0.02 from any previously notified speed or any standard descent profile agreed between the aircraft operator and ATS	report the situation
aircraft performance degraded below either: › the level required for the airspace in which it is operating › the capability reported in the flight notification	report the situation
leaving a level or reaching an assigned level	report the situation
unable to comply with an ATC clearance or instructions	report the situation
arrival	if cancelling SARWATCH: report cancellation **Note:** a report to cancel SARWATCH is not required if an aircraft has arrived at a controlled aerodrome during tower hours.
runway braking action encountered not as good as reported by ATC	report actual braking action using the prefix AIREP SPECIAL

Note: Degraded means to the degradation of aircraft performance because of the failure or degradation of navigation, communication, altimetry (including reduced vertical separation minimum (RVSM) capability), flight control or other systems.

IFR aircraft in Class G airspace – prescribed reports (MOS 21.06)

When flying under the IFR in Class G airspace, you must broadcast and report to ATS according to table 13 and other applicable tables in this sections.

Exception: *If you are flying an aircraft under the IFR in Class G airspace and are unable to make contact with the ATS in relation to the report required, you may taxi and take-off provided:*

› broadcasts are made in place of the required reports, and

› contact with ATS is established as soon as possible after take-off, and

In addition:

› for an operator that is an AOC holder, aerial work certificate holder or Part 141 certificate holder – you must be assured of radio contact with the operator, or their representative who has immediate access to a serviceable telephone, until contact is made with ATS

› except for Part 121 operations conducted using aircraft with a MOPSC greater than 19 seats – a SARTIME for departure, that is a maximum of 30 minutes after commencing to taxi, has been established with the ATS.

In some circumstances, an aircraft reporting its position by ADS-C my not be required to advise ATC of revised waypoint estimates. Refer to AIP GEN.

Table 13: IFR aircraft in Class G airspace (MOS Table 21.06)

Situation	Report
taxiing	report the situation
departure	report the situation
reaching cruising level	report the situation
position report when required by ATC, or route reporting requirements of the AIP	report the situation
previously reported position estimate is more than 2 minutes in error	report the situation
before changing level	report the situation
before changing frequency	report the situation
requiring clearance into controlled airspace	report the situation
before leaving controlled airspace on descent	report the situation
before changing to CTAF (when not monitoring the ATS frequency on a second communication system)	report the situation
after landing	if cancelling SARWATCH: report cancellation **Note:** a report to cancel SARWATCH is not required if an aircraft has arrived at a controlled aerodrome with an AFIS, during AFIS hours.

VFR aircraft in Class E or G airspace – prescribed reports (MOS 21.07)

When flying under the VFR in Class E or G airspace, you must ensure reports and broadcasts are made to ATS according to table 14.

Table 14: VFR aircraft in Classes E and G airspace (MOS Table 21.07)

Situation	Report
requiring clearance into controlled airspace	report the situation
before, and on completion of, over-water stage	report in accordance with search and rescue (SAR) reporting schedules if arranged before the over-water stage

Flights in RVSM airspace – prescribed reports (MOS 21.08)

When in RVSM airspace, regardless of the cause you must ensure that a report all deviations of 300 ft or more from your assigned level, regardless of the cause of deviation, is made in accordance with the procedures published in the AAI.

If you cannot maintain your assigned flight level, you must inform ATC as soon as possible (see MOS 11.07).

Communication monitoring in controlled airspace (91.635)

When flying in controlled airspace, you or another pilot occupying a pilot seat must continuously monitor the primary communications medium used by ATC (CASA EX67/24).

The primary communications medium would normally be the ATC VHF radio frequency (but could also be high frequency (HF)/datalink) but in the event of radio failure light signals could become the primary communications medium.

Communicating at certified, military or designated non-controlled aerodromes (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
- military
- 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.*

There are currently no designated non-controlled aerodromes prescribed in the MOS (MOS 17.01 is Reserved)

When in the vicinity of an aerodrome, if the radio has become inoperative, or the purpose of the flight is to take the radio to a place for repairs, you must join the circuit on either the crosswind or downwind leg, and if the aircraft is equipped, ensure the:

› landing lights are switched on

› anti-collision lights are switched on

› secondary surveillance radar transponder is switched on.

Air traffic services – prescribed requirements (91.255)

When you operate at a controlled aerodrome or in a control zone, control area, class of airspace or in a prohibited, restricted or danger area, it must be in accordance with the instructions below.

Controlled aerodromes (MOS 11.13)

You must operate at a controlled aerodrome in accordance with the AIP.

When operating at a controlled aerodrome (when ATC is active) you must obtain ATC clearance when:

› taxiing on any part of the manoeuvring area

› entering, crossing, or backtracking on a runway

› taking off

› landing.

When taxiing on the manoeuvring area of a controlled aerodrome, you must stop and hold at all illuminated stop bars. You may only proceed beyond the stop bars when the stop bar lights are switched off.

> **Exception:** *You may proceed beyond a lighted stop bar if ATC advises you that stop bar contingency measures are in effect for the lighted stop bar, and ATC has identified the relevant lighted stop bar to you by reference to the specific holding position and instructs you to cross it.*

Controlled aerodromes – other requirements (MOS 11.14)

Reserved

Control zones and areas – entry into Class A, B, C, D or E airspace (MOS 11.15)

You must not enter a control zone or a control area that is Class A, B, C , D or E airspace without ATC clearance.

> **Exception:** *VFR flights do not require clearance to enter Class E airspace.*

> **Exception:** *A clearance is not required when an ATC service is not in operation for a control zone.*

Control zones and control areas – operating in Class A, B, C, D, or E airspace (MOS 11.16)

When flying in a control zone or a control area, you must fly in accordance with the procedures published in the AAI and take positive action to regain the cleared track as soon as you recognise a deviation.

You must immediately notify ATC if the aircraft's deviation from track exceeds any of the following navigation tolerances:

› for PBN operations, the RNP value for the segment of the IAP being conducted

› for VOR or localiser, full-scale deflection of the course deviation indicator (Note: you must notify ATC at half-scale deflection or more of the course deviation indicator. AIP ENR refers.)

› for NDB, + or - 5 degrees or more from the specified bearing

› for DME, + or - 2 NM or more from the required arc

› for visual navigation, more than 1 NM from the cleared track.

Further, relevant procedures and navigational requirements for operations in a control area or control zone, are published in the AAI. These publications are available through the Airservices Australia website: www.airservicesaustralia.com

Control areas – IFR flights, VFR climb/ descend and VFR-on-top (MOS 11.17)

Only when flying under the IFR in Class D or E airspace , you have the option to climb or descend VFR. You must request a clearance for a VFR climb or VFR descent

During the VFR climb or VFR descent, you must:

- always remain in VMC
- comply with the IFR reporting and communication requirements
- maintain separation from other aircraft
- visually maintain obstacle clearance.

When flying under the IFR in E airspace you have an option to fly VFR-on-top, you must request a clearance to fly VFR on top.

When flying VFR-on-top, you must:

- always remain in VMC
- comply with the IFR reporting and communication requirement
- maintain separation from other aircraft and apply wake turbulence separation
- fly at a specified VFR cruising level.

You must obtain an ATC clearance to cancel the climb or descent VFR, or VFR-on-top.

In Class D or E airspace when weather conditions permit, the option of a specific clearance under the IFR, known as a VFR climb or descent may facilitate a climb or descent to your planned cruising level.

Similarly, in Class E airspace when weather conditions permit under the IFR, the option of a specific clearance to fly at a VFR cruising level on top of cloud may provide operational efficiencies.

In both these circumstances ATC will not apply IFR terrain or traffic separation; therefore it is emphasised you must visually maintain obstacle clearance, be vigilant to see and avoid and maintain wake turbulence separation from other aircraft.

Readback of ATC clearances and instructions (MOS 11.12)

When in a control zone, a control area, or a controlled aerodrome, you must ensure that you, or another member of the flight crew (if any) reads back the safety-related parts of any spoken ATC clearance or instruction.

In addition, the following parts of an ATC clearance or instruction must always be read back:

- ATC route clearances, including any amendments

  Note: ATC route clearances include departure, en route, arrival and approach clearances.
- en route holding instructions
- route and runway-holding positions specified in a taxi clearance
- clearances, conditional clearances and instructions to taxi on, enter, line up on, wait on, land on, take-off from, hold short of, cross, or backtrack on, any runway
- the assigned runway or helicopter landing site (HLS), altimeter settings, Mode A transponder codes, data link logon addresses, altitude instructions, heading and speed instructions
- radio frequency instructions.

Airborne collision avoidance system (ACAS) resolution advisory (MOS 11.06)

In the event of an ACAS resolution advisory (RA), you must:

- respond immediately by following the RA as indicated, unless doing so would jeopardise the safety of the aircraft
- follow the RA even if there is a conflict between the RA and an ATC instruction to manoeuvre
- limit the alterations of the flight path to the minimum extent necessary to comply with the RA
- promptly return to the last assigned level when the conflict is resolved
- notify ATS when returning to the last assigned level.

A pilot who complies with an RA does not breach the requirement to comply with an ATC clearance or instruction (91.257).

Unauthorised entry into prohibited or restricted areas (91.260)

If you become aware your aircraft is in an active prohibited or restricted area, and you are able to communicate, you must inform ATS, or the controlling authority specified in the AAI and:

- fly out of the area
- for balloons and hot air airships (Part 131 aircraft) unable to fly out of the area, land and then inform the controlling authority as soon as practicable.

CASA may declare an area to be a prohibited area for reasons of military necessity.

CASA may declare an area to be a restricted area, if CASA believes it is necessary to restrict flight in accordance with specified conditions for public safety or to protect the environment.

Prohibited and restricted areas declared for 3 months or longer are published in the AAI (AIP). For shorter periods they are published by NOTAM (see regulation 7 of the Airspace Regulations 2007).

Prohibited areas (MOS 11.20)

A flight must not enter a prohibited area in any circumstance.

Restricted areas (MOS 11.21)

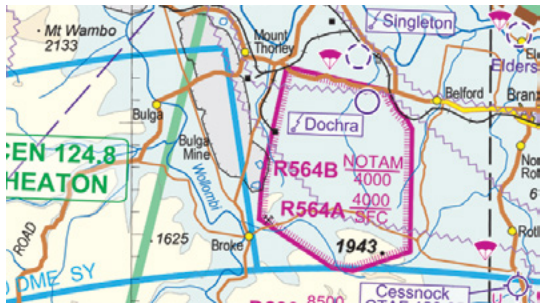
A flight must not enter an active restricted area without approval of the controlling authority (see Figure 10).

Note: On 15 June 2023 Australia's Airspace Regulations 2007 were amended so that in international airspace (airspace outside Australian territory) areas designated as restricted have been redesignated as danger areas. This included military exercise areas and military training areas..

Australian territory means:

- the territory of Australia and every external territory
- the territorial sea of Australia and each external territory
- the airspace over any such territory or sea

Figure 10: Restricted area



R564A 4000/SFC — **Must NOT operate without permission**

R564B NOTAM/4000 — **May operate ABOVE 4,000 ft without permission provided not activated by NOTAM**

Sydney VNC chart

SFC/4000 shown in the picture means R564A extends from surface level to 4,000 ft AMSL when active.

When ATS is available within an activated restricted area, ATS may approve your flight within or across the area if you request clearance in the same way as for entering controlled airspace.

A clearance may be withheld when hazardous activities are taking place or when those activities require priority.

Provided you receive an ATC clearance, you may fly:

- from controlled airspace into an adjoining activated restricted area
- through an activated restricted area into adjoining controlled airspace
- through an activated restricted area within controlled airspace.

Danger areas (MOS 11.22)

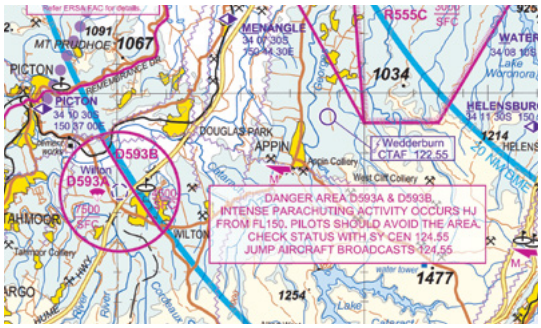
You may fly an aircraft within or across a danger area that is not a military operating area provided that:

- you are aware of the specific activity which causes the area to be a danger area
- before and during the flight, you take precautions against any safety risks that could arise from the flight
- you comply with any applicable conditions for the area as in force from time to time.

Note: Danger areas in international airspace may lie in controlled airspace.

Details on prohibited, restricted and danger areas can be found in the relevant aeronautical charts, NOTAMS, the En Route Supplement Australia (ERSA-SUA) and the Designated Airspace Handbook (DAH).

Figure 11: Danger area



Military operating areas (MOS 11.23)

Military operating areas (MOAs) have been established at the following military bases and are distinguished with an 'M' prefix: Cerberus (Vic), Edinburgh (SA), East Sale (Vic), Nowra (NSW) and Williamtown (NSW). See current aeronautical information circulars (AIC).

MOAs are a subset of danger areas. Australian registered aircraft are required to request a clearance to transit a MOA and must comply with any conditions of entry. Foreign registered aircraft can transit a MOA outside Australian territory without a clearance. Within Australian territory however, a clearance must be requested, and conditions of entry may be imposed.

RVSM airspace (MOS 11.07)

If you fly in RVSM airspace, you must operate in accordance with the procedures in the AAI.

When changing levels in RVSM airspace, you must ensure that that you do not overshoot or undershoot your cleared flight level by more than 150 ft.

If the cleared flight level cannot be maintained, you must inform ATC as soon as possible of the circumstances, and either:

- obtain a revised clearance before initiating any deviation from the cleared route or flight level
- if a revised clearance cannot be obtained before the deviation, obtain a revised clearance as soon as possible after the deviation.

If it is not possible to obtain a revised clearance within RVSM airspace in an oceanic control area (OCA) in an Australian flight information region (FIR), you may initiate a temporary lateral offset procedure with the intention of returning to the cleared route as soon as possible.

CASA approval required for flight in the North Atlantic Track – High Level Airspace (NAT-HLA) (MOS 11.08)

You may only operate an Australian aircraft in a portion of a class of the NAT-HLA if:

- the aircraft meets all the requirements for operational approval and the aircraft systems for flight in the NAT-HLA specified in NAT Doc 007, North Atlantic Operations and Airspace Manual (as in force from time to time) and
- there is evidence of this compliance in one or more of the following documents:
  - the AFM
  - an original equipment manufacturer service letter
  - any other document from the entity responsible for the design approval of the equipment
  - if the operator holds an AOC, aerial work certificate or Part 141 certificate:
    - the operator's exposition, operations manual or AOC
    - any other civil aviation authorisation held by the operator.

Note: NAT Doc 007, North Atlantic Operations and Airspace Manual contains requirements relating to, but not limited to, flight rules, flight plans, communications, navigation (PBN), surveillance, air traffic service provision, safety monitoring, air traffic flow management, special procedures, phraseology, SAR, meteorology and aeronautical information services.

The North Atlantic Track-High Level Airspace (NAT-HLA) is the airspace between North America and Europe. Approximately 3,000 aircraft fly the North Atlantic daily. To operate in NAT-HLA operators are required to be approved for RNP 10 or RNP 4 with RNP 2 probably being required in the future.

Performance-based communication and surveillance requirements (MOS 11.09)

This section applies to a flight of an aircraft within any class of airspace, whether controlled or uncontrolled, that involves:

- the conduct of datalink operations using FANS 1/A
- the declaration of RCP or RSP capabilities for the aircraft on the flight plan for the flight.

Definitions for this section:

automatic dependent surveillance – contract (ADS-C) means a contract between ATC and an aircraft's system:

- for the reporting of aircraft position and other data via a datalink
- which specifies:
  - under what conditions ADS-C reports are to be initiated
  - what data is to be contained in the reports.

CSP, or communication services provider, means any public or private entity which, under a contract or agreement, provides communication services for general air traffic which may include services provided by a satellite service provider (SSP) or services provided by the CSP in its own capacity as an SSP.

controller-pilot datalink communications (CPDLC) is the means of communication between ATC and a pilot, using datalink for ATC communications.

datalink operations means aircraft operations using FANS 1/A avionics.

FANS 1/A, which is taken to include FANS1/A+,is a direct datalink communication between the pilot of an aircraft and ATC via FANS 1/A avionics and FANS 1/A ground end systems, based on EUROCAE ED-100A/RTCA DO-258A, or a later version as in force from time to time.

performance-based communication (PBC) means communication based on performance specifications applied to the provision of air traffic services.

performance-based communications and surveillance (PBCS) means the application of required communication performance (RCP) and required surveillance performance (RSP) specifications to ensure appropriate performance levels for relevant air traffic management operations.

performance-based surveillance (PBS) means surveillance based on performance specifications applied to the provision of air traffic services.

RCP 240 is the value for the communication expiry time (namely 240 seconds) after which the initiator of the communication is required to revert to an alternative procedure.

Note: In the context of RCP, the initiator is normally an air traffic controller.

RCP allocation is a portion of an RCP parameter and is a time value assigned to a specific component of the communication system used for transferring messages between aircraft and ATC.

RCP parameters are performance characteristics that:

- provide the basis for developing an RCP specification
- include RCP transaction time, RCP continuity, RCP availability and RCP integrity.

RCP pilot operational response time, or RCP PORT, is an RCP allocation that specifies the maximum time for a flight crew member to recognise and respond to an ATC instruction.

required communication performance (RCP) specification means the requirements needed to support PBC, being requirements for the following:

- ATC and associated ground equipment
- the communication service provider
- aircraft equipment
- flight crew members.

required surveillance performance (RSP) specification means the requirements needed to support PBS, being requirements for the following:

- ATC and associated ground equipment
- the communication service provider
- aircraft equipment.

RSP 180 is the value for the surveillance data delivery time (namely 180 seconds) at which the surveillance data delivery is considered overdue.

Note: RSP 180 means that 99.9% of surveillance data must be delivered in less than 180 seconds.

RSP allocation is a portion of an RSP parameter and is a time value assigned to a specific component of the communication system used for transferring surveillance reports from aircraft to ATC.

RSP parameters are performance characteristics that:

› provide the basis for developing an RSP specification

› include RSP data delivery time, RSP continuity, RSP availability and RSP integrity.

satellite service provider (SSP) means an entity or group of entities that provide the portion of the communication system that involves the operation of one or more satellites.

Flight plan declaration of capability

Prior to declaring RCP 240 or RSP 180 capabilities on a flight plan, you must:

› check with the operator of the aircraft whether they have received advice from Airservices Australia that the relevant aircraft has consistently not met the operational criteria of RCP 240 and RSP 180 specifications

› if such advice was received – be reasonably satisfied that the operator of the aircraft has ensured that the aircraft consistently meets the operational criteria of the specifications.

Note: Airservices Australia monitors datalink communications in Australian-administered airspace and advises when operational criteria of RCP 240 and RSP 180 specifications are consistently not met.

A declaration must not be made on a flight plan, submitted to ATS, that the aircraft has RCP capability or RSP capability unless:

› the declaration relates solely to RCP 240 or RSP 180 capabilities

› the requirements in this section are complied with at the time of the declaration.

Note: It is ultimately a matter for the relevant aviation authority to be satisfied that an aircraft operator's declaration is, in actual fact, valid for the relevant aircraft at the time of any declaration, audit or inspection. A false declaration would constitute an offence under regulation 11.255 of the Civil Aviation Safety Regulations 1998 and could result m other legal consequences under the Civil Aviation Act 1988.

Equipment

The aircraft must be equipped with avionics supporting ADS-C and CPDLC applications over FANS 1/A (the equipment), and be operative for the flight.

Aircraft documentation

One of the following documents:

› the AFM

› an original equipment manufacturer service letter

› any other document from the entity responsible for the design approval of the aircraft datalink communications equipment must include a statement of compliance (a SOC) indicating that both:

  » the aircraft system is approved for datalink communications using FANS 1/A avionics

  » the aircraft datalink system meets the aircraft-allocated requirements of the RCP 240 and RSP 180 specifications.

However, if the AFM or original manufacturer's service letter or any other document from the designer of the datalink communications equipment do not include an SOC, a temporary substitute document may be referenced instead. Whilst formal issue of the SOC is pending and if no indication of non-compliance has been given by the State of Design a written and dated copy of the operator's request for the SOC may act as a temporary substitute for the SOC provided it indicates that:

› the aircraft system is approved for datalink communications using FANS 1/A avionics

› the aircraft datalink system meets the aircraft-allocated requirements of the RCP 240 and RSP 180 specifications.

Note: Allocation requirements for RCP 240 and RSP 180 specifications are as defined in ICAO Doc 9869, Performance-based Communications and Surveillance (PBCS) Manual.

Communication service provider agreement

Subject to the terms of the agreement between the operator of the aircraft and the CSP (below) you must reasonably satisfied that an agreement is in place between the aircraft operator and the CSP that includes the following terms and conditions:

- that there is adequate subnetwork coverage in the route flown
- that there is to be notification of coverage and performance failures
- that there is to be recording of datalink messages for 30 days
- that datalink messages mentioned in the dot point immediately above will be available on written request by either:
  - CASA
  - the national aviation authority responsible for the regulation of flight plans to whom the declaration of an RCP or RSP capability on the flight plan is made
- that datalink messages will not be manipulated or altered
- that network-allocated requirements for the RCP 240 and RSP 180 specification are met according to the definitions contained in ICAO Doc 9869, Performance-based Communications and Surveillance (PBCS) Manual.

If the agreement between the operator of the aircraft and the CSP does not include the terms and conditions mentioned above, the following may act as a temporary substitute pending the formal issue of an agreement that does include the terms and conditions under a revised agreement – a copy of the relevant operator's written and dated request to the appropriate CSP for a revised agreement.

Australian domestic airspace – inoperative radio requirements (MOS 11.10)

The following requirements apply to a flight within any class of airspace, whether controlled or uncontrolled, that is within an Australian FIR and is not specified in the AAI as an oceanic control area.

Note: The Designated Airspace Handbook (DAH) specifies the geographic boundaries of oceanic control areas.

If the radio fails during a flight, you must:

- if operating under the VFR in Class G or Class E airspace:
  - select code 7600 on the transponder (if fitted)
  - remain outside controlled airspace
  - assume the radio is broadcasting and broadcast position and intentions on the frequency appropriate to the area of operation
  - as soon as practicable, descend below 5,000 ft to continue flight under the VFR
- if operating under the VFR in Class A, B, C or D airspace or in a restricted area, or if operating under the IFR in any class of airspace:
  - select code 7600 on transponder (if fitted)
  - assume the radio is functioning and broadcast position and intentions on the frequency prescribed in the AAI
  - if the aircraft is in VMC and certain of maintaining VMC, remain in VMC and land at the most suitable aerodrome
  - if the aircraft is in IMC or is uncertain of maintaining VMC:
    - maintain the last assigned altitude or level (or LSALT if higher) for 3 minutes
    - maintain the last assigned vector for 2 minutes or fly one more holding pattern
    - after complying with the above 2 points, proceed in accordance with the latest ATC route clearance acknowledged
    - commence descent in accordance with the latest ATC route clearance acknowledged
    - conduct the most suitable instrument approach procedure.

Certain oceanic control areas – inoperative radio requirements (MOS 11.18)

If you are flying within Australian-administered airspace specified as an oceanic control area and your radio fails during the flight, you must:

- set code 7600 on the transponder (if fitted)
- assume the radio can transmit on the frequency appropriate to the area of operation, and broadcast your intentions and make normal position reports
- keep a lookout for conflicting traffic, including by reference to ACAS and traffic displays
- as far as practicable, turn on all exterior aircraft lights
- maintain the last assigned speed and level for a period of 60 minutes following the aircraft's failure to report its position over a compulsory reporting point (including automatic dependent surveillance contract (ADS-C) flights), and thereafter revert to your flight planned speed and altitude
- upon exiting the oceanic control area, conform, as far as practicable, to the relevant state procedures and regulations.

Air traffic control clearances and instructions (91.257)

You must comply with an ATC clearance or instruction.

> **Exception:** *If it is not practicable to obtain a new or amended clearance you may deviate from an existing clearance or instruction, provided it is for the safety of the aircraft and its occupants, and you advise ATC as soon as possible.*

Use of radio outside controlled airspaces – listening watch of radio transmissions (91.640)

When operating outside controlled airspace in an aircraft with a radio, you must ensure that any radio transmissions are monitored continuously by you or another qualified pilot.

Gliders and manned free balloons which carry a radio will maintain a listening watch on the following frequencies:

- in controlled airspace-the relevant ATC frequency
- in Class G, above 5,000 ft AMSL – the relevant area frequency or one of the following glider specific frequencies (122.5; 122.7; 122.9 MHz)
- in Class G, below 5,000 ft AMSL – 126.7 MHz
- in the vicinity of a non-controlled aerodrome – the CTAF or 126.7MHz if no CTAF is specified.

Standard visual signals (91.670)

When marshalling an aircraft other than a glider, a person must display standard visual signals.

A person must not display a standard visual signal if it is likely to endanger the safety of the aircraft, any person or property as a result.

You must comply with a standard visual signal during a flight unless you reasonably believe that doing so is likely to endanger the safety of the aircraft, any person or property.

Standard visual signals include light signals, ground marks and hand signals.

For standard visual signal (MOS 2.03)

The following details the light, projectile, ground and hand signals and the requirements and circumstances for their display.

Light or projectile signals to aircraft on an aerodrome or in flight (MOS 2.04)

Table 15 shows the light signals used to communicate to an aircraft on an aerodrome or in flight.

Table 15: Light signals to aircraft on an aerodrome or in flight

On ground	Light mode	In flight
authorised to take-off if pilot is satisfied that no collision risk exists	 Green	authorised to **land** if pilot is satisfied that no collision risk exists
authorised to taxi if pilot is satisfied that no collision risk exists	 Green flashing	**return** for landing
stop	 Red	**give way** to other aircraft **continue** circling
taxi clear of landing area in use	 Red flashing	**do not land** Aerodrome unsafe
return to starting point on aerodrome	 White flashing	

A series of projectiles, each discharged at intervals of 10 seconds, showing, on bursting, red or green lights, or stars, may be used to indicate that an aircraft is flying in or about to enter a prohibited, restricted or danger area and you must take such remedial action as may be necessary.

Ground signals for aircraft at aerodromes (MOS 2.05)

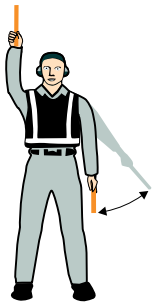
The standard ground signals for aircraft at aerodromes are set out in table 16.

Table 16: Ground signals for aircraft at aerodromes

Ground signal		
		
Description		
white cross	white double cross	horizontal white dumbbell
Where displayed		
› adjacent to wind direction indicator › on manoeuvring area	adjacent to wind direction indicator	adjacent to wind direction indicator
Meaning		
› aerodrome completely unserviceable › an area marked by a cross or crosses with the limit delineated by markers is unfit for use by aircraft	gliding operations in progress	› use only hard surface movement areas › where there are sealed and gravel manoeuvring areas, use only the sealed surfaces › where there are constructed gravel and natural surface manoeuvring areas, use only the gravel surfaces (see *ERSA* FAC for any local information relating to the dumbbell signal)

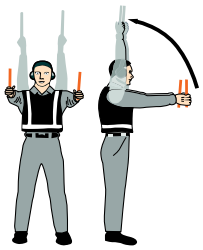
Hand signals for marshalling aircraft at aerodromes (MOS 2.06)

The hand signals depicted and described in the following diagrams are those prescribed for ground personnel (**signallers**) marshalling aircraft at an aerodrome.

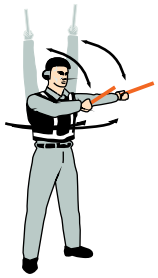


1. Wing-walker/guide
Raise right hand above head level with wand pointing up; move left hand with wand pointing down and repeatedly wave to and from the body.

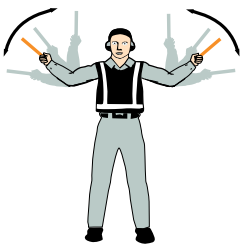
Note: This signal provides an indication by a person positioned at the aircraft wing tip, to the pilot/marshaller or push-back operator, that the aircraft movement on/off a parking position would be unobstructed.



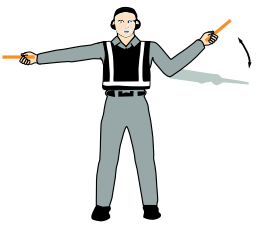
2. Identify gate
Raise fully extended arms straight above head with wands pointing up.



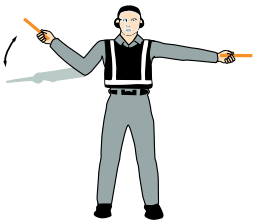
3. Proceed to next signaller or as directed by tower/ground control
Point both arms upward; move and extend arms outward to sides of body and point with wands to direction of next signaller or taxi area.



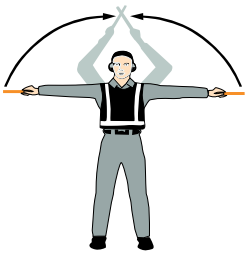
4. Come straight ahead
Bend extended arms at elbows and move wands up and down from chest height to head.



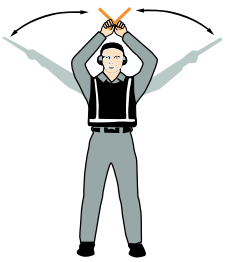
5a. Turn left (from pilot's viewpoint)
With right arm and wand extended at a 90-degree angle to body, make 'come ahead' signal with left hand. The rate of signal motion indicates the rate of aircraft turn to the pilot.



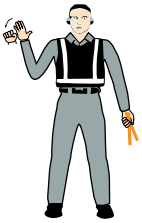
5b. Turn right (from pilot's viewpoint)
With left arm and wand extended at a 90-degree angle to body, make 'come ahead' signal with right hand. The rate of signal motion indicates the rate of aircraft turn to the pilot.



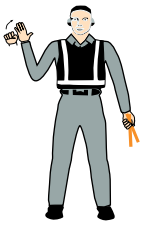
6. Normal stop
Fully extend arms and wands at a 90-degree angle to sides and slowly move to above head until wands cross.



7. Emergency stop
Abruptly extend arms and wands to top of head, crossing wands.



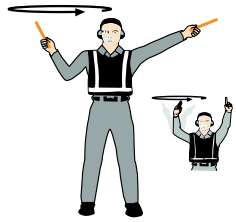
8. Set brakes
Raise hand just above shoulder height with open palm. Ensuring eye contact with flight crew, close hand into a fist. Do not move until receipt of 'thumbs-up' acknowledgement from flight crew.



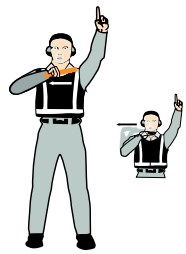
9. Release brakes
Raise hand just above shoulder height with hand closed in a fist. Ensuring eye contact with flight crew, open palm. Do not move until receipt of 'thumbs-up' acknowledgement from flight crew.

10. Chocks inserted
With arms and wands fully extended above head, move wands inward in a jabbing motion until wands touch. Ensure acknowledgement is received from flight crew.

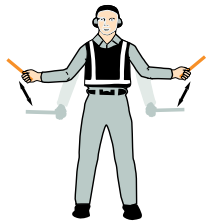
11. Chocks removed
With arms and wands fully extended above head, move wands outward in a jabbing motion. Do not remove chocks until authorised by flight crew.



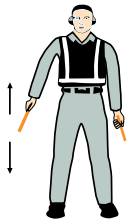
12. Start engine(s)
Raise right arm to head level with wand pointing up and start a circular motion with hand; at the same time, with left arm raised above head level, point to engine to be started.



13. Cut engines
Extend arm with wand forward of body at shoulder level; move hand and wand to top of left shoulder and draw wand to top of right shoulder in a slicing motion across throat.



14. Slow down
Move extended arms downwards in a patting gesture, moving wands up and down from waist to knees.

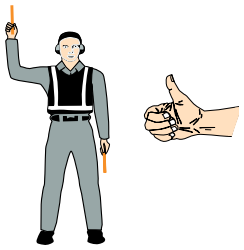


15. Slow down engine(s) on indicated side
With arms down and wands towards ground, wave either right or left wand up and down indicating engine(s) on left or right side respectively should be slowed down.

16. Move back
With arms in front of body at waist height, rotate arms in a forward motion. To stop rearward movement, use the *Emergency stop or Set brakes signal.*

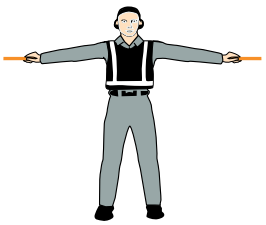
17. Turns while backing (for tail to starboard)
Point left arm with wand down and bring right arm from overhead vertical position to horizontal forward position, repeating right-arm movement.

18. Turns while backing (for tail to port)
Point right arm with wand down and bring left arm from overhead vertical position to horizontal forward position, repeating left-arm movement.

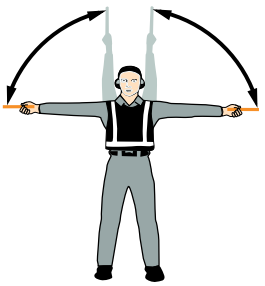


19. Affirmative/all-clear
Raise right arm to head level with wand pointing up or display hand with 'thumbs-up'; left arm remains at side by knee.

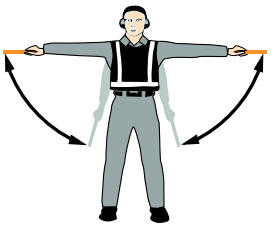
Note: This signal is also used as a technical/servicing communication signal.



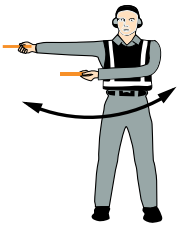
20. Hover (rotorcraft)
Fully extend arms and wands at a 90-degree angle to sides.



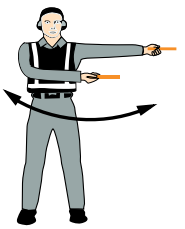
21. Move upwards (rotorcraft)
Fully extend arms and wands at a 90-degree angle to sides and, with palms turned up, move hands upwards. Speed of movement indicates rate of ascent.



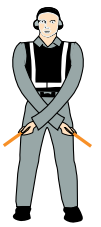
22. Move downwards (rotorcraft)
Fully extend arms and wands at a 90-degree angle to sides and, with palms turned down, move hands downwards. Speed of movement indicates rate of descent.



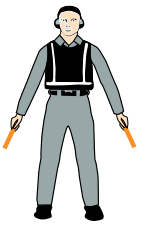
23. Move horizontally left (from pilot's point of view) (rotorcraft)
Extend arm horizontally at a 90-degree angle to right side of body. Move other arm in same direction in a sweeping motion.



24. Move horizontally right (from pilot's point of view) (rotorcraft)
Extend arm horizontally at a 90-degree angle to left side of body. Move other arm in same direction in a sweeping motion.

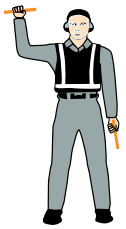


25. Land (rotorcraft)
Cross arms with wands downwards and in front of body.

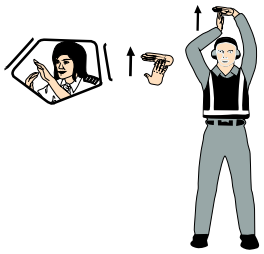


26. Hold position/standby
Fully extend arms and wands downwards at a 45-degree angle to sides. Hold position until aircraft is clear for next manoeuvre.

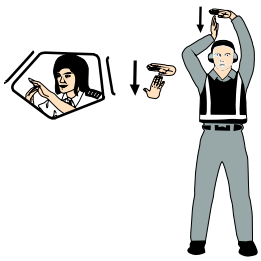
27. Dispatch aircraft
Perform a standard salute with right hand and/or wand to dispatch the aircraft. Maintain eye contact with flight crew until aircraft has begun to taxi.



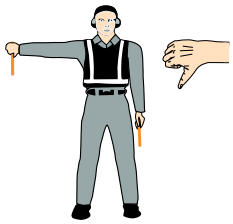
28. Do not touch controls (technical/servicing communication signal)
Extend right arm fully above head and close fist or hold wand in horizontal position; left arm remains at side by knee.



29. Connect ground power (technical/servicing communication signal)
Hold arms fully extended above head; open left hand horizontally and move fingertips of right hand into and touch open palm of left hand (forming a 'T'). At night, illuminated wands can also be used to form the 'T' above head.



30. Disconnect power (technical/servicing communication signal)
Hold arms fully extended above head with fingertips of right hand touching open horizontal palm of left hand (forming a 'T'); then move right hand away from the left. Do not disconnect power until authorised by flight crew. At night, illuminated wands can also be used to form the 'T' above head.



31. Negative (technical/servicing communication signal)
Hold right arm straight out at 90 degrees from shoulder and point wand down to ground or display hand with 'thumbs down'; left hand remains at side by knee.

32. Establish communication via interphone (technical/servicing communication signal)
Extend both arms at 90 degrees from body and move hands to cup both ears.

33. Open/close stairs (technical/servicing communication signal)
With right arm at side and left arm raised above head at a 45-degree angle, move right arm in a sweeping motion towards top of left shoulder.

Note: This signal is intended mainly for aircraft with the set of integral stairs at the front.

There are specific hand signals for emergency communications between the aircraft rescue and firefighting (ARFF) incident commander/ARFF firefighters and the cockpit and/or cabin crews of the incident aircraft. ARFF emergency hand signals should be given from the left front side of the aircraft for the flight crew.

Note: To communicate more effectively with cabin crew, ARFF firefighters may give emergency hand signals from other positions.

1. Recommend evacuation

Evacuation recommended based on ARFF and incident commander's assessment of external situation.

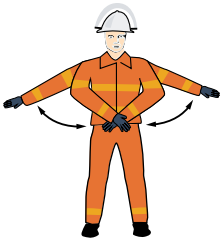
Arm extended from body and held horizontal with hand upraised at eye level. Execute beckoning arm motion angled backward. Non-beckoning arm held against body. Night signal, the same with wands.

2. Recommended stop

Recommend evacuation in progress be halted. Stop aircraft movement or other activity in progress.

Arms in front of head, crossed at wrists.

Night signal, the same with wands.



3. Emergency contained

No outside evidence of dangerous conditions or 'all-clear'.

Arms extended outward and down at a 45-degree angle. Arms moved inward below waistline simultaneously until wrists crossed, then extended outward to starting position (umpire's 'safe' signal).

Night signal, the same with wands.

4. Fire

Move right hand in a fanning motion from shoulder to knee, while at the same time pointing with left hand to area of fire.

Night signal, the same with wands.

Note: Bare hands, gloved hands, bats, wands, or torches may be used to provide the hand signal.

The signals are designed for use by the signaller with hands illuminated as necessary to facilitate observation by the pilot, and facing the aircraft in a position:

- for an aeroplane – on the left side of the aeroplane where the signaller can best be seen by the pilot
- for a rotorcraft – where the signaller can best be seen by the pilot
- for an emergency – as far as practicable, in front of the aircraft's port wing where the signaller, including rescue and firefighting personnel, can best be seen by the pilot or cabin crew as required.

For a signaller facing an aircraft, the engines are numbered from right to left as viewed by the signaller, so that the pilot's port (left) outer engine is the signaller's No. 1 engine.

Interception of aircraft (91.695)

If you are ever intercepted by another aircraft, you must comply with the MOS procedures of this section.

Interception of aircraft (MOS 23.02)

- International Civil Aviation Organization (ICAO) Annex 2 – Appendix 1 – Signals – Section 2 – Signals for use in the event of interception
- ICAO Annex 2 – Appendix 2 – Interception of Civil Aircraft, Attachment A – Interception of Civil Aircraft.

The ICAO procedures referred to above may also be found in the AAI publication.

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

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

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

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

There may be times when it is necessary for pilots to not follow aviation safety rules in order to respond to a sudden or extraordinary emergency. Please refer to www.casa.gov.au/operations-safety-and-travel/safety-advice/mercy-fights-and-operating-emergency.

Pilot in command to report emergencies (91.680)

If practicable and you have a means of communicating with ATS, you must inform them of any threat to the safety of the aircraft or its occupants (an emergency). If dangerous goods are carried, you must also advise ATS of the nature and state of the goods.

Pilot in command to report contraventions relating to emergencies (91.690)

If an emergency occurs and the flying pilot has acted in contravention of a regulation, you or the operator must notify CASA in writing of the contravention, and the circumstances, within 2 business days after the day of the emergency.

You are not excused from giving notice by claiming that giving the notice or information might tend to incriminate or expose you to a penalty.

The information in the notice, or any document or thing provided, directly or indirectly, is not admissible in evidence in criminal proceedings.

However, providing false or misleading information or documents is an offence under the Criminal Code (see sections 136.1, 137.1 and 137.2).

Aviation distress signals (91.700)

If a person has made an aviation distress signal and the reason for making the signal no longer exists they must, as soon as the circumstances permit, cancel the signal, if the aircraft's location and state of the radio allow it to be cancelled.

9. Fuel

Fuel requirements (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 (MOS 19.02)

You must carry the final reserve and contingency fuel amounts set out in table 17.

Table 17: Final reserve fuel and contingency fuel requirements

Aircraft category	Flight rules	Final reserve	Contingency
aeroplane with a MTOW equal to and less than, 5,700 kg (piston engine or turbo-prop)	VFR	30 minutes	N/A
aeroplane with a MTOW, equal to and less than 5,700 kg (piston engine or turbo-prop)	night VFR	45 minutes	N/A
aeroplane with a MTOW, equal to and less than 5,700 kg (piston engine or turbo-prop)	IFR	45 minutes	N/A
turbojet aeroplane with MTOW greater than 5,700 kg	IFR or VFR	30 minutes	5% of trip fuel
piston engine aeroplane with MTOW greater than 5,700 kg	IFR or VFR	45 minutes	5% of trip fuel
Rotorcraft	VFR	20 minutes	N/A
Rotorcraft	Night VFR	30 minutes	N/A
Rotorcraft	IFR	30 minutes	N/A

General requirements (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 (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.

If your flight:

- has been unable to land at the planned destination aerodrome
- you are diverting to the planned destination alternate aerodrome *(that was required for the flight – as applicable)* then you must ensure the aircraft is carrying at least the following useable fuel:
  - destination alternate fuel from the time of commencing the diversion
  - holding fuel (if required)
  - final reserve fuel.

Procedures for determining fuel before flight and fuel monitoring during a flight (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 replanning from any point in-flight
  - 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 (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 to continue to meet all the requirements *for amounts of fuel that must be carried for a flight* in MOS 19.04 as applicable.

You must request from air traffic services 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 air traffic services 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.

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 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 situation, but an indication that an emergency situation is possible should any additional delay occur.

Note 2: A pilot 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 air traffic control units are aware of the aircraft's fuel state.

Note 3: 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 International Civil Aviation Organization 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.

Refer AC 91-15 - Guidelines for aircraft fuel requirements and its associated documents - for further guidance. See the following links:

- https://www.casa.gov.au/sites/default/files/2021-09/advisory-circular-91-15-guidelines-aircraft-fuel-requirements.PDF
- https://www.casa.gov.au/sites/default/files/2021-08/advisory-circular-91-15-annex-a-sample-fuel-calculations-single-engine-piston-aeroplane.PDF
- https://www.casa.gov.au/sites/default/files/2021-08/advisory-circular-91-15-annex-b-sample-fuel-calculations-multi-engine-turboprop-aeroplane.PDF

Operational variations – procedures and requirements (MOS 19.07)

An operator under Part 141/142 (flight training), Part 137 (aerial application) and Part 138 (aerial work) may provide an operational variation to the *general fuel requirements* (under MOS 19.03) and the amounts that must be carried for a flight (under MOS 19.04).

