Australian Government

Civil Aviation Safety Authority

Part 121 Manual Of Standards

VERSION 1.1 JULY 2018

This version is a TECHNICAL DRAFT only. It is not a legal draft.

This draft was originally written to enable public consultation in late 2015 and has had only minor alterations for the purpose of providing indicative material to enable public consultation in July 2018 of Part 121 of CASR.

Following finalisation of the Part 121 of CASR regulations, a Part 121 Technical Working Group will provide feedback on the content of the Part 121 Manual of Standards (MOS) prior to a formal public consultation of a legal draft of the Part 121 MOS.

This technical draft has been prepared by the Flight Standards Branch, National Operations and Standards Division, Civil Aviation Safety Authority, Canberra.

Australian Government
Civil Aviation Safety Authority

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PRELIMINARY

1. Name of document

1.1. This document is the Part 121 Manual of Standards (MOS).

1.2. In this document, unless the contrary intention appears, a reference to *"this MOS"* or *"the MOS"* means the *Part 121 Manual of Standards Instrument*.

2. Commencement

2.1. This instrument commences immediately after the commencement of Part 121 of CASR 1998.

3. Scope

3.1. This MOS sets out the requirements for safety standards and aircrew training. Under Part 121 of CASR 1998 and this MOS sets out matters relating to:

a) larger aeroplane operations, performance and flight planning including fuel requirements;

b) larger aeroplane weight and balance, including documentation;

c) aeroplane instruments, equipment and some systems;

d) flight crew and cabin crew initial, conversion and ongoing training;

e) emergency evacuation equipment and procedures.

4. Definitions

4.1. Unless otherwise defined in this MOS, words and phrases have the same meaning as in *Part 121 of CASR 1998*.

4.2. In this MOS, a reference to a Part followed by a number is a reference to that Part of the CASR 1998 bearing that number.

4.3. The following definitions detailed below explain the meanings of the definitions used in this MOS:

Act means the Civil Aviation Act.

accelerate-stop distance available means the sum of:

a) The length of the take-off run available: and

b) If stopway is provided – the length of the stopway.

actual landing distance means the landing distance required for the actual conditions using the deceleration devices required to be used for the landing.

adequate aerodrome means an aerodrome at which the landing performance requirements at the expected landing weight can be met and which is expected to be available, if required, and which has the necessary facilities and services, such as air traffic services, lighting, communications, meteorological services, navigation aids, aeroplane rescue and fire-fighting services and at least one suitable instrument approach procedure which is usable by the aeroplane.

Note: *It is not necessary that an en-route adequate aerodrome within the threshold time must meet the requirements for an EDTO alternate aerodrome unless the flight is dispatched as an EDTO flight.*

AED means an automatic external defibrillator

AEO means all engines operating.

AFM means aircraft flight manual.

alternate aerodrome means an aerodrome to which an aircraft may proceed, when it becomes either impossible or inadvisable to proceed to, or land at, the aerodrome of intended landing, being an aerodrome:

a) where the necessary services and facilities are available;

b) where aircraft performance requirements can be met; and

c) which is operational at the expected time of use.

alternate fuel means the amount of fuel required to enable the aircraft to perform a missed approach at the destination aerodrome, climb to the expected cruising altitude, fly the expected routing, and descend to the point where the expected approach is initiated, and conduct the approach and landing at the destination alternate.

approved AEO cruise speed, selected by the operator for an operator's airframe/engine combination, means the AEO cruise speed within the certified flight envelope for the aeroplane, in accordance with the AFM, approved by CASA.

Note: *The approved AEO cruise speed may differ from the speed used for the threshold time.*

approved OEI cruise speed, selected by the operator for an operator's airframe/engine combination, with 2 turbine engines, means the OEI cruise speed within the certified flight envelope for the aeroplane, in accordance with the AFM, approved by CASA.

Note 1: *The approved OEI cruise speed may differ from the speed used for the threshold time.*

Note 2: *The identified speed that will be used to calculate the maximum diversion distance should be the same speed used to determine the fuel reserves for OEI diversions.*

area of operation means areas beyond certain distances from adequate aerodromes measured by an aeroplane OEI or AEO cruise speed, as applicable, under ISA still air conditions.

ARINC 424RF path terminator means a segment of a flight path known as radius-to-fix terminating as specified in *Aeronautical Radio Incorporated Specification 424-17.*

basic empty weight, for an aeroplane, means the empty weight of the aeroplane and the weight of additional standard items nominated by the operator in the exposition.

Note: *In relation to a particular type of operation, standard items may include operational equipment and items carried on all flights such as flight crew, cabin crew and seat back documentation.*

CBT means computer-based training.

CFSS means the cargo fire suppression system of an aeroplane.

clearway means a defined rectangular area at the end of the take-off run available, on the ground under the control of the aerodrome operator, selected and prepared as a suitable area over which an aircraft may make a portion of its initial climb to a specified height.

CMP means configuration maintenance and procedures.

cockpit documentation means any document taken into, or downloaded in, the cockpit of an aeroplane by (or for) the pilot in command, for the purpose of flying and navigating the aeroplane, and includes, for example, a computerised flight plan.

commencement of flight for the purposes of chapter 2.1 Extended diversion time operations and chapter 2.5 Fuel requirements, means the time when the aeroplane first moves for the purposes of take-off.

configuration maintenance and procedures (CMP) standards document means a document approved by the certification authority for the aeroplane specifying the minimum requirements for an aeroplane configuration, including any special inspections, hardware life limits, flight crew procedures, Master Minimum Equipment List constraints and maintenance practices necessary to establish the suitability of an airframe/engine combination for EDTO.

contaminated runway as defined in the OEM AFM or if not defined: means if more than 25% of the surface area required for take-off or landing is covered by any of the following:

a) water or slush more than 3mm deep;

b) loose snow more than 20mm deep;

c) compacted snow or ice, including wet ice.

critical point (CP) means the point along a route that is most critical from a fuel requirement point of view from which an aircraft can proceed towards the destination aerodrome or initiate a diversion to an en-route alternate.

Note: The CP is usually, but not always the last ETP.

CTD means cabin training device.

destination aerodrome means the flight planned destination aerodrome to which a flight is planned.

destination alternate means an alternate aerodrome at which an aircraft would be able to land should it become either impossible or inadvisable to land at the destination aerodrome.

Note: The aerodrome from which a flight departs may also be an en-route alternate or a destination alternate for that flight.

discretionary fuel means extra fuel carried at the discretion of the pilot in command. Discretionary fuel is not required.

dry operating weight, for an aeroplane, means the total of:

a) the aeroplane's basic empty weight; and

b) the weight of operational items carried on the aeroplane for a flight, including (but not limited to) the weight of the following:

(i) crew;

(ii) crew baggage;

(iii) flight equipment;

(iv) pantry items;

(v) cargo containers.

dry runway as defined by the OEM AFM or if not defined: means a runway surface are required for take-off or landing;

a) has no visible moisture; and

b) it is not contaminated.

EDTO alternate aerodrome means an adequate aerodrome that may be designated as an alternate aerodrome in the event of a diversion during an EDTO.

EDTO entry point (EEP) means the first point on an outbound EDTO route beyond which the aeroplane is no longer continuously within threshold time at the approved OEI or AEO cruise speed, as applicable, from and adequate aerodrome.

EDTO**,** or ***extended diversion time operation*****,** means any air transport flight by a turbine-engine aeroplane where the flight time at the OEI or AEO cruise speed (in ISA and still air conditions), as applicable, from a point on the route to an adequate aerodrome is greater than the threshold time determined in accordance with Regulation 121.130 of CASR 1998.

EDTO qualified maintenance personnel means maintenance personnel who have completed the operator's EDTO maintenance training.

emergency equipment means equipment required to be installed or carried in an aircraft, to be used in abnormal or emergency situations that demand immediate action for the safe conduct of the flight and protection of occupants, including life preservation (e.g. fire extinguisher).

emergency fuel means a situation of fuel emergency when the calculated usable fuel predicted to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the final reserve fuel and, as a result of this predicted fuel state, the aeroplane requires immediate assistance.

en-route alternate means an alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en-route.

Note: The aerodrome from which a flight departs may also be an en-route alternate or a destination alternate for that flight.

equal time Point (ETP) means a point along a route which is located at the same flight time from two aerodromes.

EDTO Significant System means the aeroplane propulsion system and any other aeroplane systems whose failure or degradation could adversely affect the safety of an EDTO flight, or whose functioning is important to continued safe flight and landing during an EDTO diversion.

flight dispatcher means safety critical personal under regulation *CASR Part 119* who is designated by the operator to control and supervise flight operations, including supporting, briefing and assisting pilots in command in the safe conduct of flights.

Note: A flight dispatcher is also known as a flight operations officer.

FQIS means fuel quantity indicating system.

FTL requirements means requirements with regard to flight and duty time limitations and rest requirements.

GPS means Global Positioning System.

gross flight path means a flight path assumed an aeroplane will follow when flown in a particular configuration in accordance with specified procedures in ambient conditions and that is established from the aeroplanes certification performance data representing an average fleet performance of the aeroplane type

ground training means ground instruction supervised by training staff in accordance with Chapter 8 of Part 121 MOS.

holding fuel means fuel that will allow an aircraft to fly for a specified period of time calculated at the holding fuel consumption rate established for the aircraft to account for operating conditions.

IAP means an instrument approach procedure.

IFSD, or in-flight shutdown, means an engine:

a) ceasing to function normally in flight for any reason; or

b) shutting down, whether the shutting down is:

(i) self-induced; or

(ii) crew initiated; or

(iii) caused by some other external influence.

Note: Examples of some other external influence include flameout, foreign object ingestion, icing, and the inability to obtain or control the thrust necessary for normal operations.

ISA, or ***international standard atmosphere***, means the atmospheric standard as described in *ICAO Document 7488 - Manual of the ICAO Standard Atmosphere.*

isolated aerodrome means a destination aerodrome for which there is no alternate aerodrome suitable for a given aeroplane type i.e. insufficient range capability, or if the fuel required (for a turbine aeroplane) to fly to the nearest suitable alternate aerodrome is greater than the fuel required to hold at the destination for 90 minutes.

landing distance available means the length of the runway declared to be available for the ground run of an aeroplane

maximum certificated take-off weight, for an aeroplane, means the maximum take-off weight stated in the aeroplane's type certificate, foreign type certificate, supplemental type certificate or foreign supplemental type certificate.

maximum diversion time means the time approved by CASA for an operator's airframe/engine combination, not exceeding:

a) for an aeroplane with two turbine engines the time limit of the most time limiting EDTO significant system identified in the AFM, reduced by an operational safety margin of not less than 15 minutes; and

Note: For certain twin turbine-engine aeroplanes, the CFSS is the most time-limiting EDTO significant system identified in the AFM.

b) for an aeroplane with more than two turbine engines - the time limit of the most time-limiting EDTO significant system (if any) identified in the AFM or the OEM operations manual, reduced by an operational safety margin of not less than 15 minutes.

Note: For certain aeroplanes with more than two turbine-engines, the CFSS may be the most time-limiting EDTO significant system identified in the AFM or the OEM operations manual.

MEL means minimum equipment list.

minimum fuel means when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than final reserve fuel.

MTOW means maximum take-off weight.

net take-off path means the gross flight path of an aeroplane reduced in elevation or extended in length by margins specified in chapter 3.1 of this Manual of Standards, (Take off obstacle clearance limitations). The margins are to allow for factors such as deteriorating in aeroplane performance and variations in pilot technique in relating aeroplane performance to obstacle clearance.

OEI means one engine inoperative.

OEM means the original equipment manufacturer.

operational support personnel means persons employed by an operator to carry out duties associated with fuelling, loading or dispatching aircraft.

performance deterioration allowance, or ***PDA***, means the difference between an aeroplane manufacturers' published fuel consumption model and the actual fuel consumption applicable to a specific aeroplane.

polar operation means an operation within the area:

a) north of 78 degrees north latitude; or

b) south of 60 degrees south latitude.

Note: If a polar operation involves a flight that exceeds a relevant EDTO threshold time, the relevant EDTO provisions in this Order also apply to the flight.

proving flight means a flight conducted in an aeroplane or approved simulator to demonstrate that the AOC holder has the capability and competence to safely conduct and adequately support proposed or approved EDTO with a particular airframe/engine combination.

re-dispatch point means the in-flight replanning point on a route where the decision is made to continue to the flight planned destination or divert to an intermediate destination.

reference field length, for an aeroplane, means the shortest take-off distance required for a take-off by the aeroplane at its maximum certificated take-off weight:

a) on a runway that is level and dry; and

b) in still air; and

c) in international standard atmosphere conditions at sea level.

Note: The un-factored take-off distance required is used for the purposes of determining the reference field length.

re-planning point means the in-flight re-planning point on a route where the decision is made to continue to the flight planned destination or divert to an intermediate destination.

representative training device means equipment used in training and includes:

a) safety equipment and emergency equipment as defined in this subsection;

b) cabin training devices as described in subsection 7.3.7 of Part 121 MOS;

c) emergency exit trainers as described in subsection 7.3.13 of Part 121 MOS;

d) facilities used for fire-fighting and water survival training described in section 7.4 of Part 121 MOS.

RF leg means a radius-to-fix leg encoded in the navigation database for an approved RNP operation.

RNP means required navigation performance.

RNP-capable aeroplane means an aeroplane:

a) that is approved for area navigation (RNAV); and

b) that meets RNP capability necessary for an approved RNP operation in accordance with the AFM; and

c) whose FMS permits the RNP type to be selected and displayed to the flight crew.

safety equipment means equipment required to be installed or carried in or on an aircraft, to be used during day-to-day normal operations for the safe conduct of the flight and protection of occupants (e.g. seat belts).

SATCOM means satellite communications.

separate runways means two runways at the same aerodrome configured such that if one runway is closed an operation to the other runway is operationally available for the intended aeroplane.

stopway means a defined rectangular area at the end on the ground at the end of the take-off run available prepared as a suitable area in which an aircraft can be stopped in the case of a rejected take-off.

take-off alternate means an alternate aerodrome at which an aircraft would be able to land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure.

take-off distance available means the sum of:

a) the length of the take-off run available; and

b) if clearway is provided - the length of the clearway.

take-off distance required, for an aeroplane, means the take-off distance for the aeroplane set out in the aeroplane's flight manual.

take-off run available means the length of runway declared to be available and suitable for the ground run of an aeroplane taking off.

Note: If any part of the take-off run available is lost due to alignment of the aeroplane at the start of the take-off run, account must be taken of the loss.

threshold time means the time mentioned in Column 3 of regulation 121.130 of CASR 1998.

Note: CASA will not approve an EDTO that has a threshold time in excess of the threshold time in this definition.

time-limited system means any system:

a) on whose availability the duration of the flight depends; and

b) whose capacity has a time limit.

unforeseen factors means factors that could have an influence on the fuel consumption to the destination aerodrome, including, but not limited to, the following:

a) deviation of an individual aeroplane from the expected fuel consumption data;

b) deviation from forecast meteorological conditions;

c) extended delays and deviations from planned routings or cruising levels.

V_1 means the take-off decision speed.

wet runway as defined in the OEM AFM or if not defined, means a runway surface area required for the take-off or landing:

a) is not dry; and

b) it is not contaminated.

5. Use of computer based training

5.1. When considering the use of computer based training (CBT), the operator must give consideration to the technology accessible and the equipment that is required to deliver the training.

5.2. The operator must also take into consideration that the purpose of CBT is to provide dynamic and interactive tools to address specific portions of a training program. CBT is predominantly relevant for knowledge objectives.

5.3. For subparagraph 5.2 above, a knowledge objective relates to the recall of facts, the identification of policies, rules or procedures and generally committing concepts to memory. An operator must take into account that CBT is less appropriate for evaluating hands-on motor skills or soft skills.

5.4. Instructor and/or technical support must be used with CBT. If the operator chooses to conduct the CBT as part of distance learning, the review/testing of material delivered must be considered in a classroom environment. Regardless of the method used for CBT (classroom vs. distance learning), the training programme must contain a means of testing or evaluation to ensure training effectiveness, currency, and that training objectives have been met.

5.5. Consideration must be given to the design of the programme and to each individual module. These must be maintained accordingly.

CHAPTER 1: (SUBPART 121.C – LARGE AEROPLANE OPERATIONS)

1.1 Carriage of documents - all flights

1.1.1 The following documents shall be carried on the aeroplane for all flights:

a) each part of the operator's exposition that is relevant to the duties of the aeroplane's crew;

b) each part of the operator's exposition that is required for the conduct of the flight;

c) if the operator's exposition does not contain the aeroplane's flight manual - the aeroplane's flight manual;

d) if the aeroplane is fitted with computerised navigation equipment - the operating instructions for the equipment;

e) the journey log for the flight;

f) the aeroplane's flight technical log or maintenance release;

g) the minimum equipment list for the aeroplane;

h) the operational flight plan for the flight;

i) flight notification;

j) weight and balance documents for the flight in accordance with *regulation 121.470 of CASR*;

k) authorised aeronautical information for the flight;

Note: For the definition of ***authorised aeronautical information***, see *Part 1 of the CASR Dictionary*.

l) NOTAMS and AIS briefing documents for the flight;

m) authorised weather forecasts for;

(i) the planned route of the flight; and

(ii) the departure and destination aerodromes and, if the flight plan for the flight includes an alternate aerodrome, the alternate aerodrome.

n) if there is a person on board who may require special consideration during the flight or during an evacuation of the aeroplane - a statement identifying the person and the special consideration; and

Note: Persons who may require special consideration might include air security officers, persons in custody or a person with reduced mobility.

o) a means to comply with the reporting requirements under the operator's safety management system.

Note: It should be noted that other legislation may require the carriage of additional documents. Examples are documentation requirements for dangerous goods (*regulation 92.025 of CASR*) or the requirement for an aircraft to carry its noise certificate (if any – see the *Air Navigation (Aircraft Noise) Regulations 1984*).

1.2 Carriage of documents - international flights

1.2.1 The following documents must be carried on board if a flight of an aeroplane begins or ends at an aerodrome outside Australian territory:

a) the aeroplane's certificate of airworthiness and certificate of registration;

b) if the aeroplane's radio station licence is an apparatus licence - the licence;

c) if the aeroplane's radio station licence is a class licence - a certified true copy of the licence;

d) if the flight is a passenger transport operation - a copy of the passenger list required by regulation 121.160;

e) if the aeroplane is carrying cargo (other than passenger baggage) - a manifest and detailed declaration of the cargo;

f) a copy of the operator's Australian air transport AOC;

g) a copy of the operations specification held by the operator for the aeroplane;

h) each other document (if any) required by a foreign country within whose territory the flight is conducted;

Note: For the definition of ***certified true copy***, see part 1 of the dictionary.

1.3 Information about emergency and survival equipment

1.3.1 If a flight is required to carry the item of emergency equipment on the flight, as mentioned below in Column 1 of Table 1, then when the aeroplane begins the flight, the information of the items of emergency equipment in column 2 must be available for the operator who, if required, must provide this information immediately when in communication with a rescue coordination centre.

Table 1

Information about emergency and survival equipment carried on a flight		
Item	**Column 1**	**Column 2**
	Item of emergency equipment	**Information**
1	Life raft	The number, colour and type of life rafts carried on the flight
2	Pyrotechnic signalling device	The number, colour and type of pyrotechnic signalling devices carried on the flight
3	Emergency medical supplies	Details of the emergency medical supplies carried on the flight

4	Emergency locator transmitter	The type and frequency of each emergency locator transmitter carried on the flight
5	Survival equipment not mentioned in items 1 to 4	Details of the survival equipment carried on the flight

CHAPTER 2: (SUBPART 121.D – OPERATIONAL PROCEDURES)

2.1 Extended Diversion Time Operations (EDTO)

EDTO APPROVAL

2.1.1. Application for an EDTO approval

The following conditions are required from the operator to apply for an EDTO approval:

a) the operator must apply to CASA, in writing, for EDTO approval;

b) the application must be received in sufficient time before the EDTO for CASA to issue the Operations Specification (Ops Spec) and for the operator to publish the details in the exposition;

c) the application must include the following:

(i) details of the operational control and dispatch procedures;

(ii) details of the flight crew training, flight dispatcher training, maintenance training;

(iii) details of the particular airframe/engine combination, including the latest revision number of the CMP standards document required for EDTO as normally identified in the AFM, the type certificate data sheet or supplemental type certificate;

(iv) for the specific airframe/engine combination the time limit of the most time-limiting EDTO significant system (if any) identified in the AFM or OEM operations manual;

(v) the threshold time not greater than the maximum diversion time;

(vi) details of the maximum diversion time;

(vii) details of the requested areas of operations;

(viii) the OEI cruise speed for aeroplanes with two engines, and the AEO speed for aeroplanes with more than two engines;

(ix) details of the EDTO fuel and oil policy;

(x) a list of the EDTO alternate aerodromes designated for the operation;

(xi) EDTO operations beyond 180 minutes, or EDTO in the Polar area, an approval must specify aerodromes for which the holder must prepare a passenger recovery plan or:

1. a statement confirming that each EDTO alternate aerodrome will have the facilities to ensure the care and safety of a full complement of passengers and crew; or

2. details of the recovery plan for diversion to any EDTO alternate aerodrome that can ensure the protection and well-being of a full complement of passengers and crew at the aerodrome or in its immediate area until the passengers and

crew are transported to another place that will provide for their care and safety.

d) the operator must provide CASA details of any amendments to the exposition, such as but not limited to, flight manuals, operations manuals, and maintenance requirements, required for the EDTO approval.

2.1.2. CASA conditions for an EDTO approval

The following aspects will be considerations that CASA undertakes to approve an EDTO application:

a) if the application for EDTO approval involves polar operations, in considering whether or not to give the approval CASA will take into account the limitations of SATCOM/SATVOICE as an additional communication system in the polar area;

b) in considering whether to give EDTO approval, CASA must take into account mitigating factors, including the number of aerodromes in the area of operation, the weather conditions normally prevailing in the area, the availability of communications, the safety and reliability of operations with the particular airframe/engine combination and any additional MEL restrictions;

c) to ensure the safety of air navigation, conditions on an EDTO approval may impose additional obligations on the operator;

d) CASA may grant the EDTO approval only if satisfied that:

(i) the reliability of the airframe/engine combination is acceptable for the EDTO approval applied for;

(ii) the aeroplane's type certificate or foreign type certificate covers an EDTO for at least the maximum diversion time applied for;

(iii) except for EDTO approvals with 15% extensions, the CMP document specific to the aeroplane permits an EDTO for the maximum diversion time applied;

(iv) the aeroplane's MEL includes requirements for the maximum diversion time applied for; and

(v) the time limit set out in the aeroplane's flight manual (if any) for a time limited system is not greater than the maximum diversion time reduced by an operational safety margin of no less than 15 minutes.

e) if it is considered necessary in the interests of safety, CASA may:

(i) refuse to give an EDTO approval; or

(ii) suspend or cancel an EDTO approval.

2.1.3. Aeroplane eligibility for EDTO

To be eligible for EDTO approval the aeroplane must be a turbine- engine aeroplane. The operator of a twin turbine-engine aeroplane must have an EDTO type design approval for each aeroplane operated under EDTO. The type design approval must be contained in:

a) the AFM or supplement; or

b) the type certificate data sheet or supplemental type certificate.