The operations manual must detail the procedures for the operational variation relating to the calculation of any of the following:

- taxi fuel
- trip fuel
- contingency fuel (if any)
- destination alternate fuel
- additional fuel.

An operator must not include an operational variation relating to the calculation of holding fuel.

An aerial application or aerial work operator may include a variation relating to the calculation of final reserve fuel in their operations manual, provided that only flight crew members are carried for the operation.

If an operator intends to provide an operational variation, the operator must submit to CASA at least 28 days before using the variation a copy of the operator's procedures in relation to the operational variation, along with evidence, of at least 1 of the following which demonstrates how the variation will maintain or improve aviation safety:

- documented in-service experience
- the results of a specific safety risk assessment conducted by the operator that meets the following requirements and includes at least:
  - » flight fuel calculations
  - » the capabilities of the operator, including:
    - – a data-driven method that includes a fuel consumption monitoring program
    - – the use of sophisticated techniques for determining the suitability of alternate aerodromes
    - – specific risk mitigating measures.

Note: Under regulations 137.080, 137.085, 137.090, 138.068, 141.100 and 142.155 of CASR (as applicable), CASA may direct the operator to remove or revise the operational variation, if CASA were to find there was insufficient evidence that it would maintain or improve aviation safety.

Oil requirements (91.460)

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

Contaminated, degraded or inappropriate fuels (91.465)

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

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

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

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

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

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

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

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

Always follow any flight manual instructions where provided.

See AC 91-25 Fuel and oil safety

Fire hazards (91.470)

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

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

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

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

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

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

Fuelling aircraft – firefighting equipment (91.475)

A person who fuels an aircraft must ensure at least 2 fire extinguishers are readily available and positioned not less than 6 m but not more than 15 m from the fuelling point. Each fire extinguisher must be of a type and capacity suitable for extinguishing fuel and electrical fire. A fuelling operation in Australia must comply with Australian/New Zealand Standard AS/NZS 1841.

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

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

Fuelling aircraft – electrical bonding (91.480)

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

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

Equipment or electronic devices operating near aircraft (91.485)

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

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

> **Exception:** *The above requirements do not apply if the equipment or electronic device:*
>
> - is part of the aircraft or the aircraft's fuelling equipment, or
> - is designed for use during fuelling operations, or
> - performs an aircraft servicing function and is safe for use within 15 m of a critical fuelling point for the fuelling of the aircraft, or
> - complies with an industry standard about the safe use of equipment or electronic devices within 15 m of a critical fuelling point for the fuelling of the aircraft.
>
> **Exception:** *The auxiliary power unit (APU) of the aircraft may be operated during fuelling if it is permitted by the AFM and it is started before fuelling begins.*
>
> **Exception:** *An operating electronic device, hazardous to the process of fuelling only because it is designed to produce radio emissions (within the meaning of the Radiocommunications Act 1992), may be used but must be at least 6 m from each critical fuelling point when fuelling the aircraft.*

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

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

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

> **Exception:** *A person may operate a low-risk electronic device outside the cabin of a turbine-engine aircraft while it is being fuelled, less than 3 m from each critical fuelling point, if:*
>
> - the person is employed or engaged by the operator, and they have been trained:
> - to operate the device in such areas
> - to avoid the risks associated with being distracted when doing so, and
> - the operator has assessed the person's competence to comply with the fuelling regulations as set out in this section.

Only turbine-engine aircraft to be hot fuelled (91.495)

Only a turbine-engine aircraft may be hot fuelled.

See CASR 138.300 for an exception in certain circumstances.

Hot fuelling aircraft – general (91.500)

Hot fuelling of an aircraft means the fuelling of an aircraft with an engine running.

An auxiliary power unit (APU) is not considered to be an engine unless it is capable of propelling an aircraft (MOS 26.37).

Before hot fuelling, an aircraft you must ensure:

- it is safe to do so
- if it is a turbine propeller-driven aeroplane:
  - any propeller of an aeroplane is not within 2.5 m of the fuelling point used for the hot fuelling
  - a person using the fuelling point is separated from the propeller by a part of the aeroplane's structure (such as a wing)
  - a person must not be able to move directly into the propeller's arc from the fuelling point
- the doors on the fuelling side of the aircraft are closed
- at least one door is open on the non-fuelling side of the aircraft

- the fuelling system does not allow fuel to be exposed to the atmosphere
- the person fuelling the aircraft has a means available for quickly cutting off the fuel supply at its point of entry into the aircraft's fuel tank
- the person in charge of the aircraft, or the person at the aircraft's controls, maintains communication with the person fuelling the aircraft by means of an electronic communication system, or visual contact and an agreed system of signals.

Hot fuelling aircraft – procedures (91.505)

You must ensure that hot fuelling of an aircraft is only undertaken if the aircraft flight manual contains:

- procedures for and circumstances of when it can occur
- procedures if an emergency occurs.

You must also ensure that a person who is directly involved in hot fuelling is briefed about compliance with the procedures and circumstances.

Hot fuelling is a hazardous activity. It should not be attempted without considerable thought given to the inherent risk, compliance with the AFM procedures, preparation and briefing.

Exception: *A pilot who is flying a turbine powered aeroplane operated under an approval issued by a Part 105 ASAO to conduct parachute operations is exempted from this rule.*

The Part 105 ASAO exposition must have hot fuelling requirements equivalent to those under 138.300, to cover:

- the procedures for the hot fuelling of the aircraft
- the circumstances in which the aircraft can be hot fuelled
- the procedures to be followed if an emergency occurs during hot fuelling
- procedures to ensure a person involved in hot fuelling the aircraft is trained and competent to be involved in hot fuelling the aircraft.

The operator must require the pilot to comply and the pilot must comply with the requirements. (CASA EX67/24)

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

Highly volatile fuel

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

Other than highly volatile fuel

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

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

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

Although the regulations provide for the pilot and operator to be approved when fuelling, with other than highly volatile fuel, when a person other than a crew member is onboard, boarding or disembarking the aircraft, CASA does not recommend such activities under Part 91.

Fuelling aircraft if fuel vapour detected (91.515)

When fuelling, if fuel vapour is detected in the aircraft and a person other than a crew member is onboard, boarding or disembarking, you and the operator must ensure that fuelling is stopped.

10. Pre-flight planning and preparation

Flight preparation requirements – weather assessment (91.230)

You must comply with the following flight preparation requirements.

Forecasts for flight planning (MOS 7.02)

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 first study the forecasts more than one hour before commencing a flight you must review an update to that information before the flight begins.

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
- for a flight above 10,000 ft AMSL, a significant weather (SIGWX) forecast
- for any operation – a flight forecast.

For IFR flights except those under Part 121– to a planned destination or a planned alternate with an instrument approach procedure that you can conduct – the forecast must be an aerodrome forecast or an ICAO landing forecast.

For IFR flights except those under Part 121– to a planned destination without an instrument approach procedure or where the pilot is unqualified to fly the instrument approach – the forecasts must be:

- for the planned destination aerodrome – an aerodrome forecast or an ICAO landing forecast or a GAF or GAMET area forecast
- for a planned alternate aerodrome – an aerodrome forecast or an ICAO landing forecast.

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.

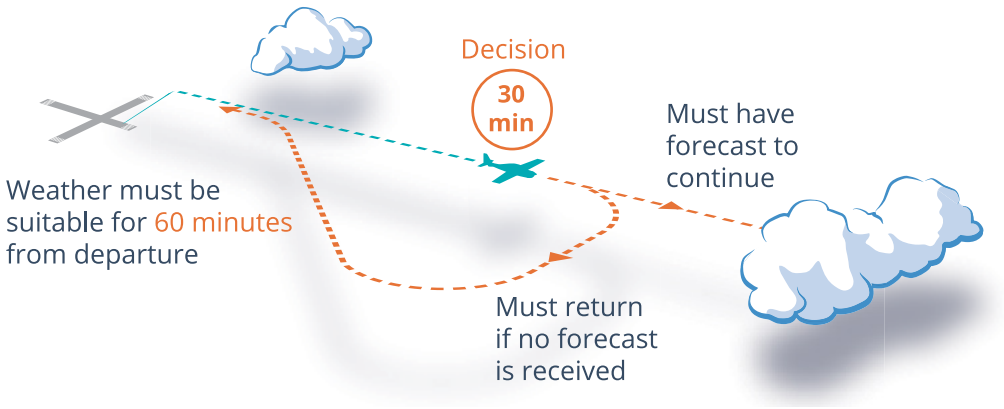
The term GAMET is not used in Australia but is of relevance to Australian aircraft operating overseas.

Flights unable to obtain an authorised weather forecast before departure (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 (see Figure 12).

> **Exception:** *For a Part 121 operation you must return to the departure aerodrome if you do not obtain a weather forecast within 30 minutes after take-off unless you satisfy the Part 121.170 Flight preparation alternate aerodromes requirements.*

Figure 12: Departure aerodrome return decision



Flight preparation requirements – alternate aerodromes (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 (MOS 8.04)

Terminal area forecast (TAF) (MOS 8.02)
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) low the alternate minima

Note: For alternate minima see table 18.

- visibility – either:
  - less than the alternate minima
  - 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 or its associated severe turbulence, or a forecast of at least 30% PROB of their occurrence (see figure 13).

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

TAF3 or ICAO landing forecast (MOS 8.02)

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 estimated time of your arrival (ETA):

- 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 probable (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.

Forecasts not available

Where a forecast that is required for a planned destination (see MOS 7.02) 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 for:
  - 30 minutes – when the forecast is endorsed INTER
  - 60 minutes – when the forecast is endorsed TEMPO
  - for a forecast that has a multiple INTER or TEMPO endorsements, the fuel for holding must be that for the most limiting requirement.

Image | Kevin Bosc | unsplash.com

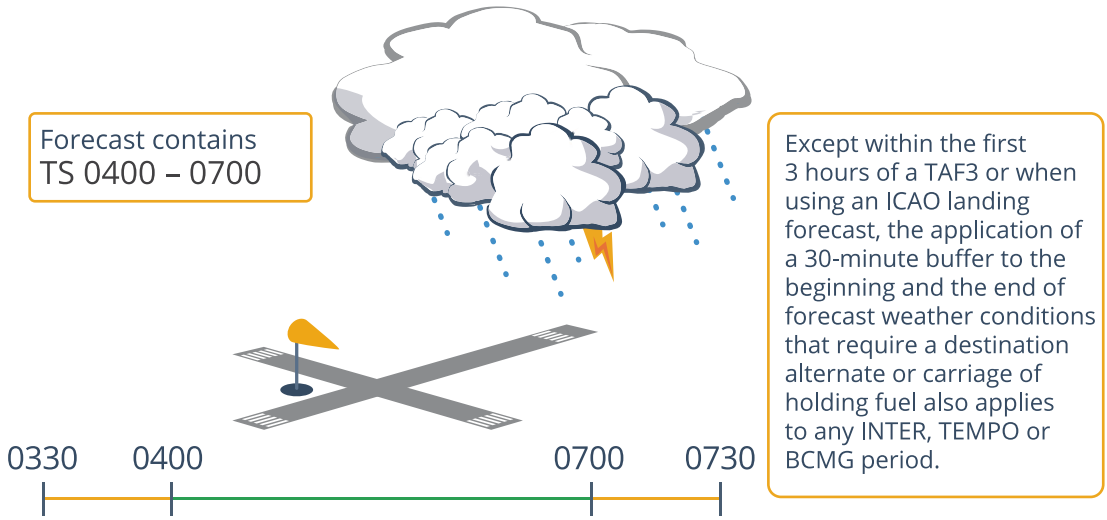
A forecast that includes the change indicator BECMG

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 13: Example of the application of the TAF buffer period



Destination alternate aerodromes – navigation (MOS 8.05)

For a flight under the IFR by night, you must nominate a destination alternate aerodrome for a planned destination aerodrome that is:

- not served by an IAP, or
- is served by an IAP that you are not able to conduct.

For a flight under the VFR 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 – aerodrome lighting (MOS 8.06)

For this section, a qualified and responsible person means a person who is instructed in, and is competent to display, the standard runway lighting with portable lights.

If a flight is planned to land at night at an aerodrome that only has portable runway lighting, you must nominate a destination alternate aerodrome unless:

- reliable arrangements have been made for a qualified and responsible person to:
  - attend the aerodrome during the period from at least 30 minutes before the ETA, to completion of landing and taxiing
  - display the portable lighting.

If a flight is planned to land at night at an aerodrome with electric runway lighting, but without standby power, you must nominate a destination alternate aerodrome unless:

- portable runway lights are available, and
- reliable arrangements have been made for a qualified and responsible person to:
  - attend the aerodrome during landing and taxiing
  - display the portable lighting in the event of a failure of the primary lighting.

> **Exception:** *The destination alternate aerodrome is not required to have standby power or portable runway lighting.*

If a flight is planned to land at night at an aerodrome with a pilot-activated lighting (PAL) system, you must nominate a destination alternate aerodrome unless reliable arrangements have been made for a qualified and responsible person to:

- attend the aerodrome during landing and taxiing
- manually switch on the runway lighting in the event of a failure of the PAL.

> **Exception:** *The destination alternate aerodrome is not required to have standby power or portable runway lighting.*

For an aircraft fitted with a single VHF radio you may only nominate an aerodrome with PAL as an alternate aerodrome if:

- reliable arrangements have been made for a qualified and responsible person to be available to manually switch on the aerodrome lighting
- the aircraft has:
  - a high frequency (HF) radio
  - 30 minutes of holding fuel.

Note: There is no requirement for a responsible person to be in attendance at the aerodrome. The requirement for holding fuel will allow ground staff to be alerted in the event of a failure of the aircraft's VHF radio.

> **Exception:** *The nomination of a destination alternate aerodrome for lighting is not required if you ensure that sufficient fuel is carried to permit the aircraft to hold until first-light plus 10 minutes.*

Destination alternate aerodromes – restrictions (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.

Alternate minima – Australian aerodromes (MOS 8.08)

Table 18 sets out for an aeroplane and rotorcraft the alternate meteorological minima for altitude and visibility for aerodromes in Australian territory.

Table 18: Alternate minima at Australian aerodromes (MOS 8.08)

Type of aircraft	Type of operation	Cloud ceiling	Visibility	Additional requirements
Aeroplane or rotorcraft	IFR to aerodrome with IAP	The alternate minima published on the instrument approach chart		
Aeroplane or rotorcraft	(a) Day IFR to an aerodrome without IAP, or (b) Day IFR to an aerodrome with one or more IAP's, none of which the pilot is able to conduct	LSALT for the final route segment plus 500 ft	8 km	See MOS 8.05 for IFR by night
Aeroplane	Day VFR and night VFR	1,500 ft	8 km	
Rotorcraft	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	

Special alternate minima are available for operations by aircraft fitted with at least:

- 2 instrument landing systems (ILS)
- 2 VORs
- one of the following combinations of distance measuring systems:
  - 2 DME
  - 2 GNSS
  - 1 DME and 1 GNSS.

The special alternate minima where available are depicted in the notes on the IAP chart.

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

Special alternate minima must not be used in any of the following circumstances:

- when an aerodrome control service is not provided
- when an authorised weather forecast or report is not available for the aerodrome
- when ground equipment associated with the approach aid has been unserviceable for more than 7 days and continues to be unserviceable.

Note: The non-availability of special alternate minima will be published in NOTAMs.

Alternate minima – at foreign aerodromes (MOS 8.09)

The relevant IAP for an aerodrome outside Australian territory is the IAP that has the second lowest minimum descent altitude for the IAP available and which the pilot is able to conduct. The IAP available must not rely on the same navigation system except if minimum altitudes for precision approach procedures are used. However, Category (CAT) II and CAT III minimum altitudes must not be used in determining the alternate minima (MOS 8.03).

The alternate minima for an aerodrome outside Australian territory are whichever one of the following provides the highest minima:

- the official alternate minima published by the state in which the aerodrome is located
- the circling minima for the aerodrome, plus:
  - a cloud ceiling increment of 500 ft
  - a visibility increment of 2 km
- the landing minima of the relevant IAP for the aerodrome, plus:
  - where the state's increments are published – those increments, or
  - where the state's increments are not published, or if the availability or reliability of the approach aid is doubtful:
    - a cloud ceiling increment of 500 ft
    - a visibility increment of 2 km
- if the relevant IAP is a precision approach procedure:
  - a cloud ceiling of 400 ft
  - a visibility of 1,600 m
- if the relevant IAP is not a precision approach procedure:
  - a cloud ceiling of 800 ft
  - visibility of 3,000 m.

If the aerodrome has straight-in procedures to a runway that is not suitable for the operation, and circling is permitted, then:

- the alternate minima must not be lower than the circling minima for the aerodrome plus:
  - a ceiling increment of 500 ft
  - a visibility increment of 2 km.

In many cases the application of a 500 ft ceiling increment and 2 km visibility increment to the circling minima will result in the highest alternate minima.

Specified aircraft performance categories (91.320)

When conducting an IAP the operator must not allow an aircraft to be operated in a lower performance category than that derived (from table 19) without holding an approval. In addition, the operator must provide its flight crew with the details of the approval and any conditions imposed by CASA.

The specified aircraft performance category for an aeroplane is the highest of those determined from table 19.

Note: Performance categories rank from A (lowest) to E (highest).

The specified aircraft performance category for a helicopter is either:

- H
- A for an instrument approach.

The specified aircraft performance category for a powered-lift aircraft is that stated in the AFM.

Table 19: Definition of specified aircraft performance category – (MOS 2.02)

Aircraft performance category – V_{AT}
A – up to 90 V_{AT}
B – from 91 to 120 V_{AT}
C – from 121 to 140 V_{AT}
D – from 141 to 165 V_{AT}
E – from 166 to 210 V_{AT}

Note: V_{AT} is the indicated airspeed (IAS) in knots at the threshold which is equal to the stalling speed V_{SO} multiplied by 1.3, or the stalling speed V_{S1G} multiplied by 1.23.

The table allows a pilot to determine the specific performance category for the aircraft. You should consult 91.287 and MOS 14.09 limitations relating to your performance category air speed limitations when conducting an instrument approach procedure.

Flight notifications (91.240)

You must follow the flight notification requirements prescribed in the MOS.

Flight notification requirements (MOS 09.02)

You must submit a flight plan in accordance with the AAI procedures for:

- an IFR flight
- a VFR flight in C or D airspace.

If your VFR flight is any of the following:

- air transport
- over water, beyond a distance from land greater than would allow the aircraft to reach land with one engine inoperative
- in a designated remote area
- at night proceeding beyond 120 NM from the departure aerodrome, then you must also do one of the following:
  - submit a flight plan
  - nominate a search and rescue time (SARTIME) for your arrival
  - leave a flight note with a responsible person.

If your flight is a VFR community service flight, you must submit a flight plan or nominate a SARTIME for arrival in accordance with procedures in the AAI.

Note: These are the minimum flight notification requirements; however, nothing prevents you from submitting a flight plan, nominating a SARTIME, or leaving a flight note with a responsible person (see MOS 9.05 below) for any flight.

Changes to flight plans and SARTIME nominations (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 onboard (POB) (except if you are conducting Australian air transport operations).

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 (MOS 9.04)

You must cancel your SARTIME no later than the time nominated.

Responsible persons for receipt of a flight note (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 operative and appropriate means of communicating with a search and rescue service (for example, 2 telephones or one telephone and one radio transmitter)
- be able to satisfy you they:
  - know how to contact the Joint Rescue Coordination Centre (JRCC) Australia
  - will immediately do so if your flight is overdue.

When cancelling a SARTIME you must include the aircraft call sign and place of arrival. ATS will acknowledge your 'CANCEL SARTIME' report with a readback of the place of arrival, if appropriate, and the words 'SARTIME CANCELLED'.

Matters to be checked before take-off (91.245)

Before take-off, you must complete the following checks prescribed in the MOS.

Matters to be checked before take-off (MOS 10.02)

Before commencing a flight, you must complete the following checks to confirm:

- each aerodrome, air route and airway facility that you plan to use will be available, suitable and safe for use
- all Head Office and FIR NOTAMs applicable to the en route phase of the flight
- all location-specific NOTAMs for relevant aerodromes
- the availability of GNSS integrity if required by MOS 11.03 or MOS 14.06
- all equipment required to be fitted to, or carried on the aircraft is available and functioning properly
- emergency and survival equipment carried on the aircraft is readily accessible
- that each crew member is fit to perform his or her duties
- the aircraft's hatches, access ports, panels and fuel tank caps are secured
- the control locks, covers and ground safety devices and restraints have been removed
- if the aircraft is an Australian aircraft, that there is either:
  - a certificate of release to service for the most recent maintenance carried out on the aircraft
  - a maintenance release for the aircraft
- that the aircraft's flight controls have been tested and are functioning correctly
- for each system fitted to the aircraft for measuring and displaying pressure altitude, the system's accuracy in accordance with the procedures described in MOS 10.03 and MOS 10.04
- if an amount of supplemental oxygen or protective breathing equipment is required, to be carried for a flight crew member, the following checks (as the case requires) have been made:
  - the required amount of supplemental oxygen is available
  - the protective breathing equipment is operative
  - the oxygen mask is connected to the supply terminal
  - each communication system associated with the oxygen mask is connected to the aircraft's communication system
  - if an oxygen mask is adjustable, the mask fits the flight crew member correctly.

Pilots and operators should identify the requirements that must be addressed that are applicable to their aircraft operations. Checks of aircraft equipment should be completed in accordance with any criteria or limitation expressed in the AFM, or where the AFM has no instruction for other equipment, the manufacturer's requirements or guidance for that equipment.

Although not mandatory under Part 91, CASA recommends operators develop the following checklists as a minimum:

- before take-off
- approach
- landing.

See AC 91-22 Aircraft checklist systems for further information.

Checking systems for measuring and displaying pressure altitude – general (MOS 10.03)

If the site elevation is known and an accurate QNH is available then before take-off, you must check the accuracy of each altimeter.

Altimeters must be checked as detailed below.

Checking pressure altitude systems – IFR flight (MOS 10.04)

For a flight under the IFR you must consider any altimeter with an error in excess of ± 75 ft as inoperative.

If the category of operation requires 2 altimeters, one must read the site elevation to within 60 ft. If the other altimeter has an error between 60 ft and 75 ft, you may fly to the first point of landing where its accuracy can be rechecked; however, if on rechecking the other system after landing, it shows an error in excess of 60 ft, this altimeter must be considered as inoperative for further IFR flight.

If the category of operation requires one altimeter, but 2 are fitted, flight is permitted if at least one of the altimeters reads the site elevation to within 60 ft; however, if the remaining altimeter has an error in excess of 75 ft, you must placard it as inoperative for IFR flight.

If the category of operation requires only one altimeter and only one is fitted and it has an error between 60 ft and 75 ft, you may fly to the first point of landing where the accuracy of the altimeter can be rechecked; however, if on rechecking the altimeter it shows an error in excess of 60 ft, you must consider it as inoperative for further IFR flight.

Certain aircraft manufacturers may specify altimeter check criteria in the AFM which are more stringent than those stated here. You must comply with the AFM.

Checking pressure altitude systems – VFR flight (MOS 10.05)

For a flight under the VFR, an altimeter used with an accurate QNH is only operative if it reads site elevation to within either (as applicable):

- 100 ft
- 11 ft at sites above 3,300 ft.

An aircraft fitted with 2 altimeters that continues to fly under the IFR with one altimeter reading erroneously by more than 100 ft (or 110 ft as the case may be), then you must consider the erroneous altimeter as inoperative for further use.

If you plan to fly VFR above FL200, you must check the altimeter accuracy against the IFR accuracy requirements.

Accurate QNH and site elevation (MOS 10.06)

QNH is to be considered accurate only if it is provided by one of the following:

- automatic aerodrome information service (AAIS)
- air traffic control (ATC)
- aerodrome automatic terminal information service (ATIS)
- automatic weather information service (AWIS)
- certified air/ground radio service (CA/GRS)
- weather and terminal information reciter (WATIR).

QNH from an authorised weather forecast must not be used for checking the accuracy of a pressure altimeter.

Site elevation must be derived from aerodrome survey data that is authorised in writing by CASA or an NAA or supplied in writing by the relevant aerodrome operator.

11. Ground operations

Use of aerodromes (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.

When considering 'all circumstances' expressed in the regulation you should include, aircraft performance, the take-off or landing distance available, obstacles in the take-off or landing flight path, temperature, wind direction and speed. Also consider the type of runway surface and the runway surface condition.

See also other MOS take-off and landing performance requirements in this section below.

› See AC 91-02 - Guidelines for aeroplanes with MTOW not exceeding 5 700 kg - suitable places to take off and land

› AC 91-29 Guidelines for helicopters – suitable places to take-off and land

Information pertinent to air transport operations in rotorcraft is contained in AC 133-01 (AC 133-02 may also be of use to Part 91 rotorcraft operators).

For information on aerodrome lighting and pavement strength refer to AMC/GM Part 91 and to the AIP-ERSA.

Military aerodromes used by Australian and foreign aircraft (CASA EX67/24)

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 the relevant military authority chooses.

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

Parked aircraft not to create hazard (91.420)

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

Safety when aeroplane operating on ground (91.425 and MOS 18.01)

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

When hand starting the engine using the propeller, and assistance is not readily available, a person must secure the aeroplane from moving and no other person may be onboard. However, a person may have another person in a pilot seat to assist with starting, to apply the brakes and control the engine including shutting down the engine, provided they have been instructed how and their competence has been assessed by a qualified person.

Safety when rotorcraft operating on ground (91.430)

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

> **Exception:** *For foreign registered aircraft a pilot authorised by either the state of registry or the state of the operator may operate a rotorcraft on the ground for other than maintenance or maintenance training (CASA EX67/24).*

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

Taxiing aircraft (91.415)

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

Taxiing or towing on movement area of aerodrome (91.365)

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

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

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

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

12. Aircraft performance and weight and balance

Loading of aircraft (91.805)

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

> **Exception:** *For CASR Part 137 Aerial application operators see CASA EX92/22 for directions and exemption that apply.*

The probability of overloading in small aircraft with less than 7 seats is high if standard passenger weights are used. Therefore, it is recommended to use actual passenger weights.

Take-off performance (91.795)

You and the operator when determining take-off performance of an aircraft must meet the requirements in Chapter 24 of the MOS that relate to:

- the aircraft's configuration
- the operation of any equipment for the flight
- characteristics of the aerodrome at which the aircraft takes off
- characteristics of the route flown
- characteristics of the aerodrome at which the aircraft lands.

For small aeroplanes,the AFM take off performance charts are normaly unfactored and often do not contain performance information for the effects of runway slope, various surface conditions or wind effect. In some cases they do not provideinformation on the effects of pressure and temperature variation. It is your responsibility to be satisfied the runway is long enough so you can take off safely (91.410).

To account for various levels of pilot competency or aircraft degradation of performance due to age, it is recommended for aeroplanes with landing performance charts which are unfactored, that the following factors are applied to the take-off distance required:

- MTOW 2,000 kg or less – 1.15
- MTOW above 2,000 kg but below 3,500 kg – linear interpolation between 1.15 and 1.25
- MTOW 3,500 kg or more – 1.25.

It is further recommended that you apply additional safety margins or factors to the above, where the AFM is silent on other matters of performance degradation.
See AC 91 02 Guidelines for aeroplanes with MTOW not exceeding 5,700kgs – Suitable places to take off and land.

Any of the following IFR aircraft taking off in other than day VMC conditions, must clear obstacles by a safe margin until reaching the LSALT (set out in 91.305):

- multi engine aeroplane under 5,700 kg
- a multi engine rotorcraft
- a single engine aeroplane or rotorcraft.

Refer to the AMC/GM Part 91 for guidance on how a safe margin is to be determined.

Take-off performance for aeroplanes (MOS 24.02)

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 after considering:

- 91.265 Minimum height rules – populous areas and public gatherings
- 91.267 Minimum heights rules – other areas
- 91.277 Minimum heights – VFR flights by night
- 91.305 Minimum heights – IFR flights.

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

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

In addition, you must also consider:

- the take-off distance available
- the pressure altitude and temperature
- the type of runway surface and the runway surface condition
- the gradient of the runway in the direction of the take-off
- the wind direction, speed and characteristics
- the take-off and en route weather forecast
- the obstacles in the vicinity of the take-off flight path.

Take-off performance for rotorcraft – general (MOS 24.03)

You must ensure, during and after take-off, until reaching the minimum height, that the rotorcraft has the performance to clear all obstacles by a safe margin after considering:

- 91.265 Minimum height rules – populous areas and public gatherings
- 91.267 Minimum heights rules – other areas
- 91.277 Minimum heights – VFR flights by night
- 91.305 Minimum heights – IFR flights.

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

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

In addition, you must also consider:

- the take-off distance available
- the adequacy of the size of the departure and planned destination aerodrome and any alternate aerodromes
- the pressure altitude and temperature
- the gradient of the take-off and initial climb stage of the flight
- the climb flight path
- the wind direction, speed and characteristics – if known, or zero wind if unknown
- the take-off and en route weather forecast
- the obstacles in the vicinity of the take-off path.

Take-off performance for rotorcraft – Category A rotorcraft within populous areas (MOS 24.04)

You may only take-off in a Category A rotorcraft, from a place that is a non-certified aerodrome or an aerodrome that is not used for the regular take-off or landing of aircraft within a populous area if:

- the performance of the rotorcraft is sufficient to comply with the category A procedure for take-off and initial climb at the place, and
- you can ensure that the rotorcraft, with one engine inoperative, will maintain an obstacle clear climb gradient until 1,000 ft above the take-off surface.

> **Exception:** *This does not apply if the rotorcraft is being operated as a Category B rotorcraft in accordance with its Category B supplement in the AFM, and MOS 24.05 is complied with for the take-off.*

Note: In the event of an engine failure, the Category A procedure allows for a rejected take-off within take-off distance available. If an engine failure occurs after the take-off decision point, the Category A procedure allows for flight clear of persons and property.

Take-off performance for rotorcraft – Category B rotorcraft within populous areas (MOS 24.05)

A Category A performance rotorcraft will allow for obstacle avoidance in the take-off path following an engine failure by being able to fly away. However, a Category B performance rotorcraft will not always be able to continue safe flight following an engine failure. A forced landing may result in such circumstances.

You may only take-off in a Category B rotorcraft from a place in a populous area, that is a non-certified aerodrome or an aerodrome that is not used for the regular take-off or landing of aircraft if:

- the rotorcraft's performance is sufficient to:
  - avoid obstacles during the take-off and initial climb stage of the flight
  - auto rotate or fly clear of persons or property if there is an engine failure
  - where the area is a confined area – hover-out-of-ground-effect, and
- as far as practicable, provide for a planned take-off profile that minimises time within the avoid area of the HV curve.

Note: Avoid area of the HV curve, for a rotorcraft, means the area depicted in the AFM heightvelocity diagram, which identifies the combinations of height above ground and airspeed in knots which a rotorcraft should avoid.

Landing performance (91.800)

You and the operator when determining landing performance of an aircraft must satisfy the requirements in Chapter 25 of the MOS that relate to the:

- aircraft's configuration
- operation of any equipment for the flight
- characteristics of the aerodrome at which the aircraft lands
- safety factor percentages to be applied.

For small aeroplanes, the AFM landing performance charts are normaly unfactored and often do not contain performance information for the effects of runway slope, various surface conditions or wind effect. In some cases they do not provide information on the effects of pressue and temerature varition. It is your responsibility to be satisfied that the runway is long enough so you can land safely (91.410).

To account for various levels of pilot compentcy or aircraft degradation of performance due to age, it is recommended for aeroplanes with landing performance charts which are unfactored, that the following factors are applied to the landing distance required:

- MTOW 2,000 kg or less – 1.15
- MTOW above 2,000 kg but below 4,500 kg – linear interpolation between 1.15 and 1.43
- MTOW 4,500 kg or more – 1.43.

It is further recommended that you apply additional safety margins or factors to the above, where the AFM is silent on other matters of performance degradation.
See AC 91 02 Guidelines for aeroplanes with MTOW not exceeding 5,700 kgs – Suitable places to take off and land.

The FAA Safety Alerts For Operators (SAFO) provide useful information on actual landing distance (SAFO 19001) and landing in very wet conditions (SAFO 19003).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Landing performance aeroplane (MOS 25.02)

You must ensure 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:

- 91.265 Minimum height rules – populous areas and public gatherings
- 91.267 Minimum heights rules – other areas
- 91.277 Minimum heights – VFR flights by night
- 91.305 Minimum heights – IFR flights.

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

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

In addition, you must also consider:

- the landing distance available
- the pressure altitude and temperature
- the type of runway surface and the runway surface condition
- the gradient of the runway in the direction of the landing
- the wind direction, speed and characteristics
- the landing weather forecast
- the obstacles in the approach flight path and missed approach flight path.

Landing performance rotorcraft – general (MOS 25.03)

You must ensure during approach and landing, the rotorcraft has the performance from the time it descends below the minimum height, to clear all obstacles by a safe margin after considering:

- 91.265 Minimum height rules – populous areas and public gatherings
- 91.267 Minimum heights rules – other areas
- 91.277 Minimum heights – VFR flights by night
- 91.305 Minimum heights – IFR flights.

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

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

In addition, you must also consider:

- the final approach and take-off area (FATO) distance available
- the adequacy of the size of the planned destination and any alternate aerodromes
- the pressure altitude and temperature
- the gradient of the approach and any missed approach
- the wind direction, speed and characteristics – if known, or zero wind if unknown
- the en route and destination weather forecast
- the obstacles in the vicinity of the approach flight path and the missed approach flight path.

Landing performance for a rotorcraft – Category A rotorcraft within a populous area (MOS 25.04)

You may only land in a Category A rotorcraft, from a place that is a non-certified aerodrome or an aerodrome that is not used for the regular take-off or landing of aircraft within a populous area if:

- the performance of the rotorcraft is sufficient to comply with the Category A performance procedure for landing and missed approach, and
- if an engine becomes inoperative, you can ensure that the rotorcraft will maintain an obstacle clear approach gradient including any missed approach.

> **Exception:** *this does not apply if:*
>
> - the rotorcraft is being operated as a Category B rotorcraft in accordance with its Category B supplement in the AFM
> - section 25.05 is complied with for the landing.

Note: The Category A procedures allows you in the event of an engine failure at, or after, the landing decision point to, continue an approach clear of persons and property and land within the landing distance available at the HLS.

Landing performance for rotorcraft – Category B rotorcraft within a populous area (MOS 25.05)

You may only land a Category B rotorcraft at a place in a populous area that is a non-certified aerodrome, or an aerodrome that is not used for the regular take-off or landing of aircraft if:

- the performance of the rotorcraft is sufficient to:
  - avoid obstacles during the landing and missed approach stage of the flight
  - autorotate or fly clear of persons or property if there is an engine failure
  - where the area is a confined area – hover out of ground effect
- as far as practical, provide for a planned landing profile that minimises time within the avoid area of the HV curve.

Note: Avoid area of the HV curve, for a rotorcraft, means the area depicted in the AFM heightvelocity diagram, which identifies the combinations of height above ground and airspeed in knots which a rotorcraft should avoid.

13. IFR – Take-off and landing

Taking off and landing in low-visibility (91.315)

A low-visibility operation at an aerodrome may only be carried out by an operator, that is required to have an operation's manual, if they hold an approval, or if the operator is not required to hold an approval then the pilot must hold an approval.

Take-off minima for low-visibility operations (MOS 15.04)

The take-off minima for a low-visibility operation at an aerodrome are the take-off minima stated in the approval.

See AC 91-11 – Approval to conduct low-visibility operations, for guidance on applying for approval to conduct low-visibility operations.

IFR take-off and landing minima (91.307)

You and the operator must not operate an aircraft below the IFR take-off or landing minima requirements for the aerodrome as prescribed in the MOS.

GNSS arrivals, GNSS/DME arrivals and Standard Terminal Arrival Routes (STAR) are instrument approach procedures. Minimum height and missed approach requirements for GNSS arrivals or GNSS/DME arrivals are therefore applicable.

Definition (MOS 15.02)

In this section:

A *qualifying multi engine aeroplane* means an IFR multi engine aeroplane that is:

- flown by at least 2 pilots, or
- if powered by piston or turbine engines, fitted with auto feather and flown by one pilot, or
- if powered by turbo jet engines, flown by one pilot, and
- in the event of an engine failure, capable of maintaining terrain clearance until reaching the minimum height for IFR flight.

A *qualifying multi-engine rotorcraft* means an IFR rotorcraft that:

- has a Category A performance supplement
- is operated to the Category A weights, limitations and procedures contained in the supplement
- is capable of maintaining terrain clearance until reaching the minimum height for IFR flight in the event of an engine failure.

Take-off minima requirements (MOS 15.03)

You must not commence a take-off if, at the time, the weather conditions:

- are less than the take-off minima for the aircraft, or
- following an engine failure, would not allow you to return to land under an instrument, or visual approach procedure, if it were necessary.

Note: If engine failure or loss of pressurisation occurs during a take-off, and the meteorological conditions necessitate flight to another aerodrome, the departure aerodrome would be the critical point for calculations of additional fuel.

Take-off minima for qualifying multi-engine aeroplanes (MOS 15.05)

In a qualifying multi-engine aeroplane, the take-off minima are:

- visibility of:
  - 800 m, or
  - 550 m but only if:
    - the runway has illuminated edge lighting at spacing intervals not more than 60 m, and centreline lighting or centreline markings, all of which are supported by a secondary power supply with a switchover capability of one second or less
    - where the aerodrome is non-controlled, or is controlled but without ATC in operation, the take-off is by day and the aerodrome is one where you must carry a radio.

Take-off minima for other aeroplanes (MOS 15.06)

For an aeroplane that is not a qualifying multi-engine aeroplane, the take-off minima are:

- a cloud ceiling of 300 ft
- a visibility of 2,000 m.

Take-off minima for qualifying multi-engine rotorcraft (MOS 15.07)

For a rotorcraft that is a qualifying multi-engine rotorcraft, the take-off minima are:

- a cloud ceiling not lower than the height at which the greater of V_{yse} or V_{min} IMC can be achieved
- visibility of:
  - 800 m, or
  - 550 m, but only if:
    - the relevant runway or final approach and take-off area (FATO) has both illuminated edge lighting at spacing intervals not exceeding 60 m, and centreline lighting, that are both supported by a secondary power supply with a switchover capability of one second or less, and
    - where the aerodrome is non-controlled, or is controlled but ATC is not in operation, where radio carriage is mandatory, the take-off must be conducted by day.

Take-off minima for other rotorcraft (MOS 15.08)

For a take-off in a qualifying multi-engine rotorcraft, the minima are:

- a cloud ceiling of 500 ft
- visibility of 800 m.

Landing minima requirements (MOS 15.09)

Low visibility operation

For a landing at an aerodrome that is a low visibility operation you must not land below the landing minima specified on the approval under 91.315.

Other than low visibility operation

You must not land below the landing minima detailed in MOS 15.10 below. You must determine the landing minima from the instrument approach chart in accordance with the:

- specified aircraft performance category
- aircraft lateral navigation (LNAV) and vertical navigation (VNAV) capabilities.

You must comply with the missed approach requirements set out in MOS 15.11.

Landing minima (MOS 15.10)

If you are flying an RNP approach (APCH)-LNAV/VNAV, an RNP APCH-LPV, or a precision approach procedure, the minimum altitude must not be lower than the higher of the:

- decision altitude (DA) or decision height (DH) on the instrument approach chart for the IAP
- relevant minima in the AFM
- relevant minima in the operations manual.

LPV refers to localiser performance with vertical navigation

If you are flying an RNP APCH-LNAV/VNAV, an RNP APCH-LPV or a precision approach procedure, the minimum visibility must not be lower than the higher of:

- the runway visual range (RVR) or visibility on the instrument approach chart for the IAP
- the relevant minima in the AFM
- the relevant minima in the operations manual
- 800 m, if:
  - the touchdown zone (TDZ) RVR report is not available, or
  - the approach lighting system normally available beyond 420 m from the runway threshold is inoperative
- 1,200 m, if:
  - the approach cannot be flown to at least the landing minima using a flight director, a head-up display (HUD), or an autopilot, or
  - the aircraft is not equipped with a failure warning system for the primary attitude and heading reference systems, or
  - high intensity runway edge lighting is not in operation, or
  - the approach lighting system normally available beyond 210 m from the runway threshold is inoperative
- 1,500 m, when the approach lighting system normally available for the runway is inoperative
- 1.5 times the RVR or visibility for the IAP if a lighting failure has occurred on a runway at a controlled aerodrome that results in doubled spacing of runway edge lights.

Note: At controlled aerodromes, in the event of failure of one electrical circuit on a runway equipped with interleaved circuitry lighting, pilots will be notified of a doubled spacing of runway edge lights that is from 60 m spacing to 120 m spacing.

If you are flying an RNP APCH-LNAV, an RNP APCH-LP or another non-precision approach (NPA), the minimum altitude or minimum visibility must not be lower than the higher of:

- the minimum descent altitude (MDA) or minimum descent height (MDH) or the visibility minima on the instrument approach chart for IAP
- the relevant minima in the AFM
- the relevant minima in the operations manual
- in the event the approach lighting system normally available for the runway is inoperative, the visibility specified on the instrument approach chart, plus a value equivalent to the length of the approach lighting system (as published).

If you are flying a circling manoeuvre, the minimum descent altitude or minimum visibility must not be lower than the higher of:

- the circling minima on the instrument approach chart for the IAP
- the relevant minima in the AFM
- the relevant minima in the operations manual.

For an aerodrome without an authorised instrument approach procedure, the minimum altitude must not be below whichever is the highest of:

- the LSALT
- the relevant minima specified in the AFM
- the relevant minima specified in the operator's exposition or operations manual.

For an aerodrome without an authorised instrument approach procedure, the minimum visibility must not be below whichever is the highest of:

- the flight visibility specified for the type of aircraft, the class of airspace and the height in Figure 3 - VMC criteria
- the relevant minima specified in the AFM
- the relevant minima specified in the operator's exposition or operations manual.

Note: VMC criteria is referred to in Figure 3. The effect of this is that flight visibility must not be below the highest flight visibility relevant to the aircraft, if it were required to maintain VMC, during the flight to the aerodrome.

Missed approach (MOS 15.11)

When flying an instrument approach, you must immediately execute the missed approach procedure if:

- during the final segment of the instrument approach, the aircraft is flown outside the tolerances for the navigation aid being used, or
- when using GNSS as a substitute or alternative to a ground-based navigation aid, there is a sustained deviation from the centreline of the instrument approach, other than during a transient manoeuvre, or
- when below the MSA, the navigational aid in use for the instrument approach becomes unreliable or inoperative.

Note 1: Examples of when a navigational aid for an approach becomes unreliable or inoperative include a Receiver Autonomous Integrity Monitoring (RAIM) warning for a GNSS approach, a red flag for a VOR approach, or a loss of the ident for an NDB approach.

Note 2: If a RAIM warning ceases, or there is no longer loss of data integrity, after the pilot has commenced the missed approach procedure, the pilot may execute the missed approach using GNSS-derived information.

In addition, when flying an instrument approach, you must immediately execute the missed approach procedure if:

- for an APV or a PA, the aircraft has arrived at the minimum altitude, or has passed the minimum altitude but has not touched down, or
- for an NPA, the aircraft has arrived at the missed approach point, or is being operated below minimum altitude, and any of the following apply:
  - the aircraft is not continuously in a position from which a descent to a landing on the intended runway or, for a rotorcraft, flight to a landing or hover on or over the intended FATO, may be made:
    - at a normal rate of descent
    - using normal manoeuvres
    - that allows touchdown to occur within the TDZ of the runway or the touchdown and lift off area (TLOF) for the intended landing, and
    - for other than low-visibility operations flight visibility is less than the landing minima, or none of the following visual references for the intended runway or FATO are distinctly visible and identifiable to the pilot:
      - elements of the approach lighting system
      - the threshold
      - the threshold markings
      - the threshold lights
      - the runway identification lights
      - the FATO itself
      - the visual approach slope indicator
      - the touchdown zone or touchdown zone markings
      - the touchdown zone lights
      - the FATO or runway lights

Note: There are certain non-precision approach procedures that have a minimum flight visibility of 5 km and where the geographical point of attaining the minimum altitude is more than 5 km from the visual references mentioned above. In these instances, noting that the minimum flight visibility is 5 km, if the requirements to conduct a visual approach procedure are met, effectively, the flight transitions from one conducting an IAP to one conducting a visual approach at the minima.

  - for low-visibility operations, the following visual references for the intended runway are not continuously visible and identifiable to the pilot:
    - for a CAT III approach using a fail operational (FO) landing system where use of a DH is prescribed – at least one centreline light
    - for a CAT III approach using a fail-passive (FP) landing system – at least 3 consecutive longitudinally-aligned lights
    - for a CAT III approach using an FO hybrid landing system – at least 3 consecutive longitudinally-aligned lights
    - for any other low-visibility operation:
      - at least 3 *consecutive longitudinally-aligned lights*
      - unless the approach is conducted using a HUD – a lateral element of lighting in the form of an approach lighting crossbar, a landing threshold light, or a barrette of TDZ lights

- for an aircraft conducting a circling manoeuvre, if:
  - the flight visibility reduces below the minimum visibility, or
  - an identifiable part of the aerodrome is not distinctly visible to the pilot (apart from loss of visibility due to normal aircraft manoeuvring during the approach).

Consecutive longitudinally-aligned lights means any of the following:

- centreline lights of the approach lighting system
- the TDZ lights
- runway centreline lighting
- runway edge lighting
- any combination of these lights.

Approach ban for IFR flights (91.310)

When making an approach to land at an aerodrome in an IFR aircraft, the approach ban procedure set out in the MOS below must be followed by the pilot and the operator.

Approach ban – other than low-visibility operations (MOS16.02)

For an IAP in other than low visibility, where ATC services and RVR reports are available and the TDZ RVR is reported to be continually less than the specified minima for the landing, you must not descend below 1,000 ft above the aerodrome elevation. However, if you receive the report after passing 1,000 ft you may continue the approach.

Approach ban – low-visibility operations (MOS 16.03)

For an IAP in low visibility, where ATC services and RVR reports are available and the controlling zone RVR is reported to be continually less than the RVR zone requirements you must not descend below 1,000 ft above the aerodrome elevation. However, if you receive the report after passing 1,000 ft you may continue the approach.

Note: Controlling zone RVR is the reported value of one or more RVR locations (touchdown, mid-point and stop-end) used to determine whether operating minima are met (MOS 1.07).

The RVR zone requirements are as follows:

- a TDZ RVR zone report is always required unless:
  - the instrument approach is a CAT III approach conducted with the use of an FO landing system, and an FO or FP rollout system, as well as the MID and END RVR zones are providing valid reports
- for other than a special authorisation (SA) CAT I instrument approach, a MID RVR report is required if the END RVR zone is not providing valid reports
- for other than a SA CAT I instrument approach an END RVR report is required if the MID RVR is not providing valid reports
- for other than a SA CAT I instrument approach and END RVR report is required for:
  - a CAT III instrument approach conducted without a rollout system
  - for any other low-visibility instrument approach, if the MID RVR is not providing valid reports

Note: MID or END RVR reports are not required for SA CAT I instrument approach operations.

- for a TDZ RVR report, the RVR value shown on the instrument approach chart
- for a MID RVR zone report:
  - 175 m for a CAT III instrument approach operation conducted without the use of a rollout system
  - 75 m for a CAT III instrument approach operation conducted with the use of an FO rollout system
  - 125 m for other instrument approach operations
- 75 m for the END RVR report.

14. Cruising levels and minimum heights

Definitions (for specified cruising levels) (MOS 2.08)

specified VFR cruising level for a track, means a cruising level prescribed by the MOS for a VFR flight on the track.

specified IFR cruising level for a track, means a cruising level prescribed by the MOS for an IFR flight on the track.

Specified VFR cruising levels (91.275)

When flying under the VFR you must fly at a specified VFR cruising level for the aircraft track (see Figure 14).

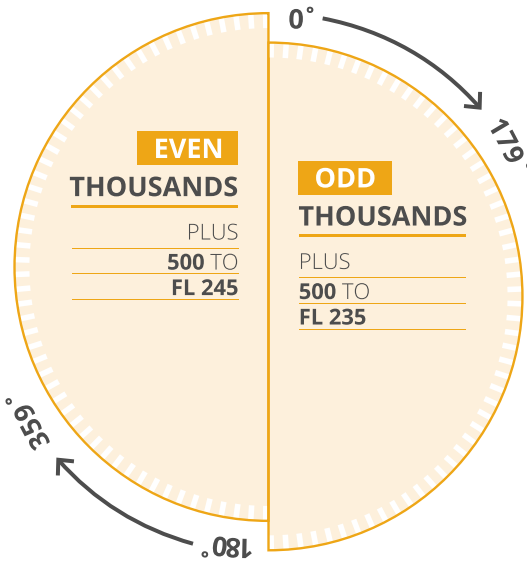
Exception: *You may fly at a non-specified VFR cruising level:*

- when in uncontrolled airspace, and
- the aircraft is below 3,000 ft AMSL, or
- the aircraft is at, or above, 3,000 ft AMSL, but below 1,500 ft AGL or
- it is not practicable to do so, or
- the aircraft is a glider in soaring flight, or
- when in controlled airspace, and ATC has given you a clearance or instruction.

Specified cruising level at or north of 80 degrees south (MOS 2.09)

The specified VFR cruising level for the aircraft track for VFR flights is shown in figure 14.
A cruising level flown north of latitude 60 degrees south must be selected with reference to the aircraft's magnetic track, and south of latitude 60 degrees south, the aircraft grid track.

Figure 14: Specified VFR cruising levels – at or north of 80 degrees south



VFR flights in Class A airspace must be approved (see 91.285).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Specified IFR cruising levels (91.290)

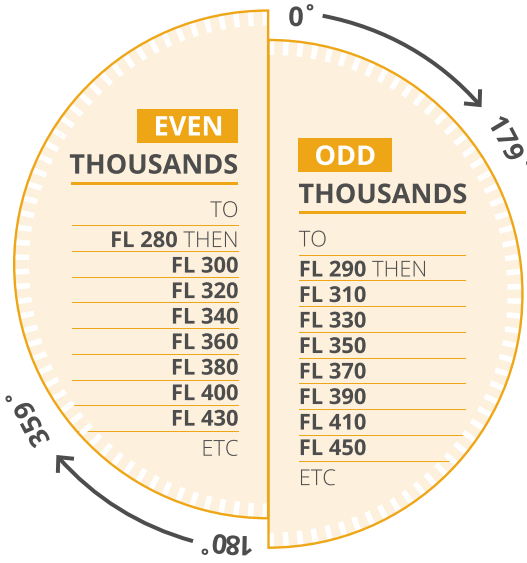
When flying under the IFR you must fly at a specified IFR cruising level for the aircraft track.

> **Exception:** *You may fly at a non-specified IFR cruising level when either:*
>
> › in uncontrolled airspace and it is not practicable to do so
>
> › ATC has given you a clearance or instruction.

Specified cruising level at or north of 80 degrees south (MOS 2.09)

The specified IFR cruising level for the aircraft's track is shown in Figure 15. A cruising level flown north of latitude 60 degrees south must be selected with reference to the aircraft's magnetic track, and south of latitude 60 degrees south, the aircraft grid track.

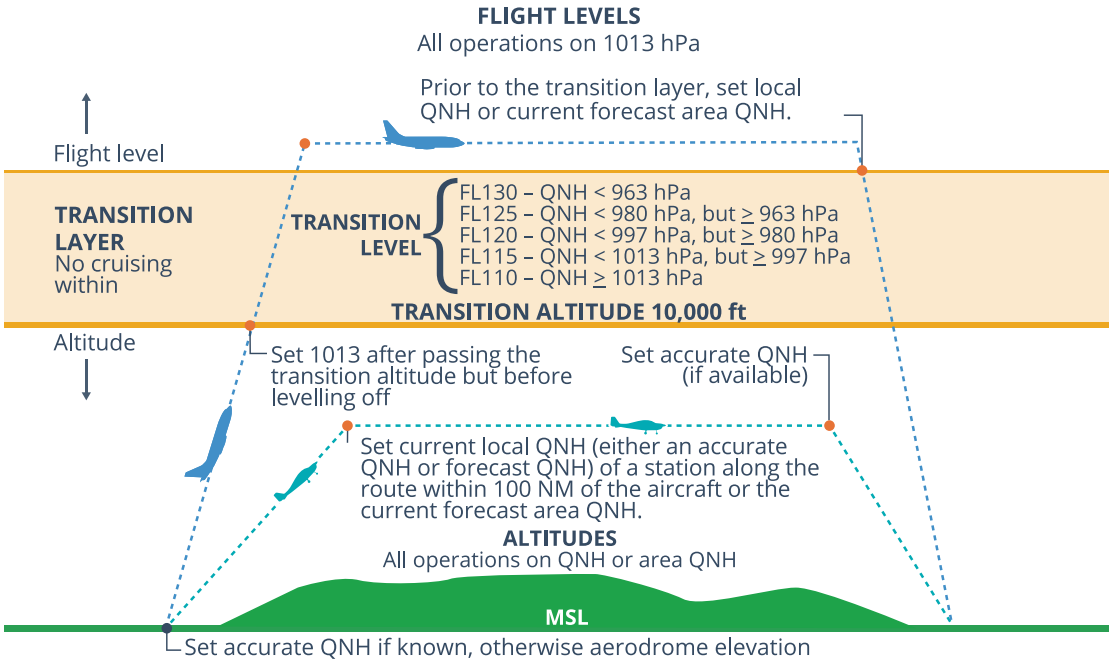
Figure 15: Specified IFR cruising level – at or north of 80 degrees south



Transition altitude, transition layer and transition level (MOS 11.02)

When you are flying within the Australian FIR, the transition altitude is 10,000 ft. The transition level is FL110 when the area QNH is 1013.2 hPa or higher; however, it will vary when an area QNH is below 1013.2 hPa (see Figure 16).

Figure 16: Positions to change between QNH and 1013.2 hPa



Note: The intention is to retain a minimum buffer of 1,000 ft between the lowest available flight level (FL) and the transition altitude therefore cruise within the transition layer is not permitted.

If you are flying below the transition altitude, set your altimeter using either:

- the current local QNH (either an accurate QNH or forecast QNH) of a station along the route within 100 NM of the aircraft
- the current forecast area QNH.

If you are flying at, or above, the transition altitude, you must use an altimeter setting of 1013.2 hPa.

On climb, you must change the QNH to 1013.2 hPa after passing 10,000 ft but before leveling off. On descent, you must change from 1013.2 hPa to the QNH before entering the transition layer.

Minimum heights – VFR flights at night (91.277 and MOS 12.03)

You must not fly under the VFR at night along a route or route segment below one of the following:

- any published LSALT for the route or route segment
- any minimum sector altitude published in the AAI
- any calculated LSALT for the route or the route segment prescribed in the MOS (**Note:** MOS 12.03 is RESERVED)
- 1,000 ft above the highest obstacle on the ground or water within 10 NM ahead of, and to either side of, the aircraft at that point on the route or route segment (see Figure 17).

Exception: *You are permitted to fly below the minimum height when:*

- taking off or landing
- within 3 NM of the aerodrome when taking off or landing
- flying in accordance with an air traffic control clearance.

Minimum heights – IFR flights (91.305)

You must not fly under the IFR below:

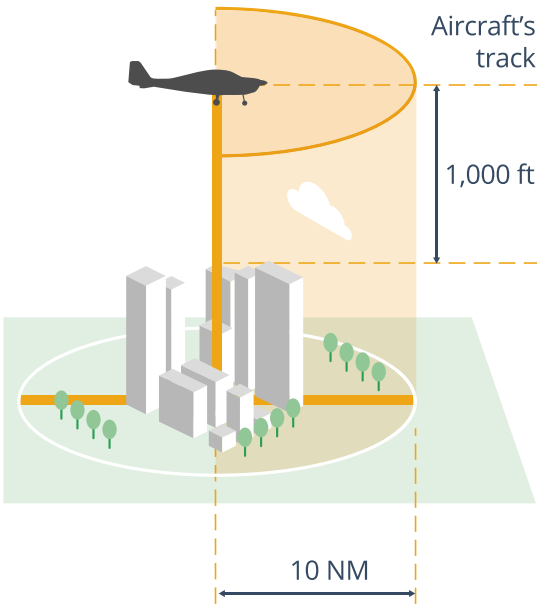
- any published LSALT for the route or route segment
- any minimum sector altitude published in the AAI
- any calculated lowest safe altitude for the route or route segment.

Exceptions: *This requirement does not apply when you are taking off or landing in day VMC or you are flying in accordance with one of the following:*

- a visual approach or departure procedure published in the AAI
- an instrument departure or approach procedure
- an air traffic control clearance.

This requirement also does not apply when you are are taking off and climbing to join along a route or route segment provided you ensure the aircraft clears all obstacles by a safe margin between the take-off and the time the aircraft reaches any LSALT (CASA EX67/24).

Figure 17: Minimum heights – VFR flights at night



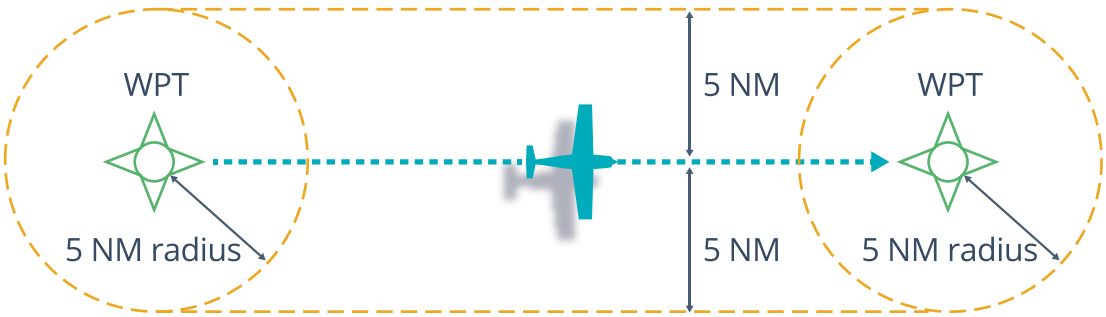
The LSALT published on an Australian en route chart (ERC) low requires an aircraft to be certified to RNP 2 standard.

To determine the lowest safe altitude for the route or route segment where it is not published you should refer to the AAI.

For operations other than RNP 2 you are responsible for determining what allowance you should apply for navigation error considering the method of navigation and the limitations of the navigation aids being used. You must apply this navigation error to the determined navigation area (for the proposed track) and use the highest grid LSALT for the area.

For RNP 2 operations the LSALT must be determined by considering the area within 5 NM surrounding and including the departure point, the destination and each side of the nominal track (see Figure 18).

Figure 18: For RNP2 routes not published – determination of minimum heights



| WPT means waypoint

IFR flights at non-specified cruising levels – notifying air traffic services (91.295)

You must notify ATS before you fly at a non-specified IFR cruising level for the aircraft track.

IFR flights at non-specified cruising levels – avoiding collisions with VFR aircraft (91.300)

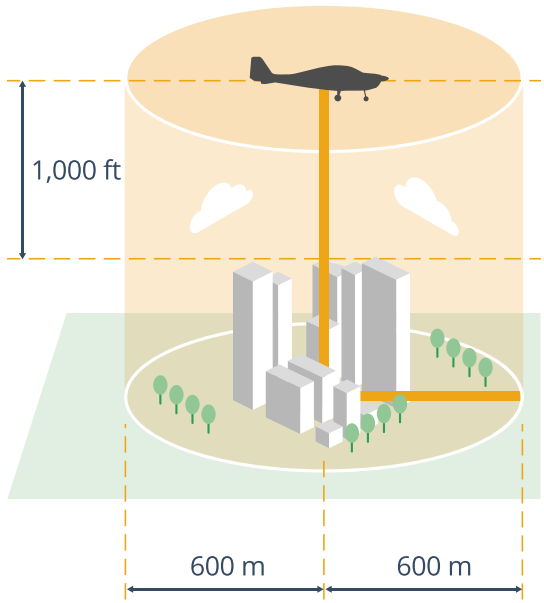
If you are flying an aircraft under the IFR that is not cruising at a specified IFR cruising level for the track, you must give way to an aircraft flying under the VFR cruising at a specified VFR cruising level where there is a collision risk.

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

Aeroplane

You must not fly an aeroplane over a populous area or public gathering below 1,000 ft above the highest feature or obstacle within a horizontal radius of 600 m of the point on the ground or water immediately below the aeroplane (see Figure 19).

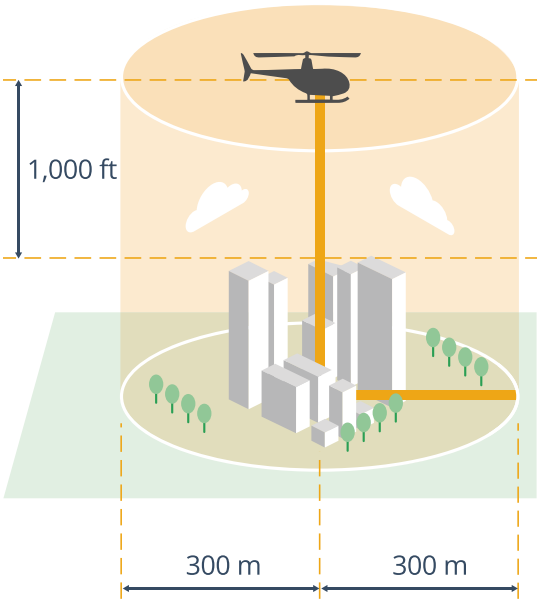
Figure 19: Minimum height populous areas and public gatherings for aeroplane



Rotorcraft

You must not fly a rotorcraft over a populous area or public gathering below 1,000 ft above the highest feature or obstacle within a horizontal radius of 300 m of the point on the ground or water immediately below the rotorcraft (see Figure 20).

Figure 20: Minimum height populous areas and public gatherings for rotorcraft



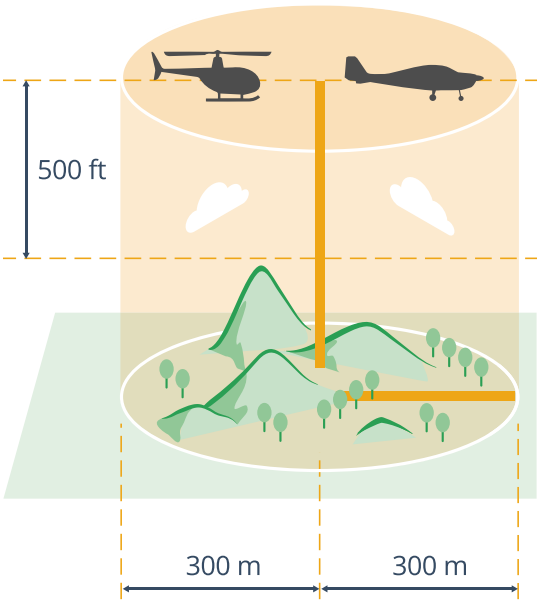
Exception: *This rule does not apply in the following circumstances:*

- taking off or landing (as prescribed below) (MOS 12.01):
  - for take-off – when the point of lift off and climb to the planned cruising level is in accordance with the normal procedures for the aircraft type
  - for landing – when the landing is conducted in a continuous descent from the cruising level or circuit height to the landing threshold using rates of descent and flight manoeuvres which are normal for the aircraft type
- engaging in a missed approach
- practising emergency procedures at an aerodrome without passengers onboard
- circuit training at an aerodrome
- carrying out air display activities for which you hold an approval
- for a rotorcraft – hovering, air transiting, air taxiing or ground taxiing at an aerodrome
- for a rotorcraft, seaplane or amphibian – flying within an access lane used by aircraft taking off from, or landing at, a particular place, and details of which are published in the AAI
- for a single-engine seaplane or a single-engine amphibian operating over water and within safe gliding distance of open water suitable for a forced landing, and not flown below 1,000 ft above the highest feature or obstacle within a horizontal radius of 300 m of the point on the water immediately below the aeroplane
- engaging in a procedure to determine the suitability of an aerodrome for a landing
- an aircraft engaged in the validation of a terminal instrument flight procedure that is conducted in accordance with a terminal instrument flight procedure under regulation 173.095 of CASR and the Part 173 MOS (CASA EX67/24).

Minimum height rules – other areas
(91.267 and MOS 12.02)

When flying over an area that is not a populous area or public gathering (91.265), you must not fly an aircraft below 500 ft above the highest feature or obstacle within a horizontal radius of 300 m of the point on the ground or water immediately below the aircraft (see Figure 21).

Figure 21: Minimum height for other areas



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

- taking off or landing:
  - for take-off – when the point of lift off and climb to the planned cruising level is in accordance with the normal procedures for the aircraft type
  - for landing – when you are conducting a circling manoeuvre as part of an IAP using rates of descent and flight manoeuvres which are normal for the aircraft type
  - for landing – when the landing is conducted in a continuous descent from the cruising level or circuit height to the landing threshold using rates of descent and flight manoeuvres which are normal for the aircraft type
- engaging in a missed approach
- not carrying passengers and practising emergency procedures at an aerodrome
- not carrying passengers and practising a forced landing procedure with the consent of the person or authority having control over the land or water above which the procedure is carried out
- low-flying training by a Part 141 operator, or a low-flying activity by a Part 142 operator, and the aircraft:
  - is not carrying passengers, and
  - is being flown over an area that, with the consent of the person or authority with control of the area, has been determined by the operator to be suitable as a flight training area and the pilot has surveyed it for obstacles before the flight
- performing training circuits at an aerodrome
- to determine the suitability of an aerodrome for a landing
- carrying out air display activities for which you hold an approval
- all of the following apply:
  - you hold a low-flying authorisation under Part 61, or hold an approval, provided the point on the ground or water vertically below the aircraft is not within a 150 m of a person, vessel, vehicle, structure or livestock, and you conduct a risk assessment of the area to be flown over
- for a rotorcraft – when the rotorcraft is hovering, air transiting, air taxiing or ground taxiing at an aerodrome
- for a rotorcraft, seaplane or amphibian – when flying within an access lane used by aircraft taking off from, or landing at, a place, and the details are published in the AAI
- an aircraft engaged in the validation of a terminal instrument flight procedure that is conducted in accordance with a terminal instrument flight procedure under regulation 173.095 of CASR and the Part 173 MOS (CASA EX67/24).

15. Navigation

VFR flights (91.273)

You must fly under the VFR in accordance with the requirements detailed below.

VFR flight navigation requirements (MOS 13.02)

When navigating by visual reference to the ground or water, you must positively fix the aircraft's position by visual reference to features marked on topographical charts at intervals not exceeding 30 minutes.

When navigating by visual reference over the sea, visual reference features may include rocks, reefs and fixed human-made objects marked on topographical charts and readily identifiable from the air.

When you are not navigating by visual reference to the ground or water, you must comply with the requirements of flight under the IFR under regulation 91.287 and the associated MOS as if a flight under the IFR.

You must also be competent (under Part 61 - Flight crew licensing) to use of any IFR navigation techniques and any IFR navigation equipment such as a global navigation satellite system (GNSS).

You may fly in airspace, on a route, or fly a terminal instrument procedure – where a minimum navigation performance value is specified – provided the aircraft is approved for flight under that navigation specification by:

- the AFM, or
- a document approved under CASR Part 21 based on an airworthiness assessment, or
- for a foreign-registered aircraft, a document approved in writing by the NAA of the state of registration or state of the operator of the aircraft.

In addition, any GNSS equipment is required to be approved, including where a GNSS is used as a substitute or alternative for any ground-based navigation aid within the meaning of MOS 14.05.

IFR flights (91.287)

You must fly under the IFR in accordance with the requirements detailed below.

Purpose and definition (MOS 14.01)

For an aircraft to fly under the IFR under a particular navigation specification it must be approved by:

- the AFM, or
- a document issued under CASR Part 21 as part of, or based on, an airworthiness assessment, or
- for a foreign-registered aircraft – a document issued in writing by the NAA of the state of registration or state of the operator of the aircraft.

IFR flight navigation requirements (MOS 14.02)

When flying under the IFR you must navigate using one of the following:

- an area navigation system that meets the performance requirements of the intended airspace or route, or
- a ground-based navigation aid, but only if:
  - after making allowance for possible tracking errors of ±9° from the last positive fix, the aircraft will come within the rated coverage of a ground-based navigation aid which can be used to fix the position of the aircraft
  - the maximum time interval between positive fixes does not exceed 2 hours
- by visual reference to the ground or water but only in the following circumstances:
  - you are unable to operate using a ground-based navigation aid (as above)
  - in daytime only
  - if weather conditions permit flight in VMC
  - the VFR position-fixing requirements are met (MOS 13.02).

You must only operate in airspace, on a route, or conduct a terminal instrument flight procedure, if the aircraft is approved to do so and meets the required navigation performance specification.

You must use an approved GNSS when you are operating in airspace or on a route that requires the use of GNSS or conducting a terminal instrument flight procedure that requires the use of GNSS.

Over the years, a range of terms used to describe the navigation capability of an aircraft has evolved. In many cases there is an equivalence in the navigation capability despite a different term being used. For example, a GPS - BARO - VNAV capability equates to an RNP - APCH capability.

Navigation capability can also be inferred if the navigation systems comply with specific FAA/JAA advisory circulars and other Standards documents. For example, meeting the JAA AMJ 20X2 standard equates to an RNAV 5 capability. Refer to CASA's Part 91, AMC/GM.

If the navigation system becomes inaccurate, unreliable or inoperative, you must:

- monitor the aircraft's track by reference to the other navigation aids with which the aircraft is equipped
- carry out appropriate procedures designed to maintain aviation safety in the event of loss of navigation equipment
- notify ATS.

You must ensure that data entered into an area navigation system has:

- for a multi-crew operation – been cross-checked for accuracy by at least 2 flight crew members
- for a single-pilot operation – been checked for accuracy.

You must ensure that position and tracking information are checked:

- at, or before, each waypoint specified as a reporting point published in the AAI or designated by ATS
- as far as practicable, at or before, each en route waypoint in the AAI
- at regular intervals (as far as practicable) during navigation via waypoints not in the AAI.

You must ensure that, for a terminal instrument flight procedure in which GNSS will be used as the sole means of navigation:

- the intended procedure is loaded from the navigation database by name
- waypoints are not added to, or deleted from, the procedure as so loaded
- the navigation system will fly the procedure as published in the AAI.

Note: During the conduct of an instrument approach procedure that is based on a ground-based navigation aid, but where GNSS will be used for navigation, pilots should be aware that not all aircraft are capable of conducting reversal or holding procedures, or of navigating DME arcs. You should confirm the aircraft navigation system can conduct such operations.

Instrument approach operational requirements (MOS 14.09)

When conducting an IAP in IMC you must ensure that the aircraft is operated within a range of, or not more than the maximum speeds in the Table19A below that is associated with the aircraft performance category.

Exception: *You may fly the aircraft in a higher performance category.*

To fly the aircraft in a lower performance category the operator must hold an approval and the operator must give the details to the flight crew of the approval and the conditions (if any) imposed by CASA. (91.320):

Note: For example, an aircraft whose specified aircraft performance category is B, may conform to the requirements of aircraft performance Category C. But an aircraft whose specified aircraft performance category is C must not attempt to conform to the requirements of aircraft performance Category B without CASA approval and operator compliance with 91.320.

Table 19A: IAP segment speeds (MOS 14.09)

	IAP segment indicated airspeed (knots)			
aircraft performance category – VAT	range of speeds for initial and intermediate approach (knots)	range of speeds for final approach	max. speed for visual manoeuvring (circling)	max. speed for missed approach
H	70 – 120	60 – 90	None specified	90
A – up to 90 VAT	90 – 150	70 – 100	100	110
B – from 91 to 120 VAT	120 – 180	85 – 130	135	150
C – from 121 to 140 VAT	160 – 240	115 – 160	180	240
D – from 141 to 165 VAT	185 – 250	130 – 185	205	265
E – from 166 to 210 VAT	185 – 250	155 – 230	240	275

Note: VAT is the indicated airspeed (IAS) in knots at the threshold which is equal to the stalling speed VSO multiplied by 1.3, or the stalling speed V_{S1G} multiplied by 1.23.

Instrument approaches – QNH sources (MOS 14.03)

When flying an instrument approach, before you pass the initial approach fix (IAF), you must set:

- the actual aerodrome QNH from one of the following approved sources:
  - AAIS
  - ATC
  - ATIS
  - AWIS
  - CA/GRS
  - WATIR
- the forecast aerodrome QNH
- the forecast area QNH.

You must not use an actual aerodrome QNH for an instrument approach for more than 15 minutes after receiving it.

If you use the forecast area QNH, you must increase the minima for the instrument approach by 50 ft.

GNSS arrivals, and DME or GNSS arrivals (MOS 14.04)

During a GNSS arrival, or a DME or GNSS arrival you must:

- use the destination VOR or NDB as the primary track guidance
- discontinue the arrival procedure if there is a significant disparity between the track guidance of the VOR or NDB and the GNSS track indication.

A significant disparity is:

- for an NDB – a divergence of more than 6.9 degrees
- for a VOR – a divergence of more than 5.2 degrees.

Note: GNSS cannot be used to substitute the VOR or NDB: see MOS 14.05.

Use of GNSS as substitute or alternative to ground-based navigation aids (MOS 14.05)

A ground-based navigation aid is one of the following:

- VOR
- DME
- NDB
- outer marker
- middle marker.

This MOS section does not apply to the use of a VOR or NDB for a GNSS arrival or DME or GNSS arrival.

GNSS may be used as a substitute or alternative to ground-based navigation aids provided the aircraft is approved as meeting the following required navigation performance (RNP) specifications for the following phases of flight:

- en route – RNP 2
- SID or STAR – RNP 1
- initial, intermediate or missed approach of an IAP – RNP 1
- final approach segment of an IAP – RNP APCH.

Before using GNSS as a substitute for or alternative to a ground-based navigation aid during an en route phase of flight, you must ensure that:

- a waypoint which is a ground-based navigation aid is entered from the navigation database by name
- latitude and longitude coordinates for the ground-based navigation aid are not manually entered.

GNSS must not be used as a substitute or alternative to a ground-based navigation aid that has been decommissioned.

Note: MOS 14.04 sets out the requirements for the conduct of GNSS arrival, and DME or GNSS arrival. The relevant VOR or NDB must be used for azimuth guidance.

GNSS performance may be measured in a number of ways. While accuracy is the most obvious quality of a navigation system, other measures, such as system availability, data integrity and continuity of service, are also important.

Availability of GNSS integrity for instrument approaches (MOS 14.06)

Where you plan to conduct an instrument approach using GNSS at the destination or alternate aerodrome you must obtain a prediction for GNSS integrity availability before departure.

If a continuous loss of GNSS integrity is predicted for more than 5 minutes for any part of an instrument approach, you must revise the flight plan to avoid the use of GNSS during the instrument approach at that time, at that location.

Note: Some examples of flight plan revisions include, delaying the departure time, planning a different route or providing for an alternate aerodrome.

If you are navigating with a satellite-based augmentation system (SBAS)-capable GNSS receiver you must regularly check for the prediction of GNSS integrity in areas where the SBAS is not available.

For an aircraft with an approved GNSS that can achieve a lateral navigation accuracy of less than 0.3 NM using requisite GNSS satellites, you may disregard obtaining prediction for GNSS integrity availability as required above.

Note: Requisite GNSS satellites means at least the number of serviceable GNSS satellites a GNSS manufacturer specifies in writing as being required for its approved GNSS to provide a particular RNP specification.

Many non-aviation and non-TSO global positioning system (GPS) receivers do not monitor integrity and will continue to display a navigation solution based on erroneous data.

Integrity is the ability of a system to provide timely warnings to the user when the equipment is unreliable for navigation purposes. RAIM is the most common form of integrity monitoring. Aircraft with inertial navigation systems can provide an integrity check (AAIM-aircraft autonomous integrity monitoring) when RAIM is unavailable but GNSS position information continues to be valid.

A GNSS receiver with a RAIM capability with 5 satellites in view can detect faulty satellite data (integrity) and will stop providing a navigation solution.

A GNSS receiver with fault detection and exclusion (FDE) capability and with 6 or more satellites in view can detect and exclude faulty satellite data and continue to supply a valid navigation solution (TSO 145, 146 and 196 receivers only).

Navigation database requirements (MOS 14.07)

The navigation database must be:

- current – up to date in accordance with the Aeronautical Information Regulation and Control cycle (AIRAC)
- valid – from an approved data service provider
- in a form that cannot be changed by the operator or a flight crew member.

Updating of the navigation database must be carried out in accordance with the manufacturer's instructions.

The aircraft operator must ensure that any person updating the navigation database is appropriately qualified and competent to properly perform that task.

The operator of an aircraft must regularly check the navigation database for integrity, and if any discrepancy in the data is discovered:

- report the discrepancy as soon as practicable to the approved provider
- deal with the discrepancy before further operational use by:
  - resolving it through the reissue of the database, or
  - prohibiting use of the route, or
  - ensuring that each flight crew member has instructions on how to preserve the safety of the operation despite the discrepancy.

Note: The Transport Safety Investigation Regulations require any discrepancy in a navigation database to be reported if it is likely to cause a hazard due to a loss of separation between aircraft or a reduction in an aircraft's terrain or obstacle clearance.

If a navigation database is not current at the start of a flight, or ceases to be current during a flight it may continue to be used for navigation (unless to do so would jeopardise the safety of the flight) provided:

- the data is verified before use, by reference to current authorised aeronautical information
- the database is not used for updating a navigation system.

An aircraft operated without a minimum equipment list (MEL) must not operate under PBN for more than 72 hours after the navigation database has ceased to be current.

PRM instrument approach operations (MOS 14.08)

You must not carry out a precision runway monitor (PRM) approach unless all pilots required by the AFM, have received training to conduct the approach from an appropriate source that ensures familiarisation with the following:

- the guidance on PRM approaches in the AAI (AIP)
- the PRM user instructions for the aerodrome
- the relevant instrument approach charts for the aerodrome
- relevant training material available on the websites of Airservices Australia and CASA.

Training for PRM operations for pilots other than those conducting air transport operations should be conducted by a Part 141 or Part 142 training provider.

Use and supply of distance information (MOS 11.05)

When you are flying within the Australian FIR, and you are providing distance information requested by ATS, you must ensure that ATS is aware of the source and the point of reference of the distance measurement, and any GNSS information must be derived from an approved GNSS with a valid database.

Note: The following are examples of source and the point of reference: 115 GNSS ML VOR, 80 GNSS CTM NDB, 267 GNSS BEEZA 86 DME BN.

Oceanic airspace (MOS 11.03)

If you have declared in a flight plan that you can navigate to RNP 2, RNP 4 or RNP 10 you must, immediately before entering oceanic airspace, ensure that a check has been completed and that there are at least 2 independent LRNSs capable of navigating the aircraft to the required navigation specification.

If, because of the check there is less than 2 LRNSs capable of navigating the aircraft you must ensure that ATS is notified of the situation as soon as practicable.

Note: See the definition of INS, IRS, LRNS and Oceanic airspace.

Note: The requirements of this subsection do not override the minimum navigation system equipment requirements required by the Part 91, Part 121, Part 133 or Part 135 Manual of Standards.

Before the departure of a flight planned to operate in oceanic airspace using GNSS, you must obtain a prediction for the availability of GNSS FDE along the intended route.

You must plan so that the maximum continuous predicted loss of FDE is not more than:

› for an RNP-4 operation – 25 minutes

› for an RNP-10 operation – 34 minutes.

For an aircraft with an approved GNSS that can achieve lateral navigation accuracy of less than 0.3 NM using requisite GNSS satellites, you may disregard obtaining a prediction as required above.

Note: Requisite GNSS satellites means at least the number of serviceable GNSS satellites a GNSS manufacturer specifies in writing as being required for its approved GNSS to provide a particular RNP specification.

FDE – or fault detection and exclusion – is the capability of the GNSS receiver to ensure continued GNSS integrity by excluding satellites that would degrade the integrity of the GNSS-calculated position.

Loss of GNSS integrity (MOS 11.04)

For a flight in any class of airspace within the Australian FIR where you are required to maintain regular contact with ATS or when you are being provided a separation service by ATS, you must advise ATS if any of the following occurs:

› during an en route phase of flight, there is a loss of GNSS integrity for more than 5 minutes

› during a terminal phase of flight, there is a loss of GNSS integrity

› GNSS integrity is not available when ATS requests the provision of GNSS-derived information

› GNSS integrity is not available when ATS grants a clearance or imposes a requirement based on GNSS-derived information

› the GNSS receiver is in dead-reckoning mode, or experiences loss of its navigation function, for more than one minute.

If you have notified ATS of a loss of GNSS integrity you must notify ATS when GNSS integrity is restored.

Note: Regulation 91.630 requires certain flights to make regular reports or broadcasts to an ATS. Regulation 91.635 requires certain flights to continuously monitor the primary communications medium used by air traffic control in controlled airspace.

RVSM airspace (91.655)

An aircraft may only be flown in RVSM airspace if:

› the operator holds an approval, or

› the pilot has been given an air traffic control clearance or instruction for the aircraft to be flown in RVSM airspace.

When flying in RVSM airspace and you are unable to operate to the required vertical separation minimum, you must inform ATC as soon as practicable.

For aircraft where an operator does not hold RVSM approval, ATC is unlikely to clear you to operate in RVSM airspace if there is conflicting traffic.

To operate in RVSM airspace an aircraft must have:

› 2 independent primary altimetry systems

› a Mode C secondary surveillance radar (SSR) transponder

› an altitude alert system

› an autopilot with height lock.

If this equipment is not serviceable an aircraft may be operated in RVSM airspace provided ATC is informed that the aircraft is being operated 'negative RVSM'.

Performance-based navigation (91.660 and MOS 22.01)

You and the operator must hold an approval to conduct operations in accordance with the approved prescribed navigation specifications as follows:

› RNP AR APCH

› RNP AR DP.

RNP AR APCH means RNP authorisation required approach. RNP AR DP means RNP authorisation required departure.

16. Non-controlled aerodromes

Take-off or landing at non-controlled aerodromes – all aircraft (91.370)

Rules for taking off

You must not commence a take-off until a preceding departing aircraft using the same runway:

- has crossed the upwind end of the runway
- has commenced a turn
- the runway must be longer than 1,800 m and the other aircraft must have become airborne and be at least 1,800 m beyond your proposed lift off point
- the other aircraft and your aircraft must each have MTOW below 2,000 kg and the other aircraft must be airborne at least 600 m beyond your proposed lift off point.

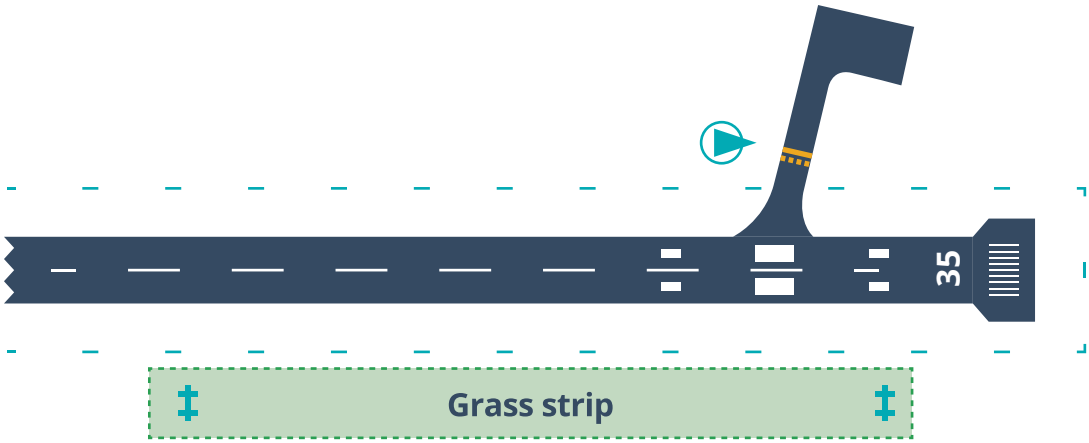
You must not commence a take-off until a landing aircraft that is using the same runway has vacated the runway or if using a crossing runway, has crossed or stopped short of the runway intersection.

Rules for landing

You must not continue an approach to land beyond the threshold of the runway until:

- an aircraft that is taking off from the same runway has become airborne and commenced a turn
- an aircraft that is taking off from the same runway is beyond the point of the runway at which your aircraft could be expected to complete its landing roll, and there is enough distance to manoeuvre in the event of a missed approach
- an aircraft landing on the same runway has vacated the runway, or is taxing away from the runway
- if a landing aircraft ahead is using a crossing runway, the aircraft ahead has crossed or stopped short of the runway intersection.

Figure 22: Runway with parallel strip



Application of rules where gliders or glider tugs operate.

At an aerodrome where gliders or glider tugs are operating to a common circuit pattern from either a runway or parallel strip, you cannot take off or land when another aircraft on the parallel strip or runway is taking off or landing. However, you may take-off or land if there is another aircraft taxiing or stationary on either the runway or parallel strip, provided it does not affect your ability to take off or land safely (see Figure 22).

> **Exception:** *The above requirements do not apply where gliders and glider tugs are permitted to operate in contra-rotating circuits on both a runway and a parallel strip outside the runway strip, and simultaneous operations on the runway and parallel strip are permitted.*

Meaning of in the vicinity of a non-controlled aerodrome (91.360)

An aircraft is *in the vicinity of* a non-controlled aerodrome if it is:

- in uncontrolled airspace
- within 10 NM of the aerodrome
- at a height above the aerodrome that could result in conflict with operations at the aerodrome.

For an aerodrome that has a reference point published in the AAI, the distance must be measured from that point.

> The definition of in the vicinity of a non-controlled aerodrome applies in 91.375, 91.380, 91.385 and 91.390.

Operating on manoeuvring area, or in the vicinity, of a non-controlled aerodrome – general requirements (91.375)

When operating on the manoeuvring area, or in the vicinity of a non-controlled aerodrome you must:

- keep a lookout for other aircraft to avoid a collision
- ensure that your aircraft does not endanger other aircraft
- either join or avoid the circuit pattern of the aerodrome
- for an aeroplane only, take off or land within the aerodrome landing area.

Operating on manoeuvring area, or in the vicinity, of a non-controlled aerodrome – landing and taking off into the wind (91.380)

To the extent practicable, you must land and take-off into wind unless:

- the aircraft's flight manual allows you to land or take-off downwind or crosswind
- you are satisfied that traffic conditions at the aerodrome will allow you to land or take off safely.