2.1.4. **EDTO operational approval**

The following EDTO operational approval criteria are to be used:

a) EDTO with a maximum diversion time up to and including 120 minutes to an en-route alternate, at the OEI cruise speed under standard conditions in still air;

b) EDTO with a maximum diversion time of 138 minutes to an en-route alternate, at the approved OEI cruise speed under standard conditions in still air;

c) EDTO with a maximum diversion time beyond 120 minutes up to 180 minutes to an en-route alternate, at the approved OEI cruise speed under standard conditions in still air;

d) EDTO with a maximum diversion time of 207 minutes to an en-route alternate, at the approved OEI cruise speed under standard conditions in still air;

e) EDTO with a maximum diversion time beyond 180 minutes up to 240 minutes to an en-route alternate, at the approved OEI cruise speed under standard conditions in still air;

f) EDTO with a maximum diversion time beyond 240 minutes to an en-route alternate, at the approved OEI cruise speed under standard conditions in still air;

g) EDTO for aeroplanes with more than two turbine engines with a maximum diversion time beyond 180 minutes to an en-route alternate, at the approved AEO cruise speed under standard conditions in still air.

2.1.5. **Performance based EDTO approval**

CASA may approve EDTO beyond the time limits of the most time-limited system based on the results of a specific safety risk assessment indicating an equivalent level of safety will be maintained. The specific risk assessment shall take into account at least the following:

a) capabilities of the operator;

b) overall reliability of the aeroplane;

c) reliability of each time-limited system;

d) relevant information from the aeroplane manufacturer; and

e) specific mitigating measures.

2.1.6. **Operations specification (Ops Spec)**

Aeroplanes must not be operated on an EDTO unless the operator has complied with the provisions in this MOS section and the flight is authorised in accordance with the Ops Spec. An Ops Spec for EDTO must include provisions covering at least the following:

a) approved area of operation, and

b) for each EDTO approved airframe/engine combination, the maximum diversion time, at the approved OEI or AEO speed as applicable, that any point on the route may be from an EDTO alternate aerodrome.

2.1.7. **Operations specification conditions**

h) each EDTO approval is subject to Ops Spec conditions which must be complied with by the operator.

i) the Ops Spec conditions issued by CASA for EDTO will include the following:

(i) the authorised area(s) of operations;

(ii) the EDTO alternate aerodromes;

(iii) the specific approved airframe/engine combinations;

(iv) the threshold time for the applicable airframe/engine combinations;

(v) the maximum diversion time for the applicable airframe/engine combination;

(vi) the approved OEI and AEO (as applicable) cruise speed for the applicable airframe/engine combination;

j) the Ops Spec conditions must be contained in the exposition and those details may not be varied without the approval of CASA.

k) each approval is subject to the condition that, where the operator is unable to comply with the Ops Spec, the holder will cease operations under approval until the operator is able to comply with those specifications.

2.1.8. **EDTO pertinent information: AFM, TC or STC.**

The Aircraft Flight Manual (AFM), Type Certificate (TC) or Supplemental Type Certificate (STC) must contain the following pertinent information:

a) special limitations, including any limitations associated with operation of the aeroplane up to the maximum diversion time being approved;

b) the airborne equipment, installation, and flight crew procedures required for EDTO operations being approved;

c) aeroplane performance information including fuel consumption rates; and

d) the maximum diversion time capability of the aeroplane for EDTO as limited by the time limited systems.

Additional requirements for EDTO approvals

2.1.9. **EDTO approval requirements - beyond threshold time up to and including 120 minutes twin turbine-engine aeroplane**

The operator requesting approval to conduct EDTO must provide CASA details to show that the operator must have 12 consecutive months in service experience with the specified aeroplane and airframe/engine combination.

2.1.10. **EDTO approval requirements - 138 minutes, twin turbine-engine aeroplane**

CASA may approve on an individual case by case basis 138 minutes EDTO. The operator requesting approval to conduct EDTO must provide CASA details to show that:

a) a minimum of 3 months of 120 minute EDTO operations with the airframe/engine combination for which approval is requested;

b) an EDTO type design approval for a minimum of 120 minutes EDTO criteria;

c) the operator has an approved system of maintenance that specifically addresses significant maintenance factors with respect to 120 minutes EDTO criteria;

d) an aeroplane time limited system other than cargo fire suppression system shall not have a time limit less than the authorised 138 minute diversion time in ISA still air conditions at the OEI cruise speed plus 15 minutes, i.e. no less than153 minutes;

e) MEL for system component/relief for EDTO operation beyond 120 minutes;

f) flight crew, flight dispatcher and maintenance personnel training provided to address the differences between 120 minutes and 138 minute EDTO approval;

g) CASA may approve unlimited 138 minutes EDTO based on a 180 minute EDTO approval in accordance with:

(i) an EDTO type design approval for a minimum 180 minute EDTO criteria;

(ii) flight crew, flight dispatcher and maintenance personnel training provided to address the differences between 138 minutes and 180 minute EDTO approval.

2.1.11. **EDTO approval requirements - beyond 120 minutes up to and including 180 minutes, twin turbine-engine aeroplane**

The operator requesting approval to conduct the EDTO must provide CASA details to show that:

a) the operator must have 12 consecutive months in service experience with the specified aeroplane airframe/engine combination conducting 120 minute EDTO; and

b) flight crew, flight dispatcher and maintenance personnel training applicable to 180 minutes EDTO.

2.1.12. **EDTO approval requirements - 207 minutes, twin turbine-engine aeroplane**

CASA may approve 207 minutes EDTO on a case by case basis. The operator requesting approval to conduct the EDTO must provide CASA details to show that:

a) a minimum of 3 months of 180 minute EDTO operations with the airframe/engine combination for which approval is requested;

b) an EDTO type design approval for a minimum of 180 minutes EDTO criteria;

c) an aeroplane time limited system other than a cargo fire suppression system, shall not have a time limit less than the authorised 207 minute diversion time in ISA still air conditions at the OEI cruise speed plus 15 minutes, i.e. not less than 222 minutes; and

d) MEL system component/relief for EDTO operation beyond 180 minutes.

2.1.13. **EDTO approval requirements - beyond 180 up to and including 240 minutes, twin turbine-engine aeroplane**

The operator requesting approval to conduct the EDTO must provide CASA details to show that flight crew, flight dispatcher and maintenance personnel training applicable to 240 minutes EDTO.

2.1.14. **EDTO approval requirements - beyond 240 minutes, twin turbine-engine aeroplane**

a) CASA may only give the approval for the specific airframe/engine combination if:

(i) the operator must have operating experience with the aeroplane for at least the 24 months of 180 minute EDTO immediately before the approval would take effect;

(ii) the operator has been operating the specific airframe/engine combination for at least the 12 months immediately before the approval would take effect; and

(iii) the operator requesting approval to conduct the EDTO must give CASA details to show that flight crew, flight dispatcher and maintenance personnel training applicable to operations beyond 240 minutes EDTO.

b) CASA may only give the approval if:

(i) for the airframe/engine combination listed in the application the operator holds a current 240 minute EDTO approval; and

(ii) in addition to the MEL limitations for the current approval the following systems are serviceable for dispatch:

1. if required for EDTO - the APU (including electrical and pneumatic supply to its designated capability);

2. the auto throttle system;

3. a communication system, in addition to those required for the aeroplane, capable of providing effective direct communication, for example, by voice, SATCOM/SATVOICE or ACARS, between the flight crew and air traffic services, and the flight crew and the operations control and/or dispatcher; and

4. One engine inoperative auto-land capability, if alternate planning minima is predicated on the use of auto-land.

2.1.15. **Dispatch conditions for EDTO beyond 180 minutes-twin-engine aeroplanes**

For EDTO beyond 180 minutes (including 207 minutes), flight planning must minimise the diversion time where practicable when beyond 180 minutes and the following systems must be operational for dispatch:

a) the FQIS;

b) the auto-throttle system;

c) if it is required by the OEM for OEI or depressurisation procedures, or for the time-limiting EDTO significant system (if any) - the APU (including electrical and pneumatic supply to its designated capability); and

d) a communication system, in addition to the requirements for the aeroplane, capable of providing effective direct communication, for example, by voice, SATCOM/SATVOICE or ACARS, between the flight crew and air traffic services, and the flight crew and the operations control and/or dispatcher.

2.1.16. **Aeroplanes with more than two engines with a maximum diversion time of more than 180 minutes**

There is no minimum in service experience required for EDTO for aeroplanes with more than two engines. CASA may give the approval only if the following conditions are met:

a) the operator has an approved operations training program that specifically addresses significant operational factors with respect to the maximum diversion time requested;

b) the operator has an approved MEL appropriate to the maximum diversion time requested;

c) EDTO approval based on the OEM approved maximum time limited system restriction, if any, for the airframe/engine combination; and

Note: There are no EDTO specific maintenance requirements for passenger-carrying aeroplanes with more than two engines conducting EDTO.

d) in addition to the MEL limitations for the current approval, the following systems must be serviceable for dispatch:

(iii) FQIS;

(iv) if it is required by the OEM for OEI or depressurisation procedures, or for the time-limiting EDTO significant system (if any) - the APU (including electrical and pneumatic supply to its designated capability);

(v) the auto throttle system;

(vi) a communication system, in addition to those required for the aeroplane, capable of providing effective direct communication, for example, by voice, SATCOM/SATVOICE or ACARS, between the

flight crew and air traffic services, and the flight crew and the operations control and/or dispatcher;

(vii) the CFSS in accordance with the MEL; and

(viii) When operating in the Polar area carriage of one automated external defibrillator (AED).

2.1.17. **Accelerated EDTO approval**

CASA may approve a specific airframe/engine combination, on a case by case basis, an accelerated EDTO up to and including 180 minutes. The airframe/engine combination must have EDTO type design approval and the operator must demonstrate to CASA that an acceptable level of safety can be achieved in order to waive the operating experience requirements and provide evidence of acceptable operational control and flight dispatch capability.

a) The operator must provide at least the following:

(i) airframe/engine type design CMP;

(ii) compliance with EDTO maintenance and reliability requirements; and

(iii) Compliance with the EDTO operational requirements.

b) To waive operating experience requirements CASA will:

(i) review the capabilities of the operator; and

(ii) include any specific mitigation measures (if any).

2.1.18. **EDTO in polar areas**

EDTO in the Polar areas requires an approval under regulation CASR 121.145 and must meet all of the following:

a) the operator must have a passenger recovery plan;

b) carriage of an automatic external defibrillator (AED); and

c) MEL considerations relevant to polar operations.

EDTO approval in the polar operations will take into account the limitations of SATCOM/SATVOICE as an additional communication system in the polar area.

2.1.19. **EDTO proving flights**

In addition to any other requirements imposed by this MOS, in considering whether to give an operator an EDTO approval, CASA may require the operator to conduct an EDTO proving flight in the aeroplane or in an approved simulator.

The flight must demonstrate that the operator has the capability and competence to safely conduct and adequately support the intended operation. The initial EDTO proving flight must be carried out in an aeroplane or approved simulator with the specific airframe/engine combination in the EDTO application.

An EDTO proving flight is required for an initial EDTO approval or when there is significant change to the airframe/engine combination or the introduction of new series or model of a type where the airframe/engine combination is considered significantly different.

The following emergency conditions must be demonstrated during the validation of flight unless CASA has witnessed successful demonstration of these conditions in an acceptable simulator prior to an EDTO proving flight in the aeroplane:

a) total loss of thrust on one engine;

b) total loss of normal generated electrical power, i.e. demonstrating the EDTO critical electrical condition identified during certification;

c) total loss of pressurisation; and

d) any other event or condition considered to be equivalent in operational challenge, safety management, and crew workload or performance risk.

The capability of the operator's operational control including flight dispatchers must also be assessed during the EDTO proving flight.

If an EDTO proving flight is required, CASA must give the operator a statement of the conditions that will apply for the flight, including the presence of CASA officers as observers on the flight.

Any condition of the EDTO proving flight stated by CASA to be critical to airworthiness, crew workload or performance risks must be successfully demonstrated during the flight unless CASA has observed a successful demonstration for that particular condition previously.

EDTO conditions - pre-flight and planning requirements

2.1.20. General conditions for EDTO

The operator must ensure that an EDTO flight does not commence unless:

a) the Operations Specification (Ops Spec) permits the intended EDTO; and

b) procedures for the EDTO are set out in the operator's exposition.

2.1.21. Flight preparation and in-flight considerations

For aeroplanes for which EDTO approval is required, the route, range performance and fuel flow must be determined for the EDTO operational weight range, altitude and temperature within the operating limits established for the aeroplane. The route and range performance must be determined for each selected configuration with:

a) the critical engine inoperative;

b) the remaining engine at the available maximum continuous power or thrust;

c) the means for controlling the aeroplane environmental system to ensure a reasonable cabin temperature; and

d) consideration of the effects of icing on performance.

2.1.22. **Time limiting system planning**

The maximum time approved must take into consideration of the most limiting EDTO significant system time limitations which must not exceed:

a) for a twin engine aeroplane, EDTO flight, operating up to and including 180 minutes and the 15% extension to 207 minutes, the time required to fly the distance to the planned EDTO alternate or alternates, at the approve OEI cruise speed in ISA, still air must not exceed the time specified in the AFM for that aeroplanes most time limited EDTO system, including cargo fire suppression system, minus 15 minutes;

b) for an EDTO flight operating beyond 180 minutes, the time required to fly the distance to the planned EDTO alternate/s, at all AEO cruise speed, at the normal cruise altitude, correcting for wind and temperature, must not exceed the time specified in the AFM for that aeroplanes cargo fire suppression system, minus 15 minutes;

c) for an EDTO flight operating beyond 180 minutes, the time required to fly the distance to the planned EDTO alternate/s at the approved speed and associated altitude, corrected for wind and temperature, must not exceed the time specified in the AFM for the airplanes most time limited system time (except for cargo fire suppression), minus 15 minutes.

Note: c) above applies to all aeroplanes including aeroplanes with more than two engines that have time limiting system specified in the AFM.

2.1.23. **Minimum equipment list (MEL)**

For all EDTO flights, the MEL must be based on the information contained within the aeroplane MMEL, the Type Certificate (TC) Supplement and the CMP document. System redundancy levels appropriate to the intended EDTO must be reflected in the MMEL and/or TC Supplement. An operator's MEL may be more restrictive than the MMEL considering the kind of EDTO being considered, and equipment and service problems unique to the air operator. For aeroplanes already in non EDTO operational service, the existing MEL must be re-evaluated and adjusted to reflect system redundancy level requirements for EDTO.

2.1.24. **Communication and navigational facilities**

An aeroplane must not be dispatched on an EDTO flight unless the following requirements are met for the flight:

a) for all EDTO where voice communication facilities are available, voice communication must be provided. While planning an EDTO flight, an operator must consider potential route and altitudes necessary for diversion to EDTO alternate aerodrome/s in determining whether voice communications facilities are available. Where voice communication facilities are not available or unreliable and voice communication is not possible, communications using alternative system must be substituted;

b) for EDTO beyond 180 minutes, the aeroplane must be equipped with an additional communication system that is capable of providing immediate satellite based voice communication (SATCOM/SATVOICE). The system must provide communication capability between the flight crew and Air Traffic Services and the flight crew and the operator's

operational control centre. While planning an EDTO flight beyond 180 minutes, an operator's. flight dispatcher must consider potential route and altitudes necessary for diversion to EDTO alternate aerodromes in determining whether immediate, satellite based voice communications are available;

c) where immediate, satellite based voice communications are not available or unreliable, communications using alternative system must be substituted;

d) communication facilities are available to provide, under normal conditions of propagation at the normal OEI cruise or depressurisation altitudes, reliable two-way communications between the aeroplane and the appropriate ground communication facility over the planned route for the flight and the routes to any EDTO alternate aerodrome to be used in the event of diversion;

e) it must be shown that, current weather information, adequate system status monitoring information, and crew procedures for all aeroplane and ground facilities' critical systems are available to enable the flight crew to make diversion decisions;

f) navigation aids (including ground and/or GNSS) are available and located so as to provide, taking account of the navigation equipment installed in the aeroplane, the navigation accuracy required over the planned route and altitude of flight, and the routes to any alternate and altitudes to be used with one engine inoperative or at depressurisation cruising altitudes;

g) visual and navigation aids (including ground and/or GNSS) are available at the specified EDTO alternate aerodromes as required for the authorised types of approaches and operating minima; and

h) flights that are planned to be operated in an area of known or expected area of solar flare activity, cosmic radiation, radio blackout, or GPS RAIM conditions that may affect the operation of the aeroplane must be planned to avoid these areas based on criteria established in the operator's exposition.

2.1.25. **Maintenance and exposition elements for EDTO - twin- engine aeroplanes**

The operator must have the following:

a) a system for each airframe/engine combination that ensures compliance with the minimum requirements set out in the latest revision of:

(i) the CMP standards document; or

(ii) the type design document; and

(iii) any relevant airworthiness directives;

b) an approved system of maintenance for the aeroplane approved to conduct an EDTO flight that:

(i) is based on the aeroplane type certificate holder's maintenance program; and

(ii) is supplemented for each EDTO airframe/engine combination; and

(iii) includes the following:

1. a pre-departure service check must be completed immediately before an EDTO flight and certified as completed;
2. EDTO system verification procedures and maintenance checks are complete;
3. journey log and/or maintenance log reviewed and documented to ensure EDTO MEL procedures have been performed;
4. a list of EDTO significant systems;
5. procedures for corrective action to an EDTO significant system;
6. a list, or other form of identification, of EDTO specific procedures or tasks that must be accomplished or verified;
7. a procedure to verify the status of the aeroplane and that EDTO significant systems and equipment are serviceable for an intended flight.

c) detailed procedures to prevent multiple identical system maintenance actions and the procedures to be followed if any such maintenance actions cannot be avoided;

d) a parts control program that ensures:

(i) the type certification standard is maintained; and

(ii) the proper identification of parts to maintain the EDTO configuration.

e) an EDTO reliability program acceptable to CASA that is designed for the early identification and prevention of EDTO-related problems and that contains a reporting procedure for any significant events detrimental to EDTO;

Note: A manufacturer's support program may be an integral part of the reliability program.

f) a supplement to the operators maintenance control manual for use by all personnel involved in EDTO that:

(i) lists all EDTO supporting programs;

(ii) references all the EDTO systems of maintenance;

(iii) specifies the maintenance procedures, duties and responsibilities of all relevant maintenance personnel; and

(iv) indicates where more detailed information on each of these matters may be found in the operator's document system.

Note: The supplement need not be exhaustive provided further details are contained within the exposition.

2.1.26. **Maintenance training**

The operator must establish an airframe/engine combination maintenance training program to ensure it provides adequate training on each specific airframe/engine combination to any person involved in the EDTO maintenance of the particular airframe/engine combination.

The operator must ensure that a person has successfully completed the training mentioned above before the person is assigned to conduct any EDTO maintenance on a specific airframe/engine combination.

The maintenance training program must provide for the recurrent training of each EDTO maintenance person at intervals not exceeding 24 months.

2.1.27. **Engine condition monitoring**

The operator must establish an engine condition monitoring program designed to detect engine deterioration at an early stage and allow for corrective action before safe operation is affected.

a) The engine condition monitoring program mentioned above must describe:

   (i) the parameters to be monitored, the methods of data collection and analysis, and the corrective action process; and

   (ii) the procedures to ensure that engine limit margins are maintained so that a prolonged engine inoperative diversion may be conducted without exceeding approved engine limits at all approved power levels and expected environmental conditions.

b) The operator must establish an engine and APU (if required for EDTO) oil consumption monitoring program that ensures:

   (i) that sufficient oil is carried and available for each engine and APU (if an APU is required for EDTO) to allow completion of a scheduled EDTO flight;

   (ii) the oil consumption of an engine or APU (if an APU is required for EDTO) does not exceed the manufacturer's recommendation; and

   (iii) monitoring of all oil added to an approved EDTO engine or APU (if an APU is required for EDTO) of an approved ETDO airframe/engine combination whether or not a flight is an EDTO flight.

2.1.28. **APU**

If the APU is required by the OEM for EDTO or the APU in-flight start capability is required for EDTO, the operator must have a cold soak in-flight APU start and run reliability program acceptable to CASA.

2.1.29. **Training and evaluation program: flight crew and dispatcher**

The operator must have a program for EDTO training and checking of flight crew and flight dispatchers with associated recurrent training and competency evaluation.

The flight crew EDTO training and evaluation program must include initial and recurrent training, competency evaluation and proficiency checking for the following scenario:

a) if standby sources of electrical power significantly degrade cockpit instrumentation to the pilots - simulation of aerodrome approaches using standby power as the sole power source;

b) contingency procedures for each area of operation intended to be used;

c) evaluation of, and response to, probable propulsion and airframe systems failures;

d) diversion procedures and diversion decision-making processes;

e) the EDTO regulatory framework and operational approvals.

2.1.30. **Quarterly EDTO summary reports - twin-engine aeroplanes**

a) An operator approved to conduct EDTO using a twin-engine aeroplane must prepare a summary report, available to CASA on request, for aeroplanes with the same specific airframe/engine combination, for the period of 3 months after receiving EDTO approval, and for every 3 month period after that, for each of the following:

(i) aeroplane operations and utilisation;

(ii) engine operations and utilisation;

(iii) for each flight - interruptions, delays or cancellations due to technical reasons;

(iv) unscheduled termination or diversion from a route caused by actual or suspected technical malfunctions;

(v) IFSD rates;

(vi) reportable defects and events, including those mentioned in paragraph 2.1.42, In-flight event reporting;

(vii) system defect summary reports which have exceeded their alert level;

(viii) minimum equipment list usage;

(ix) unscheduled component removals.

b) The operator must ensure that if requested by CASA the summary report is available no later than 14 days after the end of each 3 month period after receiving EDTO approval.

c) A summary report is not required if the operator:

(i) has an EDTO Reliability Program, approved by CASA, that includes a requirement to provide CASA with a quarterly reliability report, and

(ii) within the relevant time frames specified in the Program for the particular report, the operator provides CASA with the following reports:

1. each quarterly reliability report;

2. a report on each of the matters required in the summary report;

3. a report on any other information specified by the Program as information to be reported to CASA.

Dispatch requirements

2.1.31. **EDTO flight dispatch release**

The flight dispatch release must specify:

a) the EDTO alternate aerodromes for the flight, and

b) the EDTO maximum diversion time from a suitable aerodrome for the flight. The maximum diversion time must not be greater than the value approved by CASA.

2.1.32. **Flight dispatch requirements for EDTO**

a) The operator must ensure that an EDTO flight does not commence unless:

(i) an EDTO flight must be dispatched in accordance with the operator's exposition;

(ii) an EDTO flight must be provided with a flight dispatch release; and

(iii) an EDTO pre-departure service check is completed.

b) The operator must ensure that an aeroplane is only dispatched on an EDTO if the communication facilities required for the operation are available.

c) For a twin engine aeroplane the operator must ensure that the aeroplane is dispatched on an EDTO only if it meets the requirements of the CMP standards document for the EDTO flight.

d) The operator must ensure that:

(i) for a twin engine aeroplane, the aeroplane is not dispatched on an EDTO unless the required take-off aerodromes, destination aerodromes and alternate aerodromes, including EDTO alternate aerodromes to be used in the event of engine shutdown or aeroplane system failure, which require a diversion, are listed in the cockpit documentation; and

(ii) for an aeroplane with more than two engines, the aeroplane is not dispatched on an EDTO unless the nominated EDTO alternate aerodromes to be used in the event of a diversion are listed in the cockpit documentation.

e) The operator must ensure that an aeroplane is only dispatched on an EDTO if EDTO alternate aerodrome/s are identified and listed in the EDTO flight dispatch release and on the operational flight plan.

f) The operator must ensure that an aeroplane is only dispatched on an EDTO if the meteorological forecast for the estimated time of use at the

EDTO alternate aerodrome/s, meets the requirements for a nominated EDTO alternate aerodrome.

Note: Estimated time of use in relation to meteorological forecasts for EDTO flights is the period commencing from earliest time of estimated landing and ending at the latest time of estimated landing at the aerodrome.

2.1.33. **Use of maximum diversion time**

The procedures in the exposition must ensure that EDTO is limited to flight plan routes where the approved maximum diversion time to suitable aerodrome/s can be met in ISA still air. Operators must provide:

a) in the exposition, procedures stating that upon occurrence of an in-flight shutdown of an engine, the pilot must promptly initiate a diversion to fly to, and land at, the nearest aerodrome, in terms of time, determined to be suitable by the flight crew, taking into account the safe operation of the aeroplane;

b) in the exposition, procedures such that in the event of a single or multiple primary system failure, the pilot will initiate the diversion procedure to fly to and land at, the nearest aerodrome in terms of time, determined to be suitable by the flight crew, taking into account the safe operation of the aeroplane, unless it has been determined that no substantial degradation of safety results from continuation of the planned flight.

2.1.34. **EDTO alternate aerodromes**

a) EDTO alternate aerodrome/s must be selected in order to make it possible for the aeroplane to reach the EDTO alternate aerodrome taking into account:

(i) the lowest safe altitude;

(ii) the obstacle clearance performance; and

(iii) the applicable oxygen requirements.

b) A list of EDTO alternate aerodromes, the EDTO aerodrome alternate minima and aerodrome operating minima, applicable to the approved EDTO, must be published in the exposition.

c) The exposition need not contain details of all EDTO alternate aerodromes if the operator has procedures in the exposition for selecting EDTO alternate aerodromes.

d) An EDTO alternate aerodrome is an adequate aerodrome that:

(i) is listed in the operator's exposition as being an aerodrome that may be designated as an EDTO alternate in the event of a diversion during an EDTO; and has:

(ii) air traffic control or air traffic services (available within 30 minutes notice); and

(iii) for EDTO up to and including 180 minutes rescue and firefighting services (RFFS) to ICAO category 4, or higher (or other equivalent facilities available within 30 minutes notice); and

Note: if the equipment or personnel is not immediately available at the aerodrome, the aerodrome may still be nominated provided the RFFS capability is available within 30 minute response time such that the RFFS will be available at the estimated time of arrival of the aeroplane.

(iv) for the estimated time of use has a meteorological forecast at or above:

1. for flight planning and prior to dispatch, the aerodrome planning minima set out in Part 121 MOS, Chapter 2, Flight Planning (121 alternate aerodromes) requirements, as applicable for the facilities available at the aerodrome; and

Note: A departure or destination aerodrome is not required to meet the relevant Standard EDTO alternate aerodrome planning minima unless it happens also to be an EDTO alternate aerodrome.

2. after the commencement of flight and before passing the EEP, the approved aerodrome landing minima for the expected approach, during the estimated time of use of the EDTO alternate aerodrome; and

(v) has a forecast wind component at the estimated time of use, including gusts, for the landing runway expected to be used, of the least of the following:

1. the maximum demonstrated cross-wind component specified in the AFM;

2. the maximum demonstrated cross-wind component specified in the AFM for one engine inoperative landing (if any); and

(vi) for the expected runway surface conditions, wind conditions, aeroplane landing configuration, and aeroplane landing weight, at the aerodrome - has a landing distance available that is not less than that required in accordance with Part 121 MOS, Chapter 3, Performance.

2.1.35. **EDTO critical fuel scenario:**

The operator must ensure that the aeroplane does not commence a flight, planned as an EDTO flight unless, considering the known and forecast weather conditions, or in the case of substituting the forecast en-route wind element - a wind forecast model acceptable to CASA, the aeroplane carries sufficient fuel to satisfy the following requirements:

a) when planning an EDTO flight, the operator must consider and carry, if applicable, the fuel required that corresponds to the additional fuel in the Part 121 MOS, Chapter 2 Fuel Requirements, taking into account the EDTO critical fuel scenario conditions in 2.1.35 below. The EDTO critical fuel scenario must be determined in accordance with whichever is the greatest of following:

(i) sufficient fuel to fly to an EDTO alternate at the AEO speed assuming a rapid depressurisation at the most critical point followed by a descent to a safe altitude;

Note: the AEO speed selected for the depressurisation may be different from the approved OEI speed used to determine the EDTO threshold in CASR 121.130 and the speed used to determine the maximum diversion distance.

(ii) sufficient fuel to fly to an EDTO alternate at the approved OEI cruise speed assuming a rapid depressurisation and a simultaneous engine failure at the most critical point followed by a descent to a safe altitude;

(iii) sufficient fuel to fly to an EDTO alternate at the approved OEI cruise speed assuming an engine failure at the most critical point followed by a descent to the OEI cruise altitude; and

b) then proceed to the EDTO alternate aerodrome with sufficient fuel to:

(i) hold for 15 minutes at 1500 feet above the aerodrome elevation; and

(ii) conduct an instrument approach and land;

Performance deterioration allowance (PDA):

c) when calculating the final fuel required for the critical fuel scenario the operator must increase the final fuel required taking into account the critical fuel scenario conditions by 5% as a PDA; or

d) if the operator has a program to monitor aeroplane in-service deterioration in cruise fuel burn performance then the fuel burn increase, determined by that program, must include in the fuel final supply calculation with sufficient fuel to compensate for any such deterioration.

2.1.36. **Critical fuel scenario conditions:**

In establishing the fuel required for the EDTO critical fuel scenario, the operator must determine the fuel necessary to fly to the most critical point and then execute a diversion to a EDTO alternate aerodrome then fly at 1500ft above the aerodrome elevation for 15 minutes, and conduct an instrument approach and land under the 'Critical Fuel Scenario' conditions.

The following critical fuel scenario conditions must be taken into account when determining the EDTO critical fuel scenario requirements:

Wind forecast:

a) an operator using a wind forecast model acceptable to CASA, in order to account for errors in wind forecasting, the operator must add a 5% wind speed factor (i.e. as an increment to a headwind or as a decrement to a tailwind) on the actual or forecast wind used to calculate the fuel requirements e.g. if forecast wind is 100kts of head wind then 105kts of headwind is required to be used to calculate the fuel requirements for that sector of the flight; or

b) an operator that is not using a wind forecast model acceptable to CASA, in order to account for errors in the model's wind data, the operator must ensure that the fuel required for the EDTO critical fuel scenario is increased by an additional 5% to take into account inaccuracies of the en-route wind forecast.

Note: World Area Forecast System (WAFS) is an example of a wind forecast model acceptable to CASA.

Icing forecast:

c) when it is expected taking into account the route weather forecast the flight during the critical fuel scenario, will be conducted in known icing conditions, then the fuel that would be used by operation of engine anti-ice, and if appropriate wing anti-ice, for the entire time during which icing is forecast; or

d) the effect of airframe icing for 10% of the time during which icing is forecast (including taking into account the fuel that would be used by the use of engine and wing anti-ice during the same period). In computing the EDTO critical fuel scenario fuel quantity, advantage may be taken of the drift down computed at the OEI cruise speed. Account of wing anti-ice may apply to some aeroplanes based on their characteristics and the OEM recommended procedures.

Aeroplane system considerations:

e) aeroplane system accountability and MEL items must be taken into account when determining the fuel required for the critical fuel scenario as follows:

(i) any Configuration Deviation List (CDL) and/or Minimum Equipment List (MEL) items shall be taken into account; and

(ii) any required operation of an auxiliary power unit and/or Ram Air Turbine (RAT), in accordance with the OEM, shall be taken into account.

2.1.37. **EDTO fuel and oil requirements.**

The amount of fuel on board the aeroplane on departure must be in accordance with Part 121 MOS, Chapter 2, Fuel requirements, taking into account the EDTO critical fuel scenario.

An aeroplane must not be dispatched on an EDTO unless it carries sufficient fuel and oil to meet the requirements of regulations CASR 121.230 and CASR 121.235 and any additional fuel that may be required by the critical fuel scenario calculation.

The following must be considered in determining the EDTO fuel requirements:

a) current forecast winds and meteorological conditions along the expected route at the appropriate OEI cruise altitude, cruise altitude after depressurisation and throughout the approach and landing;

b) any necessary operation of ice protection systems and performance loss due to ice accretion on the unprotected surfaces of the aeroplane;

c) icing considerations likely to be encountered;

d) any necessary operation of the APU including APU oil consumption in accordance with the CMP;

e) EDTO critical fuel scenario conditions; and

f) required navigational accuracy as necessary.

2.1.38. **Aeroplane performance data**

An EDTO flight must not be dispatched unless the operator's exposition contains performance data for the specific airframe/engine combination to support all phases of any applicable EDTO operation.

The following data must be based on information provided or referenced in the approved AFM as follows:

a) detailed OEI performance data including fuel flow for ISA and ambient atmospheric conditions and as a function of airspeed and power setting, where appropriate, covering:

   (i) drift down (including net performance);

   (ii) cruise altitude coverage including, OEI, depressurisation and 10,000 feet;

   (iii) holding;

   (iv) altitude capability in accordance with the en-route obstacle performance requirements; and

   (v) missed approach.

b) detailed AEO performance data, including nominal fuel flow data, for ISA and ambient atmospheric conditions and as a function of airspeed and power setting, where appropriate, covering:

   (i) cruise altitude coverage including depressurisation and 10,000 feet; and

   (ii) holding.

c) details of any other conditions relevant to EDTO which can cause significant deterioration of performance that is specific to the airframe/engine combination, such as:

   (i) ice accretion on the unprotected surfaces of the aeroplane;

   (ii) Ram Air Turbine deployment, if applicable;

   (iii) thrust reverser deployment, if applicable.

Note; Ram Air Turbine and Thrust Reverser deployment need only be considered if required by the OEM and if required as part of the EDTO certification.

d) the altitudes, airspeeds, thrust settings, and fuel flow used in establishing the EDTO area of operations for each airframe/engine combination, must be used in showing the corresponding terrain and obstacle clearances in accordance with Part 121 MOS Chapter 3, Subpart 121.F - Performance.

2.1.39. **Navigational documentation**

The necessary navigation documentation including threshold and maximum diversion limited distances, and a means to determine the location of each Equal Time Point and the Critical Point must be provided to the flight crew.

In flight procedures

2.1.40. EDTO operational procedures

Before an EDTO flight proceeds beyond the applicable EDTO entry point (EEP) the operator for the aeroplane must ensure that the pilot in command is notified of any significant changes in forecast weather, aerodrome availability, or any other required services at EDTO alternate aerodromes designated for the flight.

a) The operator must ensure that:

(i) changes notified prior to the EEP are evaluated by the pilot in command; and

(ii) if any changes are identified that would preclude a safe approach and landing at an EDTO alternate aerodrome during the estimated time of use, the pilot in command selects an additional EDTO alternate aerodrome where a safe approach and landing can be made.

b) The operator must ensure that the pilot in command of an EDTO flight does not proceed beyond an EEP unless the meteorological forecast for each required aerodrome nominated as an EDTO alternate aerodrome indicates that it will be at, or above;

(i) the approved aerodrome landing minima for the expected approach during the expected period of use; and

(ii) no other event has occurred that makes the aerodrome unusable.

c) For an EDTO in a twin-engine aeroplane, the operator must ensure that before the aeroplane goes beyond the EEP and prior to the exit point, the pilot in command ensures that the aeroplane complies with the in-flight operational requirements of the CMP standards document for the EDTO flight.

d) After an EDTO flight goes beyond the applicable EEP and prior to the exit point, the operator must ensure that the pilot in command is informed of any significant changes in conditions at designated EDTO alternate aerodrome/s, if:

(i) the meteorological forecast is subsequently revised below the landing minima for a designated EDTO alternate aerodrome/s; or

(ii) any other event occurs that makes the aerodrome unusable;

e) The pilot in command will only continue the planned flight if satisfied that doing so would be no less safe than an alternative course of action.

2.1.41. EDTO Significant event during flight for aeroplanes with two engines

A list of systems that are considered EDTO significant systems specific to the airframe/engine combination and area of operation should be developed.

In the occurrence of an EDTO significant event in-flight prior to the EDTO entry point, all available means of communication must be used by the flight crew to ensure assistance from the flight dispatcher to update and/or revise, if applicable, the flight plan as a result of re-evaluating the aeroplane's

system capability to ensure that the flight can safely continue into the EDTO area of operation.

2.1.42. **In-flight event reporting**

a) The operator must ensure that each of the following events is reported to CASA within 72 hours of the event occurring:

(i) IFSD;

(ii) diversion or turn-back;

(iii) uncommanded power change or surge;

(iv) inability to control an engine or to obtain desired power;

(v) malfunction or adverse trend of an EDTO significant system;

(vi) any other event detrimental to EDTO.

b) The operator must conduct an investigation into the cause of any event mentioned above. The report must include, (but not limited to) the following:

(i) aeroplane make and serial number;

(ii) engine make and serial number;

(iii) total time, cycles and time since last maintenance;

(iv) time since overhaul or inspection of the defect item;

(v) phase of flight; and

(vi) corrective action.

2.2 Operational flight plans - all flights

2.2.1 **Operational flight plan – content information**

The flight plan shall contain the following information:

a) the aeroplane's registration mark or the flight number (if a flight number is designated);

b) the date of the flight;

c) the place of departure and the planned destination;

d) that the flight is an IFR flight;

e) the amount of fuel on board the aeroplane;

f) the total amount of fuel required to be carried on the flight;

g) for the planned flight route;

(i) the route and route segments required for the flight, including waypoints, distances and tracks; and

(ii) the lowest safe altitude for each route segment; and

(iii) the planned cruising speed and flying times between waypoints; and

(iv) the planned altitudes or flight levels.

h) if a take-off alternate aerodrome is required for the flight:

(i) the take-off alternate aerodrome; and

(ii) the routes or route segments required for a flight to the take-off alternate aerodrome this does not apply if:

1. there is a change to the take-off alternate aerodrome required for the flight; and

2. it is not reasonably practicable in the circumstances to update the flight plan to include the matters before take-off.

i) if a destination alternate aerodrome is required for the flight;

(i) the destination alternate aerodrome; and

(ii) the routes or route segments required for a flight to the destination alternate aerodrome this does not apply if:

1. there is a change to the destination alternate aerodrome required for the flight; and

2. it is not reasonably practicable in the circumstances to update the flight plan to include the matters before take-off.

2.2.2 **Operational flight plan - in-flight completion**

The pilot in command of an aeroplane for a flight shall record in the operational flight plan the following;

a) for selected waypoints for the flight;

(i) the estimated time that the aeroplane will fly over the waypoint; and

(ii) the actual time the aeroplane flew over the waypoint;

b) the fuel calculations required for the flight;

c) the place of arrival.

2.3 Flight planning (Part 121 alternate aerodromes) requirements

Take-off alternate aerodromes

2.3.1 A take-off alternate shall be selected before departure if either, the meteorological conditions at the aerodrome of departure are below the established aerodrome landing minima or if it would not be possible to return to the aerodrome of departure for other reasons.

2.3.2 The take-off alternate aerodrome shall be located within the following flight time from the aerodrome of departure:

a) for aeroplanes with two engines, one hour of flight time at the one-engine inoperative cruise speed, determined from the AFM calculated in ISA and still air conditions at the flight planned take-off weight; or

b) for aeroplanes with more than two engines, two hours of flight time at an all engines operating cruise speed determined from the AFM, calculated in ISA and still air conditions at the flight planned take-off weight; or

c) for aeroplanes engaged in EDTO and where a take-off alternate aerodrome meeting the distance criteria in (a) and (b) above is not available, taking into account the safe operation of the aeroplane, aerodrome meteorological conditions and aeroplane operational limitations, an aerodrome that is within the distance of the approved maximum EDTO diversion time for the aeroplane.

Note: The operator may choose a standard speed and distance for the calculations mentioned in (a) and (b).

2.3.3 For an aerodrome to be selected as a take-off alternate the available meteorological information must indicate that at the estimated time of use, the conditions at the take-off alternate will be at or above the aerodrome operating minima and the aeroplane will be able to land safely taking into account of the aeroplane operating limitations.

Destination alternate aerodromes

2.3.4 At least one destination alternate aerodrome must be selected, unless:

a) taking into account all meteorological conditions and operational information relevant to the flight, at the estimated time of use, a reasonable certainty exists that;

(i) the appropriate weather reports and/or forecasts for the destination aerodrome indicate that the ceiling will be at least 2 000 ft or circling height + 500 ft, whichever is greater, and the ground visibility will be at least 5 km, and

(ii) separate runways are useable at the estimated time of use at the destination aerodrome with at least one runway having an operational instrument approach; or

Note: Separate runways are two runways at the same aerodrome configured such that if one runway is closed an operation to the other runway is operationally available for the intended aeroplane.

2.3.5 Two destination alternate aerodromes must be selected when, for the destination aerodrome:

a) the meteorological conditions at the estimated time of use are forecast to be below the aerodrome operating minima; or

b) the meteorological forecast information for the destination aerodrome is not available.

2.3.6 For paragraph 2.3.5, only one destination alternate aerodrome is required if one alternate aerodrome can meet the meteorological requirements of 2.3.4 (a)(i).

2.3.7 Paragraph 2.3.4 does not apply for operations to isolated aerodromes if the flight is planned in accordance with the following;

a) for each flight to an isolated aerodrome a critical point must be determined; and

b) a flight shall not continue to the destination isolated aerodrome past the critical point unless an assessment of the meteorological conditions, traffic and other operational conditions indicate a safe landing can be made at the estimated time of use.

2.3.8 Paragraph 2.3.4 does not apply for operations to a destination alternate aerodrome where the weather conditions are forecast to be below the MOS 2.3.4 a)(i) conditions if separate runways are available at the destination aerodrome and either of the following criteria are met:

a) Weather forecast to be at or above the aerodrome operating minima and at least two independent means by which a flight can conduct an approach are available and conform to one or more of the following criteria:

(i) two runways are available each with an operational instrument approach

Note: Two runways can be the same runway but operations from either runway number.

(ii) a categorised ILS shall be considered as two independent approaches provided the aircraft has two ILS receivers available

(iii) GNSS approach systems may be considered as two independent means providing the aircraft is fitted with dual receivers that meet specifications equivalent to those detailed in FAA TSO 145/146 except for the Wide Area Augmentation System (WAAS) requirements

(iv) the operator may utilise GNSS capability as a substitution for a ground-based aid providing the aid is in commission at the time of the approach and the approach is coded in the aircraft's FMS. (Note: There is no requirement for the aid to be serviceable). The minima for such an approach should not be less than 250 feet above the applicable reference unless specifically approved by CASA

(v) a GNSS approach with vertical guidance may be considered as being equivalent to a CAT I ILS. In this case the GNSS approach should not be considered as two independent approaches, unless the aircraft is fitted with dual receivers that meet specifications equivalent to those provided for in FAA TSO 145/146 except for the WAAS requirements

OR

b) for destination aerodromes serviced by operational CAT III or CAT II ILS approaches:

(i) the weather is forecast to be at, or above CAT I minima for the estimated time of use

(ii) the flight crew are authorised to conduct the approaches

(iii) the operator has a process to alert the flight of a change in weather forecast.

2.3.9 Paragraph 2.3.4 does not apply for operations to a destination alternate aerodrome without separate runways if all of the following criteria are met:

a) the weather at the destination aerodrome at the estimated time of use is forecast to be at or above the alternate aerodrome weather minima in Table 2 of the Part 121 MOS

b) a critical point shall be determined for the flight

c) a flight shall not continue to the destination past the critical point unless a current assessment of the meteorological conditions, traffic and other operational conditions indicate a safe landing can be made at the estimated time of use

d) the destination aerodrome shall have at least one operational instrument approach procedure for which the flight crew are authorised to conduct, or in accordance with para 2.3.10 below.

2.3.10 Paragraph 2.3.4 does not apply for operations to a destination alternate aerodrome without an instrument approach procedure if:

a) distance information is available to touchdown (DME or GNSS updated information to the FMS distance i.e. the runway threshold in the FMC data base)

b) the aircraft can be navigated to the destination aerodrome either in VMC or in accordance with en-route navigation aid or GNSS

c) a visual approach can be conducted to the landing runway from the LSALT;

d) the weather conditions shall be at least the following:

(i) Cloud ceiling is not below final segment LSALT plus 500 ft

(ii) Visibility is not less than 5 km.

Navigation aids

2.3.11 A destination alternate aerodrome must be selected if the planned destination aerodrome is not served with an instrument approach procedure which the pilot in command is authorised to conduct.

Runway lighting

2.3.12 *Portable lighting*. If a flight is planned to land at night at an aerodrome with portable runway lighting, the pilot in command must make provision for an alternate aerodrome unless reliable arrangements are made for a responsible person to attend to the runway lighting during the period from at least 30 minutes before the ETA, to the time landing and taxiing have been completed.

2.3.13 *Standby power.* If a flight is planned to land at night at an aerodrome with electric runway lighting, whether pilot activated or otherwise, but without standby power, the pilot in command must make provision for an alternate aerodrome unless:

a) portable runway lights are available; and

b) reliable arrangements are made for a qualified and responsible person to:

(i) attend to the runway lighting during the period from at least 30 minutes before the ETA, to the time landing and taxiing have been completed; and

(ii) display the portable lights in the event of a failure of the primary lighting.

2.3.14 *PAL.* If a flight is planned to land at night at an aerodrome with PAL and standby power, the pilot in command must make provision for flight to an

alternate aerodrome equipped with runway lighting unless a responsible person is in attendance to manually switch on the aerodrome lighting.

2.3.15 *Alternate aerodromes – PAL.* An aerodrome may be nominated as an alternate aerodrome provided that the alternate aerodrome must be one which is:

a) served by a lighting system which is not pilot activated; or

b) served by PAL and there is a responsible person in attendance to manually switch on the aerodrome lighting.

2.3.16 The alternate requirements of paragraphs 2.3.12 to 2.3.15 inclusive need not be applied if the aircraft carries holding fuel for first light plus 10 minutes at the destination.

2.3.17 An alternate aerodrome nominated in accordance with 2.3.13 and 2.3.14 need not have standby power or standby portable runway lighting.

2.3.18 A responsible person is one who has been instructed, and is competent, in setting out the standby portable runway lighting.

Operational variations to alternate aerodrome requirements

2.3.19 CASA may approve variations to the alternate aerodrome requirements above, based on the results of a specific safety risk assessment indicating an equivalent level of safety will be maintained. The specific risk assessment shall take into account the capabilities of the operator to include:

a) overall capability of the aeroplane and its systems;

b) available aerodrome technologies, capabilities and infrastructure;

c) quality and reliability of meteorological information;

d) identified hazards and safety risks associated with each alternate aerodrome variation; and

e) specific mitigation measures.