It is well documented that taking off and landing into wind is the safest option. However, runway options do not always allow for an into-wind take-off without some crosswind component. Pilots should be familiar with the crosswind limitation in the AFM.

Although the regulation does not preclude a downwind take-off or landing, they should not be attempted in other than very light winds. You should be aware that the take-off and landing distance will increase, and you should apply a considerable safety margin to the normal take-off and landing calculations. You should also consider that the climb and descent angle will be lower/flatter than when operating into wind, and obstacle clearance may become a critical issue after take-off or on your approach to land. You must not exceed any limitation in the AFM.

Operating on manoeuvring area, or in the vicinity, of non-controlled aerodrome – requirements that apply after joining the circuit pattern (91.385)

For other than a rotorcraft, when flying in the circuit of a non-controlled aerodrome you must make all turns to the left unless the AAI contains alternative instructions.

Exception: *The above circuit pattern requirements do not apply:*

- to a seaplane or amphibian, where it necessary:
  - to avoid an obstacle
  - without compromising the aircraft's safety, to avoid undue noise over a populated area
  - for a single-engine seaplane or amphibian, to enable the aircraft to land on water if its engine fails
- to a glider (other than a glider without an engine operating) if the pilot believes it is necessary to land safely.

Operating on manoeuvring area, or in the vicinity, of non-controlled aerodrome – requirements related to maintaining the same track after take-off (91.390)

For other than a rotorcraft, you must, after take-off, maintain the take-off track until the aircraft is above 500 ft AGL unless a track change is necessary to avoid terrain.

Exception: *The above circuit pattern requirements do not apply to a seaplane or amphibian, where it is necessary:*

- to avoid an obstacle
- without compromising the aircraft's safety, to avoid undue noise over a populated area
- for a single-engine seaplane or amphibian, to enable the aircraft to land on water if its engine fails.

Straight-in approaches at non-controlled aerodromes (91.395)

Before commencing a straight-in approach, you must determine the wind direction and the runways in use at the aerodrome.

Unless you are carrying out an instrument approach in IMC or an approach in a specific Part 103 aircraft, you must complete your manoeuvring and be established on final approach by at least 3 NM from the runway threshold you intend to use for the landing.

The aircraft making the straight-in approach must give way to any other aircraft flying in the circuit pattern for the aerodrome.

Exception: *for Part 103 the following aircraft need not comply with the requirement to be established on final approach by 3 NM:*

- sailplanes (except for powered sailplanes including touring motor gliders, and power-assisted sailplanes – when the engine is operating)
- hang gliders and paragliders (whether or not power-driven).

The exception is necessary since compliance with the 3 NM straight-in rule would expose slower Part 103 aircraft to a collision risk from faster overtaking aircraft. Part 103 aircraft are therefore permitted to establish on a short final approach within 3 NM of the runway threshold.

See AC 91-10 – Operations in the vicinity of non-controlled aerodromes.

Aircraft in aerodrome traffic at controlled aerodromes (91.405)

When operating at a controlled aerodrome you must:

- have an ATS clearance to taxi, land or take-off
  - » maintain a continuous listening watch on the ATS frequency for the aerodrome, or where you cannot maintain a continuous listening watch, maintain a watch for any visual signals given by ATS (CASA EX67/24).

Unless you are complying with an ATS clearance or instruction, or flying in accordance with an instrument departure or approach procedure, you must (other than a Part 131 aircraft):

- maintain runway track from the take-off until you reach 500 ft AGL unless a change to the track is necessary to avoid terrain
- make all turns in the direction of the circuit pattern when joining the circuit for a landing or when taking off for the purpose of conducting a circuit.

You would only need to watch for visual signals if your radio failed, or if ATS had approved your aircraft operation without a radio. Standard visual signals would be used (see regulation 91.670 Standard visual signals).

In an aerodrome environment – where there is no ATS or you are not following a authorised instrument departure - it is not an offence of strict liability if you do not:

- maintain runway track from the take-off until you reach 500 ft AGL unless a change to the track is necessary to avoid terrain
- make all turns in the direction of the circuit pattern when joining the circuit for a landing or when taking off for the purpose of conducting a circuit.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17. Icing

Flight in icing conditions – adherence of frost, ice or snow (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 also 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 – requirements for flight (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 flight path to try and avoid the icing conditions as soon as practicable.

18. Special flight operations

Air displays in Australian territory (91.180)

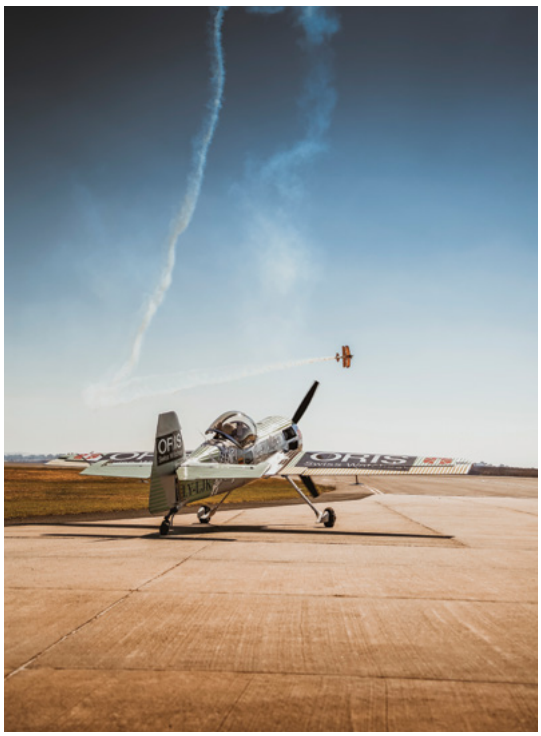
A person who conducts an air display must hold an approval. You and the operator of an air display flight must ensure the person conducting the air display holds an approval.

An air display may only be conducted with the approval of CASA. The air display event organiser (the person conducting/managing the air display) is the person required to obtain and hold the approval.

The manual contains advice for air display organisers including instruments that may be applicable from time to time.

Instrument EX81/21 provides for exemptions of certain rules when conducting an air display, including practice flights by the pilot before approval is issued for the air display. See Appendix C.

For guidance on air displays see AC 91-21



Conducting aerobatic manoeuvres (91.185)

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

You must not fly aerobatic manoeuvres in IMC.

For aerodrome activities in the vicinity of non-controlled aerodromes – exemptions and directions, see Appendix C (CASA EX67/24).

Pilots must hold an aerobatic flight activity endorsement, see 61.380 and Flight activity endorsement table (61.1145).

An aerobatic flight manoeuvre is one that has:

- bank angles greater than 60°, or
- pitch angles greater than 45° or are otherwise abnormal to the aircraft type, or
- abrupt changes of speed, direction, angle of bank or angle of pitch.

You must not engage in aerobatic flight below 3,000 ft AGL unless your aerobatic activity endorsement permits lower heights.

Before engaging in an aerobatic manoeuvre, you should ensure:

- any loose objects are either removed from the aircraft or stowed securely
- all hatches and doors are securely fastened
- seatbelts or harnesses are securely and firmly fastened
- seatbelts or harnesses of any vacant seat are made secure
- you have checked for other aircraft in your vicinity.

Dropping things from aircraft (91.190)

You must not allow anything to be dropped from an aircraft.

Picking up or setting down people or things during flight (91.195)

You must not pick up or set down a person or anything during a flight unless you hold an approval, or it is permitted by another regulation.

Flying in formation (91.205 and MOS 6.01)

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

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

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

Note: If you are soaring in a glider with one or more other gliders in a thermal, this is not a formation flight.

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

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

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

Towing of things by aircraft (91.210)

You may only tow a thing with an aircraft if you hold an approval or are permitted to do so by another provision of the regulations.

The other regulations which permit towing are in Part 103 for towing gliders and Part 138 for aerial work operations.

Night vision imaging system (NVIS) flights (91.085)

You must ensure that when conducting an NVIS flight you comply with the MOS requirements set out in Appendix B and the equipment requirements set out in Appendix A.

Part 91 MOS operational rules for NVIS flights are generally restated by the Part 133 and 138 manuals of standards.

If you are operating or training under other Parts (such as 133 or 138), the rules that apply to you may be varied by the Part 133 or 138 MOS requirements for NVIS.

To fully comprehend any broader obligations you may have, it is recommended you review section 2.3 of the latest version of the 'Night Vision Imaging Systems' multi-part advisory circular AC 91-13, AC 133-09 and AC 138.06, referred to in this guide simply as AC 91-13).

Search and rescue services and emergency and survival equipment (Division 91.C.5)

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Image | Herve Goussé | Airbus S.A.S.

19. Aircraft equipment

Requirements relating to equipment (91.810)

A person must satisfy the requirements of MOS chapter 26 relating to:

- the fitting or non-fitting of equipment
- the carrying of the equipment
- the equipment that is fitted to or carried on an aircraft.

The variation in approval by the authorities certifying helicopter automatic pilot and automatic stabilisation systems characteristics, means it is not possible for CASA to prescribe specifications for this equipment. Accordingly, each application for approval to conduct helicopter IFR operations will be individually assessed.

Carbon Monoxide (CO) detectors- it is strongly recommended that pilots of piston engine aircraft should wear personal CO detectors. Refer Part 91.

MOS Chapter 26

The following requirements of MOS Chapter 26 can be found in Appendix A.

Purpose MOS (26.01)

Approval of aircraft equipment (MOS 26.02)

Visibility and accessibility of pilot-operated equipment (MOS 26.03)

Flight with inoperative equipment (MOS 26.04)

Aeroplane – VFR flight by day (MOS 26.06)

Aeroplane – VFR flight by night (MOS 26.07)

Aeroplane – IFR flight (MOS 26.08)

Rotorcraft – VFR flight by day (MOS 26.10)

Rotorcraft – VFR flight by night (MOS 26.11)

Rotorcraft – IFR flight (MOS 26.12)

Application – VFR flight requirements do not apply to certain light sport aircraft (LSA) (MOS 26.13)

Application – VFR and IFR flight requirements do not apply to certain experimental aeroplanes (MOS 26.14)

ADMINISTRATIVE RULES

20. Special certificates and permits

Approvals by authorised persons for Subpart 91.T (91.050)

If a provision in Subpart 91.T refers to a person holding an approval, a person may apply to an authorised person, in writing, for the approval. The approval must be granted provided the applicant meets the requirements of regulation 11.055.

This provision simply allows a person to seek an approval from an authorised person other than CASA.

Aircraft with more than one certificate of airworthiness – application of Subpart 91.T (91.835)

If a certificate of airworthiness has been issued in more than one category for the aircraft, it can only be flown under one category under Subpart 91.T at any one time.

If, for example, the aircraft is being flown under a restricted category, the aircraft must be flown in accordance with Subpart 91.T. If the aircraft then returns to operations under a normal category certificate, Subpart 91.T will cease to apply.

Restricted category aircraft – general operating requirements (91.840)

Where a special certificate of airworthiness (CoA) in the restricted category has been issued for the aircraft, before a flight you and the operator must ensure the following requirements are met:

- the certificate has been issued and is in force
- any condition or requirement on the certificate is met
- the flight is not an air transport operation
- the flight is of a kind listed in 91.845
- a person carried on the flight is limited to:
  - a crew member, or
  - for a special purpose operation – a person needed for work activity directly associated with the special purpose for which the certificate was issued
  - carrying out a demonstration or test of the aircraft for sale (see 91.845).

Aircraft types which may be eligible for a special CoA include:

- those which have been type certified in a restricted category e.g. specialist water bombers or agricultural aircraft
- ex-military aircraft of the Australian Defence Force or an armed force of Canada, the UK or the USA
- aircraft which may have been in a standard airworthiness category but have been modified for special purpose operations.

Restricted category aircraft – kinds of operations permitted (91.845)

The kinds of operation (91.840) for a restricted category aircraft are:

- a special purpose operation for which the special certificate of airworthiness for the aircraft was issued
- participation in an air display
- taking the aircraft to or from a place where a demonstration or display of the aircraft is to take place
- practice in flying the aircraft for participation in an air display
- taking the aircraft to a place for maintenance
- taking the aircraft from a place where maintenance has been done
- testing the aircraft after maintenance
- flying training (other than for issuing a pilot licence)
- pilot proficiency training, or practice in flying the aircraft
- demonstrating or testing the aircraft for sale
- delivering the aircraft to a person under a contract of sale.

For 'a special purpose operation' for which the special certificate of airworthiness for the aircraft was issued referred to above, this includes:

- training in the special purpose operation
- taking the aircraft to a place where the special purpose operation is to start
- taking the aircraft from a place where the special purpose operation has ended
- any other operation necessary to accomplish the special purpose operation.

A special purpose operations is one for:

- agricultural operations (e.g. spraying, seeding, livestock or feral animal control)
- forest and wildlife conservation
- firefighting
- aerial surveying or scientific research (e.g. photography mapping oil and mineral exploration)
- patrolling (e.g. pipelines, power lines, canals)
- weather control and atmospheric research (e.g. cloud seeding)
- glider towing
- target towing
- target designation
- any similar operation to those above.

Provisionally certificated aircraft – operating requirements (91.850)

Where a provisional certificate of airworthiness has been issued for the aircraft, before flight you and the operator must ensure the following requirements are met:

- the certificate is in force
- any condition or requirement on the certificate is met
- the flight is not an air transport operation
- the flight is of a kind listed in regulation 91.855
- unless the aircraft is being flown to obtain type certification or supplemental type certification (operations for type certificate or supplemental type certificate (91.860)), you must fly within the limitations stated in the aircraft flight manual
- the requirements for the carriage of people under 91.865 are met
- for the pilot, the procedures associated with any approval issued to the operator under 91.870 are met.

Provisionally certificated aircraft – kinds of operations permitted (91.855)

The kinds of operation referred to in 91.850 (above) in a provisionally certified aircraft are:

- those required to obtain type certification, or supplemental type certification
- training flight crew, including simulated air transport operations
- a demonstration flight by the aircraft's manufacturer for prospective purchasers
- a market survey operation by the aircraft's manufacturer
- a flight to check instruments, accessories and items of equipment that do not affect the aircraft's airworthiness
- service testing of the aircraft.

Provisionally certificated aircraft – operation for type certification or supplemental type certification (91.860)

For a provisionally certified aircraft being flown to obtain type certification or supplemental type certification referred to in 91.850:

- if the aircraft's certificate is subject to a condition limiting the area within which the aircraft may be flown, the flight must not take place outside, or partly outside, that area unless the holder of the certificate holds an approval from CASA or an authorised person, or
- if the flight is over a populous area, the holder of the certificate must hold an approval from CASA or an authorised person, and
- the flight must be under the VFR by day, or the holder of the certificate must hold an approval from CASA or an authorised person.

For an approval to be issued by CASA or an authorised person they must be satisfied that the aircraft is controllable throughout its normal range of speeds and throughout all manoeuvres to be executed and has no hazardous operating characteristics or design features.

Provisionally certificated aircraft – requirements for the carriage of people (91.865)

A person referred to in 91.850 may only be carried if they have been notified before they board the aircraft that the aircraft is provisionally certified and:

- they have a function in the aircraft's operation, or
- both the manufacturer has authorised the carriage of each person, and the holder of the provisional certificate holds an approval for carrying persons from CASA or an authorised person.

Provisionally certificated aircraft – additional requirements for operators (91.870)

The operator of a provisionally certified aircraft must hold an approval from CASA, or an authorised person, for procedures for use by flight crew and personnel who carry out a ground support duty in both:

- operating the aircraft, and
- landing at and taking off from an aerodrome if take-off or approach over a populous area is necessary.

Experimental aircraft – operating requirements (91.875 and CASA EX67/24)

Where an experimental certificate has been issued for the aircraft, before flight you and the operator must ensure that:

- the certificate has been issued and is in force
- any certificate conditions or requirements, can be complied with
- the flight is not an air transport operation or a balloon transport operation
- the flight is either:
  - for a purpose mentioned in regulation 21.191 for which the certificate was issued
  - a kind of operation permitted in 91.880
- the flight must be under the VFR by day, or the holder of the certificate must hold an approval from CASA or an authorised person

- if a flight is over a built up area of a city or town, the holder of the certificate must hold an approval from CASA or an authorised person
- if the flight is over a public gathering, the holder of the certificate must only pass over the public gathering when arriving or departing an aerodrome or transiting in the normal course of navigation (CASA EX67/24)
- if the aircraft's experimental certificate is subject to a condition limiting the area within which the aircraft may be flown, the flight must remain within that area
- if the aircraft is carrying a passenger:
  - the total number of persons onboard must not exceed that allowed under 91.885
  - each passenger must be notified before boarding that the design, manufacture and airworthiness of the aircraft are not required to meet any standards recognised by CASA
  - a placard complying with the MOS requirements must be displayed inside the aircraft (see Figure 23).
- if the aircraft is carrying a person that is not a crew member whose presence is essential to the operation of the aircraft, it must have been shown that the aircraft:
  - is controllable throughout its normal range of speeds and throughout all manoeuvres to be executed
  - has no hazardous operating characteristics or design features.

An experimental aircraft certificate may be issued for:

- research and development
- showing compliance with the regulations
- training an applicant's flight crew
- exhibition
- air racing
- market surveys
- operating amateur-built aircraft
- operating kit-built aircraft
- private operation of prototype aircraft previously certified under subregulation 21.191 (a) (b) or (d)
- operating a light sport aircraft that:
  - has been assembled from a kit for which the applicant can provide the information required in subregulation 21.193 (e), or
  - has been assembled from the kit manufacturer's instructions, or
  - is the same make and model as a production aircraft covered under regulation 21.186
- operating a light sport aircraft covered by regulation 21.186, for which a special certificate of airworthiness or another document of similar effect under the law of an ICAO Contracting State has been issued.

Experimental aircraft – placards (MOS 27.01)

The following placard must be displayed inside an experimental aircraft in full view of the passengers.

Figure 23: Warning placard

WARNING

PERSONS FLY IN THIS AIRCRAFT AT THEIR OWN RISK.

THIS AIRCRAFT IS NOT OPERATED TO THE SAME SAFETY STANDARDS AS A NORMAL COMMERCIAL PASSENGER FLIGHT.

CASA DOES NOT SET AIRWORTHINESS STANDARDS FOR EXPERIMENTAL AIRCRAFT.

Exception: *For aircraft flown before 1 December 1999 the MOS 27.01 placard requirement (above) is satisfied if the following text is displayed in full view of all the passengers.*

WARNING

THIS AIRCRAFT IS NOT REQUIRED TO COMPLY WITH THE SAFETY REGULATIONS FOR STANDARD AIRCRAFT.

YOU FLY IN THIS AIRCRAFT AT YOUR OWN RISK.

Experimental aircraft – kinds of operations permitted (91.880)

The kinds of operation permitted in an experimental aircraft in 91.875 are:

- taking the aircraft to a place for maintenance
- taking the aircraft from a place where maintenance has been done
- testing the aircraft after maintenance
- flying training (other than for issuing a pilot licence)
- practice in flying the aircraft
- demonstrating or testing the aircraft for sale
- delivering the aircraft to a person under a contract of sale
- for an amateur-built aircraft or a kit-built aircraft – flying training given to the aircraft's owner
- for an experimental aircraft subsequently approved for glider towing by the the Gliding Federation of Australia Inc, ARN 217932 (the GFA), glider towing, provided the operator:
  - is a member of the GFA, and
  - complies with the GFA memberships rules for glider towing (CASA EX67/24).

Experimental aircraft – maximum number of persons to be carried (91.885)

The maximum number of persons that may be carried on an experimental aircraft is:

- the number specified in any approval
- for a Part 103 aircraft, unless otherwise approved, 2 persons
- the lesser of the number of persons the aircraft was designed to carry, or 6 persons.

Primary category aircraft and intermediate category aircraft – operating requirements (91.890)

You and the operator must ensure flights in primary or intermediate category aircraft, have a special certificate of airworthiness in force. Such flights must not be an air transport operation.

An aircraft can be certified in the primary category if:

- it is unpowered
- it is powered by a single naturally aspirated engine with a maximum stall speed of 61 knots or a rotorcraft powered by a single naturally aspirated engine with a 29.3 kg per square metre main rotor disc loading limitation (ISA)
- has a MTOW of 1,225 kg or 1,530 kg (for seaplanes)
- has a maximum seating capacity of 4 (including the pilot)
- has an unpressurised cabin.

An aircraft can be certified in the intermediate category if:

- it is an aeroplane with a maximum stall speed of 61 knots
- if it is a rotorcraft with a 29.3 kg/ square metre main rotor disc loading limitation (ISA)
- has a MTOW of 1,750 kg
- has a maximum seating capacity of 4 (including the pilot)
- has an unpressurised cabin.

Light sport aircraft – operators (91.895)

A light sport aircraft operator must not operate the aircraft unless a special certificate of airworthiness has been issued and is in force.

A light sport aircraft is an aircraft other than a helicopter which:

- has a MTOW of less than:
  - 600 kg, or
  - 650 kg for an aircraft intended for water operations, or
  - 560 kg for lighter-than-air aircraft
- has a maximum stalling speed V_{SO} 45 knots calibrated airspeed (CAS) at the MTOW and most critical centre of gravity
- has a maximum seating capacity of 2 (including the pilot)
- if powered, is single-engine (non-turbine) with a propeller
- has a non-pressurised cabin
- has fixed landing gear for operation over land
- has fixed or repositionable landing gear for water operations
- for a glider, has a fixed or retractable landing gear and a never-exceed-speed (Vne) of 135 knots CAS.

Light sport aircraft – pilots (91.900)

You may only operate a light sport aircraft provided it has a special certificate of airworthiness which is in force and it is operated:

- solely under Part 91, or Part 103, or
- for flying training.

A placard which complies with the MOS must be displayed inside the aircraft so that each person who boards the aircraft is notified of the contents of the placard.

You must comply with the aircraft operating instructions, including the necessary equipment listed by the manufacturer, and any safety direction or requirement issued by the manufacturer.

> **Exception:** *The aircraft's manufacturer may approve operation of the aircraft in contravention of the instruction, directions or requirement above.*
>
> **Exception:** *If the manufacturer of the aircraft no longer exists or can no longer provide instructions for the continuing airworthiness of the aircraft, references to the 'manufacturer of the aircraft' include references to a person appointed by CASA to perform the functions of the manufacturer in relation to the continuing airworthiness of the aircraft.*

Light sport aircraft – placards (MOS 27.02)

When carrying passengers in a light sport aircraft the following placard must be displayed in their full view.

Figure 24: Placard

THIS AIRCRAFT WAS MANUFACTURED IN ACCORDANCE WITH LIGHT SPORT AIRCRAFT AIRWORTHINESS STANDARDS AND DOES NOT CONFORM TO STANDARD CATEGORY AIRWORTHINESS REQUIREMENTS.

Flights under special flight permits (91.905)

You may only fly an aircraft with a special flight permit that authorises the flight, and you comply with the conditions on the permit.

If you are the only person on the aircraft, you must carry a copy of the permit on the aircraft.

If an additional person is carried, you and the operator must ensure a copy of the permit is displayed where the person will see it. In addition, before boarding, a person must also be informed:

- that the aircraft is being operated under a special flight permit
- the reasons for the issue of the permit
- what the permit authorises.

A special flight permit may be issued under Part 21 to allow an aircraft to be flown for the purpose of: maintenance or storage; delivery or export; testing for production; removal from danger; demonstration to a customer (for aircraft that have completed flight production flight tests); assisting in search and rescue; assisting in a state of emergency; operating above maximum certificated take-off weight for long-range flights in specific circumstances.

Flight tests for the purpose of completion of a maintenance action or assessment flight, as detailed in the aircraft maintenance manual, may be conducted by entering the requirement in the aircraft flight and technical log without the need for a special flight permit to be issued.

Special certificate of airworthiness – application (91.910)

The following regulations (91.915, 91.920) apply to the operation of an aircraft for which a special certificate of airworthiness is in force.

A special CoA may be issued in the following categories:

- primary
- intermediate
- restricted
- limited
- amateur-built under an-amateur built aircraft acceptance (ABAA).

Aircraft with special certificates of airworthiness – maintenance release (91.915)

You or the operator must not allow a flight to begin unless a maintenance release or a certificate of release to service for the aircraft is in force.

Exception: *This regulation does not apply to an aircraft for which a special flight permit is in force.*

Aircraft with special certificates of airworthiness – flight tests to be conducted in certain areas (91.920)

You may only flight test an aircraft over:

- open water
- a sparsely populated area
- an unpopulated area
- an area where, in the event of a loss of control of the aircraft, there would be minimal risk to other air traffic.

In addition, for an amateur-built aircraft, a flight test can only be over and in an area for which the holder of the certificate of airworthiness holds an approval from CASA or an authorised person.

Image | Lufthansa AG

21. Foreign aircraft

Foreign-registered aircraft – Chicago Convention (91.965)

You and the operator of a foreign-registered aircraft flown in Australian territory must comply with the requirements of the Chicago Convention relating to the:

- nationality and registration marks of the aircraft
- aircraft's certificate of airworthiness
- holding, number and description of crew member licences and ratings
- documents to be carried by the aircraft
- flight and manoeuvre of the aircraft
- carriage or fitting of radio equipment.

> **Exception:** *The requirement relating to the aircraft's certificate of airworthiness does not apply if a special flight authorisation has been granted in relation to the flight.*

Note: The requirements of the Chicago Convention about certificates of airworthiness apply to aircraft with a standard certificate of airworthiness. Foreign aircraft with the equivalent of a special certificate of airworthiness or a special flight permit require a special flight permit to be flown in Australian territory (see regulation 91.970).

> **Exception:** *The requirements of the Chicago Convention relating to documents to be carried, aircraft flight and manoeuvre, and fitting and carriage of radio equipment do not apply to the extent that the requirement is inconsistent with a requirement under another provision of Part 91.*

Foreign-registered aircraft – special flight authorisations (91.970)

A person may apply to CASA for a special flight authorisation to fly a foreign-registered aircraft in Australian territory without a certificate of airworthiness.

You must comply with any conditions of the special flight authorisation that is in force.

Foreign-state aircraft – approval to fly in Australian territory (91.975)

When a state aircraft of a foreign country is flown in Australian territory, you and the operator must ensure the operator holds an approval for the flight.

You must comply with any conditions on the operator's approval.

Foreign-registered aircraft – major defect – CASA direction (91.980)

If CASA is satisfied that a foreign-registered aircraft of a Contracting State operating in Australian territory has a major defect, CASA may issue a written direction to a person which must not be contravened imposing conditions on the operation of the aircraft where:

- requested by the national aviation authority, or
- CASA is satisfied it is necessary for the safety of air navigation.

Foreign-registered aircraft – CASA to notify contracting state of direction (91.985)

If CASA issues a direction, CASA must give the national aviation authority of the state:

- notice in writing of the action taken, together with a copy of the direction
- a written report of the defect.

Foreign-registered aircraft – CASA may revoke direction (91.990)

Revocation following notification by Contracting State

A direction issued under 91.980 may be revoked by CASA if the national aviation authority of the Contracting State tells CASA, in writing, that it:

- has revoked any suspension of the certificate of airworthiness of the aircraft that they had imposed, or
- considers that the defect giving rise to the direction by CASA is not of such a nature as to prevent the aircraft from fulfilling the minimum safety requirements adopted by the Contracting State under the Chicago Convention, or
- considers that, in the circumstances of the case, the aircraft should be permitted to fly, with nobody onboard other than crew members, to a place where the defect can be repaired.

However, CASA must not revoke the direction if it is satisfied that doing so would adversely affect the safety of air navigation.

Revocation if CASA satisfied direction no longer necessary

In writing, CASA may revoke a direction if CASA is satisfied that it is no longer necessary for the safety of air navigation.

Foreign-registered aircraft – when direction or revocation takes effect (91.995)

A direction or the revocation of a direction issued under 91.980 does not have effect until it has been served:

- on a person, or
- has been affixed to the relevant aircraft.

Note: For service of documents on a person, see section 28A of the Acts Interpretation Act 1901.

ADS-B OUT equipment on certain foreign-registered aircraft in private operations

> **Exception:** *The pilot of a private ferry operation of a foreign registered aircraft covered by the operator's foreign certificate is exempted from carrying at least one ADS-B OUT equipment under the IFR in A,B,C,D,E and G airspace. See table 28 Surveillance equipment* Appendix A.
>
> *They are also exempted from having the ADSB-OUT equipment serviceable.*
>
> *They must not land within Australian territory at more than 2 intermediate stops unless unforeseen circumstances arise. The sole purpose of landing is limited to refuelling, flight planning and complying with Australian customs and immigration requirements. See CASA EX67/24.*

22. Minimum equipment list (MEL)

Definitions (91.925)

For a type of aircraft, a master minimum equipment list or MMEL, is a document which:

- includes a list of items in the aircraft that may (subject to any conditions or limitations specified in the document) be inoperative for a flight of the aircraft
- is prepared by the holder of the type certificate for the aircraft
- is approved by the national aviation authority that issued the type certificate for the aircraft.

For an aircraft, a minimum equipment list or MEL, is a document which:

- includes a list of items in the aircraft that may (subject to any conditions or limitations specified in the document) be inoperative for a flight of the aircraft
- is prepared by the operator of the aircraft
- is approved under 91.935
- complies with the requirements in 91.930, and includes any variation to the document approved under 91.940.

A rectification interval, for an item in an MEL that may become inoperative, means the period within which the item must be rectified after the discovery that the item is inoperative.

Requirements for minimum equipment list (91.930)

The MOS prescribes:

- the contents of an MEL
- the calculation and specification of rectification intervals for items in the MEL
- the conditions and limitations that may or must be included in the MEL.

The conduct of Part 91 operations does not necessitate the use of an MEL. However, due to the associated safety benefits, operators may choose to apply to CASA seeking approval for an MEL.

An MEL is a document that allows for the operation of an individual aircraft by a specific operator under specified conditions, with item(s) of equipment inoperative at the time of dispatch for an intended flight.

An MEL consists of an approved list of the specific inoperative equipment for a particular aircraft, not for an aircraft make and model. Its use is described in the associated procedures contained in an operator's maintenance control manual and/or operations manual, or other appropriately documented procedures (for Class B aircraft).

An MEL is derived from an MMEL and is normally not less restrictive than the corresponding MMEL, except where regulatory requirements permit. An operator's MEL must consider the aircraft configuration, type of operation and operating environment.

An approved MEL for an aircraft is a non-transferable document. If an aircraft moves from one operator to another, the new operator cannot automatically use the previously approved MEL.

Irrespective of the provisions of the MEL, you may require a defect to be rectified after considering operational implications, multiple unserviceabilities, and additional failures during continued operation with inoperative systems or components.

The requirement to have an MEL is defined according to the type of operations conducted. Refer to the regulations below for requirements:

- 121.060 operator to have minimum equipment list for certain flights (air transport operations – larger aeroplanes)
- 133.035 operator to have minimum equipment list for certain flights (air transport operations – rotorcraft)
- 135.045 operator to have minimum equipment list for certain flights (air transport operations – smaller aeroplanes).

The regulations above prescribe the requirement for an operator to have an MEL in some circumstances. Subpart 91.Y of CASR prescribes the technical requirements of an MEL.

Definitions (MOS 28.02)

For this section:

- *Category A rectification interval* means a rectification interval other than 3 days, 10 days or 120 days
- *Category B rectification interval* means a rectification interval that is 3 consecutive days
- *Category C rectification interval* means a rectification interval that is 10 consecutive days
- *Category D rectification interval* means a rectification interval that is 120 consecutive days
- *day*, in relation to a rectification interval for an inoperative item of equipment, means the calendar day starting after 12 midnight on the day of discovery of the inoperative item
- a reference to *days (plural) means consecutive days*
- *day of discovery*, in relation to an inoperative item of equipment for an aircraft, means the day that information about the inoperative state of the item is recorded in the flight technical log for the aircraft
- *extendable rectification interval* means:
  - a Category B rectification interval or
  - a Category C rectification interval
- *item* means an item of equipment as defined in this section
- *MMEL* means master MEL
- *UTC* means Coordinated Universal Time as determined by the International Bureau of Weights and Measures.

Note: The UTC is located at bipm.org/en/

MEL – contents (MOS 28.03)

An MEL must include:

- the name of the operator of the aircraft, including any operating or trading name
- the aircraft type, model, registration mark and serial number
- a list of the items in the aircraft, one or more of which may be inoperative for a flight
- identification of the MMEL on which the MEL is based
- definitions of any unique terms used in the MEL
- guidance for the use and application of the MEL
- a statement of whether rectification intervals will be calculated in accordance with the local legal time or UTC.

The MEL must also:

- describe the item
- specify whether the rectification interval for the item is a Category A, B, C or D
- set out the conditions or limitations (if any) that must be complied with if the aircraft is to conduct a flight with the item inoperative

- if the aircraft must comply with an operational procedure to fly with the item inoperative:
  - » set out the operational procedure, or
  - » if the procedure is in another document, include a cross-reference to the procedures and the document
- if the aircraft requires maintenance to conduct the flight with the item inoperative:
  - » set out the maintenance data, or
  - » if the maintenance data is in another document, include a cross-reference to the data and the document.

For an aircraft that can provide an ACAS resolution advisory (RA) set out in MOS 11.06, the information regarding the RCP 240 and RSP 180 capabilities (as applicable) of the aircraft must be included in the MEL.

If the operator intends to extend the rectification interval of an inoperative item in accordance with 91.945, the operator must set out, in the MEL, the procedures used to extend the rectification interval must include:

- who, on behalf of the operator, may extend the rectification interval
- how the operator ensures compliance with the requirements of the approval of an extension of the rectification interval (see 91.945).

Compliance with the MMEL (MOS 28.04)

An aircraft's MEL must be based on the MMEL for the aircraft type.

The MEL must not be less operationally restrictive than the MMEL in the same circumstances.

Examples:

- If the MMEL specifies a rectification interval for an inoperative item, the MEL must not specify a less restrictive rectification interval.
- If the aircraft is to fly with an inoperative item and the MMEL specifies conditions or limitations that must be complied with, the MEL must include conditions or limitations for the item that are at least as restrictive as those in the MMEL.

Compliance with the regulations (MOS 28.05)

An MEL must not permit an aircraft to operate with an inoperative item if the flight would contravene the regulations.

If the regulations permit an aircraft to operate with an inoperative item, the MEL may permit the operation with the inoperative item in accordance with the regulations, even if the MEL is less restrictive than the MMEL.

Examples:

- If a provision of the regulations permits an aircraft to operate for a period with an inoperative item and the period is less restrictive than the rectification interval for the item specified in the MMEL – the rectification interval for the item in the MEL may be based on the period mentioned in the provision.
- If a provision of the regulations permits an aircraft to operate with an inoperative item subject to conditions or limitations, and these are less restrictive than those in the MMEL – the conditions or limitations specified in the MEL for the item must be at least as restrictive as those specified in the provision.

Compliance with the AFM (MOS 28.06)

An MEL must not permit an aircraft to fly with an inoperative item in contravention of any of the conditions, limitations or emergency procedures specified in the AFM.

If the MMEL does not specify rectification intervals (MOS 28.07)

If the MMEL does not specify a rectification interval for an inoperative item, the rectification interval for the item in an MEL must clearly reflect the item's significance for the safe operation of the aircraft.

Effects of repairs or modifications made to the aircraft (MOS 28.08)

If a repair or modification is made, and the approval for the repair or modification places a new condition on the aircraft to fly with an inoperative item, then the conditions or limitations specified in the MEL for the inoperative item, must be at least as restrictive as those specified in the approval for the repair or modification.

Approval of minimum equipment list (91.935)

An operator may apply, in writing, for the approval of an MEL to:

› CASA, or

› a Part 42 continuing airworthiness management organisation, or

› if the aircraft is not flown under Parts 121, 133 or 135, an authorised person.

A person, to whom the application has been made, may approve an MEL application if they are satisfied that the MEL:

› complies with the requirements in 91.930 (which prescribes the contents, the calculations and the specification of rectification intervals as well as the conditions and limitations to be included in the MEL)

› will enable the operator to operate the aircraft safely.

An application must include the proposed MEL.

Note: Not all aircraft must have an MEL. Other provisions of the CASRs may require certain aircraft to have an MEL. This regulation sets out how an MEL for an aircraft must be approved.

Approval of variations (91.940)

An operator may apply in writing to vary the approved MEL, to:

› CASA, or

› a continuing airworthiness management organisation permitted under Part 42 to approve variations, or

› an authorised person, if the aircraft is not flown under Parts 121, 133 or 135.

The variation may be approved if the person to whom the application has been made, is satisfied that:

› it complies with the requirements in 91.930 (which prescribes the contents, the calculations and the specification of rectification intervals as well as the conditions and limitations to be included in the MEL)

› it will enable the operator to operate the aircraft safely.

The operator must include the proposed MEL variation in the application.

Approval of extensions of rectification intervals (91.945)

Approval of extension on application

An operator may apply, in writing, for the approval of an extension of the rectification interval for an item in an MEL to:

› if the operator is not a continuing airworthiness management organisation (CAMO), and there is a Part 42 CAMO for the aircraft permitted to approve the extension–that organisation, or

› in any case – CASA.

CASA or a CAMO may approve the application for an extension.

Approval of extension without application

Subject to the requirements for approval of extension (below) a CAMO may approve an extension, if:

› the CAMO is the operator of the aircraft

› the CAMO is permitted, under Part 42, to approve the extension.

Requirements for approval of extension

An extension of the original rectification interval for an item in an MEL must not be approved unless:

› the item is inoperative

› the original rectification interval is of a kind prescribed by the MOS (i.e. Category B or C)

› the operator is unable to rectify the item before the original rectification interval ends because of circumstances beyond their control

› the original rectification interval has not previously been extended in accordance with this regulation during the same continuous period throughout which the item has been inoperative

› the MMEL does not prohibit extending the rectification interval for the item

› if a provision of these regulations (other than Subpart 91.Y) permits the aircraft to operate with the item inoperative for a maximum period – the extended rectification interval for the item will not exceed that period

› the extended rectification interval will not exceed the period prescribed by the MOS.

Matters to be set out in an approval
An approval extension must be in writing that sets out:

- details of the inoperative item
- a statement to the effect, that the operation of the aircraft with the inoperative item is permitted in accordance with this regulation
- the day on which the extended rectification interval starts (being a day not earlier than the day the notice is given)
- the day on which the extended rectification interval ends.

For a CAMO approval, the following must also be included:

- the CAMO's name and approval certificate reference number
- the name and signature of the individual who approved the extension on behalf of the CAMO.

Extension of rectification interval (MOS 28.09)

For 91.945, an application can be made to extend the rectification interval from the original as follows:

- an original Category B rectification interval may be extended by a maximum of 3 days
- an original Category C rectification interval may be extended by a maximum of 10 days.

Note: A rectification interval that has been extended once may not be further extended.

Effect of approval (91.950)

An extension of the rectification interval for an item specified in an MEL that is approved, allows the aircraft to operate during the extended rectification interval.

If Part 42 does not apply to the aircraft, a copy of the approval of the extension must be kept with the aircraft's maintenance release throughout the period of the extension.

CASA to be notified of extensions approved by a continuing airworthiness management organisation (91.955)

If a CAMO has approved the MEL extension, the operator must notify CASA in writing within 10 days of the start of the extended rectification interval of the following:

- the aircraft's registration mark
- details of the inoperative item
- the original rectification interval for the item
- the extended rectification interval
- the day the extended rectification interval took effect
- the reason why the item could not be rectified before the end of the original rectification interval.

Operation of aircraft with multiple inoperative items not permitted in certain circumstances (91.960)

The MEL must not be applied to permit the aircraft's operation where an aircraft has more than one inoperative item under the MEL and the number and kind of inoperative items, or the relationship between the items, is such that they:

- reduce the aircraft's operational level of safety, or
- increase the flight crew's workload, and
- may make the flight unsafe.

APPENDICES

Appendix A: MOS Chapter 26 – Equipment

Purpose (MOS 26.01)

The requirements for the pilot and the operator in relation to 91.810 to the fitting/non-fitting and carriage of equipment on an aircraft are as follows:

Note: Requirements in relation to equipment may also be in relation to inoperative equipment.

For this Appendix (unless otherwise stated):

- a reference to a pilot seeing or viewing anything from a pilot's seat means that the thing is seen or viewed from the pilot's normal sitting position in the seat
- any mention of feet (or ft) in the context of an altitude means feet above mean sea level (AMSL).

Approval of aircraft equipment (MOS 26.02)

Relevant aircraft in this section means any of the following:

- a light sport aircraft for which a special certificate of airworthiness has been issued and is in force under regulation 21.186 of CASR
- a light sport aircraft for which an experimental certificate has been issued and is in force under paragraph 21.191 (j) or (k) of CASR
- any other aircraft for which an experimental certificate has been issued and is in force under paragraph 21.191 (g) or (h) of CASR.

Before an Australian aircraft begins a flight, the equipment that is required to be fitted to or carried on an aircraft other than equipment required under MOS 26.16 must be compliant with the requirements of or approved under CASR Part 21. The following are exceptions to this requirement:

- equipment used to display the time (noting that a timepiece displays accurate time if it is within a 30 second margin of error AIP ENR)
- an independent portable light, for example a flashlight or torch
- a headset
- a sea anchor and other equipment for mooring
- survival equipment, including signalling equipment.

Note: 1 MOS 26.16 contains requirements for mandatory or optional carriage of surveillance equipment, most of which requires TSO or ETSO authorisation. However, the Division also contains a conditional alleviation. For the relevant equipment, a requirement for Part 21 approval would inappropriately negate this conditional alleviation.

The requirement of CASR Part 21 does not apply to a relevant aircraft if the aircraft is fitted with a radio which provides the pilot with the same radio capability as would be provided if the radio complied with CASR Part 21.

However, if equipment is carried on an aircraft, although not required by this Appendix to be fitted or carried, then:

- the equipment need not be compliant with the requirements of, or approved under, CASR Part 21
- for a foreign-registered aircraft, the equipment need not have been approved by the NAA of the aircraft's state of registry
- no information provided by the equipment may be used by a flight crew member to comply with any requirement of this Appendix in relation to equipment that is required to be fitted or carried for communications or navigation
- the equipment, whether functional or otherwise, must not at any time affect the airworthiness of the aircraft.

Note: For other requirements in relation to surveillance equipment that is not required to be fitted or carried, see MOS 26.69.

Foreign-registered aircraft

The equipment required by this Appendix to be fitted to, or carried on, a foreign-registered aircraft must have been approved by the NAA of the aircraft's state of registry.

Visibility and accessibility of pilot-operated equipment (MOS 26.03)

Equipment required to be fitted or carried in an aircraft and which is to be used by the pilot manually or visually from the cockpit, must be usable and visible from the pilot's seat.

Required emergency equipment fitted to, or carried on, an aircraft must be easily accessible for immediate use in the event of an emergency.

Serviceability of equipment (MOS 26.04)

Any equipment required to be fitted to, or carried on, an aircraft must be operative unless another section of MOS chapter 26 applies or the equipment:

- is inoperative because of a defect that has been approved as a permissible unserviceability and
- is fitted or carried in accordance with the permissible unserviceability.

Note: A minimum equipment list (an MEL), approved under regulation 91.935, can only permit equipment required to be fitted to, or carried on, an aircraft, to be unserviceable within the limits of the requirements contained in this MOS Chapter 26. For example, MOS26.26 contains an allowable time period of 72 hours related to flights with inoperative altitude alerting equipment. An MEL would not be approved if it contained a maximum time period for altitude alerting equipment to be inoperative that was greater than the time period specified by either a master minimum equipment list (MMEL) or the legislation.