Alternate aerodrome meteorological conditions requirements:

2.3.20 To ensure adequate margin of safety is observed in determining whether or not an approach and landing can be safely carried out at an alternate aerodrome, the operator shall add the incremental or apply the values, as applicable, in ***Table 2*** to the ceiling and visibility of the aerodrome operating minima established for the aerodrome, or where no addition is stated, use the value in the table.

2.3.21 For EDTO en-route alternate aerodromes, the operator shall add the incremental values in ***Table 3*** to the ceiling and visibility of the aerodrome operating minima established in accordance with *regulation 121.180 of CASR* for the aerodrome.

Table 2

Alternate aerodrome weather minimums		
Approach facility configuration[1]	**Ceiling[2]**	**Visibility[3]**
For aerodromes with at least one navigation facility providing a straight-in non-precision approach, or Category I precision approach, or when applicable, a circling approach from an IAP	Add 400 feet to MDA(H) or DA(H) as applicable	Add 1500 metres to the landing minimum
For aerodromes with at least two operational navigation facilities each providing a straight-in approach procedure to different suitable runways	Add 200 feet to higher MDA(H) or DA(H) of the two approaches used	Add 800 metres to the higher authorised landing minimum of the two approaches used
One usable authorised Category II ILS IAP	N/A	CAT I visibility or RVR
One usable authorised Category III ILS IAP	N/A	CAT I visibility or RVR

Notes

[1] When determining the suitability of a runway, wind including gust must be forecast to be within operating limits and should be within the manufacturer's maximum demonstrated cross wind limits.

[2] All conditional forecast elements below the lowest applicable operating minima must be taken into account. Additives are applied only to height value (H) to determine the required ceiling.

[3] When dispatching with an MEL, those MEL limitations affecting instrument approach minima must be considered in determining the alternate minima.

Table 3

EDTO – En-route alternate aerodrome weather minimums		
Approach facility[1]	**Alternate aerodrome Ceiling[2+3]**	**Meteorological minima visibility/RVR[2+3]**
Precision approach procedure (3D approach procedure)	Add 200 ft to the authorised DA(H)	Add 800 metres to the authorised visibility
Non-Precision approach or circling approach (2D approach procedure)	Add 400 ft to the authorised MDA(H)	Add 1500 metres to the authorised visibility

Notes

[1] When determining the suitability of a runway, wind including gust must be forecast to be within operating limits and should be within the manufacturer's maximum demonstrated cross wind limits.

[2] Weather Forecasts that contain the terms BECMG, INTER, TEMPO, or PROB may be used to determine the weather suitability of an aerodrome as an EDTO alternate provided that:

a) where conditions are forecast to improve, the forecast BECMG conditions to be applicable as of the end of the BECMG time period, and these conditions must not be below the published alternate minima requirements for that aerodrome;

b) where conditions are forecast to deteriorate, the forecast BECMG conditions to be applicable as of the start of the BECMG time period, and these conditions must not be below the published alternate minima requirements for that aerodrome;

Conditional forecast elements need not be considered except that an INTER or TEMPO below the lowest applicable operating minima requirements must be taken into account;

c) conditional forecast elements need not be considered when forecast "PROB" is less than 40%;

d) additives are applied only to height value (H) to determine the required ceiling.

[3] When dispatching with an MEL, those MEL limitations affecting instrument approach minima must be considered in determining the alternate minima

2.4 Narrow runway operations

2.4.1 Definitions

The following definitions shall be used for the purposes of this MOS provision:
code letter, for an aeroplane, means:

a) for an aeroplane with a wing span and an outer main gear wheel span mentioned in the same item in table 4 (other than an aeroplane mentioned in paragraph c) below) - the letter mentioned in column 3 of the item; or

b) for an aeroplane with a wing span and an outer main gear wheel span mentioned in different items in table 4 (other than an aeroplane mentioned in paragraph (c) below) - the letter mentioned in column 3 of the item in the table with the higher number; or

c) for an aeroplane with a wing span mentioned in item 1, 2, 3 or 4 of table 4, and an outer main gear wheel span that is at least 9 metres but less than 14 metres - **D**.

Table 4

Aeroplane code letters – Narrow runway operations			
Item	**Column 1**	**Column 2**	**Column 3**
	Aeroplane wingspan	**Aeroplane outer main gear wheel span**	**Code letter**
1	<15 metres	<4.5 metres	**A**
2	≥15 metres to <24 metres	≥4.5 metres to <6 metres	**B**
3	≥24 metres to <36 metres	≥6 metres to <9 metres	**C**
4	≥36 metres to <52 metres	≥9 metres to <14 metres	**D**
5	≥52 metres to <65 metres	≥9 metres to <14 metres	**E**
6	≥65 metres to <80 metres	≥14 metres to <16 metres	**F**

Table 5

code number, for an aeroplane with a reference field length mentioned in column 1 of an item of table 5, means the number mentioned in column 2 of the item.

Aeroplane code numbers – Narrow runway operations		
Item	**Column 1**	**Column 2**
	Reference field lengths	**Code No.**
1	<800 metres	**1**
2	≥800 metres to <1200 metres	**2**
3	≥1200 metres to <1800 metres	**3**
4	≥1800 metres	**4**

2.4.2 **Determination of minimum runway width**

An aeroplane must not take off from, or land on, a runway of width that is less than the ***ICAO minimum runway width*** for the aeroplane (***a narrow runway***) unless the aeroplane flight manual provides for the operation of the aeroplane on a ***narrow runway***.

2.4.3 The ***ICAO minimum runway width***, must be the width shown in table 6 determined by the intersection of the aeroplane's ***code letter*** and ***code number***.

Table 6

ICAO minimum runway width – Narrow runway operations						
Code letter / Code number	**A**	**B**	**C**	**D**	**E**	**F**
1	18 metres	18 metres	23 metres	-	-	-
2	23 metres	23 metres	30 metres	-	-	-
3	30 metres	30 metres	30 metres	45 metres	-	-
4	-	-	45 metres	45 metres	45 metres	60 metres

2.5 Fuel requirements

2.5.1 Matters to be considered when determining whether there is sufficient fuel on board to complete the flight safely

An aeroplane must carry a sufficient amount of usable fuel to complete the planned flight safely and to allow for the potential for deviations from the planned operation.

In determining the quantity of usable fuel required to complete a flight in safety, the following matters must be considered:

a) aeroplane specific fuel consumption data, being:

(i) current aeroplane specific fuel consumption data derived from a fuel consumption monitoring system; or

(ii) fuel consumption data provided by the aeroplane manufacturer;

b) operating conditions for the planned flight, including the following;

(i) anticipated weight of the aeroplane;

(ii) Notices to Airmen;

(iii) meteorological forecasts and reports;

(iv) air traffic service (ATS) procedures or restrictions;

(v) anticipated delays; and

(vi) the effects of maintenance items or configuration deviations.

2.5.2 The amount of fuel that must be carried for a flight

The amount of usable fuel required to be on board at the commencement of a flight must include:

a) ***taxi fuel:*** the amount of fuel expected to be used prior to take-off. Local conditions at the departure aerodrome and APU consumption (if applicable) must be taken into account.

Note: Taxi fuel includes fuel required for engine start.

b) ***trip fuel:*** the amount of fuel required to enable the aeroplane to fly from take-off, or the re-planning point, until landing at the destination aerodrome taking into account the operating conditions referred to in 2.5.1b). This includes:

(i) fuel for take-off and climb from departure aerodrome to initial cruising level/altitude, taking into account the expected departure routing; and

(ii) fuel for cruise from top of climb to top of descent, including any step climb/descent from initial cruising level/altitude; and

(iii) fuel from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and

(iv) fuel for executing an approach and landing at the destination aerodrome.

c) ***contingency fuel:*** the amount of fuel required to compensate for unforeseen factors. The amount of contingency fuel must be the greater of the following:

(i) five percent of the planned trip fuel or if the flight is planned with in-flight re-planning, five percent of the trip fuel required from the re-planning point, or

(ii) an amount to fly for 5 minutes at holding speed at 1 500 ft above the destination aerodrome in ISA conditions.

d) ***destination alternate fuel***: the amount of fuel must be calculated as follows:

(i) where a destination alternate is required, the amount of fuel to enable the aeroplane to:

1) perform the expected missed approach at the destination aerodrome;

2) climb to the planned cruising altitude;

3) fly the flight planned route;

4) descend to the point where the expected approach is initiated; and

5) conduct the expected approach and landing at the destination alternate aerodrome; or

(ii) where two destination alternate aerodromes are required, the amount of fuel to enable the aeroplane to proceed to the alternate aerodrome which requires the greater amount of fuel calculated in accordance with 2.5.2(d)(i)1) through 5) above; or

(iii) where a flight is to operate without a destination alternate aerodrome the amount of fuel required to enable the aeroplane to fly for 15 minutes at holding speed at 1500 ft above the destination aerodrome elevation in ISA conditions; or

(iv) where the destination aerodrome is an isolated aerodrome:

1) for piston-engine aeroplanes, the amount of fuel required to fly for 45 minutes plus 15 percent of the flight time planned at cruising level, including final reserve fuel, or two hours, whichever is less; or

2) for turbine-engine aeroplanes, the amount of fuel required to fly for two hours at the cruise altitude and at the normal cruise consumption above the destination aerodrome, including final reserve fuel.

e) ***final reserve fuel***: the amount of fuel, expressed as a period of time, required to fly at holding speed at 1 500 feet above aerodrome elevation in ISA conditions; calculated using the estimated weight on arrival at the destination alternate aerodrome, or the destination aerodrome when operating with no destination alternate aerodrome. The amount of fuel must be:

(i) for piston-engine aeroplanes, 45 minutes;

(ii) for turbine-engine aeroplanes, 30 minutes.

Note: In addition to the required final reserve fuel calculation operators are recommended to determine conservative standard final reserve fuel values for each aeroplane type and variant in their fleet.

f) ***additional fuel***: the supplementary amount of fuel that must be carried if the minimum fuel calculated in accordance with 2.5.2(b),(c),(d) and (e) is not sufficient to:

(i) allow the aeroplane to descend as necessary and proceed to an alternate aerodrome in the event, of an engine failure or loss of pressurisation, whichever event requires the greater subsequent fuel consumption, when such an event occurs at the most critical point along the route:

1) to proceed to an alternate or destination aerodrome; and

2) to fly for 15 minutes at holding speed at 1500ft above aerodrome elevation in ISA conditions; and

3) to make an approach and landing; or

(ii) allow an aeroplane engaged in EDTO to comply with the EDTO critical fuel scenario; or

(iii) as required by CASA to meet other specific fuel requirements (if any).

*Note**: discretionary fuel:*** which shall be the extra amount of fuel carried at the discretion of the pilot-in-command, is not a required fuel element.

2.5.3 Usable fuel requirements - re-planning point

The amount of usable fuel required to be on board from the re-planning point must include:

a) trip fuel to destination;

b) contingency fuel;

c) destination alternate fuel (if required);

d) final reserve fuel; and

e) additional fuel (if applicable).

2.5.4 Fuel re-analysis after commencement of flight

The pilot in command must carry out a fuel re-analysis if fuel is consumed after flight commencement for purposes other than originally intended during pre-flight planning and, if applicable, an adjustment of the planned flight must be made such that the flight can proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining upon landing.

The amount of usable fuel required to be on board to continue a flight must include:

a) trip fuel;

b) destination alternate fuel (if required);

c) final reserve fuel; and

d) additional fuel (if applicable).

2.5.5 **Performance based fuel requirements**

CASA may approve variations to the pre-flight fuel calculations of taxi fuel, trip fuel, contingency fuel, destination alternate fuel, and additional fuel, based on in-service experience or the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained. The specific risk assessment must include at least the following;

a) flight fuel calculations;

b) capabilities of the operator to include;

(i) a data driven method that includes a fuel consumption monitoring programme; and/or

(ii) the advanced use of alternate aerodromes; and

(iii) specific risk mitigating measures.

In-flight fuel management: monitoring fuel quantity

2.5.6 The operator must establish policy and procedures to ensure in-flight fuel checks and in-flight fuel management are performed.

2.5.7 The pilot in command must at regular intervals ensure that the amount of usable fuel remaining on board is not less that the fuel required to proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining upon landing. Evaluation of the useable fuel remaining must:

a) compare planned fuel consumption with actual fuel consumption;

b) determine that the usable fuel remaining is sufficient to complete the planned flight; and

c) determine the expected usable fuel remaining on arrival at the destination aerodrome.

2.5.8 The pilot-in-command must ensure that pre-flight determination of fuel quantity is conducted and that prior to commencement of the flight the quantity of usable fuel on board is recorded on the operational flight plan or other suitable means (e.g. EFB).

2.5.9 The relevant fuel quantity evaluated in accordance with this subsection must be recorded on the operational flight plan or other suitable means (e.g. EFB) after each fuel quantity check.

2.5.10 **Procedures to be followed if fuel reaches specified amounts during flight**

The pilot in command shall request delay information from ATC when unanticipated circumstances may result in landing at the destination aerodrome with less than final reserve fuel plus any fuel required to proceed to an alternate aerodrome or the fuel required to proceed to an isolated aerodrome.

If as a result of an in-flight fuel quantity check the usable fuel expected to be remaining on arrival at the destination aerodrome is less than the fuel required

above, the pilot-in-command must take into account the traffic and other operational conditions prevailing at the destination aerodrome when deciding whether to proceed to the destination or divert.to an alternate aerodrome.

The pilot-in-command must advise ATC of a minimum fuel when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than the planned final reserve fuel for the flight.

The pilot-in-command must declare a situation of emergency fuel when the calculated usable fuel predicted to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel for the flight.

2.6 Safety briefings, demonstrations and reminders

2.6.1 Safety briefings - instructions and inclusions

The safety briefing and instructions must include the following matters:

a) the rules applying to smoking on the aeroplane (see *Air Navigation Regulations 1947)*;

b) the requirement to comply with a safety direction given by the pilot in command under *Division D.11 of CASR - Safety of persons on aircraft*, that seat backs be in the upright position (or other position certified for take-off and landing), with attachments to the seat (including a tray table or footrest) stowed during taxiing, take - off and landing;

c) if the aeroplane has a tray table or cot attached to a bulkhead (or any other part of the aeroplane) - when the tray table or cot must be in its stowed position;

d) if an infant or child is carried - that the restraint of the infant or child must comply with any provision of *regulation 91.805 of CASR, Restraint of infants and children,* with the restraint of infants or children;

e) when and how to stow carry-on baggage securely;

f) if life rafts are required to be carried on the flight by *regulation 121.655 of CASR* - where they are and how to use them;

g) the limitations imposed by *Division 91.C.4 of CASR –Portable electronic devices,* on the use of portable electronic devices;

h) what is in the safety briefing card and where to find it;

i) for a passenger with reduced mobility and any person accompanying or assisting the passenger for the flight - what to do if an emergency evacuation of the aeroplane is necessary; and

j) a description of the brace positions.

2.6.2 Safety demonstration and explanations - inclusions

The safety demonstration and explanations must include the following:

a) the location of the emergency exits.

b) if the aeroplane has an escape-path lighting system - where it is and how to use it to exit the aeroplane.

c) if automatic deployment of equipment to dispense supplemental oxygen is required to be carried on the flight - the location of the equipment and how to use it.

d) if life jackets are required to be carried on the flight where they are, how to use them and a warning that life jackets must not be inflated inside the aeroplane.

e) when seat belts must be worn during the flight and after landing, and how to use them.

2.6.3 **Safety demonstration - requirements**

A safety demonstration must be given:

a) by a crew member; or

b) by audio-visual presentation; or

c) by a combination of the methods mentioned in paragraphs a) and b).

2.6.4 **Safety reminders by cabin crew**

The following safety reminders must be given on flights where a cabin crew member is required:

d) during the flight in an aeroplane where display of no-smoking signs are not available, a safety reminder about the rules for smoking on board the aeroplane.

e) before landing, safety reminders of the following;

(i) that seat belts must be securely fastened during landing;

(ii) that seat backs must be in the upright position (or other approved position), with attachments to the seat (including a tray table or footrest) stowed;

(iii) if the aeroplane has a tray table or cot attached to a bulkhead (or other part of the aeroplane) - that the tray table or cot must be stowed;

(iv) that carry - on baggage must be re - stowed securely;

(v) the limitations imposed by *CASR Part 91, Division 91.C.4 – Aircraft – portable electronic devices*, on the operation of portable electronic devices before, during and after landing.

f) after landing, safety reminders of the following:

(i) when the use of seat belts is necessary after landing;

(ii) the rules for smoking on the aeroplane and while disembarking;

(iii) the rules on the use of portable electronic devices on the apron area (if applicable).

2.6.5 Safety reminders by cockpit crew

For flights where cabin crew are not required under these regulations, the pilot in command must give a reminder about the rules on smoking for the flight (where the display of no-smoking signs are not available) and that the items in *2.6.4 (b)* above, are to be complied with by the passengers.

2.6.6 Safety reminders - delivery method

The following passenger briefings must be given by one the methods described in paragraph *2.6.7*, below:

g) the safety briefing and instructions;

h) an explanation of a safety demonstration; or

i) a safety reminder.

2.6.7 Safety reminders - delivery method requirements

The pre take-off briefing should be given so that each passenger can clearly hear it and easily see the required demonstration. Crew giving these briefings should speak slowly and distinctly, be animated, and make eye contact with as many passengers as possible. Steps should be taken to eliminate distractions for crew and passengers during the briefing.

Where more than one crew member gives the briefings and demonstration, the crew should be distributed through the passenger cabin at designated positions, as per the company's documented procedures. They should coordinate their actions with the information given in the oral briefing.

The methods of passenger briefings mentioned in paragraph *2.6.6* are;

j) by a crew member;

k) by audio presentation;

l) by audio - visual presentation;

m) by a combination of the methods mentioned in paragraphs (a) thru to (c);

n) if the person receiving the safety reminder is a person with reduced mobility who needs special conditions or assistance - in a form appropriate to;

   (i) the person with reduced mobility; or

   (ii) a person accompanying or assisting the person with reduced mobility for the flight.

CHAPTER 3: (SUBPART 121.F – PERFORMANCE)

3.1 Performance

3.1.1 General

An operator must ensure that performance data in accordance with Regulation 121.435 of CASR 1998 is used to determine the performance requirements. When applying the factors prescribed in these requirements, account of the applicable factors need not be taken into account if the factors have already been incorporated in the AFM performance data, this will avoid double application of factors, e.g. the application of 50% headwind and 150% tailwind factors are only necessary to be applied if these factors have not been incorporated in the production of the AFM performance data.

3.1.2 When showing compliance with the performance requirements account must be taken of the aeroplane configuration, meteorological conditions and the operation of systems which have an adverse effect on performance.

3.1.3 The operator must ensure the performance data in the AFM complies with ICAO Annex 8 and the performance data will:

a) account for reasonably expected operating conditions such as take- off and landing on contaminated runways; and

b) consider engine failure in all flight phases.

3.1.4 In determining whether an aeroplane meets the landing performance requirements, the following, but not limited to, shall be taken into account:

a) the aeroplane is landed on a suitable runway;

b) the wind conditions;

c) the ground handling characteristics of the aeroplane;

d) instrument approach procedures expected to be used; and

e) terrain.

3.1.5 The operator must ensure that for wet and contaminated runway operations the performance information used is that provided for in the AFM.

3.1.6 Gross to net climb margins shall be in accordance with the NAA certification requirements.

3.2 Take-off performance

3.2.1 Take-off weight limitations

The operator must ensure that the take-off weight does not exceed the maximum take-off weight specified in the AFM, at the aerodrome, at which the take-off is to be made, taking into account the following:

a) the aeroplane configuration;

b) pressure altitude;

c) ambient temperature;

d) runway surface condition;

e) runway surface type;

f) runway slope in the direction of take-off;

g) unless otherwise accounted for in the AFM performance data, not more than 50% of the headwind and not less than 150% of the tailwind;

h) the loss of any runway length due to alignment of the aeroplane for take-off; and

i) credit for stopway and clearway that meet the requirements of part 139 MOS.

3.2.2 An operator must comply with the following requirements when determining the maximum permitted take-off weight at the time of take-off:

a) the accelerate stop distance required must not exceed the accelerate stop distance available in the direction of take-off;

b) subject to paragraph c), the take-off distance required must not exceed the take-off run available;

c) the take-off distance required may exceed the take-off run available if:

(i) the take-off distance required does not exceed the take-off distance available, when including a clearway distance not exceeding half of the take-off run available; and

(ii) the take-off run required does not exceed the take-off run available.

d) compliance with this paragraph must be shown using a single value of V_1 for the rejected and continued take-off; and

e) on a wet or contaminated runway, the take-off weight must not exceed that permitted for a take-off on a dry runway under conditions in paragraph *3.2.1* above.

3.2.3 **Obstacle clearance limitations in the take-off area.**

For the purposes of determining the take-off weight limitations in Regulation 121.405 of CASR 1998, the take-off obstacle clearance requirements are met if the net flight path of the aeroplane, following the failure of the critical engine so that it is recognised at V1 appropriate to a dry runway, would clear all obstacles in the take-off area in accordance with the following:

a) the aeroplane must not commence a take-off at a weight in excess of a weight in the AFM that corresponds with a net flight path which clears all obstacles either by:

(i) at least a height of 35 ft. vertically; or

(ii) at least a height of 50 ft. vertically for the duration of a turn in the case of a planned departure procedure with a change of heading.

b) for the purpose of meeting this requirement, the planned departure procedure may include a change of heading but, in that event, the change of heading must not be initiated before a point where the net flight path clears all obstacles by at least 50 ft;

c) the planned angle of bank must not exceed 15º except that in an approved RNP operation the angle of bank must not exceed 25º subject to the AFM containing data that supports the planned angle of bank;

d) the AFM data must provide increased take-off safety speed V_2 when the planned take-off path requires an angle of bank greater than 15º. The AFM must also contain data to allow construction of the net flight path when using an increased take-off safety speed V_2 when planning to use an angle of bank greater than 15º.

Note: If an engine failure is recognised at or after V1 (wet) during the take-off from a wet or contaminated runway, the net flight path may clear obstacles by less than 35 feet or, during a turn by less than 50 feet, as specified by the OEM.

The point on the net flight path where the horizontal flight segment commences is the same horizontal distance from the end of the runway as the point where the gross flight path intersects the height selected for the level flight acceleration manoeuvre.

The operator is not required to calculate the area beyond the point on the planned flight path at which the net flight path complies with 3.3.2 a) or b) as applicable.

3.2.4 **Take-off area**

In VMC operations by aeroplanes below 22700kg maximum take-off weight the take-off area must be calculated as follows:

a) the area on either side of the planned flight path within a lateral distance of at least:

150 feet (45.7 meters) + 0.125D

Note: D is distance measured horizontally along the planned flight path and commencing at the end of the take-off distance available.

b) the area more than 1000 feet (304.7 meters) either side of the planned flight path need not be considered unless: the planned flight path involves a change of heading in excess of 15º, then the lateral area will continue to expand throughout the turn and the limiting lateral distance shall become the greater of 1000 feet (304.7 meters) or the distance represented by 150 feet (45.7 meters) plus 0.125D where D is measured to the point of completion of the turn.

3.2.5 In VMC operations by aeroplanes at or above 22,700kg maximum take-off weight and IMC operations the take-off area must be calculated as follows:

a) the area on either side of the planned flight path within a lateral distance of at least:

250 feet (76.2 meters) + 0.125D

Note: D is distance measured horizontally along the planned flight path and commencing at the end of the take-off distance available.

b) despite paragraph a) above for an RNP – capable aeroplane engaged in an approved RNP operation, equipped and approved to conduct RF legs

and turns, and the departure procedures are constructed using ARINC 424 RF path terminators, then the lateral expansion of the take-off area may be discontinued when the perimeter of the take-off area reaches:

(i) RNP set equal to, or greater than, 0.5nm - 900 metres either side of the defined flight path; or

(ii) RNP set equal to, or less than, 0.2nm - 370 metres either side of the defined flight path; or

(iii) RNP set to more than 0.2nm but less than 0.5nm - a distance either side of the defined flight path derived by linear interpolation between 370 metres and 900 metres according to the RNP.

3.2.6 **Alternative take-off area requirements:**

Subject to paragraphs 3.2.7, 3.2.8 and 3.2.9 below, the take-off area consists of the area on either side of the planned flight path within a lateral distance calculated using the formula:

90 metres + 0.125D

Note: D is distance measured horizontally along the planned flight path and commencing at the end of the take-off distance available.

3.2.7 Obstacles at a distance greater than 600 metres on either side of the planned flight path need not be cleared:

a) if the planned flight path does not include a change of heading of more than 15º; or

b) in the case of operations conducted in VMC by day.

3.2.8 If paragraph 3.2.7 above does not apply, obstacles at a distance greater than 900 metres on either side of the planned flight path need not be cleared.

3.2.9 Despite paragraphs 3.2.7 and 3.2.8 above, for an RNP-capable aeroplane engaged in an approved RNP operation, equipped and approved to conduct RF legs and turns, and the departure procedures are constructed using ARINC 424 RF path terminators, then the expansion of the take-off area may be discontinued when the perimeter of the take-off area reaches:

a) if RNP is set equal to or greater than 0.5nm - 900 metres on either side of the defined flight path; or

b) if RNP set to or less than 0.2nm - 370 metres on either side of the defined flight path; or

c) if RNP is set to more than 0.2nm but less than 0.5nm - a distance on either of the defined flight path, derived by linear interpolation, between 370 metres and 900 metres according to RNP.

3.2.10 The operator must take into account the charting obstacle data accuracy when assessing compliance against paragraphs 3.2.3 through to 3.2.9.

3.2.11 When showing compliance with take-off area requirements, an operator must take into account of the following meteorological conditions:

1) the pressure altitude;

2) the ambient temperature at the aerodrome; and

3) no more than 50% of the reported headwind component or not less than 150% of the reported tailwind component.

3.3 En-route performance

3.3.1 En-route - one engine inoperative

An aeroplane must not commence a take-off at a weight in excess of that which, in accordance with the one-engine inoperative en-route net flight path data shown in the AFM, provides compliance with either paragraph 3.3.2, a) or 3.3.2, b) below at all points along the route. The net flight path must have a positive gradient at 1500 ft. ***above the aerodrome*** where the landing is assumed to be made after an engine failure. The net flight path shall take into account:

a) normal operating altitudes;

b) operating weights;

c) ambient temperature anticipated along the route. Forecast temperature may be used in the determination of en-route net flight path; and

d) meteorological conditions where icing protection systems are to be operable, the effect of their use.

3.3.2 The one-engine inoperative en-route net flight path at all points along the route complies with either of the following:

a) the gradient of the net flight path must be positive at least ***1000 ft. above terrain and obstacles*** along the route within the distance 5nm on either side of the intended track subject to paragraph 3.3.3; or

b) In the case of a “drift down” procedure the net flight path must permit the aeroplane to continue the flight from the cruising altitude to an aerodrome where a landing can be made in accordance with the landing distance requirements of paragraphs 3.4.1 or 3.4.5, as appropriate, a net flight path providing clearance vertically, ***by at least 2000ft, all terrain and obstacles*** along the route within 5nm on either side of the intended track, subject to paragraph 3.3.3 below in accordance with the following requirements:

(i) the engine is assumed to fail at the most critical point along the route;

(ii) account is to be taken of the forecast wind on the flight path.

(iii) account of fuel jettison, if applicable, consistent with Part 121 MOS chapter 2 fuel requirements; and

(iv) the aerodrome where the aeroplane is assumed to land after the engine failure is specified in the operational flight plan, and meets the following requirements:

1) the landing performance requirements at the expected landing weight; and

2) the meteorological forecast or reports, or any combination, indicate a safe landing can be made at the expected time of landing.

3.3.3 An operator must increase the route width margins in 3.3.2 a) and b) to 10 nm where the navigational accuracy does not meet RNP 5.

3.3.4 **En-route - aeroplanes with three or more engines, two engines inoperative**

The operator must ensure that an aeroplane having three or more engines will not at any point along its intended, track be more than 90 minutes, at the AEO cruise speed in ISA, still air, from an adequate aerodrome at which the landing performance requirements at the expected landing weight are met ***unless*** compliance with this paragraph 3.3.4, a) through to c) below can be met;

a) the two engine inoperative en-route flight path must permit the aeroplane to continue the flight, in the forecast meteorological conditions, from the point where two engines are assumed to fail simultaneously, to an aerodrome where a safe landing can be made taking into account the two engine inoperative landing procedures, and:

(i) the net flight path must clear vertically, by at least 2000 ft., all terrain and obstructions along the route within:

1) 5nm when navigational accuracy meets at least RNP 5; or

2) 10 nm; and

(ii) At altitudes and in meteorological conditions requiring the use of ice protection, the effect of their use on the net flight path must be taken into account.

b) the two engines are assumed to fail at the most critical point of that portion of the route where the aeroplane is more than 90 minutes, at the AEO speed in ISA still air away from an adequate aerodrome at which the two engine inoperative landing performance requirements at the expected landing weight are met.

(i) the net flight path is to have a positive gradient at 1500ft above the aerodrome where the landing is assumed to be made after the failure of two engines; and

(ii) fuel jettison is permitted consistent with the required fuel reserves and paragraph c) can be met; and

c) the expected weight of the aeroplane at the point where the two engines are assumed to fail is not less than that which would include sufficient fuel meet the Part 121 MOS Chapter 2 Fuel Requirements.

3.3.5 **Planned take-off weight - destination and alternate aerodromes missed approach climb gradient**

For the expected instrument approach procedure at the destination and alternate if one is specified, with a missed approach gradient greater than 2.5% the operator must not plan a flight at a weight in excess of that which would allow a missed approach:

a) in accordance with the instrument approach missed approach climb gradient; and

b) with the aeroplane in the one-engine inoperative missed approach configuration and speed as specified in the AFM.

For instrument approach procedures with a decision height below 200ft, the operator must not plan a flight at a weight in excess of that which would allow:

a) a missed approach climb gradient of at least 2.5%; or

b) the missed approach climb gradient specified for the instrument approach procedure, whichever is greater; and

c) with the aeroplane in the one-engine inoperative missed approach configuration and speed as specified in the AFM.

3.4 Landing performance

3.4.1 Planned landing weight - dry runways

An operator must not commence a take-off at a weight in excess of that which would ensure that the landing weight of the aeroplane at the estimated time of arrival, at the destination aerodrome and alternate aerodrome if one is provided, allows a full stop landing from 50ft above the threshold:

a) for jet engine aeroplanes - within 60% of the landing distance available; or

b) for turbo-propeller and piston engine aeroplanes - within 70% of the landing distance available.

Note: The 60% and 70% factors of the landing distance available are equivalent to factors of 1.67 and 1.43, respectively, of the landing distance required.

3.4.2 When showing compliance with paragraph 3.4.1 CASA may approve in accordance with Regulation 121.450 of CASR 1998 any other supplemental conditions that CASA considers necessary in order to ensure and acceptable level of safety for the particular operation.

3.4.3 When showing compliance with this section, the operator must take account of the following criteria with regard to the landing:

a) a dry runway;

b) the landing configuration;

c) the wind direction;

d) the consumption of fuel and oil;

e) aerodrome elevation;

f) runway slope if greater than +/- 1%; and

g) unless otherwise accounted for in the AFM performance data, not more than 50% of headwind and not less than 150% of tailwind.

3.4.4 The planned landing weight shall ensure compliance with the missed approach climb gradient criteria specified in paragraph 3.3.5.

Planned landing weight- wet or contaminated runways

3.4.5 An operator must insure that if weather reports or forecasts or a combination of them, indicate the runway at the planned destination for the flight, and any alternate aerodrome in the operational flight plan for the flight, at the estimated time of arrival may be wet, the landing distance available is at least 115% of the

required landing distance determined in accordance with paragraph 3.4.1 above.

3.4.6 An operator must ensure that if weather reports or forecasts, or a combination of them, indicate the runway at the planned destination for the flight and any alternate aerodrome in the operational flight plan for the flight, at the estimated time of arrival, may be contaminated, the landing distance available must be at least the greater of the following:

a) The landing distance in paragraph 3.4.5; or

b) 115% of the landing distance required determined in accordance with the AFM for operations on contaminated runways.

3.4.7 A landing distance on a wet runway shorter than that required by paragraph 3.4.5, but not less than that required by paragraph 3.4.1, (a) or (b), may be used if the AFM provides landing distance information on wet runways.

3.4.8 A landing distance on a contaminated runway shorter than that required by paragraph 3.4.6, but not less than that required by paragraph 3.4.1, (a) or (b), may be used if the AFM provides landing distance information on contaminated runways.

3.4.9 When showing compliance with paragraphs 3.4.6, 3.4.7 and 3.4.8, the criteria in paragraphs 3.4.3 should be applied except that subparagraphs 3.4.1 a) and b) do not apply in the case mentioned in subparagraph 3.4.6 b).

Inflight landing distance

3.4.10 Before landing, the pilot in command must determine the landing distance required at the estimated time of landing.

3.4.11 If the ***actual landing distance*** is available from the OEM, and that landing distance is used for the purposes of calculating the landing distance required in accordance with this section, then operator must ensure that the landing distance available is at least 115% of the landing distance required.

3.4.12 When determining the inflight landing distance in accordance with paragraph 3.4.11, the operator must take account of the following conditions:

a) the landing weight at the estimated time of landing ;

b) the pressure altitude at the aerodrome;

c) the runway surface conditions;

d) the runway slope if greater than +/- 1%;

e) the wind direction at the estimated time of landing;

f) the landing configuration; and

g) retardation devices required to ensure a landing within the landing distance available.

3.4.13 If actual landing distance is not available or is not used in the landing performance calculations, then the landing distance at the time of landing must be determined in accordance with paragraph 3.4.1 for dry runways and 3.4.5 for wet or contaminated runways taking into account the conditions of paragraph 3.4.12.

3.5 Computerised performance data systems

3.5.1 Computerised systems used as the primary means to calculate the performance of the aeroplane must use a software application (SA) that meets the SA requirements for a Class 1 or Class 2 EFB with functionality 2 or better.

Note: Software applications are those that use algorithms requiring manual input to satisfy operational requirements including weight and balance calculations required by the AFM.

3.5.2 Before the first use of the SA, or after any update of the SA, the operator must:

a) validate output from the SA for the aeroplane to ensure that it complies with the performance limitations set out in the AFM;

b) retain written evidence of the completion of the validation; and

c) make the written evidence mentioned in paragraph a) available to CASA on request.

3.5.3 When the SA is used for performance calculations for an aeroplane the suitability of the SA must be validated in accordance with a procedure in the operator's exposition.

CHAPTER 4: (SUBPART 121.J – WEIGHT AND BALANCE)

4.1 Standard crew, passenger (including carry-on baggage) and checked baggage weights

Operators must specify in their exposition the procedure for working out the weights used in accordance with Regulation 121.460 (1) of CASR 1998.

Operators may choose to use actual or standard weights for specific operations. The procedures for using actual and/or standard weights must be detailed in the exposition. For any one flight, and any one weight item, actual or standard weights must be used, not a combination of both.

4.1.1 Standard weights

a) When an aeroplane is being loaded, Regulation 121.460 (2) of CASR 1998 requires its operator to work out the weight of crew members either by weighing or by the use of standard weights, including carry-on baggage. Use of the following standard weights will satisfy this requirement:

(i) for a flight crew member (including bag) – 95 kg;

(ii) for a cabin crew member (including bag) – 85 kg;

b) The operator must take into account the weight of any additional baggage, and the subsequent location of that extra baggage when determining the centre of gravity.

c) When an aeroplane is being loaded, Regulation Part 121.460 (2) of CASR 1998 requires the operator to determine the weight of the traffic load. The following Tables and paragraphs provide standard passenger and baggage weights acceptable to CASA, and methods acceptable to CASA for use by operators who wish to weigh passengers or use different standard weights.

Table 7

Standard weights - passengers - aeroplanes with up to 19 passenger seats		
Item	**Type of passenger**	**Aeroplane with 10 to 19 passenger seats**
1	Adult male	92 kg
2	Adult female	74 kg
3	Child	35 kg

Table 8

Standard weights - passengers - aeroplanes with more than 19 passenger seats		
Item	**Type of passenger**	**Aeroplane with more than 19 passenger seats**
1	Adult male	88 kg
2	Adult female	70 kg
3	Child	35 kg

d) The weights in the above tables include an allowance of 6kg for carry-on baggage to account for hand baggage and personal effects carried on-board, and include a margin to allow for the weight of any infant carried by an adult on a passenger seat.

4.1.2 Actual weighing and survey plans

In accordance with Regulation 121.460, (2), (a) of CASR 1998, when determining passenger weights by weighing, personal belongings and carry-on baggage should also be weighed, and the weighing should be carried out as near as practicable to the place of boarding.

All items of checked baggage should be weighed irrespective of aeroplane size; however, GM 121.460, (2), (b*)* provides a method, acceptable to CASA, for conducting a survey for the purpose of establishing standard weights for checked baggage and for determining different standard passenger weights to those found in Tables 7 & 8 above.

Where a passenger weighing survey determines that standard weight values are higher than those tabulated, those higher values should be used.

4.2 Weight and balance documents

4.2.1 Weight and balance documents

The weight and balance documents must include the following:

a) the aeroplane's type and registration mark;

b) the aeroplane's loading configuration as specified in the AFM;

c) the date of the flight and the flight identification number;

d) the name of the pilot in command;

e) the name of the person responsible for planning the loading of the aeroplane for the flight;

f) the place of departure and the planned destination;

g) the dry operating weight of the aeroplane in the loading configuration;

h) the aeroplane's zero fuel weight, take-off weight[1] and planned landing weight;

i) weight of the total amount of the usable fuel and trip fuel carried for the flight;

j) weight of consumables, other than usable fuel, carried for the flight, if applicable;

k) the weight of each component of the load, including the following:

(i) passengers including carry-on baggage;

(ii) other cargo (not including carry-on baggage);

(iii) ballast;

l) how the load is distributed throughout the aeroplane;

m) applicable aeroplane centre of gravity positions, inlcuding limitations relating to these centre of gravity positions, as specified in the AFM;

n) any other information that the pilot in command needs to ensure that the loading of the aeroplane is in accordane with the weight and balance limits for the aeroplane, including information about any last-minute change to the load;

o) signed confirmation by:

(i) the person responsible for planning the loading of the aeroplane for the flight; and

(ii) the person responsible for supervising the loading of the aeroplane for the flight; and

(iii) if the person mentioned in (i) and (ii) is not the pilot in command or the co-pilot, then a signed confirmation by the pilot in command or the co-pilot is required that the loading is acceptable for the flight.

p) for a last minute change to the load that is within the maximum tolerance mentioned in Regulation 121.460 (1)(d):

(i) weight and balance information about the last minute change; and

(ii) signed confirmation by the pilot in command or the co-pilot that the weight and balance information for the last minute change is acceptable for the flight.

4.2.2 Weight and balance documents - centre of gravity

Notwithstanding paragraph 4.2.1, h) and m), the centre of gravity position may not need to be on the weight and balance documentation, if the load distribution is in accordance with pre-calculated weight and balance information, or if it can be shown that for the planned operations a correct weight and balance can be

[1] The take-off weight in the weight and balance calculations may be a weight limited by performance calculations in accordance with Part 121 MOS Chapter 3 Performance.

assured for any load within the range of weight and balance in the aeroplane flight manual.

4.2.3 Weight and balance documents - last minute changes

For paragraphs 4.2.1, a) to n), the information and signed confirmations about the weight and balance of the aeroplane mentioned in the paragraphs do not need to take into account a last-minute change to the load if the change is within the maximum tolerance mentioned in Regulation 121.460(1)(d).

4.3 Computerised weight and balance systems

4.3.1 Computerised weight and balance systems used as the primary means to calculate the weight and balance must use a software application (SA) that meets the SA requirements for a Class 1 or Class 2 EFB with functionality 2 or better.

Note: Software applications are those that use algorithms requiring manual input to satisfy operational requirements including weight and balance calculations required by the AFM.

4.3.2 Before the first use of the SA, or after any update of the SA, the operator must:

a) validate output from the SA for the aeroplane to ensure that it complies with the weight and balance limitations set out in the AFM; and

b) retain written evidence of the completion of the validation; and

c) make the written evidence mentioned in paragraph a) available to CASA on request.

4.3.3 When the SA is used for weight and balance calculations for an aeroplane the suitability of the SA must be validated in accordance with a procedure in the exposition.

CHAPTER 5: (SUBPART 121.K – Instruments, equipment and systems)

5.1 Flight recording equipment requirements

1.1.1. A flight data recorder installed in an aircraft of maximum take-off weight exceeding 29 000 kg which:

a) receives its initial issue certificate of airworthiness on or after 1 July 1977; or

b) is of a type first certificated in its country of manufacture after 30 September 1969;

c) must record at least the parameters 1-20 inclusive listed in Table 9.

1.1.2. A flight data recorder installed in an aircraft other than one mentioned in paragraph 1.0 must record at least the parameters 1-6 inclusive listed in Table 7.

1.1.3. If first registered on or after 1 January 2017, the following types of aeroplane must be fitted with a Type II FDR or a Type I FDR, as follows:

a) a Type II FDR, if the aeroplane:

(i) has an MTOW greater than 5 700 kg but not greater than 27 000; and

(ii) was first issued with a certificate of airworthiness on or after 1 January 2005; or

b) a Type I FDR, if the aeroplane:

(i) has an MTOW greater than 27 000 kg; and

(ii) was first issued with a certificate of airworthiness on or after 1 January 1989.

1.1.4. The flight data recorder and cockpit voice recorder systems installed in an aircraft under this section shall not be any of the following:

a) commencing on 1 January 2016:

(i) an analogue flight data recorder that utilises mechanically inscribed recording mediums;

(ii) an analogue flight data recorder that utilises frequency modulation;

(iii) a flight data recorder that utilises photographic film;

b) commencing on 1 January 2019, a cockpit voice recorder or flight data recorder that utilises magnetic tape.

1.1.5. Unserviceable magnetic tape flight data recorders, or cockpit voice recorders, must be replaced with solid state recorders.

1.1.6. Where an aircraft is required to be so equipped by this section, the flight data recorder system shall be operated continuously from the moment when the aircraft begins moving under its own power for the purpose of flight until the time the flight ends and the aircraft can no longer move under its own power.

1.1.7. Where an aircraft is required to be so equipped by this section, depending on the availability of electrical power, the cockpit voice recorder system shall be

operated continuously as early as possible during the cockpit checks before starting engines for the purpose of flight until completion of the final check list at the termination of the flight.

1.1.8. Where an aircraft is required to be so equipped by this section the operator shall ensure that:

a) the flight data recorder retains at least its last 25 hours of recording; and

b) for aircraft first registered before 1 January 2017, the cockpit voice recorder must retain at least its last 30 minutes of recording; and

c) data from the last 2 occasions on which the flight data recorder system was calibrated from which the accuracy of the system can be determined are preserved; and

d) for aircraft first registered on or after 1 January 2017, the cockpit voice recorder must retain at least its last 2 hours of recording.

1.1.9. The operator of an aircraft which is required by this section to be equipped with recorders shall take action to ensure that during ground maintenance periods the recorders are not activated unless the maintenance is to the recorder or an engine.

1.1.10. An aircraft required to be fitted with a flight data recorder system and/or a cockpit voice recorder system may operate with an unserviceable recorder system for a period of 21 days commencing on the day on which the system was determined to be unserviceable providing that:

a) the aircraft does not depart from an aerodrome where staff and equipment are available to replace the unserviceable units; and

b) where the aircraft is required to be fitted with both a flight data recorder and a cockpit voice recorder system, where 1 system is serviceable; and

c) the aircraft is not operating training or test flights.

1.1.11. **System requirements**

The components of the flight data recorder system, including the recording unit, acquisition unit, sensors and accessories, must comply with:

a) the appropriate requirements of Technical Standards Order C124 Flight Data Recorder Systems (TSO C124) of the Federal Aviation Administration of the United States of America., as amended from time to time; or

b) a standard that is at least equivalent to the requirements referred to in subparagraph (a) and has been approved by a recognised National Airworthiness Authority or CASA; or

c) the requirements of Annex 6 to the Chicago Convention.

1.1.12. The components of the cockpit voice recorder system, including the recording unit, acquisition unit, sensors and accessories, must comply with:

a) the appropriate requirements of Technical Standards Order C123 Cockpit Voice Recorder Equipment (TSO C123) of the Federal Aviation Administration of the United States of America, as amended from time to time; or

b) a standard that is at least equivalent to the requirements referred to in subparagraph (a) and has been approved by a recognised National Airworthiness Authority or CASA; or

c) the requirements of Annex 6 to the Chicago Convention.

1.1.13. The quality of the recording on each channel must be as high as practicable. Before approval is given for each first type of aircraft/recorder system combination the quality must be established by play back of in-flight recorded information.

Note: Guidance on CVR testing is provided in CASA Advisory Circular AC 21-24

1.1.14. On and after 1 January 2019, installations utilising equipment approved in accordance with TSO C51a are no longer acceptable.

1.1.15. On and after 1 January 2019, installations utilising equipment approved in accordance with TSO C84 are no longer acceptable.

1.1.16. The flight data recorder system specified by this section must be fitted with an approved self-powered underwater locating advice.

1.1.17. On and after 1 January 2017, the underwater locator beacon must be compliant with TSO C121b, or a CASA approved equivalent, having at least a 90 day operational device.

Note: Type I flight data recorder - means a flight data recorder that complies with the requirements of Part 1 of Annex 6, Operation of Aircraft, to the Chicago Convention for a Type 1 flight data recorder.

Type II flight data recorder - means a flight data recorder that complies with the requirements of Part 1 of Annex 6 to the Chicago Convention for a Type II flight data recorder.