For aircraft that do not have an MEL or equipment that is permitted to be unserviceable (permissible unserviceability), nothing prevents you from flying with inoperative equipment which is not required to be fitted or carried for the flight.

Aeroplane – VFR flight by day (MOS 26.06)

An aeroplane flying by day under the VFR must be fitted with the equipment for measuring and displaying the flight information as shown in table 20.

For certain light sport aircraft, experimental aircraft and other certain registered aircraft, there are equipment variations allowable. Refer to MOS 26.13 through to 26.17 in Appendix A of this guide.

Table 20: Requirements for equipment – aeroplane VFR by day

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

During a flight, you must maintain a time reference accurate to within +/- 30 seconds. (AIP ENR)

Aeroplane – VFR flight by night (MOS 26.07)

An aeroplane flying under the VFR at night must be fitted with:

› an approved GNSS, or

› an automatic direction finder (ADF) or VOR.

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

› (E)TSO-C129a

› (E)TSO-C145a

› (E)TSO-C146a

› (E)TSO-C196a.

An aeroplane flying under the VFR at night must have equipment for measuring and displaying the flight information, as shown in table 21.

For certain light sport aircraft, experimental aircraft and other certain registered aircraft, there are equipment variations allowable. Refer to MOS 26.13 through to 26.17 in Appendix A of this guide.

Table 21: Requirements for equipment – aeroplane VFR flight by night

Flight information	Requirements
indicated airspeed	the equipment must be capable of being connected to: › an alternate source of static pressure that: » a pilot can select » includes a selector that can open or block the aeroplane's static source and alternative static source simultaneously, or › a balanced pair of flush static ports
mach number	only for an aeroplane with operating limitations expressed as a Mach number
pressure altitude	the equipment must: › have an adjustable datum scale calibrated in millibars or hPa › be calibrated in ft except: » if a flight is conducted in a foreign country which measures FLs or altitudes in metres must be calibrated in metres or fitted with a conversion placard or device › be capable of being connected to either: » an alternate source of static pressure that a pilot can select » a balanced pair of flush static ports
magnetic heading	› a direct reading magnetic compass, or › both a remote indicating compass and a standby direct reading magnetic compass
time	The equipment must display accurate time in hours, minutes and seconds, and be either: › fitted to the aircraft › worn by, or immediately accessible to, the pilot for the duration of the flight
turn and slip	the equipment must display turn-and-slip information, except when a second independent source of attitude information is available, in which case only the display of slip information is required
attitude	no additional requirements
vertical speed	the equipment must be capable of being connected to either: › an alternate source of static pressure that a pilot can select › a balanced pair of flush static ports

Flight information	Requirements
stabilised heading	the equipment must indicate whether the power supply to the gyroscopic instruments is working satisfactorily **Note:** A gyro-magnetic type of remote indicating compass meets this requirement if it has a primary and an alternate power supply.
outside air temperature	no additional requirements

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

Aeroplane – IFR flight (MOS 26.08)

An aeroplane flying under the IFR must be fitted with an approved GNSS.

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

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

Note: For aircraft entering oceanic airspace with RNP 2, 4 or 10 navigation specification capability, see MOS 11.03 in relation to long range navigation systems (LRNS) operability requirements.

An aeroplane flying under the IFR must be fitted with a GNSS and systems for measuring and displaying the flight information as shown in table 22.

For certain light sport aircraft, experimental aircraft and other certain registered aircraft, there are equipment variations allowable. Refer to MOS 26.13 through to 26.17 in Appendix A of this guide.

Table 22: Requirements for equipment – aeroplane IFR flight

Flight information	Requirements
indicated airspeed	the equipment must be capable of being connected to either: › an alternate source of static pressure that is selectable by a pilot › a balanced pair of flush static ports at least one airspeed indicator must have a means of preventing malfunction due to condensation or icing
mach number	only for an aeroplane with operating limitations expressed as a Mach number
pressure altitude	the equipment must: › have an adjustable datum scale calibrated in millibars or hPa › be capable of being connected to an alternate source of static pressure that a pilot can select, or a balanced pair of flush static ports. › be calibrated in feet, except: » if a flight is in a foreign country which measures FL or altitudes in metres, be calibrated in metres or fitted with a conversion placard or device
magnetic heading	the equipment must be either: › a direct reading magnetic compass › both a remote indicating compass and a standby direct reading magnetic compass
outside air temperature	no additional requirements
time	the equipment must display accurate time in hours, minutes and seconds, and be either: › fitted to the aircraft › worn by, or immediately accessible to, you for the duration of the flight

Flight information	Requirements
turn and slip	the equipment must display turn-and-slip information, except where a second independent source of attitude information is available, in which case only slip information is required. The equipment must have both a primary power and alternate power supply: › unless the equipment has a source of power independent of the power operating other gyroscopic instruments › a second independent source of attitude is available
attitude	the equipment must have both a primary and alternate power supply, unless either: › the equipment has a power source independent of source of turn-and-slip information › a second independent source of attitude information is available
vertical speed	the equipment must be capable of being connected to either: › an alternate source of static pressure that a pilot can select › a balanced pair of flush static ports
stabilised heading	the equipment must have both a primary and alternate power supply, unless either: › the equipment has a power source independent of that operating the turn-and-slip equipment › a second independent source of attitude information is available **Note:** A gyro-magnetic remote indicating compass meets this requirement if it has both a primary and an alternate power supply.
Note: For gyroscopic instruments (if any), equipment that indicates whether the power supply is adequate must be fitted.	

Rotorcraft – VFR flight by day (MOS 26.10)

A rotorcraft flying by day under the VFR must be fitted with equipment for measuring and displaying the flight information as shown in table 23.

Table 23: Requirements for equipment – rotorcraft VFR flight by day

Flight information	Requirements
indicated airspeed	no additional requirements
pressure altitude	the equipment must: › have an adjustable datum scale calibrated in millibars or hPa › be calibrated in ft except that if a flight is conducted in a foreign country which measures FLs, or altitudes in metres – must be calibrated in metres or fitted with a conversion placard or device
magnetic heading	either: › a direct reading magnetic compass › both a remote indicating compass and a standby direct reading magnetic compass
time	the equipment must display accurate time in hours, minutes and seconds, and be either: › fitted to the aircraft › worn by, or immediately accessible to, you for the duration of the flight
slip	only for an aerial work operation
outside air temperature	only for aerial work operations from an aerodrome at which ambient temperature is not available from ground-based instruments

For certain light sport aircraft, experimental aircraft and other certain registered aircraft, there are equipment variations allowable. Refer to MOS 26.13 through to 26.17 in Appendix A of this guide.

Rotorcraft – VFR flight by night (MOS 26.11)

A rotorcraft flying under the night VFR must have equipment fitted for measuring and displaying the flight information as shown in table 24.

A rotorcraft flying under the VFR at night must be fitted with:

- an approved GNSS, or
- an ADF or VOR.

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

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

If you are a single pilot, flying a rotorcraft under the VFR by night over land or water you must be able to:

- maintain attitude by using visual external surface cues from lights on the ground or celestial illumination, or by lighting fitted to the aircraft, or
- the rotorcraft must be fitted with an automatic pilot system or an automatic stabilisation system.

Note: Visual external surface cues can be established by using either unaided sight, or NVIS or other enhanced vision systems where permitted.

Table 24: Requirements for equipment – rotorcraft VFR flight by night

Flight information	Requirements
indicated airspeed	no additional requirements
pressure altitude	the equipment must: › have an adjustable datum scale calibrated in millibars or hPa › be calibrated in ft except that if a flight is conducted in a foreign country which measures FLs or altitudes in metres – must be calibrated in metres or fitted with a conversion placard or device
magnetic heading	the equipment must be either: › a direct reading magnetic compass › both a remote indicating compass and a standby direct reading magnetic compass
time	the equipment must display accurate time in hours, minutes and seconds, and be either: › fitted to the aircraft › worn by, or immediately accessible to, you for the duration of the flight
slip	no additional requirements
attitude	the equipment must have a primary power supply and an alternate power supply
standby attitude or turn indicator	not required for agricultural operations the equipment power supply must be independent of the power source for the attitude information
vertical speed	if the rotorcraft operates onto vessels or platforms at sea by night, the equipment must either: › be an instantaneous vertical speed indicator (IVSI) › meet performance requirements for acceleration sensitivity equivalent to an IVSI
stabilised heading	not required for agricultural operations **Note:** A gyro-magnetic type of remote indicating compass meets this requirement if it has a primary power supply and an alternate power supply
outside air temperature	no additional requirements

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

For certain light sport aircraft, experimental aircraft and other certain registered aircraft, there are equipment variations allowable. Refer to MOS 26.13 through to 26.17 in Appendix A of this guide.

Rotorcraft – IFR flight (MOS 26.12)

A rotorcraft flying under the IFR must be fitted with an approved GNSS.

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

› (E)TSO-C129a

› (E)TSO-C145a

› (E)TSO-C146a

› (E)TSO-C196a.

Note: For aircraft entering oceanic airspace with RNP 2, 4 or 10 navigation specification capability, see MOS 11.03 in relation to long range navigation systems (LRNS) operability requirements.

A rotorcraft flying under the IFR must be fitted with an automatic pilot system or an automatic stabilisation system.

A rotorcraft flying under the IFR must have equipment fitted for measuring and displaying the flight information as shown in table 25.

Table 25: Requirements for equipment – rotorcraft IFR flight

Flight information	Requirements
indicated airspeed	› the equipment must be capable of being connected to: » an alternate source of static pressure that a pilot can select, and/or » a balanced pair of flush static ports › at least one airspeed indicator must include a means of preventing malfunction due to condensation or icing › the equipment must operate independently of other sources of indicated airspeed information
pressure altitude	the equipment must: › have an adjustable datum scale calibrated in millibars or hPa › be calibrated in ft except that if a flight is conducted in a foreign country which measures FLs or altitudes in metres – must be calibrated in metres or fitted with a conversion placard or device the system must be capable of being connected to: › an alternate source of static pressure that a pilot can select › a balanced pair of flush static ports
magnetic heading	the equipment must be either: › a direct reading magnetic compass › both a remote indicating compass and a standby direct reading magnetic compass
outside air temperature	no additional requirements
time	the equipment must display accurate time in hours, minutes and seconds, and be either: › fitted to the aircraft › worn by, or immediately accessible to, the pilot for the duration of the flight
slip	no additional requirements
attitude	the equipment must have both a primary, and an alternate, power supply the system must operate independently of other sources of turn-and-slip information

Flight information	Requirements
standby attitude	the equipment must: › have a power source independent of the electrical generating system › operate independently of other sources of attitude information › continue to operate without any action by a flight crew member, for 30 minutes after the electrical power generating system fails
vertical speed	the equipment must be capable of being connected to either: › an alternate source of static pressure that a pilot can select › a balanced pair of flush static ports the equipment must either: › be an instantaneous vertical speed indicator (IVSI) › meet performance requirements equivalent to an IVSI
stabilised heading	the equipment must have a primary, and an alternate power supply

Note 1: A gyro-magnetic remote indicating compass meets this requirement if it has a primary and an alternate power supply.

Note 2: For gyroscopic instruments (if any), equipment that indicates whether the power supply is adequate must be fitted.

For certain light sport aircraft, experimental aircraft and other certain registered aircraft, there are equipment variations allowable. Refer to MOS 26.13 through to 26.17 in Appendix A of this guide.

Where only one pilot, as permitted by the regulations or AFM, conducts an IFR flight the aircraft must be fitted with a second pressure altimeter which is separate from and independent of the first altimeter.

Where 2 pilots are required by the AFM, or the regulations, to conduct an IFR flight, the following equipment must be duplicated, separate from and independent of the other:

› indicated airspeed

› pressure altitude

› slip

› attitude

› vertical speed.

Application – VFR flight requirements do not apply to certain light sport aircraft (MOS 26.13)

Light sport aircraft for which a special certificate of airworthiness has been issued and is in force under CASR 21.186, or for which an experimental certificate has been issued and is in force under CASR 21.191, the equipment standards listed in table 20 and table 21 do not apply if the aircraft is fitted with equipment which provides a pilot with the same flight and navigation information.

Application – VFR and IFR flight requirements do not apply to certain experimental aeroplanes (MOS 26.14)

For experimental aeroplanes with an experimental certificate that has been issued and is in force under CASR 21.191, the equipment standards listed in table 15, table 16 and table 17 do not apply if it is fitted with equipment which provides a pilot the same flight and navigation information.

Note: For a flight under the IFR an experimental aeroplane must be fitted with an approved GNSS (see 26.08).

Application – VFR and IFR flight requirements do not apply to certain experimental rotorcraft (MOS 26.15)

For experimental rotorcraft with an experimental certificate that has been issued and is in force under CASR 21.191, the equipment standards listed in table 18, table 19 and table 20 do not apply if it is fitted with equipment which provides a pilot with the same flight and navigation information.

Note 1: A VFR flight by night conducted by a single pilot in an experimental rotorcraft must be fitted with an autopilot or automatic stabilisation system.

Note 2: An IFR fight in an experimental rotorcraft must be fitted with an approved GNSS and an autopilot or automatic stabilisation system.

Application – VFR and IFR flight requirements do not apply to certain registered aircraft (MOS 26.16)

For a registered aircraft, equipment listed under the table 20, table 21 and table 22 (aeroplanes) and table 23, table 24 and table 25 (rotorcraft) do not apply if, it is fitted with equipment, that the type certificating authority of a recognised country determines will achieve, for the intended operation, an equivalent level of safety.

Electronic flight information systems (MOS 26.17)

Light sport aircraft (MOS 26.13), experimental aeroplanes (MOS 26.14) and experimental rotorcraft (MOS 26.15) must be fitted with one of the following:

- an electronic flight information system (EFIS)
- an electronic display indicator (EDI)
- another system for displaying flight information electronically.

The system must have a battery-powered back-up, or a power source independent of the aircraft's primary electrical system.

The battery-powered back-up must be fully charged before flight and have enough capacity to power the EFIS panel or other display for at least 60 minutes.

Radiocommunication systems (MOS 26.18)

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

- two-way, by voice
- on all frequencies necessary to meet the reporting, broadcast and listening watch requirements under regulations 91.630, 91.635, 91.640 and 91.675 of CASR, 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:** *For other than an aircraft flying within or intending to enter an MBA, 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 (see MOS 26.02).

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

Note 3: Certain operational requirements for an MBA are contained in MOS 11.10A. Radio broadcast requirements for an MBA are contained in MOS 21.09.

When aircraft may begin a flight with inoperative radio communications (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

An aircraft may only be flown in controlled airspace with an inoperative radio if:

- ATC is informed, before the flight begins, of the inoperative radio
- clearance is obtained from ATS for the flight.

An aircraft required to carry a radio may only fly with it inoperative in Class G airspace above 5,000 ft or in an MBA if:

- the flight is conducted during the day in VMC

- the flight is conducted in-company with another aircraft and the other aircraft is carrying an operative radio and:
  - the pilot of the other aircraft ensures that all the required broadcasts ad reports required by regulation 91.630 are made for both aircraft
  - the pilot of the other aircraft is qualified to use the radio.

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

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

Equipment to measure and record cosmic radiation (MOS 26.20)

An aeroplane flying under the IFR above FL 490, must be fitted with equipment to measure and display the total cosmic radiation received in the cabin. The equipment must continuously measure and display:

- the dose rate of total cosmic radiation being received
- the cumulative dose of total cosmic radiation received on each flight.

Total cosmic radiation means the sum of ionising or neutron radiation of galactic and solar origin.

Cockpit and cabin lighting requirement (MOS 26.21)

Night

An aircraft flying at night must be fitted with, or carry:

- a cockpit lighting system that:
  - illuminates each item of equipment including checklists and flight documents a flight crew member may use
  - is compatible with each item of equipment a pilot may use
  - is arranged in a way that:
    - each pilot from their normal sitting position can read all placards and instrument markings and
    - their eyes are shielded from direct and reflected light
  - is adjustable, so that the intensity of the lighting for the light conditions can be varied
- a cabin lighting system that enables each occupant of the aircraft to see and use:
  - their seatbelt and oxygen facilities (if any)
  - the normal and emergency exit
- for each FCM, an independent portable light accessible to the FCM from their normal sitting position
- for each other crew member (if any), an independent portable light accessible to the crew member at their crew station.

Day

Cockpit lighting and cabin lighting is also required if, by day, natural light does not adequately illuminate the items of equipment and documents mentioned above.

An independent portable light is most commonly a flashlight or torch. A torch carried by a flight crew member meets the definition as an independent portable light if it is serviceable and can produce sufficient light to properly illuminate any switch control or display that the pilot may be required to use or view in normal abnormal and emergency situations.

Anti-collision lights (MOS 26.22)

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

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

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

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

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

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

> **Exception:** *Anti-collision lights do not need to be displayed (on) if:*
>
> - you reasonably believe that in the circumstances, reflection or glare from the lights may cause a hazard to the aircraft, or
> - permitted by another MOS provision such as MOS 12.09 of the Part 138 MOS: display of exterior lighting in an NVIS operation that is an aerial work operation. See also MOS 3.08 of the Part 91 MOS.

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

Landing lights (MOS 26.23)

An aircraft operating by night must be fitted with at least one landing light.

Navigation lights (MOS 26.24)

An aircraft operating by night must be fitted with navigation lights.

Navigation lights, where required to be fitted, must be displayed on the aerodrome movement area.

> **Exception:** *Navigation lights do not need to be displayed if permitted by another MOS provision such as MOS 12.09 of the Part 138 MOS: display of exterior lighting in an NVIS operation that is an aerial work operation. See also MOS 3.08 of the Part 91 MOS.*

Altitude alerting system and assigned altitude indicator – IFR flights (MOS 26.25)

For flight under the IFR, the following aircraft must have an altitude alerting system:

- piston-engine aircraft, operating in controlled airspace above FL150
- unpressurised turbine-engine aircraft, operating in controlled airspace above FL150
- pressurised turbine-engine aircraft operating in any controlled airspace.

The altitude alerting system must include an assigned altitude indicator and include an aural or visual warning to alert the flight crew if the aircraft approaches a selected altitude, or if the aircraft deviates from a selected altitude.

If an aircraft other than one referred to above is flying under the IFR in controlled airspace, it must be fitted with altitude alerting which at least includes an assigned altitude indicator.

Aircraft flown with inoperative altitude alerting equipment – IFR flights (MOS 26.26)

Despite MOS 26.25, altitude alerting equipment may be inoperative at the beginning of a flight only if the flight begins within 72 hours of the time the equipment was found to be inoperative and is from an aerodrome at which there is no facility for the equipment to be repaired or replaced.

Aeroplane airborne collision avoidance system – ACAS II (MOS 26.27)

Reserved

ACAS II requirements for use (MOS 26.28)

Reserved

Flight with inoperative ACAS (MOS 26.29)

Reserved

Flight recorders – definition (MOS 26.30)

Combination recorder means a single recording system combining the capabilities and the functions of a flight data recorder (FDR) and a cockpit voice recorder (CVR).

Recorder means a combination recorder, an FDR or a CVR.

Aeroplane flight data recorder (MOS 26.31)

One FDR must be fitted to a turbine-powered aeroplane that has a MTOW of more than 5,700 kg, or is of a type first certificated in its country of manufacture on or after 1 July 1965.

> **Exception:** *MOS 26.31 does not apply to an agricultural or restricted category aeroplane.*

Aeroplane cockpit voice recorder (MOS 26.32)

One (1) CVR must be fitted to:

- an aeroplane that has a MTOW of more than 5,700 kg which:
  - is turbine powered or
  - is of a type first certificated in its country of manufacture on or after 1 July 1965
- a multi-engine turbine-powered aeroplane that:
  - is pressurised
  - has a MTOW of 5,700 kg or less
  - is type certified in its country of manufacture for operation with more than 11 seats (including seats specifically designed for the use of crew members)
  - was first issued with a certificate of airworthiness after 1 January 1988.

> **Exception:** *MOS 26.32 does not apply to an agricultural or restricted category aeroplane.*

Rotorcraft flight data recorder (MOS 26.33)

One FDR must be fitted to a turbine-powered rotorcraft that has a MTOW of more than 5,700 kg, or is of a type first certificated in its country of manufacture on or after 1 July 1965.

> **Exception:** *MOS 26.33 does not apply to an agricultural or restricted category rotorcraft.*

Rotorcraft cockpit voice recorder (MOS 26.34)

One CVR must be fitted to the following rotorcraft:

- a turbine-powered rotorcraft that:
  - has a MTOW of more than 5,700 kg, or is of a type first certificated in its country of manufacture on or after 1 July 1965.
- a multi-engine turbine-powered rotorcraft that:
  - is pressurised
  - has a MTOW of 5,700 kg or less
  - is type certified in its country of manufacture for operation with more than 11 seats (including seats specifically designed for the use of crew members)
  - was first issued with a certificate of airworthiness after 1 January 1988.

> **Exception:** *MOS 26.34 does not apply to an agricultural or restricted category rotorcraft.*

Combination recorders – for aeroplane or rotorcraft (MOS 26.35)

Where an aircraft is required to be fitted with a CVR and an FDR the requirement may be met by the following fitting:

For aeroplanes:

- 2 combination recorders, or
- one FDR and one combination recorder, or
- one CVR and one combination recorder.

For rotorcraft:

- one combination recorder, or
- one FDR and one combination recorder, or
- one CVR and one combination recorder.

> **Exception:** *MOS 26.35 does not apply to an agricultural or restricted category aeroplane or rotorcraft.*

FDR, CVR and combination recorder technical requirements (MOS 26.36)

An FDR, or a combination recorder must comply with either the requirements of CAO 103.19 or (E) TSO-C124a.

A CVR or a combination recorder must comply with either the requirements of CAO 103.20 or (E) TSO-C123a.

Note: The standards referred to above include the minimum recording time requirements.

The operator of an aircraft that is required to be equipped with any of the following must ensure:

- for an FDR or combination recorder – the recorder retains its last 25 hours of flight data recording
- for an FDR or combination recorder – data from the last 2 occasions on which the flight data recording was calibrated are preserved

Note: This is to enable a determination of the accuracy of the recorded data

- for a CVR or a combination recorder – the recorder retains its last 30 minutes of cockpit voice recording.

Use of FDR, CVR and combination recorders (MOS 26.37)

An FDR must record continuously from the time the aircraft first begins moving under its own power, until the time the flight is terminated, and the aircraft can no longer move under its own power.

Subject to the exception below a CVR must:

- start to record before the aircraft first begins moving under its own power
- as far as practicable if electrical power is available, start to record as early as possible during the cockpit checks before the engines are started at the beginning of the flight
- record continuously until the termination of the flight when the aircraft is no longer capable of moving under its own power and the engines have been shut down
- as far as practicable if electrical power is available, continue recording until as close as possible to the conclusion of the cockpit checks immediately following engine shutdown at the end of the flight.

The FDR and the CVR within a combination recorder must record continuously during the same periods as an FDR and a CVR as described above.

> **Exception:** *If:*
>
> - there is no auxiliary power unit (APU) or other alternative power source for the aircraft
> - it is reasonably necessary to preserve the aircraft's primary power source to start the aircraft's engines
> - the FDR is operated continuously during the period beginning just before the engines are started for take-off and ending when the final checklist is completed at the end of the flight
> - then a CVR must record continuously from immediately after the engines are started, to after the final checklist is completed by you at the end of the flight.

An FDR or combination recorder must not be operated during maintenance of the aircraft or of an aeronautical product fitted to the aircraft, except if the maintenance is to the recorder or an aircraft engine. An APU fitted to the aircraft is not an aircraft engine unless it can propel the aircraft.

Flight with inoperative FDR, CVR or combination flight recording equipment (MOS 26.38)

An FDR, a CVR, or a combination recorder may only be inoperative at the beginning of a flight if:

- the departure aerodrome has no facility to repair or replace the recorder
- for an aircraft that is only required to be fitted with one CVR *or* one FDR – the inoperative recorder has not been inoperative for more than 21 days
- for an aircraft required to be fitted with one CVR *and* one FDR:
  - the inoperative recorder has not been inoperative for more than 21 days
  - the other recorder is operative
- for an aircraft fitted with one combination recorder – the inoperative recorder has not been inoperative for more than 3 days
- for an aircraft fitted with more than one combination recorder
  - the inoperative combination recorder has not been inoperative for more than 21 days
  - the other combination recorder is operative.

Data link recorder (MOS 26.39)

Reserved

Flight crew intercommunications system – VFR flights (MOS 26.40)

An aircraft flown under the VFR that is required by the regulations or AFM to be flown by at least 2 pilots, and whose cockpit noise levels at any stage of the flight prevent pilots from communicating with each other in speech at a normal conversation level, must be fitted with an intercommunication system which includes a headset with a combined microphone.

Flight crew intercommunications system – IFR flights (MOS 26.41)

An aircraft flown under the IFR with one pilot permitted under the regulation or AFM, must be fitted with, or carry:

- 2 headsets with combined microphones, or
- one headset with a combined microphone, and one hand-held microphone with a loudspeaker.

An aircraft flown under the IFR that is required by the regulations or the AFM to be flown by at least 2 pilots must be fitted with either:

- 3 headsets with combined microphones
- 2 headsets with combined microphones, and one hand-held microphone with a loudspeaker.

Public address system (MOS 26.42)

An aircraft that has a maximum operational passenger seating configuration of 20 or more, and at least one passenger is onboard, must be fitted with a public address system to enable you to address the passengers.

Supplemental oxygen (MOS 26.43)

An aircraft must carry sufficient supplemental oxygen as described in table 26.

Fitted or carried supplemental oxygen, must be able to be stored and dispensed to the crew and passengers.

Flight crew members must use supplemental oxygen in accordance with the supply requirements set out in table 26.

Pilots should consider whether supplemental oxygen should be carried even if it is not required since hypoxia is insidious, and its onset is determined by many variables.

Electronic oximeters are available for personal use and may be useful for those who have not been trained in the hypoxia symptom awareness, for example by entering a hyperbaric chamber and experiencing hypoxia in a controlled setting.

Table 26: Supplemental oxygen requirements

Person	Supplemental oxygen supply requirements
flight crew member or cabin crew member	for any period exceeding 30 minutes when the cabin pressure altitude is continuously at least FL125 but less than FL140, there must be supply for the entire period. For any period when the cabin pressure altitude is at least FL140, there must be supply for the entire period. When a pressurised aircraft is flown at an altitude of FL250 or more, there must also be at least 10 minutes supply even if the entire period spent at that altitude is less than 10 minutes
passengers	for any period when the cabin pressure altitude is at least FL150, there must be supply for the entire period. When a pressurised aircraft is flown at an altitude of FL250 or more, there must also be at least 10 minutes supply after descending below FL250 even if the entire period spent at that altitude is less than 10 minutes

Oxygen masks usage requirement – pressurised aircraft above FL250 (MOS 26.44)

When flying above FL250 in a pressurised aircraft, at all times at least one seated pilot, must wear securely, a sealed oxygen mask which is being supplied with supplemental oxygen, or:

- which automatically supplies supplemental oxygen when the cabin pressure altitude is at or above FL140, or
- have access to a quick-donning mask supplied with supplemental oxygen when the mask is donned or worn.

Note: A quick-donning mask means one for personal use which within 5 seconds of it being deployed and ready for use, can be, placed, secured and sealed on the FCM's face, using one hand.

Protective breathing equipment – flight crew members (MOS 26.45)

When a pressurised aircraft is required by either the regulations or the AFM to have at least 2 pilots, it must carry protective breathing equipment (PBE) for each pilot which must protect the wearer's eyes, nose and mouth.

For the wearer's eyes, it must not adversely affect vision in any noticeable way and must allow corrective glasses to be worn in a normal position.

The oxygen supply must be continuously available for at least 15 minutes.

Note: The oxygen supply for the PBE for each flight crew member can be provided by the supplemental oxygen required under MOS 26.43.

The PBE for a flight crew member must be accessible for immediate use at their crew station and not prevent, or be likely to prevent, effective use of any crew intercommunications or radio equipment fitted to or carried on the aircraft.

Portable protective breathing equipment (MOS 26.46)

A pressurised aircraft which is required by the regulations or AFM to be flown by at least 2 pilots must carry portable protective breathing equipment (*portable PBE units*) for each pilot to protect the wearers eyes, nose and mouth.

For the wearer's eyes, it must not adversely affect vision in any noticeable way and must allow corrective glasses to be worn in a normal position.

The oxygen supply must be continuously available for at least 15 minutes.

The portable PBE units must be located as follows:

- where no crew members other than the minimum flight crew members are carried – one portable PBE unit must be located in, or as close as practicable to, the flight crew compartment
- as far as practicable – one portable PBE unit must be located adjacent to each of the hand-held fire extinguishers required to be carried
- if this is not practicable to carry the PBE adjacent to the fire extinguishers – one portable PBE unit must be located adjacent to each individual cabin crew member crew station that is being used by a cabin crew member.

Portable PBE units must not prevent, or be likely to prevent, a crew member from effectively using any crew intercommunications or radio equipment that is fitted to or carried on the aircraft.

First aid oxygen equipment – pressurised aircraft (MOS 26.47)

In this section:

- *BTPD* means body temperature and pressure dry.
- *BTPS* means body temperature and pressure saturated.
- *first aid oxygen* means a supply of undiluted oxygen for any passengers who, for physiological reasons, may still require oxygen when:
  - there has been a cabin depressurisation
  - the amounts of supplemental oxygen supply otherwise required have been exhausted.
- *standard temperature and pressure* mean 0 degrees Celsius at a pressure of 760 mm Hg.
- *STPD* means standard temperature and pressure dry.

A pressurised aircraft must be fitted with or carry first aid oxygen in accordance with this section.

The aircraft must carry, for use in first aid, enough first aid oxygen that will provide an average oxygen gas flow rate, calculated assuming dry oxygen gas at standard temperature and pressure, of 3 litres per minute per person for:

- whichever of the following is the greater:
  - 2% of the passengers carried on the flight
  - one passenger
- for the period after a cabin depressurisation where the cabin pressure altitude is above 8,000 ft but is not above FL150.

The aircraft must also carry enough first aid oxygen dispensing units (masks) but in no case less than 2 units.

An oxygen dispensing unit must be capable of generating a flow rate, calculated assuming dry oxygen gas at standard temperature and pressure, of at least 4 litres per minute per person STPD, and that may have a means of reducing the flow to not less than 2 litres per minute per person STPD at any altitude.

Carriage of emergency locator transmitter (ELT) (MOS 26.48)

All aircraft

As a minimum, all aircraft must be fitted with an automatic ELT or carry a survival ELT.

> **Exception:** *This requirement does not apply to:*
>
> - a single seat aircraft, or
> - an aircraft flown not more than 50 NM from the place of departure or
> - a flight for the purposes of:
>   - the aircraft's manufacture
>   - the preparation or delivery of the aircraft following the purchase or transfer of the operator
>   - the 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.

Single-engine aircraft over water

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 aircraft's manufacture
>   - preparing or delivering the aircraft following the purchase or transfer of the operator
>   - positioning an Australian aircraft from a location outside Australia to a place where any ELTs required to be fitted to the aircraft will be registered with AMSA
> - an aircraft fitted with a radio (or equivalent) 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 either be:

- fitted with an automatic ELT and carry a survival ELT
- carry at least 2 survival ELTs.

> **Exception:** *The requirement that a transmitter which is carried or fitted needs to be registered with either 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.

ELT switches

If the ELT carried is an automatic ELT that has a switch marked (however described) as 'armed,' then you must ensure that the switch is set to this position at the time the flight begins.

Location of carriage

If the ELT carried is a survival ELT, you must ensure that the ELT is carried in one of the following locations on the aircraft:

- on the person of a crew member, or
- in, or adjacent to, a life raft, or
- adjacent to an emergency exit used for evacuation of the aircraft in an emergency.

ELT – basic technical requirements (MOS 26.49)

An ELT is a transmitter that must:

- when activated, transmit simultaneously on 121.5 MHz and 406 MHz
- when fitted to, or carried on, an Australian aircraft, be registered, solely, with AMSA
- when fitted to, or carried on, a foreign-registered aircraft, be registered with the authority of the aircraft's state of registry responsible for search and rescue services, and not with AMSA
- for identification purposes, be coded in accordance with the requirements for the transmitter in Appendix 1 to Chapter 5 of Part II, Voice Communications, in Volume III of ICAO Annex 10, Aeronautical Telecommunications
- where fitted with a lithium-sulphur dioxide battery, the battery must be authorised by the FAA or EASA in accordance with (E) TSO-C142a.

Automatic ELT (MOS 26.50)

An *automatic ELT* is one that meets the criteria of MOS 26.49 above and must automatically activate on impact and be one of the following types:

- authorised by the FAA or EASA in accordance with (E)TSO-C126
- authorised by EASA in accordance with:
  - ETSO-2C91a for operation on 121.5 MHz
  - ETSO-2C126 for operation on 406 MHz
- approved under CASR Part 21 as having a level of performance equivalent to a type of transmitter mentioned above.

Survival ELT (MOS 26.51)

A *survival ELT* is one that meets the criteria of MOS 26.49 and can be removed from the aircraft, and is one of the following types:

- an emergency position-indicating radio beacon that meets the requirements of AS/NZS 4280.1:2003
- a personal locator beacon that meets the requirements of AS/NZS 4280.2:2003
- authorised by the FAA or EASA in accordance with (E)TSO-C126
- authorised by EASA in accordance with:
  - ETSO-2C91a for operation on 121.5 MHz
  - ETSO-2C126 for operation on 406 MHz
- approved under CASR Part 21 as having a level of performance equivalent to a type mentioned above.

Aircraft flown with inoperative ELT (MOS 26.52)

An aircraft required to carry either an automatic ELT, or a survival ELT but which is not required to carry a life raft, may begin a flight with either being inoperative if the purpose of the flight is to ferry the aircraft to have the ELT repaired or maintained.

An aircraft may be flown without an automatic or survival ELT if:

- the ELT has been temporarily removed for maintenance and there is an entry in the aircraft's flight technical log, stating:
  - the ELT make, model and serial number
  - the date on which the ELT was removed from the aircraft
  - the reason for the removal of the ELT
- a placard stating 'Emergency locator transmitter not installed or carried' has been placed in the aircraft in a position where you can see it
- no more than 90 days have passed since the ELT was temporarily removed for maintenance.

For a period not exceeding 90 days, an aircraft with an inoperative automatic ELT that has been removed is not required to carry a survival ELT. Conversely an aircraft with an inoperative survival ELT that has been removed, is not required to carry an automatic ELT.

Hand-held fire extinguishers – aeroplanes (MOS 26.53)

An aeroplane with a MTOW above 5,700 kg, must at least carry the following hand-held fire extinguishers:

- one in the flight crew compartment
- one in each galley or one readily accessible for use in each galley, being a galley that is not in a passenger, crew or cargo compartment
- one that is accessible to the crew members, conveniently located for use, for the following compartment classes as defined under the Federal Aviation Regulation (FAR) 25.857:
  - a Class A cargo or baggage compartment
  - a Class B cargo or baggage compartment
  - a Class E cargo or baggage compartment
- for an aircraft with the maximum certified passenger seating capacity as set out in table 27.

Table 27: Requirements for number of hand-held fire extinguishers

Maximum certified passenger seating capacity	Number of extinguishers
7–30	1
31–60	2
61–200	3
201–300	4
301–400	5
401–500	6
501–600	7
601 or more	8

Exception: *For an aeroplane with a maximum certified passenger seating capacity of not more than 9, in which the flight crew members and the passengers occupy the same compartment only one hand held fire extinguisher that is readily available to the pilot is required.*

Exception: *For an aeroplane with a maximum certified passenger seating capacity of more than 9, in which the flight crew members and the passengers occupy the same compartment only one hand held fire extinguisher that is readily available to the pilot and one readily available to the passengers is required.*

It is recommended that operators consider the number and type of handheld fire extinguishers as appropriate to their needs and not simply with a view to compliance. Refer to AWB Airframes 26 - Fire protection-further information for fire protection and the Part 91.

Hand-held fire extinguishers – rotorcraft (MOS 26.54)

A rotorcraft that is *type certified in the transport category* must carry the following minimum number of hand-held fire extinguishers:

- *one* in the cockpit
- for an aircraft with a maximum certified passenger seating capacity of 7 or more, one in the passenger compartment.

Exception: *a rotorcraft with a maximum certified passenger seating capacity of not more than 9, in which the flight crew members and the passengers occupy the same compartment – one hand-held fire extinguisher, must be readily available to the pilot.*

Exception: *a rotorcraft with a maximum certified passenger seating capacity of more than 9, in which the flight crew members and the passengers occupy the same compartment – one hand-held fire extinguisher, must be readily available to the pilot and one readily available to the passengers.*

It is recommended that operators consider the number and type of handheld fire extinguishers as appropriate to their needs and not simply with a view to compliance. Refer to AWB Airframes 26 - Fire protection-further information for fire protection and the Part 91.

Sea anchors etc and sound signals – seaplanes and amphibians and certain rotorcraft (MOS 26.55)

A seaplane, amphibian or a rotorcraft designed to take off or land on either land or water must carry a sea anchor and other equipment for mooring when a flight involves taking off or landing on water.

If the flight is on or over water to which international regulations apply, the aircraft must carry equipment for making the sound signals required by the international regulations for the flight.

Flights over water to which international regulations apply are those beyond 12 NM from the Australian coastline even though they may be within the Australian flight information region boundary.

Life jackets – carriage requirements (MOS 26.56)

For an aircraft that is one of the following:

- seaplane or amphibian
- 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
- 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.*

Stowage of life jackets (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 (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.

Exception: *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: *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.*

Wearing life jackets – rotorcraft – special provision (MOS 26.59)

When a rotorcraft is taking off or landing at an aerodrome in a populous area, and an area of water is the only reasonably available forced landing area, each person (other than an infant) must wear a life jacket, while the rotorcraft, after take-off or on descent, is below the minimum height at which the rotorcraft is required to be flown under 91.265.

Determination of the minimum height is set out in 91.265 and in most circumstances, outside access lanes, will be 1,000 ft above the highest obstacle.

Life rafts – carriage requirements (MOS 26.60)

An aircraft must carry enough life rafts for each person being carried whenever the aircraft is operated over water and is further from land than:

- for a jet-driven multi-engine aeroplane with a MTOW of more than 2,722 kg – the shorter of:
  - the distance the aeroplane would fly in 2 hours at its normal cruising speed in still air, or
  - 400 NM
- for a propellor-driven turbine-engine multi-engine aeroplane with a MTOW of more than 5,700 kg – the shorter of:
  - the distance the aeroplane would fly in 2 hours at its normal cruising speed in still air, or
  - 400 NM
- for any other aircraft – the shorter of:
  - the distance the aircraft would fly in 30 minutes at its normal cruising speed in still air, or
  - 100 NM.

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.

Stowage of life rafts (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.

Overwater survival equipment (MOS 26.62)

An aircraft that is required to carry a life raft (MOS 26.60) must carry survival equipment that is appropriate for sustaining life in the overwater area in which it is flying and signalling equipment that can make the distress signals set out in Appendix 1 to ICAO Annex 2 – 'Rules of the Air' if required.

Electronic Visual Distress Signals - it is recommended that operators consider whether EVDS (lasers) meet the requirements of the MOS and whether they can be used within the limits of the CAA 1988, AS 2092-2004, other State and Territory legislation and indeed whether they would be recognised as a distress signal at all since they are not internationally approved distress signals.

Remote area – definitions (MOS 26.63)

A *remote area* means one of the following:

- Central Australia remote area
- Snowy Mountains remote area
- Tasmania remote area.

Remote area survival equipment (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 (MOS 26.65)

Remote areas are the areas of Australia illustrated by shading in Figure 25, Figure 26 and Figure 27 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 Ana Plains
- 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, then 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 25: Central Australia remote area

Figure 26: Snowy Mountains remote area

Figure 27: Tasmania remote area

Surveillance equipment exceptions to (E) TSO or NAA requirements (MOS 26.66)

Relevant aircraft in this section means any of the following:

- a light sport aircraft for which a special certificate of airworthiness has been issued and is in force under regulation 21.186 of CASR
- a light sport aircraft for which an experimental certificate has been issued and is in force under 21.191 of CASR
- any other aircraft for which an experimental certificate has been issued and is in force under 21.191 of CASR.

An item of equipment, or element of an item of equipment, required and authorised in accordance with a particular TSO or ETSO, does not apply to a relevant aircraft in respect of any surveillance equipment if:

- the configuration of surveillance equipment that is fitted or carried provides the pilot, other aircraft and ATS with the same surveillance capability as would be provided if the equipment had complied with the TSO or ETSO
- the pilot or the operator has a statement of conformance (however described) from the equipment manufacturer stating the standard or standards of the TSO or ETSO with which the equipment conforms.

The MOS 26.75 requirement below, that an approved integrated TABS device be authorised by the relevant NAA of the equipment manufacturer, does not apply to a relevant aircraft if:

- the configuration of the Integrated TABS device that is fitted or carried provides the pilot, other aircraft and ATS with the same surveillance capability as would be provided if the equipment had been expressly authorised by the relevant NAA
- the pilot or the operator has a statement of conformance (however described) from the Integrated TABS device manufacturer stating the equipment meets the requirements of this Division for the equipment.

Surveillance equipment – definitions (MOS 26.67)

Definitions for this section are as follows:

14 CFR 91.225 means regulation 91.225 of the United States Title 14 Code of Federal Regulations (CFR) titled *Automatic Dependent Surveillance-Broadcast (ADS-B) Out equipment and use.*

ADS-B means automatic dependent surveillance – broadcast.

ADS-B OUT means the functional capability of an aircraft or vehicle to periodically broadcast its state vector (position and velocity) and other information derived from onboard systems in a format suitable for ADS-B IN capable receivers.

ADS-B test flight means a flight to prove ADS-B transmitting equipment that is newly installed on the aircraft undertaking the flight.

aircraft address means a unique combination of 24 bits available for assignment to an aircraft for the purpose of air–ground communications, navigation and surveillance.

alternate ADS-B OUT equipment configuration: see paragraph (b) of the definition of approved ADS-B OUT equipment configuration.

approved ADS-B OUT means an equipment configuration capable of ADS-B OUT operation on the ground and in flight, and that is one of the following:

a) an approved Mode S transponder with ADS-B capability connected to an approved GNSS position source

b) an alternate ADS-B OUT equipment configuration meeting the requirements mentioned in MOS 26.72

c) another system approved under CASR Part 21 as having a level of performance equivalent to a system mentioned in paragraph (a) or (b).

approved GNSS position source means a GNSS position source that is:

a) authorised by the FAA or EASA in accordance with one of the following:

   i. (E)TSO-C145a

   ii. (E)TSO-C146a

   iii. (E)TSO-C196a, or

b) an alternate GNSS position source meeting the requirements mentioned in MOS 26.71, or

c) another system approved under CASR Part 21 as having a level of performance equivalent to performance in accordance with paragraph (a) or (b).

approved Mode A/C transponder means a Mode A transponder or a Mode C transponder that is authorised:

a) by CASA or the NAA of a recognised country in accordance with TSO- C74c (E)TSOC74d, or

b) by CASA in accordance with TSO-1C74c.

*approved EC device configuratio*n means an equipment configuration meeting the requirements mentioned in section 26.72C.

approved integrated TABS configuration means an equipment configuration meeting the requirements mentioned in section 26.72B.

approved Mode S transponder means a Mode S transponder that is:

a) authorised by CASA or the NAA of a recognised country in accordance with (E) TSO-C112, or

b) another system approved under CASR Part 21 as having a level of performance equivalent to a system mentioned in paragraph (a).