Table 9:

FDRs – parameters, ranges, accuracy and recording intervals				
Item No.	**Parameter**	**Range**	**Accuracy – minimum recorder and readout**	**Maximum recording intervals (seconds)**
1	Time	See Note 1	See Note 1	60
2	Altitude	— 1 000 ft to max. certificated altitude of aircraft	± 100 to ± 700 ft - see TSO-C51a	1
FDRs – parameters, ranges, accuracy and recording intervals				

FDRs – parameters, ranges, accuracy and recording intervals				
Item No.	**Parameter**	**Range**	**Accuracy – minimum recorder and readout**	**Maximum recording intervals (seconds)**
Item	**Parameter**	**Range**	**Accuracy – minimum recorder and readout**	**Maximum recording intervals (seconds)**
3	Airspeed	100 to 450 knots IAS or 100 knots IAS to 1.0VD whichever is the greater	±10 knots at room temperature ±12 knots at low temperature *see* TSO-C51a	1
4	Vertical acceleration	-3g to +6g	±0.2g stabilised ±10% transient *see* TSO-51a	0.125
5	Heading	360°	±2°	1
6	Press to transmit for each transceiver See Note 2	On/Off	—	1
7	Pitch attitude	± 750	±2°	1
8	Roll attitude	±180°	±2°	1
9	Thrust of each engine	Full range	±2%	4
10	Flap position	Full range	±3°	2
11	Longitudinal acceleration	±1.0g	+0.02g	0.5
12	Undercarriage squat or tilt switch	On/Off	—	0.5
13	Thrust reverser stowed/deployed (each engine)	On/Off	—	4
14	Leading edge devices stowed/deployed	On/Off	—	2

FDRs – parameters, ranges, accuracy and recording intervals				
Item No.	**Parameter**	**Range**	**Accuracy – minimum recorder and readout**	**Maximum recording intervals (seconds)**
15	Angle of attack (if sensor fitted)	-20° to +40°	±1°	0.5

FDRs – parameters, ranges, accuracy and recording intervals				
Item	**Parameter**	**Range**	**Accuracy – minimum recorder and readout**	**Maximum recording intervals (seconds)**
16	Lateral acceleration	± 1.0g	±0.05g stabilised ±10% transient	0.25
17	Pitch trim	Full range	±1° or ±5% whichever is greater	2
18	Control column or pitch control surface position	Full range	±2°	1
19	Control wheel or roll control surface position	Full range	±2°	1
20	Rudder pedal or yaw control surface position	Full range	±2°	0.5

5.2 Data-link communications

5.2.1 Requirements

Where applicable the recorder must record the following;

a) data-link communication messages related to ATS communications to and from the aeroplane, including messages applying to the following applications:

(i) data link initiation;

(ii) controller-pilot communication;

(iii) addressed surveillance;

(iv) flight information;

(iv) as far as is practicable, given the architecture of the system, aircraft broadcast surveillance;

(v) as far as is practicable, given the architecture of the system, aircraft operational control data; and

(vi) as far as is practicable, given the architecture of the system, graphics

b) information that enables correlation to any associated records related to data link communications and stored separately from the aeroplane; and

c) information on the time and priority of data link communications messages, taking into account the system's architecture.

5.2.2 **Data-link recorders – information acquisition requirements**

The recorder must use a digital method of recording and storing data and information and a method for retrieving that data. The recording method must allow the data to match the data recorded on the ground.

5.2.3 **Data-link recorders – information retention requirement**

The recorder must be capable of retaining data recorded for at least the same duration as set out for CVRs.

5.2.4 **Data-link recorders – water location requirement**

The recorder must have a device to assist in locating it in water.

5.2.5 **Data-link recorders – information retention requirements**

The requirements applicable to the start and stop logic of the recorder are the same as the requirements applicable to the start and stop logic of the CVR.

5.2.6 **General**

As a means of compliance with regulation CASR *121.505*, the recorder on which the data link messages are recorded may be

a) the CVR;

b) the FDR;

c) a combination recorder; or

d) a dedicated flight recorder.

In that case, the operational performance requirements for this recorder should be those laid down in EUROCAE Document ED-112 *(Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems)* dated March 2003, including amendments No 1 and No 2, or any later equivalent standard produced by EUROCAE.

5.2.7 The operator should enable correlation by providing information that allows an accident investigator to understand what data was provided to the aeroplane

and, when the provider identification is contained in the message, by which provider.

5.2.8 The timing information associated with the data link communications messages required to be recorded should be capable of being determined from the airborne-based recordings. This timing information should include at least the following:

a) the time each message was generated;

b) the time any message was available to be displayed by the crew;

c) the time each message was actually displayed or recalled from a queue; and

d) the time of each status change;

e) The message priority should be recorded when it is defined by the protocol of the data link communication message being recorded.

5.2.9 The expression “taking into account the system architecture”, in paragraph *5.2.1(c)* above, means that the recording of the specified information may be omitted if the existing source systems involved would require a major upgrade. The following should be considered:

a) the extent of the modification required;

b) the down-time period; and

c) equipment software development.

The intention is that new designs of source systems should include this functionality and support the full recording of the required information.

5.2.10 Data link communications messages that support the applications in Table 10 below should be recorded.

5.2.11 Further details on the recording requirements can be found in the recording requirement matrix in Appendix D.2 of EUROCAE Document ED-93 (Minimum Aviation System Performance Specification for CNS/ATM Recorder Systems, dated November 1998).

Table 10

Data-link communications messages			
No.	**Application type**	**Application description**	**Required recording content**
1	Data link initiation	This includes any application used to log on to, or initiate, a data link service. In future air navigation system (FANS)-1/A and air traffic navigation (ATN), these are ATS facilities notification (AFN) and context	C

Data-link communications messages			
No.	**Application type**	**Application description**	**Required recording content**
2	Controller/pilot communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and air traffic controllers. In FANS-1/A and ATN, this includes the controller pilot data link communications (CPDLC) application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	C

Data-link communications messages			
No.	**Application type**	**Application description**	**Required recording content**
3	Addressed surveillance	This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data. In FANS-1/A and ATN, this includes the automatic dependent surveillance-contract (ADS-C) application.	C, F2
4	Flight information	This includes any application used for delivery of flight information data to specific aeroplanes. This includes for example, digital automatic terminal information service (D-ATIS), data link operational terminal information service (D-OTIS), digital weather information services (D-METAR or TWIP), data link flight information service (D-FIS), and Notice to Airmen (electronic NOTAM) delivery.	C
5	Aircraft broadcast surveillance	This includes elementary and enhanced surveillance systems, as well as automatic dependent surveillance-broadcast (ADS-B) output data.	M*, F1

Data-link communications messages			
No.	**Application type**	**Application description**	**Required recording content**
6	Aeronautical operational control (AOC) data	This includes any application transmitting or receiving data used for AOC purposes (in accordance with the ICAO definition of AOC). Such systems may also process AAC messages, but there is no requirement to record AAC messages.	M*

Note: The letters and expressions in Table 10 have the following meaning:

C complete contents recorded.

M information that enables correlation with any associated records stored separately from the aeroplane.

* Applications that are to be recorded only as far as is practicable, given the architecture of the system.

F1 where parametric data sent by the aeroplane, such as Mode S, is reported within the message, it should be recorded unless data from the same source is recorded on the FDR.

5.2.12 The definitions of the applications type in Table 10 are described in Table 11.

Table 11

Data-link communications messages			
#	**Application type**	**Messages**	**Comments**
1	CM		CM is an ATN service
2	AFN		AFN is a FANS 1/A service
3	CPDLC		All implemented up and downlink messages to be recorded.
4	ADS-C	ADS-C reports Position reports	All contract requests and reports recorded. Only used within FANS 1/A. Only used in oceanic and remote areas.
5	ADS-B	Surveillance data	Information that enables correlation with any associated records stored separately from the aeroplane.

Data-link communications messages			
#	**Application type**	**Messages**	**Comments**
6	D-FIS		D-FIS is an ATN service. All implemented up and downlink messages to be recorded.
7	TWIP	TWIP messages	Terminal weather information for pilots.
8	D-ATIS	ATIS messages	Refer to EUROCAE Document ED-89A dated December 2003. Data Link Application System Document (DLASD) for the 'ATIS' Data Link Service.
9	OCL	OCL messages	Refer to EUROCAE Document ED-106A dated March 2004. Data Link Application System Document (DLASD) for 'Oceanic Clearance' Data
10	DCL	DCL messages	Refer to EUROCAE Document ED-85A dated December 2003. Data Link Application System Document (DLASD) for 'Departure Clearance' Data Link Service
11	AOC	Aeronautical operational control messages	Messages exchanged in the framework of procedures within the operational control. Information that enables correlation with any associated records stored separately from the aeroplane. Definition in EUROCAE Document ED-112, dated March 2003.
12	Surveillance	Downlinked aircraft parameters (DAP)	As defined in ICAO Annex 10 Volume IV (Surveillance systems and ACAS).

Table 11: Definitions of applications types

AAC	Aeronautical administrative communications
ADS-B	Automatic dependent surveillance - broadcast
ADS-C	Automatic dependent surveillance - contract
AFN	Aircraft flight notification
AOC	Aeronautical operational control
ATIS	Automatic terminal information service
ATSC	Air traffic service communication
CAP	Controller access parameters
CPDLC	Controller pilot data link communications
CM	Configuration/context management
D-ATIS	Digital ATIS
D-FIS	Data link flight information service
D-METAR	Data link meteorological airport report
DCL	Departure clearance
FANS	Future Air Navigation System
FLIPCY	Flight plan consistency
OCL	Oceanic clearance
SAP	System access parameters
TWIP	Terminal weather information for pilots

5.3 Windshear warning systems

This chapter applies to aeroplanes that are turbine-engine aeroplanes other than propeller-driven aeroplanes.

5.3.1 Requirements

Aeroplanes manufactured after January 2, 1991; must be equipped with either an approved airborne windshear warning and flight guidance system, an approved airborne detection and avoidance system, or an approved combination of these systems.

5.3.2 Aircraft equipment requirements

Aeroplanes manufactured before January 3, 1991; must be equipped in accordance with one of the following requirements as applicable.

The makes/models/series listed below must be equipped with either an approved airborne windshear warning and flight guidance system, an approved airborne detection and avoidance system, or an approved combination of these systems:

a) A-300-600

b) A-310 - all series

c) A-320 - all series

d) B-737 - 300*, 400, and 500 series

e) B-747 - 400

f) B-757 - all series

g) B-767 - all series

h) F-100 - all series

i) MD-11 - all series; and

j) MD-80 series equipped with an EFIS and Honeywell-970 digital flight guidance computer

* Passenger transport operations only

5.3.3 All other aeroplanes not listed above must be equipped with as a minimum requirement, an approved airborne windshear warning system. These aeroplanes may be equipped with an approved airborne windshear detection and avoidance system, or an approved combination of these systems.

5.4 Automatic pilot systems

5.4.1 Automatic pilot system

Aeroplanes must be fitted with an automatic pilot system that has at least the following modes:

a) an altitude-hold mode;

b) a heading mode.

5.5 Global navigation satellite systems

5.5.1 General

An approved GNSS means a GNSS authorised by CASA or a recognised country NAA in accordance with:

a) (E)TSO-C129;

b) (E)TSO-C145;

c) (E)TSO-C146;

d) (E)TSO-C196; or

e) a multi-sensor navigation system that includes GNSS and intertial integration with a level of performance equivalent to a GNSS listed in (a) – (d).

5.5.2 Requirement

Aeroplanes must be fitted with at least 2 approved GNSS.

5.5.3 Use of approved GNSS

An aeroplane must use an approved GNSS for any of the following:

a) an approved RNAV instrument approach procedure (including missed approach);

b) a RNAV SID or RNAV STAR.

An approved GNSS may be used as a substitute or alternative means of navigation for the following navigational aids:

a) VOR;

b) DME;

c) VOR/DME;

d) NDB;

e) Outer marker;

f) Middle marker.

Before using an approved GNSS as a substitute or alternative means of navigation for a conventional navigational aid for terminal or approach phases of flight, the pilot in command must verify that:

a) the intended waypoints or procedures can be loaded from the navigation database by name;

b) manually entered waypoints are not used;

c) the navigation system will fly the procedure as published in authorised aeronautical information;

d) RAIM or other approved integrity monitoring is available.

5.5.4 Restrictions on use of approved GNSS

An approved GNSS must not be used for the following:

a) navigation using procedures advised by NOTAM as not authorised for use;

b) lateral navigation on localised-based courses (including back-courses) without reference to raw localised data.

5.5.5 Procedures for using approved GNSS for certain phases of flight

An approved GNSS may be used with data that has been manually entered into a database, only if the entries have been checked for accuracy by at least 2 flight crew members.

The pilot in command of an en route aeroplane must ensure that GNSS-derived position and tracking information obtained from manually entered data or supplied data is checked:

a) at, or before, each reporting point published in the AIP or designated by ATS; and

b) at, or before, each en route waypoint; and

c) at hourly intervals during area navigation; and

d) after the insertion of new data relating to the flight, such as a new flight plan or alteration of an existing flight plan.

The pilot in command of an en route aeroplane may use an approved GNSS as a navigation aid for an Oceanic or remote area phase of flight only if an appropriate en route prediction analysis conducted before the flight ensures that GNSS availability will provide a useable service.

5.6 Aeronautical databases

5.6.1 Computerised navigation system — databases

The data in the computerised navigation system's database must be:

a) current for the flight;

b) in a form that ensures the navigational information within the database cannot be changed;

c) for an Australian registered aircraft — supplied by a data service provider authorised for that purpose under *Part 175 of CASR*.

5.7 Radio communication equipment

5.7.1 Radio communication equipment

At least one of the items of radio communication equipment must be capable of continuous communication with ATS on all frequencies necessary to meet reporting, broadcast and listening watch requirements.

The aeroplane must be fitted with:

a) 2 VHF radio communication systems; or

b) 1 VHF radio communication system and 1 HF radio communication system.

A HF radio communication system must be fitted to an aeroplane when flown beyond the range of VHF coverage and must only be used for communication with ATS in these circumstances.

5.8 Transponders and surveillance equipment

5.8.1 Transponders and surveillance equipment to be fitted

The aeroplane must be fitted with 2 approved Mode S transponders with ADS-B OUT.

5.8.2 Operation of transponders

An approved transponder must be operated at all times, except when ATC issues an instruction that the transponder is not to be operated.

Only one transponder is to be operated at any time.

The Mode A transponder code must be set to the code assigned by ATC for the flight, or to the relevant standard code if no transponder code is assigned.

5.8.3 Specific requirements

An approved Mode S transponder with ADS-B OUT fitted to an aeroplane must be configured as follows:

a) the assigned aircraft address must be entered into the equipment;

b) the aircraft identified mentioned in the flight notification or aircraft registration mark must be entered into the equipment.

An approved Mode S transponder with ADS-B OUT must have receiving and transmitting antennae that are:

a) located in the upper and lower fuselage;

b) 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.

5.9 In-flight communications systems

5.9.1 Crew intercommunications

The crew member interphone system must:

a) operate independently of the public address system except for handsets, headsets, microphones, selector switches and signalling devices;

b) provide two-way communication between ground personnel and at least two flight crew members. This interphone system for use by the ground personnel should be, where practicable, so located that the personnel using the system may avoid detection from within the aeroplane;

c) be readily accessible for use from each flight crew station.

5.9.2 Crew intercommunications-flights with at least one cabin crew member

In the case of aeroplanes where at least one cabin crew member will be required for the flight by regulation *121.875*, the crew member interphone system must also:

a) be readily accessible for use at required cabin crew member stations close to each separate or pair of floor level emergency exits;

b) have an alerting system incorporating aural or visual signals for use by flight and cabin crew;

c) have a means for the recipient of a call to determine whether it is a normal call or an emergency call that uses one, or a combination, of the following:

(i) lights of different colours;

(ii) codes defined by the operator (e.g. different number of rings for normal and emergency calls); or

(iii) any other indicating signal specified in the exposition;

d) provide two-way communication between:

(i) the flight crew compartment and each passenger compartment;

(ii) the flight crew compartment and each galley located other than on a passenger deck level;

(iii) the flight crew compartment and each remote crew compartment and crew member station that is not on the passenger deck and is not accessible from a passenger compartment;

5.9.3 Passenger public address system

The public address system must:

a) operate independently of the interphone systems except for handsets, headsets, microphones, selector switches and signalling devices;

b) be readily accessible for immediate use from each required flight crew station;

c) have, for each floor level passenger emergency exit that has an adjacent cabin crew seat, a microphone operable by the seated cabin crew member, except that one microphone may serve more than one exit, provided the proximity of exits allows unassisted verbal communication between seated cabin crew members;

d) be operable within 10 seconds by a cabin crew member at each of the stations in (c); and

e) be audible at all passenger seats, toilets, galleys, cabin crew seats and work stations, and other crew remote areas.

5.10 Oxygen equipment and supplies

This chapter sets out the requirements for flights above 10 000ft to be fitted with supplemental oxygen equipment and also sets out the amount of supplemental oxygen to be carried.

5.10.1 Pressurised aeroplanes

The requirements for supplemental oxygen equipment for aeroplanes are as follows:

a) an aeroplane flown above 10 000 ft but not above flight level 250 must be equipped with supplemental oxygen equipment capable of storing and dispensing the amount of oxygen required by this chapter; or

b) an aeroplane flown above flight level 250, must be fitted with supplemental oxygen equipment that meets the following requirements:

(i) the equipment must be immediately available to each cabin crew member and passenger on the flight, wherever seated;

(ii) the equipment must have at least 10% more dispensing units ***(the extra units)*** than the number of passenger and cabin crew seats on the aeroplane;

(iii) the extra units must be evenly distributed throughout the aeroplane's passenger compartments.

5.10.2 The requirements for supplemental oxygen equipment in the passenger compartments mentioned in 5.10.1 b)(i), in aeroplanes in which the certificate of airworthiness was first issued after 9 November 1998 are as follows:

a) for aeroplanes flown above flight level 250; or

b) for aeroplanes flown above flight level 130 and not above flight level 250 but cannot descend safely within 4 minutes to flight level 130; then

c) the supplemental oxygen equipment mentioned in 5.10.1 b)(i) above must be automatically deployable.

5.10.3 Oxygen masks intended for use by flight crew must be within immediate reach of a flight crew member who is in a flight crew station.

5.10.4 If the aeroplane is flown above flight level 250, one of the following requirements must be met:

a) each oxygen mask for a flight crew station must be a quick donning mask; or

at least one pilot who is in a flight control seat must wear and use an oxygen mask while the aeroplane is flown above flight level 250.

5.10.5 ***A quick donning mask*** is a type of mask that:

a) can be placed on the face from its ready position, properly secured, sealed and supplying oxygen upon demand, with one hand and within 5 seconds and will thereafter remain in position, both hands being free;

b) can be donned without disturbing eye glasses and without delaying the flight crew member from proceeding with assigned emergency duties;

c) once donned, does not prevent immediate communication between the flight crew members and other crew members over the aircraft intercommunication system; and

d) does not inhibit radio communications.

5.10.6 **Pressurised aeroplanes-amount of supplemental oxygen-occupants of flight crew stations and cabin crew**

When an aeroplane begins a flight to which Division 121.K.7 applies, it must be carrying the amount of supplemental oxygen as required by Table 12 below.

Table 12

Supplemental oxygen – Pressurised aeroplanes – flight and cabin crew			
Item No.	**If during flight**	**the aeroplane must carry sufficient supplemental oxygen to supply**	**for the following period:**
1	both: (a) the aeroplane's cabin pressure altitude exceeds 10 000 ft; and (b) the aeroplane's altitude does not exceed flight level 250	each occupant of a flight crew station	the greater of the following: (a) 30 minutes (*Note 1*) (b) the period while the aeroplane's cabin pressure altitude exceeds 10 000 ft (*Note 3*)
2	both: (a) the aeroplane's cabin pressure altitude exceeds 10 000 ft; and (b) the aeroplane's altitude exceeds flight level 250	each occupant of a flight crew station	the greater of the following: (a) 2 hours (*Note 2*); (b) the period while the aeroplane's cabin pressure altitude exceeds 10 000 ft *(Note 3)*
3	both: (a) the aeroplane's cabin pressure altitude exceeds 10 000 ft for more than 30 minutes (the first 30 minutes); and (b) the aeroplane's cabin pressure altitude does not exceed flight level 130	each cabin crew member required for the flight by regulation 121.880 (Number of cabin crew)	the period, after the first 30 minutes, while the aeroplane's cabin pressure altitude exceeds 10 000 ft
4	the aeroplane's cabin pressure altitude exceeds flight level 130	each cabin crew member required for the flight by regulation 121.880 (Number of cabin crew)	the greater of the following: (a) 30 minutes *(Note 1)*; (b) the period while the aeroplane's cabin pressure altitude exceeds flight level 130

Note 1: This amount shall cover the quantity of oxygen necessary for a constant rate of descent from the aeroplane's maximum certified operating altitude to 10 000 ft in 10 minutes and followed by 20 minutes at 10,000ft.

Note 2: This amount shall cover the quantity of oxygen necessary for a constant rate of descent from the aeroplane's maximum certified operating altitude to 10 000 ft in 10 minutes followed by 110 minutes at 10 000 ft.

Note 3: The oxygen supply for the protective breathing equipment for a flight crew member at his or her flight crew station (see section 5.6) may be from, and is not additional to, the amount of the aeroplane's supplemental oxygen supply required for the flight under item 1.

5.10.7 **Pressurised aeroplanes-amount of supplemental oxygen-passengers**

The amount of supplemental oxygen required for the flight is the total of the amounts required for the flight by Table 13 if an aeroplane is flown:

a) above flight level 250, or

b) above flight level 130 but not above flight level 250 and 5.10.8 does not apply.

5.10.8 The amount of supplemental oxygen required for the flight is as per 5.10.8.1 if an aeroplane is flown:

a) above flight level 130 but not above flight level 250; and

b) at all points along the route of the flight, the aeroplane is able to:

(i) descend safely to flight level 130 within 4 minutes; and

(ii) complete the planned flight or land at an aerodrome that is suitable for the aeroplane to land at.

5.10.8.1 If a flight meets the criteria set in 5.10.8 then the amount of supplemental oxygen required for the flight is either:

(i) the total of the amounts required for the flight by Table 13; or

(ii) an amount of supplemental oxygen that is sufficient to supply 10% of the passengers for the flight for the period while the aeroplane's cabin pressure altitude exceeds 10 000 ft but does not exceed flight level 130.

5.10.9 For the purpose of 5.10.8, the method of calculating the time to descend to FL130 should be established using an emergency descent profile that takes into account the following conditions:

a) 17 seconds' time delay for pilot's recognition and reaction, including mask donning, for trouble shooting and configuring the aeroplane for the emergency descent (emergency descent data/charts established by the aeroplane manufacturer and published in the aircraft flight manual (AFM); and

b) maximum operational speed (VMO) or the airspeed approved in the AFM for emergency descent, (emergency descent data/charts established by the aeroplane manufacturer and published in the AFM, whichever is the less.