Approved Mode S transponder with ADS-B capability means an approved Mode S transponder that is:

a) authorised by CASA or the NAA of a recognised country in accordance with (E) TSO-C166, or

b) another system approved under CASR Part 21 as having a level of performance equivalent to a system mentioned in paragraph (a).

approved Mode S transponder with Class B TABS position source device configuration means an equipment configuration meeting the requirements mentioned in section 26.72.

approved transponder means an approved Mode A/C transponder or an approved Mode S transponder.

Class A TABS means TABS functionality relating to transponder function, altitude source function, and ADS-B OUT function, in accordance with (E) TSO C199.

Class B TABS means TABS functionality relating to position source function, in accordance with (E) TSO C199.

Class B TABS position source device means a device with a Class B TABS functionality.

DAPs mean Mode S enhanced surveillance (EHS) downlink aircraft parameters.

EASA AMC 20-24 means Annex II to ED Decision 2008/004/R titled Certification Considerations for the Enhanced ATS in Non-Radar Areas using ADS-B Surveillance (ADS-B-NRA) Application via 1090 MHz Extended Squitter, dated 2 May 2008, of EASA, as in force or existing from time to time.

EASA CS-ACNS means Annex I to ED Decision 2013/031/R titled Certification Specifications and Acceptable Means of Compliance for Airborne Communications, Navigation and Surveillance CS-ACNS, dated 17 December 2013, of EASA, or any later version.

GPS means Global Positioning System.

HPL means the horizontal protection level of the GNSS position of an aircraft as an output of the GNSS receiver or system.

integrated TABS device means a device with integrated Class A TABS and Class B TABS functionality.

Mode A is a transponder function that transmits a 4-digit octal identification code for an aircraft's identity when interrogated by a secondary surveillance radar (SSR).

Mode A code is the 4-digit octal identification code transmitted by a Mode A transponder function.

Mode C is a transponder function that transmits a 4-digit octal identification code for an aircraft's pressure altitude when interrogated by an SSR.

Mode S is a transponder function that uses a unique aircraft address to selectively call individual aircraft and supports advanced surveillance using Mode S EHS, Mode S ELS, or Mode S extended squitter (ES) capabilities.

Mode S EHS means Mode S enhanced surveillance, which is a data transmission capability of a Mode S transponder.

Mode S ELS means Mode S elementary surveillance, which is a data transmission capability of a Mode S transponder.

Mode S ES means Mode S extended squitter, which is a data transmission capability of a Mode S transponder used to transmit ADS-B OUT information.

NACp means Navigation Accuracy Category – Position as specified in paragraph 2.2.3.2.7.1.3.8 of RTCA/DO-260B.

NIC means Navigation Integrity Category as specified in paragraph 2.2.3.2.7.1.3.10 of RTCA/DO- 260B.

NUCp means Navigation Uncertainty Category – Position as specified in paragraph 2.2.8.1.5 of RTCA/DO-260.

RTCA/DO-229D means document RTCA/DO-229D titled *Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment*, dated 13 December 2006, of the RTCA Inc. of Washington D.C. USA.

RTCA/DO-260 means RTCA Inc. document RTCA/DO-260 titled *Minimum Operational Performance Standards for 1090 MHz Automatic Dependent Surveillance – Broadcast (ADS-B)*, dated 13 September 2000.

RTCA/DO-260B means RTCA Inc. document RTCA/DO-260B titled *Minimum Operational Performance Standards for 1090 MHz Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services – Broadcast (TIS-B)*, dated 2 December 2009 unless a later version is expressly referred to.

SA means Selective Availability and is a function of the GPS that has the effect of degrading the accuracy of the computed GPS position of a GNSS *equipped aircraft.*

SDA means System Design Assurance as specified in section 2.2.3.2.7.2.4.6 of RTCA/DO-260B.

surveillance equipment means equipment that broadcasts data as a means to identify an aircraft, determine its three-dimensional position or obtain other information (such as, but not limited to, velocity and selected altitude or flight level).

SSR or secondary surveillance radar means a surveillance radar system which uses transmitters/receivers (interrogators) and transponders.

SIL means *Source Integrity Level as specified in paragraph 2.2.3.2.7.1.3.10 of RTCA/DO-260B.*

surveillance radar means radar equipment *used to determine the position of an aircraft in range and azimuth.*

TABS means traffic awareness beacon system.

transponder means an aircraft's SSR transponder.

UK CAP 1391 means Civil Aviation Authority of the United Kingdom document number CAP 1391 titled Electronic conspicuity devices, latest edition.

Required surveillance equipment (MOS 26.68)

Surveillance equipment required to be fitted to an aircraft must be approved and meet the relevant operational and airspace requirements set out in table 28.

An aircraft operating at Brisbane, Sydney, Melbourne or Perth aerodrome must be fitted with, or carry, at least one approved Mode S transponder with ADS-B capability.

Note: An approved Mode S transponder with ADS-B capability is not required to transmit ADS-B OUT for a VFR flight.

Pilots should refer to AC 91-23 for guidance on electronic conspicuity devices (ADS-B) for operations under the VFR.

Carriage of transponders and surveillance equipment (MOS 26.68)

A transponder required to be fitted to an aircraft must be approved and meet the relevant operational and airspace requirements set out in the following table.

Table 28: Surveillance equipment – requirements

Operation	Class of airspace	Aircraft requirements
IFR	A, B, C, D, E, or G	at least one ADS-B OUT equipment configuration.
VFR	any from FL 290 and above	at least one approved ADS-B OUT equipment configuration.
VFR	A, B, C, below FL 290	at least one of the following: › approved ADS-B OUT configuration › approved Mode S transponder with Class B TABS position source device configuration › approved transponder being: » for an aircraft manufactured on or after 6 February 2014 or modified by having its transponder installation replaced on or after 6 February 2014 – an approved Mode S transponder with ADS-B capability » for any other aircraft – approved transponder. **Note:** An approved Mode S transponder with ADS-B capability is not required to transmit ADS-B OUT for a VFR flight.
VFR The requirements do not apply if the aircraft does not have an engine or sufficient engine driven electrical power generation capacity to power the surveillance equipment	G from 10,000 ft to not above FL 290 E not above FL 290	at least one of the following: › approved ADS-B OUT configuration › approved equipment configuration of a Mode S transponder with Class B TABS position source device › approved transponder being: » for an aircraft manufactured on or after 6 February 2014 or modified by having its transponder installation replaced on or after 6 February 2014 – a Mode S transponder with ADS-B capability » for any other aircraft – an approved transponder › an approved integrated TABS device. **Note:** An approved Mode S transponder with ADS-B capability is not required to transmit ADS-B OUT for a VFR flight.

Note: Australia does not currently have Class B airspace

Requirements for other surveillance equipment for VFR aircraft (MOS 26.68A)

For surveillance equipment in addition to that required or not required by MOS 26.68 any surveillance equipment fitted to or caried on the aircraft must meet the requirements in the table below.

Table 28A: Optional surveillance equipment – requirements

Operation	Class of airspace	Aircraft requirements
VFR	Classes A, B, C or E below FL 290 Class G from 10,000 ft but not above FL290	an approved EC device configuration **Note:** An EC device may be operated concurrently with a Mode A/C, or a Mode S transponder (other than one that is transmitting ADS-B – see section 26.72C).
VFR	Class G below 10,000 ft	any of the following: › approved ADS-B OUT configuration › approved equipment configuration of a Mode S transponder with Class B TABS position source device › approved transponder being: » for an aircraft manufactured on or after 6 February 2014 or modified by having its transponder installation replaced on or after 6 February 2014 – a Mode S transponder with ADS-B capability » for any other aircraft – an approved transponder › an approved integrated TABS device › an approved EC device configuration **Note:** An approved Mode S transponder with ADS-B capability is not required to transmit ADS-B OUT for a VFR flight. **Note:** An EC device may be operated concurrently with a Mode A/C, or a Mode S transponder (other than one that is transmitting ADS-B).

Operation of surveillance equipment – general requirements (MOS 26.69)

Subject to the requirements governing inoperative surveillance equipment set out in MOS 26.73 and unless ATC has issued an instruction otherwise:

› surveillance equipment required to be fitted or carried on an aircraft must be continuously operated in the circumstances set out in MOS 26.68

Note: Continuous operation for a transponder means that the equipment must be operated in a mode that enables an SSR response to be transmitted and, where an altitude reporting capability is available, that this capability is also activated.

› surveillance equipment (other than approved transponders) fitted or carried on an aircraft in the circumstances set out in MOS 26.68 must be operated continuously.

Unless otherwise required by ATC, an aircraft that is flying in formation with, or is in-company with, other aircraft, is not required to operate surveillance equipment if serviceable surveillance equipment is always operated by another aircraft while the aircraft are flying in formation or are in-company.

If an aircraft is fitted with more than one approved transponder, only one transponder is to be operated at any time.

If an approved transponder is fitted to an aircraft the Mode A code must be set:

› to the transponder code assigned by ATC or

› if no transponder code is so assigned – to the relevant standard code in Table 29.

The emergency codes 7500, 7600 and 7700 do not need to be set if it would be safer to retain an existing code.

Pressure altitude information reported by an approved transponder or approved ADS-B OUT configuration must be determined either by:

› a barometric encoder of a type authorised by CASA or the NAA of a recognised country in accordance with (E)TSO-C88a

› another system approved under Part 21 of CASR as having an equivalent level of performance.

Table 29: Transponders – Mode A standard codes

Situation	Mode A Code
Flights in Class A, C or D airspace, and IFR flights in Class E airspace	3000
IFR flights in Class G airspace	2000
VFR flights in Class E or Class G airspace	1200
Flights in Class G over water at a distance greater than 15 NM from shore	4000
Flights engaged in coastal surveillance	7615
Ground testing by aircraft maintenance staff	2100
Unlawful interference	7500
Loss of radio communication	7600
In-flight emergency (unless ATC instructs otherwise)	7700

Mode S transponders, ADS-B-OUT and electronic conspicuity equipment – specific requirements (MOS 26.70)

In this section *DAP* means downlink aircraft parameter in the context of Mode S EHS.

When configuring a Mode S transponder, the following must be entered:

› the assigned aircraft address

› as far as practicable for the equipment, the aircraft flight identification for:

  » if flight notification is filed with ATS – the aircraft identification mentioned on the flight notification

  » if flight notification is not filed with ATS – the aircraft registration mark.

When configuring approved ADS-B OUT equipment, approved integrated TABS equipment or an approved EC device, the following must be entered:

› the assigned aircraft address

› one of the following aircraft flight identification for:

  » if a flight plan is filed with ATS – the aircraft identification mentioned on the flight plan

  » if no flight plan is filed with ATS – the aircraft registration mark.

A Mode S transponder must transmit each of the following when interrogated on the manoeuvring area of an aerodrome or in flight:

› the assigned aircraft address

› the Mode A code

› the Mode C code

› the aircraft flight identification.

Transmission of the aircraft flight identification by a Mode S transponder is optional for an aircraft that was first certificated in its country of manufacture before 9 February 2012.

If an approved Mode S transponder transmits any Mode S EHS DAPs, the transmitted DAPs must comply with the standards set out in paragraph 3.1.2.10.5.2.3 and Table 3-10 of Volume IV, 'Surveillance and Collision Avoidance Systems', of ICAO Annex 10.

Note 1: Paragraph 3.1.2.10.5.2.3 includes 3.1.2.10.5.2.3.1, 3.1.2.10.5.2.3.2 and 3.1.2.10.5.2.3.3.

Note 2: Australian Mode S SSR supports EHS DAPs. Transmission of Mode S EHS DAPs that are not in accordance with the ICAO standards may provide misleading information to ATS. Operators must ensure that EHS DAPs are being transmitted.

For a Mode S transponder fitted to an aircraft, first certificated in its country of manufacture before 9 February 2012, and the certified MTOW is above 5,700 kg, or which is capable of normal operation at a maximum cruising true air speed above 250 knots, the transponder's receiving and transmitting antennae must:

› be located on the upper and lower fuselage

› operate in diversity, as specified in paragraphs 3.1.2.10.4 to 3.1.2.10.4.5 (inclusive) of Volume IV, 'Surveillance and Collision Avoidance Systems', of ICAO Annex 10.

Note 3: Compliance with paragraph 3.1.2.10.4.2.1, only, is recommended.

An aircraft must not fly in Australian territory if it is fitted with or carrying unapproved ADS-B OUT equipment, approved EC device configuration, approved integrated TABS configuration or approved Mode S transponder with Class B TABS position source information configuration, unless the equipment is either:

› deactivated

› set to transmit only a value of zero for the NUCp, NACp, NIC or SIL, as this is considered equivalent to deactivation.

> **Exception:** *The previous paragraph does not apply to an aircraft if it is undertaking an ADS-B test flight in airspace below FL290 in VMC.*

Alternate GNSS position source for ADS-B OUT – requirements (MOS 26.71)

For an aircraft first certificated in its country of manufacture on or after 8 December 2016, an alternate GNSS position source is acceptable if:

› the source is certified by the NAA of a recognised country for use in a flight under the IFR

› its specification and operation include the following:

  » GNSS-FDE, computed in accordance with the definition at paragraph 1.7.3 of RTCA/DO-229D

  » the output function HPL, computed in accordance with the definition at paragraph 1.7.2 of RTCA/DO-229D

  » functionality that, for the purpose of HPL computation, accounts for the absence of the SA of the GNSS in accordance with paragraph 1.8.1.1 of RTCA/DO-229D.

For an aircraft first certificated in its country of manufacture' before 8 December 2016, an alternate GNSS position source is acceptable if it meets the above requirements except that it does not require functionality that, for the purpose of HPL computation, accounts for the absence of the SA of the GNSS in accordance with paragraph 1.8.1.1 of RTCA/DO-229D.

Alternate ADS-B OUT equipment configuration – requirements (MOS 26.72)

An alternate ADS-B OUT equipment configuration is acceptable if:

- it has been approved or accepted by either:
  - the NAA of a recognised country as meeting the standards of EASA AMC 20-24 or EASA CS-ACNS
  - the FAA, as meeting the standards of 14 CFR 91.225 for 1090 Megahertz (MHz) Extended Squitter ADS-B
- the AFM or flight manual supplement attests to the certification
- the GNSS system meets the performance requirements mentioned in MOS 26.71.

Approved Mode S transponder with Class B TABS position source device equipment configuration – requirements (MOS 26.72A)

- the Mode S transponder must be of a type that is either:
  - authorised in accordance with (E)TSO C166B
  - approved under Part 21 of CASR as having a level of performance equivalent to (E)TSO C166B
- when required to be operated, the Mode S transponder must transmit NACp, NIC, SIL and SDA values in accordance with the authorised capability of the GNSS position source
- the geographical position transmitted by the Mode S transponder must be determined by either:
  - a Class B TABS position source device that is authorised in accordance with (E)TSO C199
  - another source approved under Part 21 of CASR as having a level of performance equivalent to (E)TSO C166B
- if a Mode S transponder with Class B TABS position source device transmits a SIL value of less than 2, the aircraft must not enter controlled airspace where the aircraft must be fitted with, or carry, equipment that is of an approved ADS-B OUT equipment configuration.

Approved integrated traffic awareness beacon system (TABS) device – requirements (MOS 26.72B)

A TABS device must:

- only be operated in transmitting mode if the flight is conducted:
  - under the VFR
  - below FL290
  - in Class D, E or G airspace
- be authorised by the equipment manufacturers' NAA as meeting:
  - the requirement to transmit a SIL value of one
  - the technical specifications in (E)TSO C199 for devices with integrated Class A TABS and Class B TABS functionality.

Note: MOS 26.6 provides for an exception to the relevant NAA authorisation requirement for certain kinds of light sport, experimental and other aircraft.

Approved electronic conspicuity (EC) device – requirements (MOS 26.72C)

An EC device must:

- only be operated in transmitting mode if the flight is conducted:
  - under the VFR
  - below FL290
- not be operated in transmitting mode concurrently with a Mode S transponder that is also transmitting ADS-B.

Note: An EC device may be operated concurrently with a Mode A/C, or a Mode S transponder (other than one that is transmitting ADS-B) but it is not a substitute for mandatory carriage of a transponder in relevant airspace.

- use a Class B TABS position source that complies with the performance standards specified in (E)TSO-C199
- meet the technical specifications in UK CAP 1391 and:
  - be capable of transmitting a SIL value of one, in accordance with the standards in UK CAP 1391 for an EC device that uses a Class B TABS position source
  - transmit that SIL value of one

  - » meet the requirements described in paragraph 2.2.3.2.7.2.4.6 of RTCA/DO 260B for transmitting an SDA of one
  - » transmit an SDA value of one
- › use a barometric encoder for altitude information
- › be mounted in accordance with the manufacturer's instructions
- › when mounted in accordance with the manufacturer's instructions, not:
  - » interfere with aircraft controls
  - » otherwise affect the safe operation of the aircraft.

The following administrative standards for the EC device must be complied with:

- › an EC device must have a statement of compliance (however described) from the EC device manufacturer certifying that the device meets the following requirements. *(a declaration of capability and conformance or declaration)*
  - » if the declaration was made before 2 December 2021 – clauses 1 to 5 of Part B of Appendix XIV of Civil Aviation Order 20.18 as in force immediately before 2 December 2021
  - » otherwise the requirements in this section (MOS 27.72)
- › the pilot that uses the device must carry the declaration, or a copy of it, on board the aircraft
- › an EC device model must not be operated in a transmit mode anywhere in Australia unless it is listed on the CASA website as an EC device model for which the manufacturer has made a valid declaration
- › the manufacturer of an EC device model may apply in writing to CASA:
  - » for a statement that CASA considers that the manufacturer has made a valid declaration of capability and conformance
  - » for inclusion of the EC device model on the CASA website.

CASA may remove an EC device model from the CASA website if the manufacturer requests its removal in writing, or if CASA is satisfied that removal is required in the interests of aviation safety.

Aircraft flown with inoperative surveillance equipment (MOS 26.73)

Surveillance equipment required under MOS 26.68 may only be inoperative at the beginning of the flight for a maximum of 72 hours from the time it was found to be inoperative, provided there is no facility for it to be repaired or replaced at the aerodrome of departure and you inform ATC about the unserviceability before flight.

Note: See also MOS 26.04 for additional requirements related to flight with inoperative equipment. For a flight with inoperative surveillance equipment, within controlled airspace or at a controlled aerodrome (refer MOS 11.11 to 11.18) relating to air traffic control clearances. Whether a clearance is issued, or when a clearance may be issued, could be affected by the flight's operative equipment.

Equipment for NVIS flights (MOS 26.74)

The following prescribes the requirements relating to:

- › the fitment and non-fitment of NVIS equipment to an aircraft
- › the carrying of NVIS equipment on an aircraft
- › NVIS equipment that is fitted to, or carried on, an aircraft.

Part 91 NVIS equipment rules apply to all Part 91 and Part 138 NVIS flights but do not apply to CASR Part 133 NVIS flights (see section 11.62 of the Part 133 MOS for Part 133 NVIS equipment requirements).

Application (MOS 26.74A)

The following applies in relation to the use of NVIS by a flight crew member of an aircraft in an NVIS flight.

It does not apply in relation to the use of NVIS by a person on an NVIS flight who is not a flight crew member unless the person is involved in air navigation or terrain avoidance functions.

Definitions (MOS 26.75)

adverse event means any event or incident in which life or property is:

- lost, injured, or damaged in, on or by an aircraft in which NVIS is used or
- at significant risk of loss or damage in, on or by an aircraft.

Note: The following are some examples of significant risks:

- a near miss
- NVIS equipment failure
- malfunction or abnormal operation
- the failure, malfunction or abnormal operation of NVIS-related or affected equipment
- unintentional IMC penetration
- inadvertent loss of visibility
- abnormal degree or accelerated onset of fatigue.

NVIS certified means that an aircraft has been modified for NVIS flight by one of the following:

- an approval under Part 21 of CASR
- the type certificate holder under the type certificate
- a supplemental type certificate.

NVIS compatible lighting means aircraft interior or exterior lighting:

- with spectral wavelength, colour, luminance level and uniformity, that has been modified, or designed, for use with NVIS
- that does not degrade or interfere with the image intensification capability performance of the NVIS beyond acceptable standards (see MOS 26.76).

Aircraft general and lighting standards for NVIS flights (MOS 26.76)

An aircraft for an NVIS flight must be NVIS certified.

Note: NVIS certification means that the aircraft also has NVIS compatible lighting.

The design of a required aircraft lighting system modification for an NVIS flight must be based on the requirements of:

- RTCA/DO-275, as in force from time to time or
- MIL-STD-3009, Lighting, Aircraft, NVIS Compatible, of the US Department of Defense, as in force from time to time.

Performance and other specifications for NVG image intensifier tubes (MOS 26.77)

NVG image intensifier tubes for an NVIS flight must meet the minimum operational performance specification that is:

- defined in RTCA/DO 275, as in force from time to time, modified as shown in table 30 Modifications of RTCA/DO 275 following, or
- a system performance regarding tube resolution, system resolution, system luminance gain, photosensitivity and signal to noise ratio approved in writing by CASA as being the equivalent of that stipulated above.

Each NVG image intensifier tube and associated NVIS equipment (the NVG tubes and equipment) must be:

- certified by its manufacturer as being for aviation use
- identified by the manufacturer's unique serial number
- acquired (with or without valuable consideration) by the aircraft operator directly from:
  - the manufacturer or the manufacturer's official supplier (an official source) or
  - a person who acquired it directly from an official source (the initial acquirer) or
  - a person who acquired it as the first or later acquirer in a line of direct and provable acquisitions originating from the initial acquirer (a subsequent acquirer) and

Note 1 In this subsection, "acquired (with or without valuable consideration)" refers to, for example, an acquisition through a purchase or a donation or in any other way.

Note 2 CASA considers the source of second-hand NVG tubes and equipment to be a matter that may affect safety.

- in the case of replacement of NVG image intensifier tubes with tubes that are sourced from other than an official source as follows:
  - replaced as a pair
  - of the same form, fit and function as the tubes being replaced
  - such that the replacement does not involve modification of the NVIS mounting frame or optical components
  - compliant with the operational performance RTCA/DO 275 set out in Table 30 following modification.

Note 3 For guidance only, US AN/AVS 9 NVIS, although manufactured by different manufacturers, are produced to the same US Department of Defense specification and, therefore, these tubes are interchangeable.

If 2 or more NVIS pilots on an NVIS flight use dissimilar NVG image intensifier tubes and equipment, the pilot in command must use the highest level of NVIS tubes and equipment in terms of resolution, gain and acuity.

Note 4 Use of dissimilar NVIS does not remove the requirement that each set must meet the minimum operational performance requirements described above.

An NVIS pilot who occupies a control seat of an aircraft during an NVIS flight must use the NVIS manufacturer's approved helmet mounted attachment device for the NVIS.

Performance and other specifications for NVG image intensifier tubes (MOS 26.77)

Document RTCA/DO-275 specifies the operational performance for NVG image intensifier tubes as described in the table below:

Table 30: Modifications of RTCA/DO 275

Paragraph reference to document: RTCA/DO-275 (as in force from time to time)	Summary	Amended performance requirement
Para 2.2.1.1 System resolution	1.0 cycles per milliradian (cy/mr). At 14º off axis = 0.81 cy/mr With a variable focus @ through infinity = 0.49 cy/mr	1.3 cy/mr
Para 2.2.1.2 System luminance gain – filmed non-autogating	= 2,500 foot-Lamberts (fL) per fL at an input light level of 1 x 10^{-4} fL	= 5,500 foot-Lamberts (fL) per fL at an input light level of 1 x 10^{-4} fL = 1,750 cd/m^2/lx at an input light level of 1.1 x 10^{-3} lx
System luminance gain – filmless autogating		=16,000 cd/m^2/lx at an input light level of 2 x 10^{-5} lx
Para 2.2.1.3 Fieldofview	38º vertical and horizontal	40º
Para 2.2.1.4 Magnification	1:1 +/- 2%	1:1
Para 2.2.1.7.1 Spectral transmission	Meet Class B filter requirements	Class B filter
Para 2.2.1.10 Eyepiece diopter range	Adjustable +1.0 to –2.0, or Fixed –0.5 and –1.0	+2 to -6
Para 2.2.1.12 Objective focus range	Adjustable from beyond infinity to no greater than 45 cm close range	25 cm close
Para 2.2.13 Exit pupil / eye relief	Type I – 25 mm Type II – 20 mm	25 mm
Para 2.2.2.3 Flip-up / flip down	Required capability	Push button
Para 2.2.2.4 Foreandaft adjustment	Sufficient to align with users' eyes	27 mm total
Para 2.2.2.4 Tilt adjustment	Sufficient to align with users' eyes	10º
Para 2.2.2.5 Interpupillary adjustment	Desired but not required. If not installed, exit pupil must be large enough to see full FOV	51 to 72 mm
Para 2.2.2.6 Voltage required	2.7 – 3.0 V DC 50mA nominal Backup power supply required	2.7 – 3.0 V DC 50 mA nominal Backup available
Technology	Intensifier tubes not specified	Not specified
Photosensitivity filmed non-autogating	Not specified	1,800 µA/lm
Photosensitivity filmless autogating		800 µA/lm
Tube resolution	Not specified	64 line pairs per millimetre (lp/mm)
Signal to noise ratio filmed non-autogating	Not specified	21:1
Signal to noise ratio filmless autogating		25:1

Maintenance of the NVIS and its components (MOS 26.78)

Manufacturer means the person who is:

- the original manufacturer of the NVIS or
- the original manufacturer of the NVG image intensification tubes fitted to the NVIS or
- the person who makes the final assembly of the part into the NVIS if parts of the NVIS are manufactured by different persons.

For an NVIS flight, the NVIS equipment must be maintained, stored, and checked for serviceability, in accordance with the manufacturer's requirements and procedures.

NVIS equipment must have a documented maintenance program to ensure that:

- maintenance, inspection, and serviceability standards for the NVIS are met
- a biennial assessment is made to identify and rectify any degradation in the compatibility of the aircraft lighting systems with the NVIS.

Note: RTCA/DO-275 (as in force from time to time) provides guidance for the ongoing maintenance of installed NVIS compatible systems.

The maintenance program must include a method for assessing NVIS compatibility with any subsequent aircraft modification, equipment introduction or repair that may have an effect on the aircraft's NVIS compatibility.

Any item of equipment other than NVIS equipment, that is fitted to, or carried on, the aircraft must not adversely affect the safe operation of the aircraft in an NVIS flight.

Maintenance of NVIS must be carried out by an organisation that:

- complies with regulation 30 of CAR or Part 145 of CASR as if the regulation or the Part applied to the organisation for the maintenance of NVIS and its related equipment
- is endorsed in writing by the manufacturer of the NVIS as an appropriate organisation to carry out maintenance on the NVIS.

To avoid doubt, maintenance as referred to above includes routine scheduled servicing of NVIS.

An organisation endorsed by a manufacturer as an appropriate maintenance organisation for any particular NVIS manufactured in the United States (the US) that complies with the specification of RTCA/DO 275 (MOS 26.77) is taken to be endorsed for any other NVIS that:

- is manufactured in the US and is available in Australia
- complies with the specification of RTCA/DO 275 (MOS 26.77).

The operator must, within 28 days of the failure, report the failure to CASA through the service difficulty reporting system using ATA Code 2590 if either:

- one or more image intensification tubes (tubes) fail for any reason during an NVIS flight
- one or more tubes fail at any time as a result of a suspected error in maintenance.

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Minimum aircraft equipment for NVIS flight (MOS 26.79)

Before an NVIS flight, the aircraft must be fitted with a serviceable radio altimeter that:

- conforms to the following requirements:
  - it has a display presentation that requires minimal interpretation for both an instantaneous impression of absolute height and rate of change of height
  - it is positioned to be instantly visible and discernible to each NVIS crew member from the person's station in the cockpit (Note: this dot point does not take effect until 2 December 2023)
  - it has an integral audio and visual low height warning that operates at a height selectable by the pilot
  - it provides unambiguous warning to each NVIS crew member of radio altimeter failure
- has a visual warning system that provides clear visual warning at each cockpit crew station of height below the pilot-selectable height
- has an audio warning system that:
  - is unambiguous and readily cancellable
  - does not extinguish any visual low height warnings when cancelled
  - operates at the same pilot-selectable height as the visual warning.

A rotorcraft for an NVIS operation must be fitted with a serviceable pilot-steerable searchlight, adjustable in both pitch and azimuth from the flight controls.

The operator and the pilot must be satisfied that in a NVIS operation below 500 ft AGL or from an HLS-NVIS basic (using a searchlight with an NVIS compatible infra-red filter) the risk of an adverse event due to NVIS failure below 500 ft AGL is controlled by either:

- the aircraft's capacity to revert immediately to a non-filtered search or landing light
- the presence of 2 pilots, each of whom:
  - is NVIS qualified and NVIS equipped
  - has access to dual flight controls.

Appendix B: Night Vision Imaging Systems flights

Appendix B contains chapter 3 of the Part 91 MOS (compilation 3, dated 6 August 2022) relating to flights conducted using Night Vision Imaging Systems (NVIS).

To assist the reader, Appendix B also contains the VMC criteria that apply for NVIS operations from chapter 2 of the MOS.

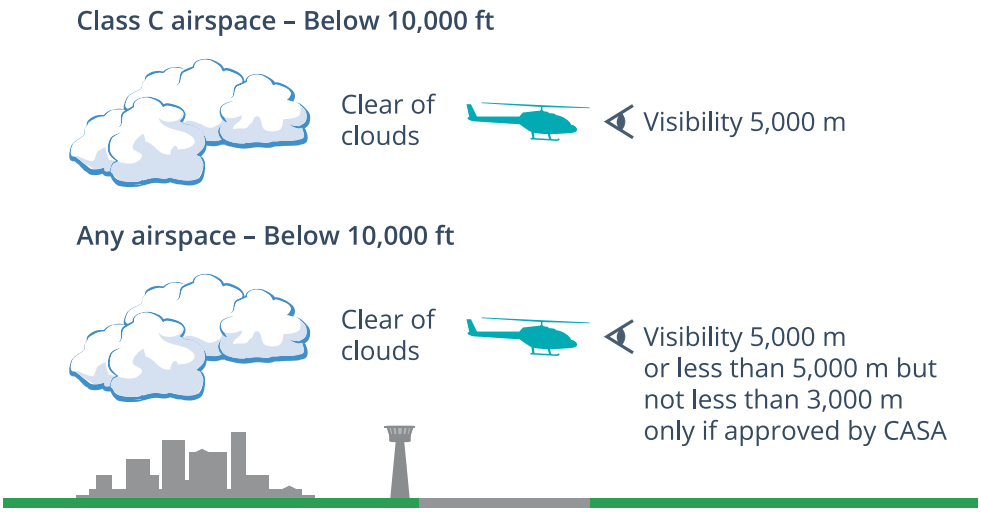
Part 91 MOS operational rules for NVIS flights are generally restated by the Part 133 and 138 manuals of standards. If you are operating or training under other Parts (such as 133 or 138), the rules that apply to you may be varied by the Part 133 or 138 MOS requirements for NVIS.

To fully comprehend any broader obligations you may have, it is recommended you review section 2.3 of the latest version of the 'Night Vision Imaging Systems' multi-part advisory circular AC 91-13, AC 133-09 and AC 138.06, referred to in this guide simply as AC 91-13).

VMC minima for NVIS operations
(MOS Table 2.07 (3A) and (3B))

Figure 28 details the VMC criteria that apply for NVIS operations.

Figure 28: NVIS visibility



Class of airspace	Height	Flight Visibility	Distance from cloud	Conditions
C	below 10,000 ft AMSL	5,000 m	clear of cloud also refer table 31	VMC minimum applies to all NVIS operations
Any	below 10,000 ft AMSL	5,000 m or less, but not less than 3,000 m. In all cases, only with relevant CASA approval	also refer table 31	VMC minima apply providing: › the flight is conducted under the Part 138 MOS by an aerial work operator › there are least 2 authorised NVIS crew members: » for an Australian aircraft, under Part 61 » for foreign registered aircraft, the NAA of the state of registry of the aircraft › the operator holds a CASA approval (see MOS 2.07 3C)

MOS 2.07 (3C) CASA may approve a minimum in-flight visibility requirement of less than 5,000 m but not less than 3,000 m for an NVIS operation for a particular class of airspace provided:

› it is not for NVIS fire bombing, fire mapping or incendiary dropping

› the operator's application includes a detailed risk assessment

› given the risks, approval including any conditions (if required) issued, would not have an adverse effect on aviation safety.

Refer to AC 91-13 for guidance on risk mitigators which would support an application for an approval. This AC also notes that it is not intended to grant approvals for routine or expected NVIS police or EMS operations.

See the stipulations regarding minimum crew, class of operation, IFR or VFR, and cloud separation requirements set out in MOS 3.10 below.

CASR 91.085 MOS NVIS requirements

This regulation requires you to comply with chapter 3 of the MOS, which is set out below.

Purpose and applicability (MOS 3.01 and MOS 3.01A)

The purpose of chapter 3 of the MOS is to prescribe the requirements relating to an NVIS flight.

This chapter applies to the use of NVIS by a flight crew member of an aircraft in an NVIS flight.

This chapter does not apply to the use of NVIS by a person on an NVIS flight who is not a flight crew member unless the person is involved in air navigation or terrain avoidance functions.

These MOS requirements are applicable to all NVIS flights except:

› flights conducted by an Australian air transport operator under Part 133 (refer to 133.265 NVIS flights)

› flights conducted by an aerial work certificate holder under Part 138 (refer to 138.350 NVIS flights).

To be clear, for limited aerial work operations (spotting and aerial photography with no remuneration), the requirements of this Appendix apply.

NVIS equipment requirements are set out in Appendix A of this guide (in MOS 26.74 - 26.79). (Refer to the Part 133 MOS for NVIS equipment requirements for Part 133 operations.)

Definitions (MOS 3.02)

Chapter 3 of the MOS has the following specific definitions:

IFR capable, for an aircraft, describes a circumstance in which:

- the aircraft is equipped for IFR flight in accordance with the regulations, and
- the operating crew meet the relevant requirements for IFR flight under Part 61 of CASR.

NVFR capable, for an aircraft, describes a circumstance in which:

- the aircraft is equipped for flight by night under the VFR in accordance with the regulations, and
- the operating crew meet the relevant requirements for a VFR flight at night under Part 61 - Flight crew licensing.

NVIS air crew member, for a particular NVIS operation, means an air crew member:

- of an NVIS operator who holds an AOC, a Part 141 certificate, or an aerial work certificate for the NVIS operation, and
- who is qualified (however described) to carry out the person's assigned functions as an air crew member for the operation in accordance with this MOS.

NVIS crew member means an NVIS pilot, an NVIS trainee pilot or an NVIS air crew member.

NVIS endorsement means an endorsement issued under Part 61 Flight crew licensing.

NVIS flight means a flight conducted using a night vision imaging system.

NVIS operation means an NVIS flight in any of the following operations:

- authorised Part 141 flight training for a person to qualify for an NVIS rating or endorsement
- training and checking for a Part 141 operator in relation to its personnel who carry out the activities mentioned above
- authorised Part 142 activities including:
  - training for a person to qualify for an NVIS rating or endorsement
  - contracted recurrent training of personnel holding an NVIS rating or endorsement
  - contracted checking of personnel holding an NVIS rating or endorsement
- training and checking for the Part 142 operator in relation to its personnel who carry out the activities mentioned above
- a flight test (Part 61 Flight crew licensing)
- an NVIS proficiency check (Part 61 Flight crew licensing)
- a flight, conducted by a Part 141 operator or a Part 142 operator, for the purpose of ensuring the proficiency of an NVIS pilot
- training or checking for a Part 133 operator in relation to its crew members who conduct NVIS flights during the operator's medical transport operations
- a maintenance flight for the purpose of ensuring the serviceability of the aircraft, or the NVIS, for NVIS operations mentioned in any other paragraph of this definition
- a test flight for the purpose of certifying the aircraft, or the NVIS, for NVIS operations mentioned in any other paragraph of this definition.

NVIS operator means the operator for an NVIS operation.

NVIS pilot, for an NVIS flight, means a pilot who:

› holds each of the licences, ratings and endorsements required for the NVIS flight by Part 61 of CASR, or

› if the aircraft is a foreign-registered aircraft – is authorised by the aircraft's state of registry to pilot the aircraft for the NVIS flight.

NVIS rating means a rating issued under Part 61 Flight crew licensing.

NVIS trainee pilot means a pilot who:

› does not hold an initial NVIS rating (Part 61 - Flight crew licensing) and

› is undergoing an approved course of training by a Part 141 or a Part 142 operator for the issue of such a rating, or is undergoing a flight test.

Part 141 operator holds a Part 141 certificate to conduct recreational, private and commercial pilot flight training, other than certain integrated training courses.

Part 142 operator holds a Part 142 authorisation to conduct integrated and multi-crew pilot flight training, contracted recurrent training and contracted checking.

safety area means an area:

› that is free of obstacles, other than those:

  » with a height not exceeding 25 cm above the surface level of the area or

  » that are required for air navigation purposes, and

› whose purpose is to reduce the risk of damage to an aircraft accidentally diverging from the load-bearing area primarily intended for landing or take-off.

Note1 Obstacles required for air navigation include, for example, a wind direction indicator.

Note 2 The safety area does not need to be a solid surface. For example, a perforated metal deck may constitute part, or all, of a safety area.

used, using or uses, in relation to the use of NVIS, means used for safe air navigation by means of visual surface reference external to the aircraft conducting the operation.

General requirements for NVIS flights (MOS 3.03)

A rotorcraft in an NVIS flight may only take off from and land on the following types of helicopter landing site (HLS):

- an HLS-NVIS standard (refer MOS 3.04 below for the requirements)
- an HLS-NVIS basic (refer MOS 3.05 below for requirements).

A pilot in an NVIS flight must either:

- hold each of the licences, ratings and endorsements required for the NVIS flight under Part 61(by definition), or
- be an NVIS trainee pilot undertaking training or testing for an NVIS rating or endorsement provided they are accompanied by an NVIS pilot.

To be clear a trainee pilot must not conduct a solo NVIS flight.

Each air crew member who uses NVIS must be either:

- an NVIS air crew member in an NVIS operation
- a person, otherwise qualified for the NVIS flight, being trained, or tested to become an NVIS air crew member.

Note Air crew members may only be carried in accordance with the requirements for NVIS operations.

HLS-NVIS standard (MOS 3.04)

To meet the HLS-NVIS standard:

- the HLS-FATO (final approach and take-off area) must:
  - be capable of enclosing a circle with a diameter equal to one and a half times the D-value (1.5 x D) of the rotorcraft
  - be free of obstacles likely to interfere with the manoeuvring of the rotorcraft
  - incorporate a safety area of 0.25 x D, or 3 m around the FATO, whichever is larger.
- the HLS-TLOF (touchdown and lift-off area) must be:
  - a cleared, and as far as practicable, stable area capable of bearing the dynamic loads which may be imposed by the rotorcraft
  - an area of 0.83 x D.

For NVIS operations only, the HLS-NVIS standard also includes an HLS that the NVIS operator after conducting a risk assessment has determined, will provide an equivalent level of safety to that which will meet the HLS-FATO and HLS-TLOF criteria above.

The D-value (D) is the largest overall dimension of the helicopter when rotors are turning.

HLS-NVIS basic (MOS 3.05)

A rotorcraft for an NVIS flight must not land on or take off from an HLS-NVIS basic unless it is conducting an NVIS operation.

The NVIS crew must consist of one of the following combinations of crew:

- at least 2 NVIS pilots
- 1 NVIS pilot and at least 1 NVIS air crew member
- 1 NVIS pilot and 1 NVIS trainee pilot
- 1 NVIS pilot, but only if the flight is conducted by an operator who holds a CASA approval based on the applicant's detailed risk assessment.

No formation flights for NVIS flight (MOS 3.06)

You must not fly in formation with another aircraft during a NVIS flight.

Alternate lighting requirements (MOS 3.07)

If an NVIS flight is conducted to a planned destination aerodrome that does not have runway or HLS lighting, then you must nominate a destination alternate aerodrome with lighting for the runway or HLS.

This does not apply if it is a NVIS operation and it is conducted by one of the following combinations of crew:

- at least 2 NVIS pilots
- 1 NVIS pilot and 1 NVIS trainee pilot
- 1 NVIS pilot and at least 1 NVIS air crew member.

Aircraft lighting (MOS 3.08)

Despite other provisions of this MOS, if the optimum performance of the NVIS is affected by, or is likely to be affected by, the aircraft's exterior lighting, you must:

- turn off the exterior lighting (if there is no risk of collision with another aircraft)
- immediately cease the NVIS operation (if there is a risk of collision with another aircraft).

Note: On ceasing the relevant NVIS operation, if at a lower altitude, you must immediately climb to at least the minimum altitude for a VFR flight at night, or an IFR flight, conducted without the use of NVIS.

Minimum height under the NVFR or the IFR for NVIS operations (MOS 3.09)

You may (under CASR 11.160 - granting exemptions), if it is operationally necessary, fly below:

- the minimum height prescribed for a VFR flight at night (refer 91.277 Minimum heights - VFR at night)
- the minimum height prescribed for an IFR flight (refer 91.305 Minimum heights - IFR flights).

For NVIS operations conducted with a minimum of 2 NVIS crew members, the following conditions apply:

- the flight is an NVIS operation
- there is an operational necessity to descend below the minimum height
- you make no request to ATC for any clearance inconsistent with the requirements of this section
- an NVIS operation conducted under the IFR maintains VMC during flight below the minimum heights listed in 91.277 or 91.305
- NVIS is used by each NVIS pilot and each NVIS air crew member who is involved in the operation.

For NVIS operations conducted by a **single** NVIS pilot as the only NVIS crew member, the above conditions apply. However, the aircraft must remain at or above 1,000 ft AGL unless:

- it is operationally necessary
- the aircraft remains at or above 500 ft AGL
- a detailed risk assessment has been provided to CASA
- the operator holds a CASA approval.

| AC 91-13 provides further detail.

If an NVIS operation (other than one flown by a single NVIS pilot as the only NVIS crew member) is conducted below 500 ft AGL in the hover, then, despite any other requirements, you may de-goggle as an individual, or permit any NVIS pilot or air crew member to de-goggle, providing it enhances safety.

You may de-goggle as an individual, or permit all or any NVIS pilot or NVIS air crew member to de-goggle, providing it enhances operational safety when:

- you are in an NVIS operation (other than one conducted by a single NVIS pilot as the only NVIS crew member)
- the performance of the NVIS used is degraded because of extensive illumination in the area being overflown
- the continued use of the NVIS in such circumstances is likely to affect operational safety
- terrain and obstacles in the area may be visually identified and avoided.

Weather requirements – cloud
(MOS 3.10)

For an NVIS operation you must comply with:

- the in-flight cloud requirements set out in table 31 below
- lower in-flight cloud requirements than those provided for in table 31 but only if:
  - operationally necessary
  - the subject of a detailed risk assessment approved by CASA.

Table 31 – In-flight cloud requirements and conditions

NVIS aircraft and crew	Kind of NVIS flight for the NVIS operation	Minimum in-flight cloud requirement
NVFR capable, with 2 NVIS crew members (aircraft and crew are NVFR equipped and qualified)	under the VFR	no more than scattered cloud up to 2,000 ft AGL within 2 NM either side of track
IFR capable (aircraft and crew are IFR equipped and qualified)	under the VFR	no more than scattered cloud up to 1,000 ft AGL within 2 NM either side of track
IFR capable (aircraft and crew are IFR equipped and qualified)	under the IFR below LSALT	no more than scattered cloud up to 1,000 ft AGL within 2 NM either side of track

If an NVIS operation is NVFR capable but the crew is only a single NVIS pilot, then they must comply with night VFR weather minima.