Table 13

Supplemental oxygen – Pressurised aeroplanes – passengers			
Item No.	**If during flight**	**the aeroplane must carry sufficient supplemental oxygen to supply**	**for the following period:**
1	the aeroplane's cabin pressure altitude exceeds flight level 150	100% of passengers	the greater of the following: (a) 10 minutes; (b) the period while the aeroplane's cabin pressure altitude exceeds flight level 150 (*Note 1*)
2	the aeroplane's cabin pressure altitude exceeds flight level 140 but does not exceed flight level 150	30% of passengers	the period while the aeroplane's cabin pressure altitude exceeds flight level 140
3	both: (a) the aeroplane's cabin pressure altitude exceeds 10 000 ft for more than 30 minutes (the ***first 30 minutes***); and (b) the aeroplane's cabin pressure altitude does not exceed flight level 140	10% of passengers	the period, after the first 30 minutes, while the aeroplane's cabin pressure altitude exceeds 10 000 ft, but does not exceed flight level 140

passenger for the purposes of this chapter, means a flight crew member who is not in a flight crew station, however, does not include a flight crew member who is in a flight crew station and whose supplemental oxygen is provided form the flight crew's supplemental oxygen supply.

Note 1: This amount shall cover the quantity of oxygen necessary for a constant rate of descent from the aeroplane's maximum certified operating altitude to 15000 ft in 10 minutes.

5.10.10 **Pressurised aeroplanes-exposition-calculating amount of supplemental oxygen**

An aeroplane operator's exposition must include procedures for calculating the amount of supplemental oxygen required for a flight by tables 12 and 13, taking into account the following:

a) the cabin pressure altitude of the aeroplane for the route of the flight;

b) the aeroplane's descent profile;

c) the duration of the flight;

d) the assumptions mentioned in clause 5.10.11.

5.10.11 For paragraph 5.10.10 (d), the assumptions are that:

a) a cabin pressurisation failure will occur at the altitude or point in the flight that is most critical to oxygen need; and

b) after the failure:

(i) the aeroplane will descend, in accordance with the emergency procedures set out in the aircraft flight manual instructions for the aeroplane, to a safe altitude for the route to be flown and for the continued safe flight and landing of the aeroplane; and

(ii) the cabin pressure altitude will be the same as the aeroplane altitude.

5.10.12 **Non-pressurised aeroplanes - equipment**

A non-pressurised aeroplane must be equipped with supplemental oxygen equipment capable of dispensing the oxygen required for the flight by Table 14 (if any).

5.10.13 **Non-pressurised aeroplanes-exposition-calculating amount of supplemental oxygen**

When a non-pressurised aeroplane begins a flight to which Division 121.K.7 applies, it must be carrying the amount of supplemental oxygen as required by Table 14.

5.10.14 An aeroplane operator's exposition must include procedures for calculating the amount of supplemental oxygen required for a flight by Table 14, taking into account the altitude, duration and route of the flight and the number of passengers and crew carried on the flight.

Table 14

Supplemental oxygen – Non-pressurised aeroplanes – Amount required			
Item No.	**If during flight**	**the aeroplane must carry sufficient supplemental oxygen to supply**	**for the following period:**
1	both: (a) the aeroplane's altitude exceeds 10 000 ft for more than 30 minutes (the first 30 minutes); and (b) the aeroplane's altitude does not exceed flight level 130	the following: (a) each occupant of a flight crew station; (b) each cabin crew member required for the flight by regulation 121.880(Number of cabin crew); (c) 10% of the passengers for the flight	the period after the first 30 minutes while the aeroplane's altitude exceeds 10 000 ft
2	the aeroplane's altitude exceeds flight level 130	all persons on board the aeroplane	the period while the aeroplane's altitude exceeds flight level 130

5.11 Protective breathing equipment

5.11.1 **Protective breathing equipment (PBE) must be carried for the following:**

a) each flight crew member at his or her flight crew station;

b) portable PBE for one flight crew member;

c) portable PBE for the lessor of

(i) each cabin crew member required for the flight by regulation 121.880; or;

(ii) the number of fire extinguishers required for the flight by Table 16 – Number of handheld fire extinguishers for passenger areas.

Note: The portable PBE required in paragraph (b) may be included in the number required in paragraph (c) (or vice versa)

5.11.2 Protective breathing equipment (PBE) must protect the eyes, nose and mouth and to provide for a period of at least 15 minutes:

a) oxygen for each flight crew member on duty in the cockpit;

b) breathing gas for the cabin crew member; and

c) breathing gas from a portable PBE for one member of the flight crew in, or as close as practicable to, the cockpit.

5.11.3 PBE intended for flight crew use must be installed in the cockpit and be accessible for immediate use by each required flight crew member at his/her assigned station.

5.11.4 PBE intended for cabin crew use must be installed adjacent to each required cabin crew member station.

5.11.5 Aeroplanes must be equipped with portable PBEs installed adjacent to the hand fire extinguishers in the passenger compartment and in the crew rest compartment (if any), or adjacent to the entrance of the cargo compartment, in case the hand fire extinguisher is installed in a cargo compartment.

5.11.6 PBE, while in use, must allow the flightcrew to communicate using the airplane radio equipment and to communicate via the flight crew intercommunication system while at their assigned duty stations. The equipment, while in use, must also allow crewmember interphone communications between each of the two pilot seats and at least one normal flight attendant station in each passenger compartment.

5.11.7 The oxygen supply for the PBE in paragraph 5.11.1(a), may be from, and is not additional to, the amount of supplemental oxygen required for the flight by Table 12 (Pressurised aeroplanes-amount of supplemental oxygen-flight and cabin crew).

5.12 Emergency Locator Transmitters (ELTs)

The number and type of ELTs for a flight must be in accordance with the following table.

Table 15

Emergency locator transmitters		
Item No.	**Aircraft type**	**Quantity and type of emergency locator transmitters**
1	An aeroplane that: (a) has a maximum operational passenger seat configuration of more than 19; and (b) was first issued with a certificate of airworthiness on or after 1 July 2008	Two emergency locator transmitters, of which at least one must be an emergency locator transmitter that is automatically activated on impact
2	An aeroplane that: (a) has a maximum operational passenger seat configuration of not more than 19; and (b) was first issued with a certificate of airworthiness on or after 1 July 2008	One emergency locator transmitter that is automatically activated on impact

Emergency locator transmitters		
Item No.	**Aircraft type**	**Quantity and type of emergency locator transmitters**
3	An aeroplane that: (a) has a maximum operational passenger seat configuration of more than 19; and (b) was first issued with a certificate of airworthiness before 1 July 2008	Either: (a) one emergency locator transmitter that is automatically activated on impact; or (b) two emergency locator transmitters
4	An aeroplane that: (a) has a maximum operational passenger seat configuration of not more than 19; and (b) was first issued with a certificate of airworthiness before 1 July 2008	One emergency locator transmitter

5.13 Fire extinguishers

5.13.1 **Quantity and location - non-passenger areas**

At least one handheld fire extinguisher must be located in the following areas on the aeroplane:

a) the cockpit;

b) a crew rest compartment not located in a passenger compartment (if any).

5.13.2 At least one handheld fire extinguisher must be located immediately adjacent to each of the following areas on the aeroplane:

a) a Class A or Class B cargo or baggage compartment (if any);

b) a Class E cargo compartment that is accessible to crew members during a flight (if any).

5.13.3 At least one handheld fire extinguisher must be carried in or located immediately adjacent to a galley that is not on a deck in which passengers are carried (if any).

5.13.4 **Quantity and location - passenger areas**

The number and location of hand fire extinguishers should be such as to provide adequate availability for use, account being taken of the number and size of the passenger compartments, the need to minimise the hazard of toxic gas concentrations and the location of lavatories, galleys, etc. These considerations may result in a number of fire extinguishers greater than the minimum required.

5.13.5 The aeroplane must carry at least the number of handheld fire extinguishers calculated in accordance with Table 16 below for the aeroplane's passenger compartments.

5.13.6 At least one handheld fire extinguisher must be located in each of the aeroplane's passenger compartments, located near the cabin crew member's station, where provided.

5.13.7 Where two or more hand fire extinguishers are required in the passenger compartments and their location is not otherwise dictated, an extinguisher should be located near each end of the cabin with the remainder distributed throughout the cabin as evenly as is practicable.

5.13.8 If the passenger compartment includes a galley—at least one of the fire extinguishers must be located in the galley or immediately adjacent to it.

Table 16

Quantity of handheld fire extinguishers – passenger areas		
Item	**For an aeroplane with a maximum operational passenger seat configuration of**	**the number of handheld fire extinguishers is**
1	10 to 30	1
2	31 to 60	2
3	61 to 200	3
4	201 to 300	4
5	301 to 400	5
6	401 to 500	6
7	501 to 600	7
8	more than 600	8

5.13.9 **Extinguisher agents**

There should be at least one hand fire extinguisher installed in the cockpit and this should be suitable for fighting both flammable fluid and electrical equipment fires. Additional hand fire extinguishers may be required for the protection of other compartments accessible to the crew in flight. Dry chemical fire extinguishers should not be used in the cockpit, or in any compartment not separated by a partition from the cockpit, because of the adverse effect on vision during discharge and, if conductive, interference with electrical contacts by the chemical residues.

5.13.10 The following fire extinguishers (as required by Table 16) must contain halon 1211 or an equivalent extinguishing agent:

a) for an aeroplane with a maximum operational passenger seat configuration of more than 30 and not more than 60 - at least one extinguisher for use in each passenger compartment;

b) for an aeroplane with a maximum operational passenger seat configuration of more than 60 - at least 2 extinguishers for use in each passenger compartment.

5.13.11 For flights where at least one cabin crew member is required for the flight by regulation 121.875 (When cabin crew required), a fire extinguisher located in, or adjacent to, a galley, or a passenger compartment in which no cabin crew member is assigned to duty at a cabin crew duty station, must not contain water.

5.13.12 **Other requirements**

The handheld fire extinguisher must be located and installed in accordance with the following requirements:

a) the fire extinguisher must be located in a manner that enables it to be readily accessible to a person who is intended to, or likely to, use it;

b) the fire extinguisher must be installed in accordance with:

(i) the recommendations (if any) of the aeroplane manufacturer; and

(ii) the recommendations of the manufacturer of the fire extinguisher.

c) the fire extinguisher must not be located or installed in a manner that may facilitate an accidental discharge of its contents;

d) the fire extinguisher must not be located or installed in a manner that restricts access to other equipment.

5.13.13 If the fire extinguisher is located in or immediately adjacent to an area in which a crew member or passenger is carried, any hazard that may be caused by toxic gas concentration from the use of the fire extinguisher must be minimised.

5.14 Medical equipment

5.14.1 **Number of first aid kits for a flight**

The aeroplane must carry at least the number of first aid kits mentioned in column 2 for the aeroplane's maximum operational passenger seat configuration mentioned in column 1 of Table 17.

Table 17

Maximum operational passenger seat configuration	Quantity of first aid kits required
Less than 100	1
100 to 199	2
200 to 299	3
300 to 399	4
400 to 499	5
500 to 599	6
More than 599	7

5.14.2 A flight may commence with a reduced number of first aid kits mentioned in the above table if:

e) the flight departs from an aerodrome where the kit may not be reasonably replaced;

f) sufficient supplies are available in the remaining first aid kits with consideration to the number of passengers boarded for the flight; and

g) the first aid kits are replenished to the number required in Table 17 at the first available aerodrome where they can be reasonably replenished.

5.14.3 **Location and other requirements**

If the aeroplane is carrying only one first aid kit - the first aid kit must be located such that it is readily accessible in the event of an emergency evacuation of the aeroplane.

5.14.4 If the aeroplane is carrying more than one first aid kit - the first aid kits must be distributed evenly throughout the aeroplane.

CHAPTER 6: (SUBPART 121.N – Flight crew)

Note:

Subpart 121.N of CASR refers to Initial Training and Conversion Training. The Part 121 TWG provided feedback to CASA to re-consider the use of these terms as they are potentially confusing to industry.

As these terms are used across Parts 119/121/133/135 of CASR, CASA has left these labels in place and will consider this matter further post public consultation.

As an explanation for industry, CASA has provided additional explanation of these terms in the accompanying Part 121 AMC/GM document.

6.1 Initial training

The initial training course will introduce the flight crew members to the company operations as well as general emergency procedures and equipment training. Initial training should also include any ground training courses required to support the operators scope of operations.

6.1.1 General fire and smoke training

General fire and smoke training must include the following aspects:

a) an emphasis on the responsibility of flight crew to deal promptly with emergencies involving fire and smoke and, in particular, emphasis on the importance of identifying the actual source of the fire;

b) the classification of fires and the appropriate type of extinguishing agents and procedures for particular fire situations;

c) the techniques of application of extinguishing agents, the consequences of misapplication, and of use in a confined space including practical training in fire-fighting and in the donning and use of smoke protection equipment used in aviation;

d) the effects of smoke in an enclosed area and actual use of all relevant equipment in a simulated smoke-filled environment

e) the general procedures of ground-based emergency services at aerodromes.

6.1.2 Water survival training

A comprehensive drill to cover all ditching procedures where flotation equipment is carried should include:

a) practice of the actual donning of a life-jacket and boarding a life raft, conducted using the life raft equipment in water. In addition to this, a demonstration or audio- visual presentation of the inflation of life-rafts and/or slide-rafts and associated equipment where applicable;

b) post-accident survival techniques; and

c) swimming proficiency.

6.1.3 General survival training

Survival information appropriate to their areas of operation (e.g. polar, desert, jungle or sea) and training in the use of any survival equipment required to be carried.

6.1.4 First aid training

Instruction on general first-aid for flight crew operating flights where no cabin crew are carried on passenger transport operations should include:

a) air sickness;

b) gastro-intestinal disturbances;

c) hyperventilation;

d) burns;

e) wounds;

f) the unconscious;

g) fractures and soft tissue injuries;

h) travel health and hygiene (where appropriate or relevant to the operations), including:

   (i) hygiene on board;

   (ii) risk of contact with infectious diseases and means to reduce such risks;

   (iii) handling of clinical waste;

   (iv) aircraft disinfection; and

   (v) handling of death on board.

6.1.5 Position description and responsibilities training:

Position descriptions and responsibility training should include:

a) duties and responsibilities of flight crew during operations and the need to respond promptly and effectively to emergency situations;

b) continuing competence and fitness to operate as a flight crew member, including as regards flight and duty time limitations and rest requirements;

c) the importance of ensuring that relevant documents and manuals are kept up-to-date, with amendments provided by the operator as applicable;

d) the importance of flight crew performing their duties in accordance with the exposition of the operator; and

e) the importance of the flight crew's pre-flight briefing and the provision of necessary safety information with regards to their specific duties.

6.1.6 **Dangerous goods training**

Dangerous goods training must be In accordance with *Part 92. See AC 92-01(1)* and *AC 92-03(0).*

6.1.7 **Training in the effects of hypoxia**

The training must deal with the physiological effects of flying with particular emphasis on hypoxia, oxygen requirements, Eustachian tubal function and barotraumas.

6.1.8 **Training in human factors (HF) principles and non-technical skills (NTS)**

In accordance with *Part 119 of CASR.* See CAAP SMS-3(1).

6.2 Conversion training

For regulation 121.795, conversion training comprises the operator specific standard operating procedures or any other procedures as mentioned in the operator's exposition. Conversion training consists of two components: ground training and flight training other than Part 141 or 142 flight training. The training syllabus required in the course may be catered to allow for different levels of previous experience with the operator or on the aeroplane type.

Ground training

6.2.1 Ground training shall be comprised of an organised program of ground instruction supervised by training staff with adequate facilities, including any necessary audio, mechanical and visual aids. Self-study using appropriate electronic learning aids, computer-based training (CBT), etc., may be used with adequate supervision of the standards achieved. However, if the aircraft concerned is relatively simple, unsupervised private study may be adequate if the operator provides suitable manuals and/or study notes.

6.2.2 Complex air transport training must include operator specific procedures such as UPRT, EDTO, PRM, LVO, LAHSO, and RNP AR etc as required.

6.2.3 Relevant training must include the emergency and safety equipment for the aeroplane type as prescribed in this Manual of Standards.

6.2.4 Where passengers are carried training should include the preparation of passengers for normal and emergency situations for the aeroplane type.

6.2.5 For operations where no cabin crew are required, training must include passenger handling. Other than general training on dealing with people, emphasis should be placed on the following:

(1) passenger briefing/safety demonstrations;

(2) advice on the recognition and management of passengers who appear or are intoxicated with alcohol, or under the influence of drugs;

(3) methods used to motivate passengers and crowd control necessary to expedite an aircraft evacuation; and

(4) the practical importance of correct seat allocation with reference to aircraft mass and balance. Emphasis should also be given on the seating of special categories of passengers.

6.2.6 The course of ground training must incorporate formal tests on matters such as load control, aircraft performance and flight planning, where applicable.

Flight training

6.2.7 If the operator holds a Part 141 or 142 authorisation to conduct flight training on an aeroplane of a type, relevant elements of conversion training may be conducted concurrent with the type rating flight training.

6.2.8 If the operator does not hold a Part 141 or 142 authorisation to conduct flight training on an aeroplane of a type, flight crew must hold a Part 61 qualification for the aeroplane of a type before commencing conversion training.

6.2.9 Flight training must include the operators specific standard operating procedures including any operational approvals the operator holds for the kind of aeroplane.

6.2.10 Flight training can be tailored to suit particular duties assigned to the flight crew member.

6.2.11 In planning flight training, appropriate emphasis should be placed on HF and NTS and the use of crew coordination procedures, including coping with incapacitation.

6.2.12 Flight training must satisfy UPRT training requirements for the kind of aeroplane.

6.2.13 Flight training must satisfy the operator that the flight crew member, whether previously qualified or not on the aeroplane type, meets their proficiency standards.

6.2.14 Initial command training may be done in conjunction with the transition training requirements for the kind of aeroplane.

6.2.15 Normally, the same training and practice in the flying of the aeroplane should be given to co-pilots as well as commanders.

6.3 Recurrent training

Each flight crew member shall complete recurrent flight training relevant to the aeroplane of the kind on which they operate. The recurrent training shall incorporate the competency standards of the initial grant of the type or class rating training as prescribed by the CASR Part 61 Manual of Standards, as well as the training needs identified through the operator's SMS.

6.3.1 Initial conversion training shall include all the recurrent training and checking for an aeroplane kind as required by Subpart 121.N.

6.3.2 The flight training must be conducted in an approved flight simulator or in the aircraft and the program must consist of the following:

a) normal and abnormal procedures;

b) system failures and associated procedures;

c) upset prevention and recovery training; and

d) other training requirements specified in the training and checking manual.

6.3.4 When engine-out manoeuvres are carried out in an aircraft, the engine failure should be simulated.

6.3.5 The recurrent flight training may be combined with the proficiency check.

6.3.6 For the training mentioned in 6.3.2(b) above, the training must be organised such that all major failures of aeroplane systems and associated procedures must be covered in a 4-year period. Major systems failures (e.g. Electrical, Hydraulic, Fuel, Pressurisation) may be identified by the operator to be covered more regularly, depending on feedback data from SMS or FDAP.

Note: Aeroplane systems referred to in this section are systems that have checklist procedures mentioned in the aeroplane flight manual (QRH).

6.4 Part 121 proficiency check

The Part 121 Proficiency Check must comply with the professional level flight tolerance standards for the aeroplane as prescribed in Table 2 and Table 5, Chapter 8 of the Part 61 Manual of Standards.

6.4.1 For the tolerance standards mentioned above, a sustained deviation outside of the applicable flight tolerance is not permitted.

6.4.2 The proficiency check for a pilot in command or a co-pilot must include the following:

a) the check must check the proficiency of the pilot in carrying out duties in relation to the flying of the aeroplane while acting as part of a normal flight crew for the aeroplane during an IFR flight;

b) after the aeroplane has taken off and before reaching the specified landing minima for landing, the pilot must perform the check by reference only to the flight deck instruments;

c) the check must include the following manoeuvres as pilot flying:

(i) rejected take-off when an approved flight simulator is available to represent that specific aeroplane, otherwise touch drills only;

(ii) take-off with engine failure between V1 and V2 (take-off safety speed) or, if carried out in an aeroplane, at a safe speed above V2;

(iii) 3D instrument approach to minima with one-engine-inoperative;

(iv) 2D instrument approach to minima (if applicable);

(v) missed approach on instruments from minima with one-engine-inoperative;

(vi) landing with one-engine-inoperative or simulated engine inoperative if conducted in the aeroplane;

(vii) a resolution advisory event must be conducted within the previous 2 years.

Note: For (c)(i), a co-pilot is only required to perform this manoeuvre as pilot monitoring and must perform their duties as specified by the AFM.

d) the flight crew member must satisfactorily demonstrate their knowledge of the flight rules and the operator's procedures in relation to an IFR flight.

e) if the commander will be required to operate the aeroplane in both the left-hand and right-hand pilot's seats (for training/checking or acting as a co-pilot), then within the last 12 months in addition to the checks in (c):

(i) the pilot must also perform the following in the right-hand pilot's seat:

1) a take-off with engine failure carried out in accordance with paragraph 6.4.2(c)(ii);

2) an approach and go-around with one engine inoperative; and

3) a landing with one engine inoperative.

6.4.3 For subparagraph 6.4.2(c)(ii) and subparagraph 6.4.2(e)(ii)(1), a take-off with engine failure must be carried out immediately after the person carrying out the check considers that the aeroplane has reached a point during take-off when it is safe for the manoeuvre to be carried out and:

a) if the aeroplane operator or the aeroplane operator's training and checking organisation is required to use an approved flight simulator for an aeroplane of that aircraft type rating - in the flight simulator at a simulated speed between V1 and V2;

b) if paragraph (a) does not apply:

(i) if a V1 for the aeroplane has been determined by its manufacturer - by means of a simulated engine failure between V1 and V2;

(ii) if subparagraph (i) does not apply - by means of a simulated engine failure.

6.4.4 For subparagraph 6.4.2(c)(vii), a resolution advisory event must be carried out:

a) if the aeroplane operator or the aeroplane operator's training and checking organisation is required to use an approved flight simulator for the aeroplane - in the flight simulator;

b) if paragraph (a) does not apply-by the use of computer-based training equipment stated in the operator's training and checking system manual.

6.4.5 If the co-pilot will be delegated the conduct of the flight by the pilot in command, in flight above FL200, then the proficiency check must also include drills and procedures stated in the operator's training and checking manual (if any) for which only the pilot in command would normally be responsible for.

6.4.5 Cruise relief co-pilot

Pilots who are only rated with a cruise-relief co-pilot type rating for the aeroplane will be assessed in normal, non-normal and emergency procedures in the climb, cruise and descent phases at flight levels above FL200. All procedures must be flown only by reference to flight deck instruments.

6.4.6 Flight Engineer

Flight Engineer proficiency checks must check the competency of the flight engineer in accordance with Appendix W.2, Section W, Schedule 5 of the Part 61 Manual of Standards Flight Engineer type rating flight test.

6.5 Annual training and checking

For the purpose of annual training programs, syllabi and the conduct of training and checking on emergency equipment and safety equipment, *emergency equipment* and *safety equipment* are defined in subsection 1.4 of Part 1 of the MOS.

6.5.1 Every year the emergency and safety equipment training program must include the following:

a) actual donning of a life-jacket, where fitted;

b) actual donning of protective breathing equipment, where fitted;

c) instruction and actual handling of fire extinguishers of the type used;

d) instruction on the location and use of all emergency and safety equipment required to be carried in the aircraft;

e) the operation and actual opening of all normal and emergency exits, including the associated procedures, for passenger evacuation;

f) instruction on the location, contents and use of universal precautions kits, first-aid and emergency medical kits (where applicable);

g) stowage of articles in the cabin (for flights where no cabin crew are carried);

h) incident and accident reviews in relation to safety and emergency equipment; and

i) human factors principles and non-technical skills.