Appendix C: Air displays, practice flights for air displays and aerobatic activities in the vicinity of non-controlled aerodromes – exemptions and directions

Air displays in Australian territory

(91.180 – CASA EX67/24 (20))

An air display may only be conducted with CASA approval. The air display event organiser (the person conducting/managing the air display), is the person required to obtain and hold the approval.

You are exempt from complying with the following regulations when conducting an air display in Australian territory for which a person holds an approval provided you comply with the associated conditions.

Regulations		Conditions
91.090	all flights - airspeed limits	only if the aircraft is not operated in a manner that creates a hazard to another aircraft, person or property
91.190	dropping things from aircraft	only if: › the operator of the aircraft does not hold an aerial work certificate authorising dispensing operation › the operation is conducted in VMC › you comply with the following Part 138 MOS requirements: » 13.02 Risk criteria – all operators » 13.04 Risk assessment matters – all operators » 13.05 Risk assessment and mitigation processes (limited aerial work certificate holders only) » in the above 3 Risk requirements, you must consider references – to an operator of any kind to be references to the pilot – to an aerial work operation to be references to the flight conducting the dropping – to aerial work passengers to be references to passengers **Note:** The applicable parts of Part 138 MOS 13.02, 13.04 and 13.05 are described as they apply at the end of this Appendix › you comply with the following Part 138 MOS 16.03 requirements for dispensing operations, as if the flight were a dispensing operation, and you consider references to a task specialist to be references to "a crew member competent to perform the dropping task to the satisfaction of the pilot" **Note:** The applicable parts of Part 138 MOS 16.03 are described as they apply at the end of this Appendix.

Regulations		Conditions
91.455	fuel requirements	to the extent of the requirements in Part 91 MOS 19.04 Amount of fuel that must be carried for a flight, that an aircraft must carry onboard the aircraft final reserve fuel, but only if: › it is operationally necessary for the aircraft to carry out the air display flight without the final reserve fuel being carried › the pilot has taken reasonable steps to ensure that the aircraft carries sufficient fuel to enable the proposed flight to be undertaken safely

You are also exempt from compliance with the following regulations:

(All conditions apply to each regulation)

Regulation		Conditions
91.375	operating on manoeuvring area, in the vicinity of non-controlled aerodrome – general requirements but only in relation to: › the pilot keeping a lookout for other aircraft › either joining or avoiding the circuit pattern when flying in the vicinity of the aerodrome	only if: › for an air display being conducted in controlled airspace – the person conducting the air display, or the pilot of the aircraft, has formal arrangements in place with the air traffic services responsible for the airspace, to ensure separation between the aircraft and other aircraft in the airspace › for an air display being conducted in uncontrolled airspace – the person conducting the air display, or the pilot of the aircraft, has arrangements in place to advise aircraft not involved in the air display that: » the air display is occurring » pilots of aircraft flying in the air display may not be actively monitoring the relevant radio frequency for the airspace or making the required radio calls.
91.390	operating on manoeuvring area or in the vicinity of non-controlled aerodrome in relation to maintaining the same track after take-off	
91.405	aircraft in aerodrome traffic at controlled aerodrome in relation to: › a continuous watch for instructions given visually › a continuous listening watch to be maintained › authorisation to taxi, land or take-off from air traffic services	
91.630	use of radio – broadcast and reports	
91.635	communication monitoring in controlled airspace	
91.640	use of radio outside controlled airspaces – listening watch of radio transmissions	

Practice flights for air displays in Australian territory – exemption

(CASA EX67/24 (20A))

This section applies to the pilot for a flight that is solely and demonstrably **a practice flight** in Australian territory for an actual or anticipated air display to be conducted in Australian territory.

You may conduct a practice flight to become competent for an actual or anticipated air display before receiving the display organiser's approval to participate in the display.

You are exempt from complying with the following regulations:

Regulations		Conditions
91.090	all flights - airspeed limits	only if the aircraft is not operated in a manner that creates a hazard to another aircraft, person or property
91.190	dropping things from aircraft	only if: › the operator of the aircraft does not hold an aerial work certificate authorising dispensing operation › the operation is conducted in VMC › you comply with the following Part 138 MOS requirements: » 13.02 Risk criteria - all operators » 13.04 Risk assessment matters - all operators » 13.05 Risk assessment and mitigation processes (limited aerial work certificate holders only) » in the above three Risk requirements, you consider references – to an operator of any kind to be references to the pilot – to an aerial work operation to be references to the flight conducting the dropping – to aerial work passengers to be references to passengers **Note:** The applicable parts of Part 138 MOS 13.02, 13.04 and 13.05 are described as they apply at the end of this Appendix. › you comply with the following Part 138 MOS 16.03 requirements for dispensing operations, as if the flight were a dispensing operation » you consider references to a task specialist to be references to "a crew member competent to perform the dropping task to your satisfaction" **Note:** The applicable parts of Part 138 MOS 16.03 are described as they apply at the end of this Appendix.

Regulations		Conditions
91.455	fuel requirements - to the extent in Part 91 MOS (19.04 Amount of fuel that must be carried for a flight) - that an aircraft must carry onboard the aircraft final reserve fuel	only if: › it is operationally necessary for the aircraft to carry out the air display flight without the final reserve fuel being carried › the pilot has taken reasonable steps to ensure that the aircraft carries sufficient fuel to enable the proposed flight to be undertaken safely

You are also exempt from compliance with the following regulations:

(All conditions apply to each regulation)

Regulations		Conditions
91.375	operating on manoeuvring area, in the vicinity of non-controlled aerodrome – general requirements, but only in relation to: › the pilot keeping a lookout for other aircraft › either joining or avoiding the circuit pattern when flying in the vicinity of the aerodrome	only if: › for a practice flight conducted in controlled airspace – the pilot has, specific, demonstrable, and formal arrangements in place with the air traffic services responsible for the airspace, to ensure separation between the practice aircraft and other aircraft in the airspace › for a practice flight being conducted in uncontrolled airspace – the pilot, has specific and demonstrable arrangements in place to advise aircraft not involved in the practice flight that: » the practice is occurring » the pilot carrying out the practice flight may not be actively monitoring the relevant radio frequency for the airspace or making the required radio calls › for a practice flight being conducted in the vicinity of a non-controlled aerodrome – the pilot ensures that a ground communications station is operating during the practice flight that: » can advise other aircraft that are operating in the vicinity of the aerodrome of the activities, location, and direction of the practice flight » has a radio operator, to conduct any radio communications, who is authorised under Part 61 or Part 64 of CASR to transmit on an aviation safety radio frequency » is active on a VHF frequency different to the CTAF that is monitored by the pilot during the flight (a separate VHF frequency), and is also active on the CTAF » commences operations at least 10 minutes before the flight begins and continues throughout the duration of the flight
91.390	operating on manoeuvring area or in the vicinity of non-controlled aerodrome requirements related to maintaining the same track after take-off	
91.405	aircraft in aerodrome traffic at controlled aerodrome in relation to: › a continuous watch for instructions given visually › a continuous listening watch to be maintained › authorisation to taxi, land or take-off from air traffic services	
91.630	use of radio - broadcast and reports	
91.635	communication monitoring in controlled airspace	

Regulations		Conditions
91.640	use of radio outside controlled airspaces - listening watch of radio transmissions	› for a practice flight being conducted in the vicinity of a non-controlled aerodrome: » the pilot ensures that the aircraft used for the flight is fitted with, or carrying, a VHF radio » the pilot monitors the separate VHF frequency during the conduct of a practice flight, unless the flight has ceased, or has not started or resumed » the pilot of the aircraft ensures that the practice flight ceases 10 minutes before the expected arrival time at the aerodrome of any scheduled air transport operation » the pilot ensures that the practice flight is not started or resumed until: – a period of 10 minutes has elapsed after the departure of any scheduled air transport operation – an aircraft conducting a scheduled air transport operation is more than 10 nautical miles away from the aerodrome reference point of the aerodrome

Note: If the pilot must cease a practice flight, then the radio monitoring, reporting and broadcast rule variances permitted by this exemption also cease, and the pilot must resume radio monitoring, reporting and broadcasting in accordance with Part 91 requirements until the variances are permitted to resume.

Each exemption is subject to the following conditions:

› If the pilot in a practice flight in the vicinity of a non-controlled aerodrome does not start, cease, or suspend the flight within the time frames described above then any exemption under this instrument from any radio monitoring, reporting or broadcasting rule ceases to apply.

› The pilot must, before a practice flight begins, demonstrate that the proposed flight is solely and demonstrably a practice flight, if requested in writing by a CASA officer.

› The pilot must, within 3 months of completion of a practice flight, demonstrate that the flight was solely and demonstrably a practice flight, if requested in writing by a CASA officer.

Aerobatic activities in the vicinity of a non-controlled aerodrome – exemptions and directions (CASA EX67/24 (20B))

Definitions applicable to this section:

aerobatic activity means any of the following that is a Club activity:

- training in aerobatic manoeuvre
- practice for, or participation in, a competition involving the conduct of aerobatic manoeuvres, provided that the competition is not, or is not part of, an air display.

Note: Aerobatic activity, in the form of, or for the purposes of, an air display or practice for an air display must comply with section 20 or 20A, as applicable.

aerobatic box means the volume of airspace, as published in a relevant NOTAM, that may be used by the pilot of an aircraft while conducting an aerobatic activity.

arrival, of an aircraft at an aerodrome, means entry of the aircraft into the airspace in the vicinity of a non-controlled aerodrome for the purpose of landing at the aerodrome.

Note The expression in the vicinity of a non-controlled aerodrome is defined in regulation 91.360 Meaning of in the vicinity of a non-controlled aerodrome.

club, in relation to an aerobatic activity, means the Australian Aerobatic Club, ARN 802745, and each of the following persons who organise the aerobatic activity:

- Australian Aerobatic Club (Queensland Chapter) Limited, ACN 010 322 353
- Australian Aerobatic Club Adelaide Chapter Incorporated, registration number SA A5798
- Australian Aerobatic Club – Victorian Chapter (Inc), registration number VIC A0042562P
- Australian Aerobatic Club (New South Wales Chapter) Incorporated, registration number NSW INC9889911
- Aerobatics Association of WA Incorporated, registration number A1011312P.

club activity means aerobatic activity that:

- is organised by the Club
- is not advertised to the public.

pilot in command means the pilot in command of an aircraft participating in an aerobatic activity to which this section applies.

relevant NOTAM means a NOTAM that details the aerobatic activity that includes the operating times of the activity and the location and boundaries of the aerobatic box.

This section applies to the following persons in relation to aerobatic activity in the vicinity of a non-controlled aerodrome:

- the club
- the pilot.

When flying within an aerobatic box nominated by the club, you are exempt from compliance with the following 3 regulations:

- 91.375 Operating on maneuvering area, in the vicinity of non-controlled aerodrome – general requirements (but only in relation to keeping a lookout for other aircraft and, either joining or avoiding the circuit pattern (if flying in the vicinity of the aerodrome.)
- 91.630 Use of radio - broadcast and reports
- 91.640 Use of radio outside controlled airspaces - listening watch of radio transmissions.

For each exemption, you must:

- be aware of all club rules and procedures before conducting aerobatic activity
- comply with all club rules and procedures for aerobatic activity, as in force or existing from time to time.

The exemptions do not apply, if you have reason to believe that the club is failing to comply with any of the requirements for an aerobatic activity imposed on the club by this section. You must then, comply with the regulation.

Note: The requirements imposed on the Club through CASR 11.245 by this section are the CASA directions as described below.

The club must:

- develop and maintain written rules and procedures that implement the requirements of this section as they apply to the Club and to the pilots
- include the details of this section in the rules and procedures
- use appropriate means to make all Club rules and procedures known to the pilots participating in aerobatic activity
- promptly give CASA a copy of the rules and procedures, on request
- appoint, in writing, a Competition Coordinator for all aerobatic activity.

The club must also, acting through the **Competition Coordinator** ensure that:

- a ground communications station (the station) is established at the non-controlled aerodrome that is relevant for the aerobatic activity
- the station:
  - operates on each day that an aerobatic activity takes place, to advise other aircraft operating in the vicinity of the non-controlled aerodrome of:
    - the aerobatic activity
    - the location and direction of the participants in the aerobatic activity, and
  - has a radio operator who:
    - conducts any radiocommunications
    - is authorised under Part 61 or 64 of CASR to transmit on an aviation radio frequency
    - monitors both the VHF frequency nominated by the Club, and the CTAF
    - makes broadcasts and reports on these frequencies, as required by the Club rules and procedures when reasonably necessary to avoid the risk of accidents or incidents involving other aircraft
  - commences operations at least 10 minutes before aerobatic activity begins and continues throughout the duration of the aerobatic activity
- only aircraft carrying VHF radio transceivers are allowed to participate in the aerobatic activity
- aerobatic activities stop at least 10 minutes before the expected arrival time at the aerodrome of any scheduled air transport operation
- aerobatic activities are not started or resumed until the later of the following:
  - 10 minutes after the departure of any scheduled air transport operation
  - when any scheduled air transport operation is no longer in the vicinity of the non-controlled aerodrome

- radio operations on the VHF frequency nominated by the Club:
  - cease before the arrival at the aerodrome of any scheduled air transport operation
  - do not resume until the later of:
    - 10 minutes after the departure of any scheduled air transport operation
    - the point in time when any scheduled air transport operation is no longer in the vicinity of the non-controlled aerodrome
- the pilot of any aircraft that was participating in the aerobatic activity and that is still in flight is told immediately if the station has ceased operations

  Note: If the station ceases operating, then you are no longer complying with the exemption and the pilot, therefore, is no longer exempt from paragraphs 91.375 (2) (a) and (c), and regulations 91.630 and 91.640.
- the pilot of any aircraft taking part in an aerobatic activity:
  - monitors the CTAF at times other than when flying in the aerobatic box
  - monitors the CTAF if so, advised by the radio operator at the station
- on each day that the aerobatic activity takes place, participants in an aerobatic activity are briefed on the following:
  - the location and dimensions of the aerobatic box for the activity
  - when a frequency change is permitted to a frequency other than the CTAF
  - the rules and procedures to comply with this section
  - any requirements for operating in the aerobatic box
  - procedures if radio communication with the station fails.

Not later than 5 working days before the commencement of an aerobatic activity, CASA must be given the following:

- notice of its intention to organise the activity
- the name, ARN and mobile telephone number of the person appointed by the Club as the Competition Coordinator for the aerobatic activity
- the location of the non-controlled aerodrome and the rules and procedures, including the CTAF, to be used
- details of the aerobatic activity that are to be published in a NOTAM, including the operating times of the activity and the location and boundaries of the aerobatic box.

For regulation 11.250 Period of effect of direction, the directions cease to be in force at the earlier of:

- the day this section is repealed
- 2 December 2024.

The following is the extract from Part 138 MOS 13.02, 13.04 13.06 and 16.03 as they apply to the exemption for air displays and practice flights for air displays (see above).

Risk criteria – all operators (Part 138 MOS 13.02)

The risk criteria that you must apply, for the air display or practice flight for the air display are that:

- the operation can be conducted without unacceptable safety risk for the crew members and aerial work passengers who may be on board the aircraft, and
- the operation can be conducted so that it presents no unacceptable risks to persons and property on the ground, and
- the operation can be conducted so that it is not likely to have an adverse effect of the safety of air navigation.

Risk assessment matters – all operators (Part 138 MOS 13.04)

The matters must be considered in the context of the nature, size, and complexity of the operation. You must assess the risks of the operation within the following risk criteria that include:

- the operation and its characteristics,
- the location of the operation and its characteristics
- the aircraft to be used in the operation, its characteristics, and its performance
- the qualifications and experience of the crew members to be used in the operation, and
- the hazards, external to the aircraft, that may be met during the operation.

Risk assessment and mitigation processes – limited aerial work operators (Part 138 MOS 13.05)

Before commencing air display or practice flight for the display, you must ensure that you:

- review the risk criteria set out in 13.02 above, and
- consider the risk assessment matters set out in13.04 above, and
- apply risk management planning and mitigation for the operation which you are satisfied with that include:
  - the risks of the operation can be mitigated, and
  - the operation can be safely carried out.

You must ensure that before and during the operation, you consider any reasonably available information relevant to managing the safety risks of the operation.

Dispensing operation requirements (Part 138 MOS 16.03)

You must comply with the following requirements

- The substance or object to be dropped or released in the dispensing operation must be carried:
  - inside the aircraft, or
  - in a manner specified in the AFM, or
  - in a manner set out in the operator's operations manual.
- The opening through which the substance or object is dropped must be such that, when dropped, the substance or object does not:
  - damage any part of the aircraft, or
  - affect the operation of any part of the aircraft.
- The size to weight ratio of each individual object to be dropped must be such that, when released, the object immediately drops away from the aircraft.
- The dimensions of the drop site on to which the substance or object is to be dropped must be such that there is no risk of the substance or object falling outside the site.
- The above bullet point does not apply to:
  - the dropping of leaflets, liquids, powders or fine grains (provided that what falls outside the drop site does not create a hazard for persons or property anywhere).
- A drop site must be cleared of all persons and livestock before a substance or object is dropped onto the site.
- The dropping of a substance or object must be controlled by a crew member.
- You (the pilot) may be the crew member for the dropping but only if you can perform the role:
  - while always remaining in the normal flying crew position, and
  - without in any way affecting your ability to control the aircraft normally.
- During the dropping phase of a dispensing operation in which you are not the crew member:
  - You and the crew member must maintain effective communication with each other, and
  - the substance or object may only be dropped with your expressed consent.

Appendix D: Observers who may be on certain flight tests and proficiency check flights (CASA EX67/24 part 4)

Applicability and background

This section only applies to operators who conduct air transport operations under Parts 121, 133, 135 and aerial work operations under Part 138 when conducting flight tests or proficiency checks and carrying an observer.

Training flights are limited to the carriage of flight crew members only. However, there are occasions where a person under training to qualify as a check pilot or as a flight examiner rating (FER) is required to observe flight tests and proficiency checks. This person (an observer) is not defined as a flight crew member and hence the pilot would be committing an offence should they carry that person without exemption to the existing rules.

Definitions

For this Appendix the following definition of check pilot applies:

check pilot means the holder of a pilot licence who:

- holds an approval under regulation 121.010 Approvals by CASA for Part 121, for 121.580 Part 121 proficiency check, ((3)(a)(ii)), to conduct a CASR Part 121 proficiency check for an aeroplane of a particular kind, or
- is an individual who satisfies the requirements expressed in any of the following regulations for the conduct of a proficiency check:
  - 133.377 Training and checking to be conducted by certain persons (2)(a),
  - 135.387 Training and checking to be conducted by certain persons (2)(a),
  - 138.505 Training and checking to be conducted by certain persons (2)(a).
- For (2)(a) a person is one who:
  - is engaged by the operator (whether by contract or other arrangement) to conduct the training or checking, and
  - meets the requirements of the Part 133, 135 or 138 MOS as applicable or
    - a Part 142 operator with whom the operator has a contract for the Part 142 operator to conduct the training or checking for the operator

Exemptions (CASA EX67/24 (28–34))

Exemptions to the following regulations allow an **observer** to be carried (other than a flight crew member).

- 91.715 Causing or simulating failure of instruments
- 91.725 Training flight limitations, under the definition of a permitted person – limited to the simulation (other than verbally) of an emergency or abnormal situation that may affect the handling characteristics of the aircraft
- 91.735 Single engine aeroplane - VFR flights by day - engine not to be shut down
- 91.740 Single engine aeroplane – simulating engine failure in IMC or at night
- 91.750 Multi engine aeroplane – simulating engine failure in IMC or at night
- 91.765 Single engine rotorcraft – simulating engine failure or initiating autorotation of main rotor system at night
- 91.775 Multi – engine rotorcraft – simulating engine failure in IMC or at night.

Each exemption is subject to the following conditions as well as the further conditions which are described below.

Conditions (CASA EX67/24 (35))

When carrying an observer, the pilot in command conducting the flight test or proficiency check must be:

- a flight examiner conducting a flight test or a proficiency check in the aircraft
- a check pilot conducting a proficiency check in the aircraft
- a person approved under regulation 61.040 of CASR to conduct, a flight test or a proficiency check in the aircraft
- an officer of CASA whose duties include conducting, a flight test or a proficiency check in the aircraft.

Note: An officer, defined in the Act, means a member of the staff of CASA.

The only persons who may be on board the flight are:

- the pilot who is conducting the relevant flight test or proficiency check
- the person who is undertaking the relevant test or check
- one passenger (the observer) who is observing the relevant test or check, being a person who is:
  - where the flight is a flight test or a proficiency check – undertaking an approved course of training for the flight examiner rating (the FER), or
  - where the flight is a proficiency check – undergoing training, to qualify as a check pilot, within the training and checking system of an operator to whom Part 119 or Part 138 of CASR applies, or
  - where the flight is a test or a check – an officer of CASA who is receiving on-the-job training that involves the observation of flight tests or proficiency checks
- where the flight is in a rotorcraft conducting a simulation (other than verbally) of an emergency or abnormal situation that is, or is part of, a flight test or a proficiency check – one air crew member, but only if the pilot is satisfied that the person's presence on board the rotorcraft is essential for the safe conduct of the test or check.

Note: Approved means approved by CASA. An approved course includes a course conducted by CASA.

Note 1: not more than one observer may be on board. However, for a rotorcraft, in addition to one observer, one air crew member may also be on board.

Note 2: "simulation (other than verbally) of an emergency or abnormal situation", in 91.725, is taken to encompass the rotorcraft simulations mentioned in regulations 91.715, 91.765 and 91.775.

Further conditions (EX81/21 (36))

For an observer who is not a CASA officer, the pilot must ensure (before carrying the observer) that the observer:

- has either
  - applied for the issue of an FER under Part 61 of CASR
  - is undertaking a training course before appointment or approval (as applicable) as a check pilot to conduct proficiency checks
- observes the flight test or proficiency check exclusively as part of a training course for such a rating, appointment, or approval.

For an observer who is a CASA officer, the pilot must ensure either:

- CASA has approved a training program with the pilot or with a particular class of pilot of which the pilot is a member (when not conducting a flight test or proficiency check), or
- the officer is on board the aircraft during the officer's duties relating to the conduct of the flight test or proficiency check.

The pilot must ensure that the observer:

- does not occupy a control seat
- does not interfere in any way with:
  - the conduct of the flight test or the proficiency check (as applicable)
  - communication between the pilot and the person undergoing the test or check
- minimises movement, noise and other distractions within the cockpit, and complies with any applicable sterile cockpit procedures.

When conducting the flight test or the proficiency check, the pilot in command must:

- limit flight manoeuvres to those:
  - required for the test or check
  - mentioned in the Part 61 Manual of Standards, or required under CASR, as in force from time to time
- ensure that the demonstration of competence in emergency procedures and low flying are carried out only to the extent necessary for the test or check.

References in this Part to approved courses of training for the FER, and to approved training programs for a CASA officer, are to the courses or programs as they exist for a particular person, or as they exist from time to time for classes of persons.

Sterile cockpit procedures mean any procedures requiring the persons piloting an aircraft to refrain from non-essential activities during critical phases of flight.

Appendix E: Abbreviations and acronyms

Term	Meaning
AAI	authorised aeronautical information
AAIS	automatic aerodrome information service
AC	advisory circular
ACAS	airborne collision avoidance system
ADF	automatic direction finder
ADS-B	automatic dependent surveillance – broadcast
AFM	aircraft flight manual
AGL	above ground level
AIP	Aeronautical Information Publication published by Airservices Australia.
AIRAC	aeronautical information regulation and control cycle
AMC/GM	acceptable means of compliance and guidance material
AMSA	Australian Maritime Safety Authority
AMSL	above mean sea level
AOC	air operator's certificate.
APCH	approach
APU	auxiliary power unit
APV	approach procedure with vertical guidance designed for 3D instrument approach operations
APV -LNAV	APV using lateral navigation minima
APV-LNAV/ VNAV	APV using lateral or vertical navigation minima
ASAO	approved self-administering organisation
AS/NZS	Australian and New Zealand Standard
ATC	air traffic control
ATIS	automatic terminal information service
ATS	air traffic service (a generic name for one or more of the following: a flight information service an alerting service an air traffic advisory service an air traffic control service an area control service an approach control service an aerodrome control service
ATSB	Australian Transport Safety Bureau
AWIS	automatic weather information service (an aerodrome weather information service provided by an aerodrome operator: that provides actual weather conditions at the aerodrome, via telephone or broadcast, and the data for which is obtained from an AWS operated or approved by the BOM)
AWS	automatic weather station
BA	broadcast area
BECMG	becoming
BOM	Bureau of Meteorology
CA/GRS	certified air/ground radio service
CAMO	continuing airworthiness management organisation
CAO	Civil Aviation Order
CAS	calibrated airspeed
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations 1998
CAT	category
CoA	certificate of airworthiness
CTA	controlled area
CTAF	common traffic advisory frequency

Term	Meaning
CVR	cockpit voice recorder
DA	decision altitude
DAH	Designated Airspace Handbook (published by Airservices Australia as part of the AIP)
DAP	departure and approach procedure
DH	decision height
DME	distance measuring equipment
EASA	European Aviation Safety Agency
EHS	enhanced surveillance
ELT	emergency locator transmitter
ERSA	En Route Supplement Australia
ETA	estimated time of arrival
ETSO	European Technical Standard Order
FAA	Federal Aviation Administration (of the United States)
FAR	Federal Aviation Regulation
FATO	final approach and take-off area
FCM	flight crew member
FDE	fault detection and exclusion
FDR	flight data recorder
FIR	flight information region
FL	flight level
FO	fail operational
FP	fail passive
ft	feet
GAF	graphical area forecast
GAMET	general aviation meteorological
GNSS	global navigation satellite system
GNSS FDE	GNSS fault detection and exclusion
HLS	helicopter landing site
HLS-FATO	helicopter landing site - final approach and take-off area
HLS-TLOF	Helicopter landing site - touchdown and lift-off area
hPa	hectopascals
HPL	horizontal protection level (of the GNSS position of an aircraft as an output of the GNSS receiver or system)
HUD	head-up display
IAF	initial approach fix
IAP	instrument approach procedure
IAS	indicated airspeed
ICAO	International Civil Aviation Organization
IFR	instrument flight rules
ILS	instrument landing system
IMC	instrument meteorological conditions
INS	inertial navigation system
IR	Infra-red
IRS	Inertial reference system
ISA	international standard atmosphere
LNAV	lateral navigation
LOC	localiser

Term	Meaning
LP	localiser performance
LPV	localiser performance with vertical navigation
LRNS	long range navigation system
LSALT	lowest safe altitude
MBA	mandatory broadcast area
MDA	minimum descent altitude
MDH	minimum descent height
MEL	minimum equipment list
MMEL	master minimum equipment list
MOA	military operating area
MOS	manual of standards
MSA	minimum sector altitude
MSL	mean sea level
MTOW	maximum take-off weight
NAA	national aviation authority
NAIPS	national aeronautical information processing system
NAT-HLA	North Atlantic Track - High Level Airspace
NDB	non-directional beacon
NM	nautical miles
NOTAM	notice to airmen
NPA	non-precision approach
NVFR	night visual flight rules
NVIS	night vision imaging system
OCA	oceanic control area
PAL	pilot-activated lighting
PBE	protective breathing equipment
PBN	performance-based navigation
PIC	pilot in command
POB	people on board
RA	resolution advisory
RAIM	receiver autonomous integrity monitoring

Term	Meaning
RNAV	area navigation
RNP	required navigation performance
RVR	runway visual range
RVSM	reduced vertical separation minimum
SA	special authorisation
SAR	search and rescue
SARTIME	search and rescue time
SARWATCH	search and rescue watch
SCT	scattered
SFIS	surveillance flight information service
SID	standard instrument departure
SOG	special operations group (however described - of a state or territory police service or the Australian Federal Police)
SSR	secondary surveillance radar
STAR	standard terminal arrival routes
SUA	Special Use Airspace
TAF	terminal area forecast
TABS	Traffic awareness beacon system
TDZ	touchdown zone
TLOF	touchdown and lift-off area
TSO	Technical Standard Order (of the FAA)
UTC	coordinated universal time (as determined by the International Bureau of Weights and Measures)
VFR	visual flight rules
VHF	very high frequency
VMC	visual meteorological conditions
VNAV	vertical navigation
VOR	VHF omnidirectional radio range
WATIR	weather and terminal information reciter

Appendix F: Definitions

AAIS means automatic aerodrome information service, and is the service that, by means of repetitive broadcasts on a discrete aerodrome frequency, provides current and routine information for aircraft arriving at, or departing from, the aerodrome.

Act means the *Civil Aviation Act 1988*

accurate QNH a QNH is to be considered accurate only if it is provided by one of the following:

- AAIS
- ATC
- ATIS
- AWIS
- CA/GRS
- WATIR.

Area or forecast QNH must not be used for checking the accuracy of a pressure altitude system.

Site elevation must be derived from aerodrome survey data that is:

- authorised in writing
  - directly or indirectly by CASA, or
  - by an NAA, or
- supplied in writing by the relevant aerodrome operator.

additional fuel means the supplementary amount of fuel required to allow an aircraft that suffers engine failure or loss of pressurisation at the critical point along the route (whichever results in the greater subsequent fuel consumption), to do the following:

- proceed to an alternate aerodrome (or for a rotorcraft, a suitable rotorcraft landing site)
- fly for 15 minutes at the holding speed for the aircraft at 1,500 ft above the aerodrome elevation, in ISA conditions
- make an approach and landing.

Note: For a rotorcraft, an alternate rotorcraft landing site would constitute the alternate aerodrome.

adult means a person who has turned 13.

aerodrome forecast means an authorised weather forecast for an aerodrome.

aerobatic manoeuvres for an aircraft, means manoeuvres that involve:

- bank angles that are greater than 60°, or
- pitch angles that are greater than 45°, or are otherwise abnormal to the aircraft type, or
- abrupt changes of speed, direction, angle of bank or angle of pitch.

aerodrome means an area of land or water (including any buildings, installations and equipment), the use of which as an aerodrome is authorised under the regulations, being such an area intended for use wholly or partly for the arrival, departure or movement of aircraft.

A helideck and a heliport fall within the statutory definition of an aerodrome if their use as an aerodrome is authorised under the regulations.

AFM means aircraft flight manual as approved by the aircraft manufacturer and includes any AFM supplement.

Note: An AFM supplement may be supplied by the original aircraft manufacturer, or by another person, in accordance with Subpart 21.M of CASR.

AIP means Aeronautical Information Publication, provided **by Airservices Australia**.

The publication includes: the AIP book, ERSA, DAPS, DAH, AIP/SUP and aeronautical information circular (AIC) and aeronautical charts. These documents are provided as Airservices Australia's Aeronautical Information Service (AIS) as part of its Aeronautical Information Package. The AIP is available through airservicesaustralia.com.

AIP is a subset of Authorised Aeronautical Information (AAI).

AIRAC cycle or **aeronautical information regulation control cycle** is the system and frequency setting used by an approved provider to regularly update the aeronautical information in a navigation database.

aircraft means an aircraft to which Part 91 of CASR applies.

aircraft flight manual means **aircraft flight manual instructions**, for an aircraft, that are the documents and information provided by the aircraft's manufacturer or issued in accordance with a CASR Part 21 approval. These include:

- the aircraft's flight manual
- checklists of normal, abnormal and emergency procedures for the aircraft
- any operating limitation, instructions, markings and placards relating to the aircraft.

air display means organised flying performed before a public gathering, including the following:

- a contest
- an exhibition of aerobatic manoeuvres
- flying in formation
- other aircraft operations associated with the air display.

air traffic services mean any of the following, in its capacity as a provider of an air traffic service:

- Airservices Australia
- the Defence Force
- an authorised ATS provider.

alternate aerodrome for an aircraft means an aerodrome:

- to which the aircraft may proceed when it becomes impossible or inadvisable to proceed to, or land at, the intended aerodrome
- where the necessary services and facilities for landing the aircraft are available
- where the aircraft's performance requirements can be met
- that is operational at the expected time of use, and
- includes the following:
  - *a take-off alternate*, being an alternate aerodrome at which the aircraft may land if this becomes necessary shortly after take-off and it is not possible to use the departure aerodrome
  - *an en route alternate*, being an alternate aerodrome at which the aircraft may land if a diversion becomes necessary while en route
  - *a destination alternate*, being an alternate aerodrome at which the aircraft may land if it becomes either impossible, or inadvisable, to land at the intended aerodrome.

The aerodrome from which a flight departs may also be an en route or a destination alternate for the flight.

alternate fuel means the amount of fuel required to enable an aircraft to do the following in a sequence:

- perform a missed approach at the destination aerodrome
- climb to the expected cruising altitude
- fly the expected route to the destination alternate
- descend to the point where the expected approach is initiated
- fly the approach
- land at the destination alternate.

altitude means the vertical distance of a level, a point or an object considered as a point measured from MSL.

amphibian means an aeroplane that is designed to take off from, and land on, either land or water.

animal means any living thing other than a plant or human being.

approach procedure with vertical guidance means a PBN IAP designed for 3D instrument approach operations Type A.

approved means approved by CASA.

approved GNSS means:

- a GNSS system that is authorised in accordance with one of the following:
  - (E)TSO-C129
  - (E)TSO-C145
  - (E)TSO-C146
  - (E) TSO-C196a, or
- a multi-sensor navigation system that:
  - includes GNSS and inertial integration, and
  - is approved under Part 21 as providing a level of performance equivalent to a GNSS system technical standard referred to above

An approved GNSS authorised in accordance with (E)TSO-C129 is unlikely to satisfy the GNSS position source requirements for ADS-B surveillance.

approved GNSS position source has the meaning given by MOS 26.67.

approved provider means:

- the holder of a Type 2 LOA or a Type 2 DAT approval that receives its aeronautical data from a data service provider or

Note: A data service provider is a person who holds a certificate under regulation 175.295 of CASR.

- for a foreign aircraft – a provider of aeronautical information for performance based navigation, approved by the NAA of the State of registration or State of operator, of the foreign aircraft.

area navigation means a method of navigation which permits aircraft operations on any desired flight path within:

- the coverage of ground or space-based navigation aids, or
- the limits of the capability of self-contained navigation aids, or
- a combination of the above.

Note: Area navigation includes PBN as well as other operations that do not meet the definition of PBN.

area navigation system means the computer hardware installed on an aircraft by its manufacturer, or under a supplementary type certificate, which enables PBN specifications to be used.

area QNH means an altimeter setting which is representative of the QNH of any location within a geographical area.

AS/NZS Standards, TSO ETSOs (E) TSOs

- Unless a contrary intention appears, a reference to a particular AS/NZS standard is a reference to:
  - the particular joint Australian and New Zealand Standard (the standard), as applicable, or
  - a later version of the standard, as applicable.
- For the meaning of "applicable" above in relation to the standard, is a reference to the version of the standard that was in existence and applicable to the thing on the date of its manufacture.

Note: For example, the joint Australian and New Zealand Standard AS/NZS 1754:2004, Child restraint systems for use in motor vehicles, would apply to an automotive child restraint system that was manufactured during the time period that this 2004 version of the AS/NZS was in force. However, there are later versions of this standard, for example, dated 2010 and 2013. If an automotive child restraint system was manufactured during the time period that the 2010 standard was in force, then that system would be acceptable for use; and if the automotive child restraint system was manufactured during the time period that the 2013 standard was in force, then that system would also be acceptable for use. In effect, by prescribing the 2004 version of this standard, or later version as applicable, the rule permits the use of this version, or any later version, but not any earlier version, and the version that applies to any specific system is the version that applied at the time the system was manufactured.

- Unless a contrary intention appears, a reference to a particular TSO is a reference to that TSO or a later version of that TSO.
- Unless a contrary intention appears, a reference to a particular ETSO is a reference to that ETSO or a later version of that ETSO.
- Unless a contrary intention appears, a reference to a particular (E)TSO is a reference to the relevant ETSO or TSO, or a later version of the relevant ETSO or TSO.

Note 1: The first versions of a TSO may have been issued with or without the notation "(0)" at the end (for example only, citations of TSO-C129 and TSO-129(0) would refer to the same document. Thus, for first version TSOs, either form is an acceptable citation for the other.

Note 2: TSO later versions are identified by an alphabetical letter (for example only, TSO-C129 (or TSO-C129(0) versus TSO-C129a). Unless the contrary intention appears, a reference to (for example only) TSO-C129 (or TSO-C129(0)) means that version or a later version. A reference to TSO-C129a means that version or a later version, but not the earlier version – unless a contrary intention appears.

ATIS is an aerodrome automatic terminal information service, which automatically provides current, routine information to arriving and departing aircraft.

AATS surveillance system has the same meaning as in ICAO Document 4444.

Note: At the commencement of this instrument, ICAO Document 4444 included the following:

"ATS surveillance system. A generic term meaning variously, ADS-B, PSR, SSR or any comparable ground-based system that enables the identification of aircraft.

Note: A comparable ground-based system is one that has been demonstrated, by comparative assessment or other methodology, to have a level of safety and performance equal to or better than monopulse SSR.."

ATS surveillance service has the same meaning as in ICAO Document 4444.

Note: At the commencement of this instrument, ICAO Document 4444 included the following:

"ATS surveillance service. A term used to indicate a service provided directly by means of an ATS surveillance system."

authorised aeronautical information for an aircraft's flight, means the aeronautical maps, charts and other aeronautical information relevant to the route of the flight, and any probable diversionary route, that are published:

- for a flight which is not in a foreign country:
  - in the AIP, or
  - by a data service provider, or
  - in NOTAMs, or
- for a flight in a foreign country:
  - in the document that in that country is equivalent to the AIP, or
  - by an organisation approved to publish aeronautical information by the national aviation authority of that country.

authorised instrument approach procedure means:

- for an aerodrome other than an aerodrome in a foreign country – an instrument approach procedure that is:
  - designed by a certified designer or authorised designer, and published in the AIP or given to CASA under CASR Part 173 Instrument flight procedure design, or
  - prescribed by an instrument issued under regulation 201.025, or
- for an aerodrome in a foreign country – an instrument approach procedure that is authorised by the national aviation authority of the country.

authorised instrument departure procedure means:

- for an aerodrome other than an aerodrome in a foreign country – an instrument departure procedure that is:
  - designed by a certified designer or authorised designer, and published in the AIP or given to CASA under CASR Part 173 Instrument flight procedure design, or
  - prescribed by an instrument issued under regulation 201.025, or
- for an aerodrome in a foreign country – an instrument departure procedure that is authorised by the national aviation authority of the country.

authorised person for a provision of CASR in which the expression occurs, means a person who is appointed under CASR 201.001 to be an authorised person for these regulations (sic) or a provision of the regulations.

authorised weather forecast means:

- in Australia – a weather forecast made by the BOM for aviation purposes, or
- in a foreign country – a weather forecast made by a person that holds an authorisation (however described) to provide weather forecasts, granted by the NAA of the country.

authorised weather report means:

- in Australia – a weather report made by one of the following:
  - the BOM for aviation
  - an individual who holds a certificate of competency, acceptable to CASA, to perform weather observations and issue weather reports for aviation
  - an automatic weather station (AWS) or RVR system at an aerodrome approved by the BOM for the aerodrome
  - an automatic broadcast service published in the AIP
  - an individual who holds a pilot's licence
  - a person appointed by an aerodrome operator to make runway visibility assessments under the CASR Part 139 MOS
  - a person included in a class of persons specified in the AIP, or
  - in a foreign country – a weather report made by a person or body holding an authorisation (however described), granted by the NAA of the country, to provide weather reports.

avoid area of the HV curve for a rotorcraft, means the area depicted in the AFM heightvelocity diagram, which identifies the combinations of height above ground and airspeed in knots which a rotorcraft should avoid.

Note: Under these combinations, successful autorotation is unlikely and therefore, must be avoided.

begins a flight means the start of the time at which the aircraft first moves under its own power for take-off.

cabin crew member means a crew member who performs, in the interests of the safety of an aircraft's passengers, duties assigned by the operator or the pilot in command of the aircraft but is not a flight crew member.

CAR means the *Civil Aviation Regulations 1988,* as in force immediately before 2 December 2021, and any mention of a provision of CAR refers to that provision as so in force.

cargo means things other than persons carried, or to be carried, on an aircraft.

cargo transport operation means an operation of an aircraft that involves the carriage of cargo and crew only, but does not include the following:

- an operation conducted for the carriage of the possessions of the operator or the pilot in command for the purpose of business or trade
- a medical transport operation.

CASR means the *Civil Aviation Safety Regulations 1998.*

category in relation to the type certification of aircraft, means a grouping of aircraft based upon intended use and operating limitations (for example, transport, normal, utility, acrobatic, limited, restricted and provisional) (source: Federal Aviation Regulation (FAR)s)

Category A in relation to a rotorcraft, means a multi-engine rotorcraft that is:

- designed with engine and system isolation features stated for Category A requirements in any of the following:
  - Part 27 of the FARs
  - Part 29 of the FARs
  - EASA CS – 27
  - EASA CS – 29
  - an equivalent airworthiness certification code of a contracting state
- capable of operation using scheduled take-off and landing data under a critical engine failure concept, which assures adequate designated ground or water area and adequate performance capability for continued safe flight or safe rejected take-off in the event of engine failure, as mentioned in the rotorcraft's flight manual.

Note: This definition is based on the ICAO, FAA and EASA definitions of the term Category A in relation to rotorcraft.

Category A performance for a rotorcraft operation, means the one engine inoperative performance (as derived from the rotorcraft flight manual) from which the pilot in command determines the most critical maximum weight that enables the rotorcraft to avoid all obstacles and complete its operation.

Category A rotorcraft means a rotorcraft that meets the requirements stated in the definition Category A, and is type certified in accordance with any of the following:

- Part 27 of the FARs
- Part 29 of the FARs
- EASA CS – 27
- EASA CS – 29
- an equivalent airworthiness certification code of a contracting state.

These documents are available as follows:
FAR 27 and 29 – faa.gov/regulations_policies/faa_regulations/
EASA CS 27 and 29 – easa.europa.eu/document-library/regulations

Category B performance for a single-engine or multi-engine helicopter, means that the helicopter is not capable of Category A performance.

Category B rotorcraft means a rotorcraft that is not capable of operation using scheduled take-off and landing data under a critical engine failure concept, which assures adequate designated ground or water area and adequate performance capability for continued safe flight or safe rejected take-off in the event of engine failure, as mentioned in the rotorcraft's flight manual.

CENSAR means an automated, centralised, SARTIME database software package used by an ATS to manage:

- full position reporting procedures, or
- scheduled reporting times (SKEDS), or
- SARTIME.

civil aviation authorisation s the meaning given by section 3 of the *Civil Aviation Act 1988.*

checking means the assessment of proficiency of the personnel of an aircraft operator, or the operator of a flight simulation training device to ensure that the personnel are competent to carry out their responsibilities.

child means a person who has turned 2 but has not turned 13.

a Class A/B cargo or baggage compartment and a **Class E cargo compartment** has the meaning given within Federal Aviation Regulations (FAR) 25.857 as in force from time to time.

combination recorder (combination FDR/CVR) means a single system combining the capabilities and the functions of an FDR and a CVR.

compartment of an aircraft, includes the space inside a non-compartmentalised fuselage.

contaminated: a runway is *contaminated* if more than 25% of the surface area required for a takeoff or landing is covered by any of the following:

- water or slush more than 3 mm deep
- loose snow more than 20 mm deep
- compacted snow or ice.

contingency fuel for an aircraft in a kind of flight mentioned in an item of Part 91 MOS Chapter 19.03 means the amount of fuel required to compensate for unforeseen factors, and which must not be less than:

- the percentage (if any) of the planned trip fuel for the flight, or
- in the event of in-flight replanning – the percentage (if any) of the trip fuel for the replanned flight.

control area – Class A, B, C, D, E is a volume of controlled airspace that exists (in the vicinity of an airport) with a specific lower level and a specific upper level (usually situated on top of a control zone- but not always).

controlling RVR means the reported value of one or more runway visual range reporting locations (touchdown, mid-point, and stop-end) used to determine whether operating minima are met.

controlling zone RVR means the reported value of one or more runway visual range reporting locations (touchdown, mid-point and stop-end) used to determine whether operating minima are met.

control zone - Class C and D are blocks of controlled airspace which extends from the surface of the Earth to a specified upper level (ICAO).

crew member means a person who is carried on the aircraft and is:

- a person:
  - who is authorised by the operator of the aircraft to carry out a specified function during flight time relating to the operation, maintenance, use or safety of the aircraft, the safety of the aircraft's passengers or the care or security of any cargo which may affect the safety of the aircraft or its occupants, and
  - who has been trained to carry out that function, or
- a person who is onboard the aircraft for the purpose of:
  - giving or receiving instruction in a function mentioned in first subpoint of the above bullet points, or
  - being tested for a qualification associated with a function mentioned in the first subpoint of the above bullet points, or
- a person authorised by CASA under these regulations, or by the operator, to carry out an audit, check, examination, inspection or test of a person mentioned in the above bullet points.

crew station for a crew member of an aircraft, means a position on the aircraft designed and equipped to enable the crew member to carry out their assigned duties on the aircraft.

critical engine means the engine whose failure would most adversely affect the performance or handling qualities of an aircraft.

critical fuelling point in relation to an aircraft, means any of the following:

- a fuel tank filling point on the aircraft
- a fuel tank vent outlet on the aircraft
- the ground fuelling equipment used to fuel the aircraft.

CTAF means common traffic advisory frequency, being a designated frequency on which pilots make positional broadcasts when operating in the vicinity of a non-controlled aerodrome.

current for a navigation database, means that the database is up to date in accordance with the AIRAC cycle.

DA means **decision altitude**, and is a specified altitude, in a 3D-instrument approach operation, at which a missed approach must be initiated if the required visual reference to continue the approach has not been established.

decision point means a point en route at which an aircraft can:

- if the flight arrives at the point with adequate fuel to complete the flight to the destination aerodrome while maintaining the final reserve fuel and contingency fuel required under CASR 91 MOS Chapter 19 – continue to the destination aerodrome, or
- otherwise – divert to an en route alternate with adequate fuel to fly there while maintaining the final reserve fuel and contingency fuel required under CASR 91 MOS Chapter 19.

destination aerodrome means the aerodrome which a flight is planned to fly to and land at.

DH means decision height, and is a specified height, in a 3D-instrument approach operation, at which a missed approach must be initiated if the required visual reference to continue the approach has not been established.

ends a flight means the time when an aircraft comes to rest after being airborne.

ENR means the en route section of the Aeronautical Information Publication (AIP) book.

equipment means instruments, indicators, items of equipment and systems.

established for the definition of holding fuel, means any of the following:

- established by the aircraft manufacturer and published in the AFM
- established by the use of a fuel consumption monitoring system
- established by the aircraft operator and published in the operations manual along with:
  - the relevant data and method used, or
  - references to another accessible location of the data and method used.

exposition means

for an Australian air transport operator:

- the set of documents approved by CASA under regulation 119.075 in relation to the operator, and
- if the set of documents is changed under regulation 119.085, 119.095 or 119.105, or in accordance with the process mentioned in regulation 119.100 – the set of documents as changed, or
- for an ASAO, means:
  - the set of documents approved by CASA under regulation 149.080 in relation to the ASAO, or
  - if the set of documents is changed under regulation 149.115 or 149.120, or in accordance with the process mentioned in paragraph 149.340 (i) – the set of documents as changed.

Essentially an exposition is a document or set of documents describing how an organisation operates safely (often referred to as the operations manual).

The term exposition is used in CASR Parts 42, 103, 121, 131, 133, 135, 142, 149.

The term operations manual is used in CASR Parts 137,138,141.

final approach and takeoff area (FATO) for the operation of a rotorcraft at an aerodrome, means the area of the aerodrome over which the final phase of the approach manoeuvre to hover or land is completed, and from which the take-off manoeuvre is commenced. Where the FATO is to be used by helicopters operated in performance Class 1 (as defined by ICAO), the defined area includes the rejected take-off area available.

final reserve fuel means the calculated amount of fuel that:

- is required to fly an aircraft:
  - at 1,500 ft above aerodrome ***elevation*** in ISA conditions for the period of time specified for the flight in column 3 of Table 19.02 (2) of the MOS (see chapter 9 of this guide), and
  - that is a rotorcraft conducting an IFR flight or VFR flight at night, an aeroplane or an airship – at holding speed, and
  - that is a rotorcraft conducting a VFR flight by day – at range speed, and
  - at its estimated weight to arrive at the destination alternate aerodrome, or the planned destination aerodrome when no destination alternate is required (the relevant aerodrome), to the relevant aerodrome, and
- is usable fuel remaining in the fuel tanks on completion of the final landing at the relevant aerodrome.

flight means:

- in the case of a heavier-than-air aircraft, the operation of the aircraft from the moment at which the aircraft first moves under its own power for take-off until the moment at which it comes to rest after being airborne, and
- in the case of a lighter-than-air aircraft, the operation of the aircraft from the moment when it becomes detached from the Earth's surface, or from a fixed object on the Earth's surface, until the moment when it becomes attached to either of these again.

flight commencement means the moment an aircraft vacates its parking position, whether pushed back or under its own power, for take-off (also known as the ***off-block time***).

flight crew endorsement means a flight crew endorsement within the meaning of CASR Part 61 Flight crew licensing, and includes a certificate of validation of an overseas endorsement.

flight crew licence means a flight crew licence within the meaning of CASR Part 61 Flight crew licensing, and includes a certificate of validation of an overseas flight crew licence.

flight crew member means a crew member who is a pilot or flight engineer assigned to carry out duties essential to the operation of an aircraft during flight time.

flight crew rating means a flight crew rating within the meaning of CASR Part 61 Flight crew licensing, and includes a certificate of validation of an overseas rating.

flight forecast means a text-based forecast issued for a part of a flight for which a routine GAF is not prepared.

flight level or FL: a reference to a ***flight level*** followed by a number ***(FL###)***, in relation to the flight of an aircraft, is a reference to the altitude at which the aircraft's altimeter, if it were adjusted to a reading on the subscale of 1013.2 hectopascals, would show an altitude in feet of 100 times that number.

flight notification requirements See regulation 91.240 (1)

forecast QNH means a forecast altimeter setting from an authorised weather forecast.

flying in formation: 2 or more aircraft are:

- flying in formation if they:
  - are operating as a single unit with regard to navigation, position reporting and control, and
  - are so close to each other that any change in height, heading or airspeed of any aircraft used for station-keeping results in a need for one or more of the other aircraft to manoeuvre to maintain station or avoid a collision
- taken to be flying in formation:
  - when the aircraft are changing station
  - during join-up or breakaway.

FO hybrid landing system means a system which consists of a primary fail-passive automatic landing system and a secondary independent guidance system enabling a manual landing after failure of the primary system.

frequency confirmation system, for an aerodrome, means a ground radio system for the aerodrome that, on receipt of a transmission from an aircraft on the radio frequency for the aerodrome, sends a signal or message to the aircraft confirming that the transmission has been received.

fuel – see:

- additional fuel
- alternate fuel
- contingency fuel
- final reserve fuel
- holding fuel
- taxi fuel
- trip fuel.

fuel emergency means the circumstance in which the fuel remaining when the usable fuel calculated to be available on landing at the nearest aerodrome where a safe landing can be made is less than the final reserve fuel and, as a result, the aircraft requires immediate assistance.

GAMET area forecast. An area forecast in abbreviated plain language for low-level flights for a flight information region or sub-area thereof, prepared by the meteorological office designated by the meteorological authority concerned. The term GAMET is not used in Australia but is of relevance to Australian aircraft operating overseas.

GEN means the general section of the *Aeronautical Information Publication* (AIP) book.

glider means:

- an unpowered, heavier-than-air aircraft that derives its lift in flight chiefly from aerodynamic reactions on surfaces remaining fixed under given conditions of flight, or
- a heavier-than-air aircraft that is fitted with one or more engines and that is capable of soaring flight when the engine or engines are inoperative.

helideck means an area intended for use wholly or partly for the arrival or departure of rotorcraft, on:

- a ship, or
- a floating or fixed structure on water.

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highly volatile fuel means:

› aviation gasoline, or

› a hydrocarbon mixture that spans the gasoline and kerosene boiling ranges, or

› a mixture of aviation gasoline and a hydrocarbon mixture mentioned in the above bullet point.

holding fuel means the amount of fuel an aircraft requires to fly for the period of time anticipated for holding (taking into account the operating conditions) calculated at the holding fuel consumption rate established for the aircraft for the anticipated meteorological conditions, or ISA, as applicable.

hot fuelling of an aircraft means: the fuelling of an aircraft with an engine running.

An APU is not considered to be an engine unless it is capable of propelling an aircraft (MOS 26.37)

HUD or **head-up display** means a system that displays flight information into a pilot's forward external field of view.

IAS, or **indicated airspeed**, means the speed of an aircraft as derived through a pitot static pressure system and calibrated to account for standard atmosphere adiabatic compressible flow at sea level, uncorrected for airspeed system errors.

ICAO Annex followed by a number, means the annex of the given number, as contained in the Chicago Convention.

IFR (short for instrument flight rules) means the rules and procedures set out in Part 91 for flight in IMC.

IFR flight means a flight conducted under the IFR.

IMC (short for instrument meteorological conditions) means meteorological conditions other than VMC.

immediately reportable matter means an investigable matter prescribed by the Transport Safety Investigations (TSI) regulations.

Under the TSI regulations (section 2.3) this encompasses:

› the death of, or a serious injury to:

  » a person onboard the aircraft, or in contact with the aircraft, or

  » anything attached to the aircraft, or

  » anything that has become detached from the aircraft, or

  » a person who has been directly exposed to jet blast

› the aircraft being missing

› the aircraft suffering serious damage, or the existence of reasonable grounds for believing that the aircraft has suffered serious damage

› the aircraft being inaccessible and the existence of reasonable grounds for believing that the aircraft has been seriously damaged

› breakdown of separation standards, being a failure to maintain a recognised separation standard (vertical, lateral or longitudinal) between aircraft being provided with an air traffic service separation service.

In-company, in relation to 2 or more aircraft in the flight means aircraft:

› that form a group and occupy a specific 3-dimensional volume of airspace, and

› each of whose pilots self-separates from the other group aircraft in the volume of airspace.

infant means a person who has not turned 2.

inoperative: an item for a flight of an aircraft is inoperative if, due to a defect, the item, or a function of the item, does not:

› accomplish its intended purpose, or

› consistently function within the operating limits or tolerances mentioned in the approved design for the item or the flight manual for the aircraft.

instrument approach operation means an approach and landing:

› flown using instruments for navigation guidance, and

› based on an authorised instrument approach procedure.

instrument approach procedure means a series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix or, where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en route obstacle clearance criteria apply.

instrument departure procedure for an aircraft, means a series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from takeoff until the aircraft reaches:

› the en route lowest safe altitude, or

› the minimum altitude at which the aircraft, on a minimum climb gradient of 3%, can intercept the planned flight route, or

› in a case where the aircraft has taken off from an aerodrome for which there is a radar control service in operation – the minimum radar vector altitude.

instrument flight procedures mean the visual and instrument procedures for use by aircraft operating IFR.

international regulations means the International Regulations for Preventing Collisions at Sea, 1972, in the Convention on the International Regulations for Preventing Collisions at Sea, done at London on 20 October 1972, as amended and in force for Australia from time to time.

Note: The Convention is in Australian Treaty Series 1980 No. 5 ([1980] ATS 5) and can be viewed in the Australian Treaties Library on the Australasian Legal Information Institute website (austlii.edu.au).

in the vicinity of a non-controlled aerodrome has the meaning given in regulation 91.360.

An aircraft is in the vicinity of a non-controlled aerodrome if it is:

› in uncontrolled airspace

› within 10 NM of the aerodrome

› at a height above the aerodrome that could result in conflict with aircraft traffic at the aerodrome.

journey log:

› for a CASR Part 121 operation – means the journey log required for the flight by regulation 121.105, or

› for a CASR Part 133 operation – means the journey log required for the flight by regulation 133.075, or

› for a CASR Part 135 operation – means the journey log required for the flight by regulation 135.085.

JRCC Australia means the Australian Joint Rescue Coordination Centre.

jump aircraft means an aircraft used to facilitate a parachute descent.

knot (kT) speed in nautical miles per hour expressed as indicated airspeed (IAS) unless specified otherwise**.**

landing decision point for landing a rotorcraft, means the point, mentioned in the rotorcraft's flight manual, from which if an engine failure is recognised:

- you may initiate a baulked landing, or
- continue the landing safely.

landing distance available

- for landing an aeroplane at a certified aerodrome – the distance declared by the aerodrome operator in the AIP as available and suitable for the ground run of the aeroplane when it lands at the aerodrome
- for landing an aeroplane at an aerodrome other than a certified aerodrome – the distance established by the aeroplane operator as available and suitable for the ground run of the aeroplane when it lands at the aerodrome
- for landing a rotorcraft means, the total of the following available for it to land from the height above the final approach and take-off area in the rotorcraft's flight manual:
  - the length of the final approach and take-off area
  - the length of the area available and suitable for it to land on.

landing distance required means for landing a rotorcraft, the horizontal distance required for it to land and come to a full stop from a point 50 ft above the landing aerodrome.

landing minima means the minimum values of the following that are used for the purpose of determining whether an aerodrome may be used for landing an aircraft:

- visibility, including runway visibility and runway visual range
- cloud ceiling height.

landing weight for a flight of an aircraft, means the total weight of the aircraft, including its load, at landing.

light sport aircraft means an aircraft that:

- has:
  - a maximum take-off weight of 600 kgs or less (if the aircraft is not intended for operation on water), or
  - a maximum take-off weight of 650 kgs or less (if the aircraft is intended for operation on water), or
  - a maximum gross weight of 560 kgs or less if it is a lighter-than-air aircraft, and
- if it is a powered aircraft that is not a glider – has a single, non-turbine engine fitted with a propeller and has a maximum stall speed in the landing configuration (V_{so}) of 45 knots calibrated air speed, and
- if the aircraft is a glider – has a maximum never-exceed speed (V_{ne}) of 135 knots calibrated air speed, and
- if the aircraft has a cabin – it is non-pressurised, and
- has a maximum seating capacity of 2 persons, including the pilot, if it is designed to be equipped with seating, and
- if it is a manned free balloon not designed to be equipped with seating – can carry no more than 2 persons, and
- has:
  - in the case of an amphibian – repositionable landing gear
  - in the case of a glider – fixed or retractable landing gear
  - in any other case – fixed landing gear.

LOA means a letter of acceptance issued by an NAA to a data supplier that has demonstrated compliance with the requirements of RTCA DO-200B, or EUROCAE ED-76A, Standards for Processing Aeronautical Data, as in force from time to time.

Note 1: An LOA may be a Type 1 LOA or a Type 2 LOA.

Note 2: An LOA, issued by an appropriate NAA to each of the participants in the data chain, demonstrates compliance with this requirement, for example, FAA LOA issued in accordance with FAA AC 20-153 or EASA LOA issued in accordance with EASA Agency Opinion 01/2005 and the associated "Conditions for the issuance of Letters of Acceptance for Navigation Database Suppliers by the Agency".

Note 3: A Type 1 LOA provides recognition of a data supplier's compliance with RTCA/DO 200A/EUROCAE ED-76 with no identified compatibility with an aircraft system. A Type 1 LOA ensures the processes for producing the aeronautical data comply with the documents identified in Note 2 and the documented data quality requirements.

Note 4: A Type 2 LOA provides recognition of a data supplier's compliance with RTCA/DO 200A/EUROCAE ED-76 and the compatibility of its delivered data with particular avionic systems that are identified in the LOA.

Note 5: A data service provider who holds a certificate under regulation 175.295 of CASR equates to an EASA or FAA Type 1 LOA.

long range navigation system, or LRNS means a navigation system, capable of area navigation in oceanic airspace, that comprises an INS, or an IRS, or an approved GNSS position source.

lowest safe altitude for a route or route segment of a flight of an aircraft, means the lowest altitude that will provide safe terrain clearance for the aircraft for the route or route segment calculated in accordance with a method specified in the CASR Part 173 Manual of Standards, or the operator's operations manual.

low-risk electronic device means:

- a digital mobile telephone, or
- a handheld personal digital assistant, or
- an electronic device:
  - to which the IEEE Standard for Information technology – Telecommunications and information exchange between systems – Local and metropolitan area network – Specific requirements CASR Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications (as in force from time to time) applies, and
  - that transmits only in a way that meets that standard.

low-visibility approach means an approach using minima for a runway that are below the Category I precision approach minima for the runway as published in the AIP.

low-visibility operation means:

- a low-visibility take-off, or
- a low-visibility approach.

low-visibility take-off means a take-off with a runway visual range of less than 550 m.

maximum landing weight for an aircraft, means the maximum landing weight for the aircraft permitted by:

- the flight manual for the aircraft, for an aircraft that is type certified, or
- for an aircraft that is not certified:
- if a document, published by the manufacturer of the aircraft setting out the operating limitations specifies a weight - that document, or
- if no weight is specified in the document published by the manufacturer or if a different weight is specified in the certificate of airworthiness – the certificate of airworthiness for the aircraft.

maximum take-off weight means the maximum take-off weight for the aircraft permitted by:

- for an aircraft that is type certified
  - the flight manual for the aircraft, or
- for an aircraft that is not type certified:
  - if a document, published by the manufacturer of the aircraft setting out the operating limitations for the aircraft, specifies a weight – that document, or
  - If the certificate of airworthiness for the aircraft specifies a different weight to the one above – the certificate or airworthiness for the aircraft, or
  - if no weight is specified in the document mentioned above, or in the certificate of airworthiness and the aircraft is a Part 103 aircraft in relation to which a statement of acceptance for the aircraft has been issued by a Part 103 ASAO in accordance with regulation 103.030 – the weight in the statement of acceptance.

manufacturer's data manual, in relation to an aircraft, means a publication (however described) other than the AFM, produced by the manufacturer of the aircraft as a guide for the flight crew members in the operation of the aircraft.

MDA means minimum descent altitude, and is a specified altitude, in a 2D-instrument approach or circling approach, below which you must not descend without the required visual reference for the operation.

MDH means minimum descent height, and is a specified height, in a 2D-instrument approach or circling approach, below which you must not descend without the required visual reference for the operation.

METAR means a routine aviation weather report in aeronautical meteorological code.

minimum fuel occurs when, having committed to land at a specific aerodrome, the pilot in command calculates that any change to the existing ATC clearance to that aerodrome may result in landing with less than the fixed fuel reserve.

MSA or ***minimum sector altitude,*** means the lowest usable altitude that provides at least 300 m (or 1,000 ft) clearance above all objects within a circle or a sector of a circle of radius 46 km (25 NM) or 18.5 km (10 NM) centred on a significant point.

NAIPS or National Aeronautical Information Processing System, is the multifunction, computerised, aeronautical information system, managed by Airservices Australia, which:

- processes and stores meteorological and NOTAM information
- enables the provision of briefing products and services to pilots and ATC
- enables the submission of flight notifications to ATS.

national aviation authority *for a foreign country means* the authority that is responsible for regulating civil aviation in the country, and includes:

- the national airworthiness authority for the country
- if EASA carries out functions on behalf of the country – EASA
- for China, for matters relating to Hong Kong – the Civil Aviation Department of Hong Kong.

navigational database contains the data from an approved provider loaded onto an aircraft navigation system.

navigation specification means a set of aircraft and aircrew requirements needed to support a flight under PBN within a defined airspace being either:

› RNAV specification which is a navigation specification based on area navigation that does not include the requirement for onboard performance monitoring and alerting, and is designated by the prefix RNAV, for example, RNAV 5, RNAV 1, or

› RNP specification which is a navigation specification based on area navigation that includes the requirement for onboard performance monitoring and alerting, and is designated by the prefix RNP, for example, RNP 2, RNP APCH.

navigational tolerance means one of the following:

› for PBN operations – the RNP value for the segment of the IAP being conducted

› for VOR or localiser – full-scale deflection of the course deviation indicator

› for NDB – + or –5 degrees or more from the specified bearing

› for DME – + or –2 NM or more from the required arc

› visual navigation – more than 1 NM from the cleared track.

night means the period between the end of evening civil twilight and the beginning of the following morning civil twilight.

non-precision approach procedure means an IAP designed for 2D instrument approach operations Type A.

NOTAM is a notice to airmen and has the meaning in the Air Services Regulation 2019.

A NOTAM is provided by Airservices Australia to alert pilots of potential hazards on a flight route or at a specific location.

NVIS flight means a flight conducted using a night vision imaging system.

› **use NVIS** means to use NVIS as the primary means of avoiding terrain to fly safely by means of visual surface reference external to the aircraft.

NVIS operation has the meaning given in Appendix B of this guide (MOS chapter 3)

oceanic airspace (relevant to MOS 11.03) means:

› any class of airspace, or portion of a class of airspace, that is within an Australian FIR and has the lateral boundaries of an area specified in the AIP as an oceanic control area, or

› for airspace not within the FIR , the airspace described by the relevant NAA as oceanic control area or (if not so described by an NAA) it is the area predominantly over ocean or sea where aircraft are unlikely to maintain VHF radiocommunication with an ATS.

Note: The effect of this section is that the vertical limits of an oceanic control area have no relevance to the definition of oceanic airspace within an Australian FIR. The AIP document specifying the geographic boundaries of oceanic control areas is the Designated Airspace Handbook.

off-block time has the same meaning as **flight commencement.**

operative means that a thing is not inoperative.

operator of an aircraft, means:

› if the operation of the aircraft is authorised by an AOC, a CASR Part 141 certificate or an aerial work certificate – the holder of the AOC or certificate, or

› otherwise – the person, organisation or enterprise engaged in aircraft operations involving the aircraft.

passenger in relation to an aircraft, means a person who:

› intends to travel on a particular flight on the aircraft, or

› is onboard the aircraft for a flight, or

› has disembarked from the aircraft following a flight, and

› who is not a member of the crew of the aircraft for the flight.

PBN or performance-based navigation means area navigation based on performance requirements for aircraft operating:

- along an ATS route
- on an IAP, or
- in designated airspace.

Note: Performance requirements are expressed in navigation specifications (RNAV specification, and RNP specification) in terms of the accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular class of airspace.

Performance class 1 (as defined by ICAO) means a helicopter with performance such that in the case of a critical power unit failure, it is able to land on the rejected take-off area, or safely continue the flight to an appropriate landing area, depending on when the failure occurs.

personnel

- for an Australian air transport operator or an aerial work operator, includes any of the following who have duties or responsibilities relating to the safe conduct of the operator's Australian air transport operations or aerial work operations:
  - an employee of the operator
  - a person engaged by the operator (whether by contract or other arrangement) to provide services to the operator
  - an employee of a person mentioned in the above sub-dot point, or
- for an ASAO, includes any of the following who have duties or responsibilities relating to the safe performance of the ASAO's approved functions:
  - an employee of the ASAO
  - a person engaged by the ASAO (whether by contract or other arrangement) to provide services to the ASAO
  - an employee of a person mentioned in above sub-dot point
  - a person appointed by the ASAO to perform an approved function on behalf of the ASAO.

pilot in command in relation to a flight of an aircraft, means a pilot designated by the operator of the aircraft as being in command and charged with the safe conduct of the flight.

planned destination aerodrome means the aerodrome which before take-off a flight is planned to fly to and land at.

point of in-flight replanning means a point en route at which an aircraft can:

- continue the flight to the planned destination aerodrome while maintaining the required final reserve fuel and contingency fuel and any other fuel required by subsection 19.04 – (*usable fuel required* when replanning from any point in flight), or
- otherwise – divert to an en route alternate while maintaining the fuel required by subsection 19.04 (*usable fuel required for* continuation of flight at any time).

populous area includes a city and town.

precision approach procedure means an IAP based on an ILS, an MLS, a GLS or an SBAS CAT I, and which is designed for 3D instrument approach operations Type A or B.

pre-flight briefing means the information the pilot must obtain before take-off including:

› relevant weather information

› aerodrome, air route and airway facility information the pilot plans to use

› a check and review of the following:

› all head office and FIR NOTAMs applicable to the en route phase of the flight

› all location-specific NOTAMs for relevant aerodromes.

prescribed aircraft means an aircraft that is being used (or is regularly used) for a prescribed air service.

prescribed air service means an air service prescribed in the *Aviation Transport Security Regulations 2005*:

(1) For the definition of prescribed air service in section 9 of the Act, an air service of any of the following kinds is prescribed:

(a) a regular public transport operation

(b) an air service in which a jet is used

(c) an air service in which an aircraft with a certificated maximum take-off weight greater than 5 700 kilograms is used.

(2) However, an air service is not taken to be a prescribed air service if the Secretary declares, by instrument in writing, that the air service is not a prescribed air service.

protective breathing equipment means equipment designed to prevent a person from having to breathe in, and to protect the person's eyes from, toxic gases and fumes.

psychoactive substance: has, subject to subclause (2), the meaning given by section 1.1 of Annex 1, *Personnel Licensing*, to the Chicago Convention.

The definition of psychoactive substances in that Annex includes: Alcohol, opioids, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens, and volatile solvents, whereas coffee and tobacco are excluded.

To avoid doubt, in the regulations, a psychoactive substance includes:

› a therapeutic substance that is a psychoactive substance within the meaning given by Annex 1 to that Convention, and

› a therapeutic substance of which a psychoactive substance (within the meaning given by that Annex) is an ingredient, but does not include:

› tea, cocoa, chocolate or any other non-alcoholic drink containing caffeine or guarana, or

› confectionery containing caffeine or guarana.

therapeutic substance means a substance that is therapeutic goods, within the meaning given by the Therapeutic Goods Act 1989.

published lowest safe altitude for a route or route segment for a flight of an aircraft, means the lowest safe altitude for the route or route segment published in authorised aeronautical information.

quick-donning mask means an oxygen mask that:

› is for a pilot's personnel use, and

› within 5 seconds of being deployed for use, the pilot can, with one hand, place over the face, secure and seal

QNH is an atmospheric pressure adjusted to sea level and measured in hPa or millibars so that when QNH is set the altimeter will read altitude.

recognised country see the CASR Dictionary:

Note: recognised countries include, Canada, France, Germany, Netherlands, New Zealand, United Kingdom and United States of America.

recreational aviation medical practitioner's certificate has the same meaning as in regulation 61.010 of CASR.

rectification interval for an MEL item that may become inoperative, means the period within which the item must be rectified after discovering it is inoperative.

regular public transport operation (*Aviation Transport Security Regulations 2005*) means an operation of an aircraft for the purposes of a service of providing air transportation of people, or both people and goods, that:

(a) is provided for a fee payable by persons using the service and

(b) is available to the general public on a regular basis and

(c) is conducted in accordance with fixed schedules to or from fixed terminals over specific routes.

rescue for an operation, means one to retrieve a person in distress, provide for their initial medical or other needs, and deliver them to safety.

rollout system reserved

RNAV or **area navigation** means a method of navigation which permits aircraft operations on any desired flight path within:

› the coverage of ground or space-based navigation aids,

› the limits of the capability of *self-contained navigation aids, or

› a combination of ground, space-based and self-contained navigation aids.

(*Self-contained navigation aids are such aids onboard an aircraft.)

RNAV specification is a particular subset of PBN.

RNP is a statement of the navigation performance necessary for an aircraft operation within a defined airspace.

RNP 0.3 means your aircraft navigation system accuracy must be no greater than + or – 0.3 NM.

RNP AR – an RNP AR navigation authorisation entitles an operator to fly:

› RNP AR approach (RNP AR APCH) procedures

› RNP AR departure (RNP AR DEP) procedures, and

› RNP AR engine-out SID (RNP AR EOSID) procedures.

| RNP AR APCH (ICAO) procedures do not include one engine inoperative (OEI) provisions.

RNP specification is a particular subset of PBN.

rotorcraft means:

› a helicopter, or

› a gyroplane, or

› a powered-lift aircraft.

rotorcraft clearway for an aerodrome, means an area of ground or water selected and prepared by the aerodrome operator as being suitable for a rotorcraft to accelerate and achieve a height mentioned in the rotorcraft's flight manual.

runway strip means a defined area at an aerodrome, including the runway and stopway (if any) to which it relates, that is intended to:

› reduce the risk of damage to aircraft running off the runway

› protect aircraft flying over the area during take-off, landing or a missed approach.

RVSM airspace means any of the following:

› the airspace, at or above flight level 290, identified in the AIP as airspace where a vertical separation minimum of 1,000 ft applies

› the airspace, at or above flight level 290, designated, or otherwise recognised, by the appropriate authority of a foreign country to be airspace where a vertical separation minimum of 1,000 ft applies

› airspace, at or above flight level 290, where a vertical separation of 1,000 ft applies under the terms of a regional air navigation agreement.

RVR means runway visual range, and is the range over which the pilot of an aircraft on the centreline of a runaway can see:

› the runway surface markings, or

› the lights delineating the runway or identifying its centreline.

RVR system is a system capable of measuring the runway visual range.

SARWATCH means the time for a SAR alert, based on:

› full position reporting procedures, or

› scheduled reporting times (SKEDS), or

› SARTIME.

SBAS means satellite-based augmentation system.

SBAS CAT I, in relation to an instrument approach procedure, means SBAS Category I.

SCT means scattered cloud (3-4 OKTAS, meaning 3 to 4 eighths of the sky is covered by cloud).

seaplane includes an aeroplane with a floating hull.

search for an operation, means one normally coordinated by a rescue coordination centre or subcentre using available personnel and facilities to locate a person in distress.

serviceable the term applies to aeronautical products and is defined in CASR sub-regulation 42.015 (6). This definition is specific to CASR Part 42.

An aeronautical product is serviceable if the product:

› conforms with its approved design, and

› is fit for its intended use.

The term 'unserviceable' is not defined but in relation to an aeronautical product it means the product is not serviceable.

SPECI means an aviation special weather report in aeronautical meteorological code.

SOG member means an individual, other than a crew member, who is conducting activities for a SOG operation and who is:

› a member of a State or Territory police service SOG or the Australian Federal Police SOG or

› an Australian Defence Force member acting under an arrangement between a State or Territory police service or the Australian Federal Police and the Australian Defence Force.

SOG operation means a specialist police operation:

› involving some or all of the following:

» winching or rappelling operations, emplaning or deplaning from a rotorcraft in flight or partially in flight **(a hover entry or exit)**

» emplaning or deplaning from a rotorcraft on the ground, in circumstances where rapid entry to, or exit from the aircraft is essential to the operation, and

› which is one of the following:

» for, or related to, the law enforcement or counter terrorism functions of a State or Territory police service or the Australian Federal Police

» for training related to the activities and functions as mentioned above, and

› which is conducted at a location where a normal landing may or may not be possible or safe.

specified aircraft performance category for an aircraft, means the aircraft performance category prescribed for an aircraft's V_{AT} (as worked out in accordance with the AFM) by the Part 91 MOS.

stage for a rotorcraft flight, means any of the following:

› take-off

› take-off and initial climb

› en route flight

› approach and landing, or baulked landing.

Stage has a specific meaning in relation to rotorcraft flight and performance. Outside of this context it takes on its ordinary meaning.

standard pressure region means the airspace above 10,000 ft where the subscale of a pressure altimeter is set to 1013.2 hPa

State of the operator has the same meaning as "***State***, for an operator", as given by the CASR Dictionary.

suitable forced-landing area means:

› an area of ground on which a rotorcraft could make a forced landing with a reasonable expectation that no-one in the rotorcraft or on the ground would be injured, or

› an area of water:

» into which a rotorcraft could ditch with a reasonable expectation, taking into account surface conditions, that no-one in the rotorcraft or on the water would be injured

» in which there would be a reasonable expectation, taking into account the limitations of the rotorcraft's emergency flotation devices, that those in the rotorcraft would survive for the time that it would take to be rescued

» that, for a passenger transport operation, would be:

– adjacent to land, or adjacent to an offshore installation with search and rescue capabilities, or

– a location set out in the operator's exposition with search and rescue capabilities.

Note: Surface conditions include, for example, wave height, wind and swell, and rocks and sandbanks only exposed at low tide.

supplemental oxygen means oxygen that is provided to an occupant of an aircraft by purpose designed equipment to supplement the oxygen available in the atmosphere inside the aircraft.

TABS means traffic awareness beacon system.

TAF3 for an aerodrome, means the terminal aerodrome forecast or TAF routinely issued by the BOM every 3 hours for the aerodrome.

take-off decision point (TDP) for a rotorcraft taking off, means the point used in determining take-off performance from which, if you recognise a power unit failure at that point, either you can make a rejected take-off, or continue to take-off safely.

take-off minima means the minimum values of the following that are used to determine whether an aerodrome may be used for aircraft takeoff:

› visibility, including runway visibility and runway visual range

› cloud ceiling height.

take-off weight for a flight of an aircraft, means the total weight of the aircraft, including its load, at the start of:

› for an aeroplane – its take-off run, or

› for a rotorcraft – its take-off manoeuvre.

taxi fuel means the amount of fuel expected to be used before take-off, taking into account:

› meteorological and operational conditions at the departure aerodrome including taxi time and traffic conditions

› APU consumption (if applicable).

Note: For rotorcraft operations requiring a take-off before taxi, such as a hover taxi from a confined helipad, taxi fuel would be the fuel you expect to consume before commencing actual departure.

threshold of a runway, means the beginning of that portion of a runway that is usable for landing.

total cosmic radiation means the sum total of ionising or neutron radiation of galactic and solar origin.

track means the projection on the Earth's surface of the path of an aircraft, the direction of which at any point is usually expressed in degrees from north (true or magnetic).

transition altitude means the altitude:

› at or below which the vertical position of an aircraft is referenced to an average mean sea level atmospheric pressure (QNH)

› above which the vertical position of the aircraft is referenced to standard pressure (pressure altitude).

transition layer means the airspace between the transition altitude and the transition level.

transition level means the lowest flight level available for use above the transition altitude.

transition point for a rotorcraft flight that begins in VMC but is not flown wholly in VMC, means the point in the flight at which the rotorcraft stops flying in VMC and starts flying in IMC.

transponder means an aircraft's SSR transponder.

trip fuel means the amount of fuel required for you to fly from take-off, or the point of in-flight replanning, until landing at the destination aerodrome, taking into account the following operating conditions:

- 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 destination aerodrome.

TSO is short for technical standard order of the FAA (*see* CASR Dictionary).

type for an aircraft, aircraft engine or propeller, means a design and make of aircraft, aircraft engine or propeller and, where appropriate, refers to a group of essentially similar aircraft, aircraft engines or propellers which, although possibly existing in different models, stem from a common basic design.

Type A for an instrument approach operation, means a minimum descent height, or a decision height at or above 250 ft.

Type B for an instrument approach operation, means a decision height below 250 ft, and includes CAT I ILS, and low-visibility CAT II and CAT III ILS.

Type 2 DAT approval means an approval issued by EASA that authorises the supply of aeronautical databases for which aircraft compatibility has been demonstrated.

Type 2 LOA means an LOA issued by the FAA or EASA that identifies the compatibility of its delivered data with a particular avionic system or avionic systems.

unforeseen factors mean factors that could influence fuel consumption to the destination aerodrome, including:

- deviation of the particular aircraft from the expected fuel consumption for aircraft of that type
- deviation from forecast meteorological conditions
- extended delays and deviations from planned routings or cruising levels.

UTC means coordinated universal time as determined by the International Bureau of Weights and Measures.

| See bipm.org/en/

valid for a navigation database, means that an approved provider must supply the database.

V_{AT}, or velocity at threshold means the indicated airspeed at the threshold which is equal to the higher of the following in the landing configuration at the maximum certified landing mass:

- stall speed V_{SO} multiplied by 1.3, or
- stall speed V_{S1G} multiplied by 1.23.

V_{AT} is short for velocity at threshold.

V_{min} means the minimum operating speed.

V_{S1G} means the stalling speed, or the steady flight speed, obtained in the clean configuration at 1G.

V_{SO} means the stalling speed, or the steady flight speed, in the landing configuration.

V_{ye} for an aircraft, means the speed mentioned in the AFM for the best rate of climb

VFR climb is a specific kind of ATC authorisation for an IFR flight.

VFR descent is a specific kind of ATC authorisation for an IFR flight.

VFR flight means a flight conducted under the VFR (Visual Flight Rules)

› For Part 131 aircraft – the rules and procedures set out in Subdivision 131. D.4.2

› For all other aircraft – the rules and procedures set out in Subdivision 91. D.4.2 (see Aircraft to be flown under the VFR or IFR in 91.270)

VFR-on-top is a specific kind of ATC authorisation for an IFR flight.

VMC (short for visual meteorological conditions) means meteorological conditions that meet the VMC criteria.

VMC criteria:

(a) for a class of aircraft (other than Part 131 aircraft) and a class of airspace (including flight visibility and distance from cloud) – means the criteria prescribed for the class of aircraft and class of airspace by the Part 91 Manual of Standards (see section 2.07), and

(b) for Part 131 aircraft and a class of airspace (including flight visibility and distance from cloud) – means the criteria prescribed for the aircraft and class of airspace by the Part 131 Manual of Standards (see section 2.02).

WATIR or weather and terminal information reciter means a service, provided by an aerodrome operator:

› that provides actual weather conditions at the aerodrome via telephone or broadcast

› the data for which is obtained from an automatic weather station (AWS) operated or approved by the BOM and supplemented by the aerodrome operator.

weight and balance documents for a flight of an aircraft, are the documents that set out the aircraft's load for the flight and the distribution of the load during the flight.

weight and balance limits for an aircraft, mean the weight and balance limits set out in the aircraft flight manual instructions for the aircraft.

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Appendix H: Exemptions included in this guide

Exemption/Instrument	Repeal Date	Page in this guide
CASA EX67/24 – Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2024	2 December 2027	3, 5, 8, 10, 22, 23, 28, 29, 30, 31, 32, 33, 41, 54, 77, 89, 90, 102, 104, 105, 116, 118, 126, 127, 128, 133, 182, 184, 187, 192 and 193.
CASA EX68/24 – Part 119 of CASR – Supplementary Exemptions and Directions Instrument 2024	2 December 2027	22
CASA EX69/24 – Part 121 and Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2024	2 December 2027	18
CASA EX70/24 – Part 133 and Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2024	2 December 2027	19
CASA EX71/24 – Part 135, Subpart 121.Z and Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2024	2 December 2027	19
CASA EX72/24 – Part 138 and Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2024	2 December 2027	20
CASA EX92/22 – Part 137 and Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2022	30 November 2025	23, 90

Version history

Updated: January 2025 (version 4.2)

Latest print version: 4.2

Version 4.2 January 2025	Details
Throughout this guide	Form number references removed. Changes made to references and table numbers. Additional cross references to guide sections inserted to assist the reader with cross referencing relevant sections of the guide. Hyperlinks to external references updated. Various formatting changes made that do not impact the intent of the content.
What Part 91 covers	Whole column updated to reflect that Part 91 is no longer new.
Section 8 Page 51	New note inserted at the top of the right-hand page to read: Note: A published radio frequency is taken to include the use of a relevant datalink, ADS-C, CPDLC, or SATCOM voice communication.
Section 1 Page 22	Removed reference and comments regarding CASA EX68/24 – Supplementary Exemptions and Directions Instrument 2021.
Table 13 Page 54	New note inserted within the last cell of table 13 to read: Note: a report to cancel SARWATCH is not required if an aircraft has arrived at a controlled aerodrome with an AFIS, during AFIS hours.
Section 8 Page 58	First paragraph replaced with: You may fly an aircraft within or across a danger area that is not a military operating area provided that: › you are aware of the specific activity which causes the area to be a danger area › before and during the flight, you take precautions against any safety risks that could arise from the flight › you comply with any applicable conditions for the area as in force from time to time.
Section 8 Page 58	New heading inserted under table 11 - Military operating area (MOS 11.23)
Section 13 Page 95	New note added after the 2nd bullet point of MOS 15.03 to read: Note: If engine failure or loss of pressurisation occurs during a take-off, and the meteorological conditions necessitate flight to another aerodrome, the departure aerodrome would be the critical point for calculations of additional fuel.
Section 13 Page 97	First and second bullet points under Missed Approach (MOS15.11) - additional requirements below the notes: › 'RNP APCH-LNAV/VNAV, an RNP APCH-LPV, or a precision approach' replaced with 'APV or a PA' › 'RNP APCH-LNAV, and PNP APCH-LP or other NPA' replaced with 'NPA'.

Version 4.2 January 2025	Details
Section 18 Page 119	The exception has been replaced with a note to read: Note: If you are soaring in a glider with one or more other gliders in a thermal, this is not a formation flight.
Appendix A Page 158	Amendment made to first paragraph under the heading Life rafts – carriage requirements (MOS 26.60) to read: over water and is further from land than: Second bullet point amend to: for a propellor-driven turbine-engine multi-engine aeroplane
Appendix F Page 200, 214, 215 and 221	Four new definitions have been added: › approach procedure with vertical guidance › non-precision approach procedure › Type A › Type B The definition for precision approach procedure has been amended.

Version 4.1 December 2024	Details
Throughout this guide	Changes to exemption instruments (numbers): › CASA EX81/21 changed to EX67/24 › CASA EX82/21 changed to EX68/24 › CASA EX83/21 changed to EX69/24 › CASA EX84/21 changed to EX70/24 › CASA EX85/21 changed to EX71/24 › CASA EX86/21 changed to EX72/24
Throughout this guide	Changes to formatting.
Section 14 Page 101	Figure 16: Positions to change between QNH – new figure inserted. Amended bullet points to read: If you are flying below the transition altitude, set your altimeter using either: › the current local QNH (either an accurate QNH or forecast QNH) of a station along the route within 100 NM of the aircraft › the current forecast area QNH.

Version 4.1 December 2024	Details
Appendix A Page 153	Table 26: Amended wording to the supplemental oxygen supply requirements › Flight crewmember or cabin crew member: For any period exceeding 30 minutes when the cabin pressure altitude is continuously at least FL125 but less than FL140, there must be supply for the entire period. For any period when the cabin pressure altitude is at least FL140, there must be supply for the entire period. When a pressurised aircraft is flown at an altitude of FL250 or more, there must also be at least 10 minutes supply even if the entire period spent at that altitude is less than 10 minutes. › Passengers: For any period when the cabin pressure altitude is at least FL150, there must be supply for the entire period. When a pressurised aircraft is flown at an altitude of FL250 or more, there must also be at least 10 minutes supply after descending below FL250 even if the entire period spent at that altitude is less than 10 minutes.
Appendix H (new)	Appendix H inserted – Exemptions included in this guide
Version history (new)	Version history inserted.

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