6.5.2 Training for each piece of equipment should be based on the following, if applicable:

a) general description;

b) use;

c) location(s);

d) pre-flight serviceability check(s);

e) removal from stowage;

f) operation;

g) conditions for operation;

h) operational limitations and duration of use;

i) precautions for use.

6.5.3 Safety and emergency equipment mentioned in 6.1(d) may include, but is not limited to items such as:

a) axe;

b) protective gloves;

c) smoke goggles;

d) portable oxygen equipment (bottles, passenger mask, full face mask, flight deck oxygen mask);

e) emergency flashlight;

f) megaphone;

g) survival kit;

h) installed/portable emergency signalling system (e.g. beacon, emergency locator transmitter, radio locator beacon);

i) any other equipment relevant to the duties of a flight crew member (including any additional equipment suited to the likely environment e.g. arctic gear);

j) Additionally, for flights where no cabin crew are carried:

(i) adult/child and infant life jackets, or other individual flotation device;

(ii) baby survival cots;

(iii) child restraint systems;

(iv) extension seat belt;

(v) restraining devices.

6.5.4 Training on the operation of normal and emergency doors/exits must cover failure of power assist systems where fitted and other door/exit failures. This must include the actions and forces required to operate and deploy evacuation slides.

6.5.6 Emergency and safety equipment training should, as far as practicable, include joint practice in aircraft evacuations procedures with cabin crew so that all who are involved are aware of the duties other crew members should perform. When such practice is not possible, combined cabin crew and flight/technical crew training should include joint discussion of emergency scenarios.

6.5.7 Emergency and safety equipment training should, as far as practicable, take place in conjunction with cabin crew undergoing similar training with emphasis on coordinated procedures and two-way communication between the flight crew compartment and the cabin.

6.6 3 Yearly training and checking

6.6.1 Every 3 years the recurrent training program must also include the following:

a) instruction or demonstration of the method to operate a slide, where fitted;

b) fire-fighting drills using all firefighting equipment, including protective clothing, representative of that carried in the aircraft;

c) instruction or demonstration of the effects of smoke in an enclosed area;

d) actual handling of pyrotechnics and other survival signalling equipment, real or simulated, where applicable;

e) a demonstration in the use of the life-rafts where fitted, including training on actual equipment (wet or dry).

CHAPTER 7: (Subpart 121.P –Cabin crew)

Note:

Subpart 121.P of CASR refers to Initial Training and Conversion Training. The Part 121 TWG provided feedback to CASA to re-consider the use of these terms as they are potentially confusing to industry.

As these terms are used across Parts 119/121/133/135 of CASR, CASA has left these labels in place and will consider this matter further post public consultation.

As an explanation for industry, CASA has provided additional explanation of these terms in the accompanying Part 121 AMC/GM document.

7.1 General English language proficiency

7.1.1 Unit description

This unit describes the general English language proficiency standard that applies to cabin crew members.

7.1.2 Elements and performance criteria

General communication - the person is able to demonstrate her or his ability to do the following:

a) pronounce words clearly, using an accent that does not cause difficulties in understanding;

b) convey information in clearly structured sentences without confusion or ambiguity;

c) use an extensive vocabulary to accurately communicate on general and technical topics, without excessive use of jargon, slang or colloquial language;

d) speak fluently without long pauses, repetition or excessive false starts;

e) respond to communications with actions that demonstrate that the information has been received and understood;

f) exchange information clearly in a variety of situations with both expert and non-expert English speakers while giving and receiving timely and appropriate responses;

g) use appropriate techniques such as questioning, non-verbal communication and paraphrasing to validate communications.

7.1.3 Range of variables

English proficiency applies to:

a) oral and written communications;

b) aviation technical learning environment and context; and

c) face-to-face situations.

7.1.4 Evidence required

A person meets the standard for this unit if they provide the following evidence:

a) an assessment report, completed by a person authorised by the operator to perform general English language assessments, that states the candidate satisfies the general English language proficiency elements prescribed above; and

b) one of the following:

(i) is currently receiving or has received secondary education in an Australian or New Zealand educational institution in which the principle language of instruction is English;

(ii) completed a minimum of 3 years in a course that is at least the equivalent of an Australian secondary education in an educational institution in a country where 1 of the principal mediums of instruction was English;

(iii) has worked in Australia or New Zealand for at least 3 of the 5 years immediately before commencing employment as a cabin crew member for the operator;

(iv) has worked in 1 or more of the following countries for at least 3 of the 5 years immediately before commencing employment as a cabin crew member for the operator:

1) United Kingdom;

2) Republic of Ireland;

3) United States of America;

4) New Zealand;

5) Canada - providing that evidence of use of English language in the workplace is available.

c) completed at least 1 of the following general English proficiency tests with the minimum grade specified for the test:

(i) the International English Language Testing System (IELTS) General or academic training module overall grade of 5.5, with no individual grade in a paper lower than 5

(ii) the Test of English for International Communication (TOEIC-Secure Program Public Testing Centre) with grades not less than the following:

1) 350 for listening;

2) 300 for reading;

3) 160 for speaking;

4) 140 for writing.

(iii) the Test of English as a Foreign Language internet-based test (TOEFL IBT) with a grade of not less than 71

(iv) the Test of English as a Foreign Language computer-based test (TOEFL CBT) with a Grade of not less than 197

(v) the Test of English as a Foreign Language paper based test (TOEFL PB) with a grade of not less than 530.

7.2 Senior cabin crew member

7.2.1 The senior cabin crew member training course shall cover at least the following elements:

a) pre-flight briefing:

(i) operating as a crew;

(ii) allocation of cabin crew stations and responsibilities;

(iii) consideration of the particular flight, aircraft type, equipment, area and type of operation and special categories of passengers with emphasis on passengers with disabilities or reduced mobility, infants and stretcher cases.

b) co-operation within the crew:

(i) discipline, responsibilities and chain of command;

(ii) importance of co-ordination and communication;

(iii) pilot incapacitation.

7.2.2 **Activity overview**

The senior cabin crew member will be required to be familiar with and manage the following activities:

a) review of operator requirements and legal requirements;

b) passenger briefing, safety briefing cards;

c) securing of galleys;

d) stowage of cabin baggage;

e) electronic equipment;

f) procedures when fuelling with passengers on board;

g) consideration of unserviceable equipment;

h) turbulence;

i) documentation;

j) handling medical emergencies; and

k) accident and incident events, including the following:

(i) participation in the operator's reporting programme (hazards, incidents, accidents, both voluntary and mandatory occurrence reporting)

(ii) duties and responsibilities specific to the Senior cabin crew, including documentation

(iii) a review of relevant (aircraft type and operation) incident/accident cases.

7.2.3 **Human factors principles and non-technical skills.**

Flight and duty time considerations and rest requirements including the following:

a) application of operator's flight and duty time limitations;

b) awareness of the operator's fatigue risk management programme;

c) rest requirements (i.e. in-flight and ground rest);

d) physiological aspects of fatigue and fatigue countermeasures. (e.g. basics of fatigue, sleep fundamentals, the effect of disturbing the circadian rhythms, the cause of fatigue and the effects on performance, the influence of lifestyle including nutrition and exercise, sleep disorders, the effects of long range operations, heavy short range schedules, operating through and within multiple time zones, the crew responsibilities, etc.);

e) operator's procedures related to allocation of in-flight crew rest where applicable and the need to remind cabin crew members on their responsibility to be well rested prior to duty;

f) the importance of re-considering cabin crew working positions in case a cabin crew member reports fatigue before take-off or during the flight;

g) fatigue reporting.

7.3 Training facilities and devices

7.3.1 The operator should establish training methods that take into account the following:

a) training should include the use of cabin training devices, audio-visual presentations, computer-based training and other types of training, as most appropriate to the training element;

b) a reasonable balance between the different training methods should be ensured so that the cabin crew member achieves the level of proficiency necessary for a safe performance of all related cabin crew duties and responsibilities.

7.3.2 General space requirements

In planning for space requirements, consideration should be given to the following:

a) the trainee work stations;

b) the area required for hands-on exercises;

c) the instructor work stations; and

d) the storage area.

7.3.3 Classroom facilities

The size of classrooms is dependent on the following:

a) number of trainees in a class;

b) trainee work station size;

c) class configuration;

d) size of aisles;

e) use of media (in particular projected media); and

f) hands-on exercises (if applicable).

7.3.4 The uses of media and hands-on exercises are important factors when determining the amount of common space required in a classroom. The most commonly used visual media are marker boards, projectors, PowerPoint presentations, video monitors and easels. The use of media (slides, TV, virtual simulations, etc.) should be taken into consideration when selecting a learning environment.

7.3.5 Use of instructional aids

Instructional aids include the use of computer-based training (CBT). CBT may encompass the use of CD-ROMs as well as web-based training (commonly referred to as eLearning). Instructional aids can be used in a classroom setting or as part of distance learning.

Note: For the use of CBT, see the preliminary section of this MOS.

7.3.6 Representative training devices

Representative training devices include:

a) safety and emergency equipment;

b) cabin training devices;

c) emergency exit trainers;

d) facilities used for fire-fighting and water survival training.

7.3.7 Cabin training devices

Cabin Training Devices (CTDs) that are capable of recreating realistic situations can be used to provide effective training on safety and abnormal/emergency procedures. When applicable, a mock-up or simulator should be used to enable realistic simulation of cabin crew's duties without continuous need for use of actual aircraft.

7.3.8 CTDs should include parts of the cabin containing lavatories, galleys, a type of emergency exit used in an aircraft, some seat rows, cabin crew seats, attendant panels and overhead bins. It should be noted that not all of the components presented in this section may be needed in a single, stand-alone CTD. These may be found in separate devices. Components included in a CTD depend on the types of hands-on exercises that are carried out on a particular device (e.g. fire-fighting simulated exercise). For the purposes of emergency procedures training, CTDs should be able to create an environment which may not be created in a classroom (e.g. filling the cabin with smoke).

7.3.9 The following components/items should be representative of those found on an aircraft:

a) dials, handles, switches, restraint brackets, and mounting devices to be operated and the force required for their operation;

b) the weight of emergency exit hatches;

c) the direction of movement, associated forces and travel of all controls for all equipment, including the weight of emergency exits when operated without power assist, where applicable;

d) stowage and location of safety and emergency equipment secured with representative brackets or mounting devices.

7.3.10 If CTDs are not available, or do not meet the criteria specified in 7.3.9, training may be covered through other means.

7.3.11 A CTD used for cabin crew training should include the following features, according to the applicable scenario:

a) safety and emergency equipment currently required on an aircraft in locations and the restraint brackets representative of those installed on an aircraft;

b) aircraft systems relevant to cabin crew duties representative of those installed on an aircraft, including but not limited to:

(i) operational cabin call chimes (aural and visual indicators);

(ii) cabin crew communications equipment and associated control panels, including an operational public address/intercom system and appropriate attendant panel(s) at the cabin crew station;

(iii) normal and emergency cabin lighting, including fail features;

(iv) deployable oxygen masks for passenger and cabin crew.

c) internal cabin markings, such as placards and exit markings;

d) emergency exit(s);

e) a flight deck door and related-security features;

f) operational ordinance signs visible from each passenger seat and cabin crew station/seat;

g) seat dimensions and seat pitch;

h) simulated cabin windows and features necessary to darken the cabin;

i) facilities and sufficient speakers to simulate sound effect/crash noises audible throughout the cabin;

j) smoke simulation capabilities.

7.3.12 A CTD used for emergency evacuation training should include the following features, according to the applicable scenario:

a) dimensions and layout of the cabin that are representative of an aircraft in relation to emergency exits, galley areas and safety and emergency equipment stowage;

b) cabin crew and passenger seat positioning that is representative to that on an aircraft, with particular accuracy for seats immediately adjacent to exits;

c) capability to operate exits in normal and emergency modes – particularly in relation to method of operation and forces required to operate them;

d) width, height and angle of inflated evacuation slides;

e) a minimum of two operational emergency exits (one door and one alternate exit or two doors, as applicable) – plus one operational window exit (where applicable). CTDs may be equipped with exits representative of more than one aircraft type. However, where possible, consideration should be given

to ensure the same exit device is opposite e.g. two B747 doors opposite each other as opposed to one B747 and one A330 door;

f) at least one cabin crew station located at an operational exit, and additional cabin crew stations depending on the grouping of exits contained in the trainer;

g) cabin crew stations and the associated attendant panel(s) that are representative of an aircraft;

h) simulation of an unserviceable exit(s);

i) simulation of hazards at emergency exits (e.g. obstacle, fire, water).

7.3.13 **Emergency exit trainer**

The operator may provide training to cabin crew members on an emergency exit trainer instead of on an actual aircraft. The emergency exit trainer must:

a) replicate the size, weight and operating characteristics of the exit of the aircraft type on which the cabin crew member will operate; (e.g. direction of movement of handles); and

b) be designed so that the representative exit can be operated in normal and emergency modes, particularly in relation to method of operation and forces required to operate them.

7.3.14 When a representative training device does not replicate the actual aircraft exit operating characteristics, any differences between the operating characteristics of the actual aircraft exits and those of the emergency exit trainer must be highlighted during training.

7.3.15 Differences in exit operating characteristics between actual aircraft exits and the emergency exit trainer can be of critical importance during an emergency evacuation, especially as this may lead the cabin crew members to an incorrect assessment of the serviceability of the exit and/or to incorrectly operate that exit. When a representative training device does not replicate the actual aircraft exit operating characteristics, any differences between the operating characteristics of the actual aircraft exits and those of the emergency exit trainer should be highlighted during training.

7.3.16 Fire-fighting

A simulated fire-fighting exercise should be conducted in a confined area, to simulate cabin fire, and under the supervision of an instructor. The device used for a simulated fire-fighting exercise should include aircraft furnishings as found on board an aircraft, such as seats, galley units, lavatories, panels, overhead bins and waste bins. Fire-fighting equipment and the restraints used should be representative to those installed on an aircraft with respect to weight, dimensions, controls, types and operations.

7.3.17 Fire extinguishers used for live fire-fighting should be charged with the appropriate agent or with an environmentally friendly agent.

7.3.18 Water survival

When the operator is required to conduct wet drills, these should be carried out in a body of water or pool of sufficient depth to realistically perform the simulated exercise.

7.3.19 A life raft exercise should be conducted using life-saving equipment that is representative to that installed on the aircraft with respect to weight, dimensions, appearance, features and operation. The rafts may be substituted if the equipment used is similar with respect to weight, dimensions, appearance, and features. In such cases, training must address any differences in the operation of the raft.

7.3.20 Use of other operator or Approved Training Organisation (ATO) training devices.

7.3.21 Where an operator arranges to use training devices owned by another operator, or by an approved training organization (ATO), the training must comply with the approved training programme and operating procedures of the operator whose crew are being trained.

7.3.22 If significant differences exist in terms of cabin layout and equipment, such training should be restricted accordingly.

7.4 Initial Training

7.4.1 The goal of initial training is to provide cabin crew trainees with sufficient general knowledge on basic aviation subjects so that they may have a more comprehensive understanding of aircraft operations. It allows cabin crew trainees to develop better situational awareness and improves inter-crew communication thus enhancing over-all safety and improving the integration of cabin crew with the flight crew members and other aviation personnel. It is also an opportunity for the cabin crew member to be introduced to emergency procedures training relative to the aviation environment.

7.4.2 General fire and smoke training shall include the following:

a) emphasis on the responsibility of cabin crew to deal promptly with emergencies involving fire and smoke and, in particular, emphasis on the importance of identifying the actual source of the fire;

b) the importance of informing the flight crew immediately, as well as the specific actions necessary for coordination and assistance, when fire or smoke is discovered;

c) the necessity for frequent checking of potential fire-risk areas including toilets, and the associated smoke detectors;

d) the classification of fires and the appropriate type of extinguishing agents and procedures for particular fire situations;

e) the techniques of application of extinguishing agents, the consequences of misapplication, and of use in a confined space including practical training in fire-fighting and in the donning and use of smoke protection equipment used in aviation;

f) the effects of smoke in an enclosed area and actual use of all relevant equipment in a simulated smoke-filled environment;

g) the general procedures of ground-based emergency services at aerodromes.

7.4.3 Water survival training

A comprehensive drill to cover all ditching procedures if the flotation equipment is required to be carried for a flight. This should include, where applicable:

a) practice of the actual donning of a life-jacket and boarding a life raft, conducted using the life raft equipment in water. In addition to this, a demonstration or audio-visual presentation of the inflation of life-rafts and/or slide-rafts and associated equipment;

b) post-accident survival techniques; and

c) swimming proficiency.

7.4.4 General survival training

Survival information appropriate to their areas of operation (e.g. polar, desert, jungle or sea) and training in the use of any survival equipment required to be carried.

7.4.5 First aid training

The First aid training must be conducted by an appropriately qualified person and include the care of:

a) air sickness;

b) gastro-intestinal disturbances;

c) hyperventilation;

d) burns;

e) wounds;

f) the unconscious;

g) fractures and soft tissue injuries:

(i) the use of appropriate equipment including first-aid oxygen, first-aid kits, universal precautions kits and emergency medical kits and their contents.

(ii) practical cardio-pulmonary resuscitation training by each cabin crew member and taking account of the characteristics of an aircraft environment; and

(iii) travel health and hygiene, including:

1. hygiene on board
2. risk of contact with infectious diseases and means to reduce such risks
3. handling of clinical waste
4. aircraft disinfection
5. handling of death on board; and
6. alertness management, physiological effects of fatigue, sleep physiology, circadian rhythm and time zone changes.

7.4.6 Training for passenger handling

The training for passenger handling must include:

a) the importance of correct seat allocation with reference to aeroplane mass and balance, special categories of passengers and the necessity of seating able-bodied passengers adjacent to unsupervised exits;

b) rules covering the safe stowage of cabin baggage and cabin service items and the risk of it becoming a hazard to occupants of the passenger compartment or otherwise obstruction or damaging emergency equipment or exits;

c) advice on the recognition and management of passengers who are, or become, intoxicated with alcohol or are under the influence of drugs or are aggressive;

d) precautions to be taken when live animals are carried in the passenger compartment;

e) duties to be undertaken in the event of turbulence, including securing the passenger compartment; and

f) methods used to motivate passengers and the crowd control necessary to expedite an emergency evacuation.

7.4.7 Training in effective communication

During training, emphasis must be placed on the importance of effective communication between cabin crew and flight crew or passengers, including communication techniques, common language and terminology.

7.4.8 Position description and responsibilities training

Position descriptions and responsibility training must include:

a) duties and responsibilities of cabin crew during operations and the need to respond promptly and effectively to emergency situations;

b) applicable aviation regulations;

c) continuing competence and fitness to operate as a cabin crew member, including as regards flight and duty time limitations and rest requirements;

d) the importance of ensuring that relevant documents and manuals are kept up-to-date, with amendments provided by the operator as applicable;

e) the importance of cabin crew performing their duties in accordance with the exposition of the operator;

f) the importance of the cabin crew's pre-flight briefing and the provision of necessary safety information with regards to their specific duties; and

g) the importance of identifying when cabin crew members have the authority and responsibility to initiate an evacuation and other emergency procedures.

7.4.9 Dangerous goods training

Dangerous Goods training in accordance with *Part 92 of CASR*.

7.4.10 **Training in the effects of hypoxia**

The physiological effects of flying with a particular emphasis on hypoxia, oxygen requirements, Eustachian tubal function and barotraumas.

7.4.11 **Training in human factors principles and non-technical skills**

Training in HF and NTS must be in accordance with Part 119 of CASR.

7.5 Conversion training

For the initial conversion training for an operator, any of the following training items already covered in the initial training requirements will not have to be repeated.

7.5.1 The following training elements must be covered as relevant to the aircraft type:

a) fire and smoke protection equipment;

b) each cabin crew member shall receive realistic and practical training in the use of all fire-fighting equipment, including protective clothing (including PBE) representative of that carried in the aircraft; and

c) each cabin crew member shall receive training on the drills for fire-fighting procedures.

7.5.2 **Operation of doors and exits:**

This training should be conducted in a representative training device or in the actual aircraft and shall include failure of power assist systems where fitted and the action and forces required to operate and deploy evacuation slides. Training shall also include operation and actual opening of the flight crew compartment security door when installed.

7.5.4 **Evacuation slide training:**

The following activities are required to complete evacuation slide training:

a) each cabin crew member shall descend an evacuation slide from a height representative of the aircraft main deck sill height;

b) the slide should be fitted to a representative training device or to the actual aircraft;

c) a further descent shall be made when the cabin crew member subsequently qualifies on an aircraft type in which the main deck exit sill height is significantly higher than any aircraft type previously operated (e.g. B737 to B747/B777).

7.5.5 **Procedures for dealing with emergency situations, including crowd control**

Training shall be provided on the practical aspects of passenger preparation and handling, as well as crowd control, in various emergency situations as applicable to the operator's specific aircraft cabin configuration, and shall cover the following:

a) communications between flight crew and cabin crew and use of all communications equipment, including the difficulties of coordination in a smoke-filled environment;

b) verbal commands;

c) the physical contact that may be needed to encourage people out of a door/exit and onto a slide;

d) redirection of passengers away from unusable doors/exits;

e) mustering of passengers away from the aircraft;

f) evacuation of special categories of passengers with emphasis on passengers with disabilities or reduced mobility;

g) authority and leadership.

7.5.6 Operation of equipment related to pilot incapacitation

The training shall cover any type specific elements or conditions relevant to cabin crew actions to be taken in case of pilot incapacitation. Each cabin crew member should be trained to operate all equipment that must be used in case of pilot incapacitation.

7.5.7 Safety and emergency equipment and aircraft systems installed

Each cabin crew member shall receive realistic training on, and demonstration of, the location and use of all aircraft type specific safety and emergency equipment and aircraft systems installed, with emphasis on the following:

a) life jackets, infant life jackets and flotation devices;

b) first-aid and drop-out oxygen, including supplementary systems;

c) fire extinguishers and protective breathing equipment (PBE);

d) crash axe or crowbar;

e) emergency lights including torches;

f) communication equipment, including megaphones;

g) slide rafts and life rafts' survival packs and their contents;

h) pyrotechnics (actual or representative devices);

i) first-aid kits, universal precaution kits, emergency medical kits and their contents;

j) all other portable and/or fixed safety and emergency equipment, where applicable.

7.5.8 Normal and emergency procedures

Each cabin crew member shall be trained on the operator's normal and emergency procedures as applicable, with emphasis on the following:

a) passenger briefing, safety demonstration and cabin surveillance;

b) severe air turbulence;

c) non–pressurisation, slow and sudden decompression, including the donning of portable oxygen equipment by each cabin crew member;

d) other in-flight emergencies.

7.5.9 **Aircraft description**

The following description of the aircraft and components is required:

a) type of aircraft, principal dimensions, narrow or wide bodied, single or double deck;

b) passenger seating capacity;

c) flight crew number and minimum number of required cabin crew;

d) cabin doors/exits location and sill height;

e) cargo and unpressurised areas as relevant;

f) aircraft systems relevant to cabin crew duties;

g) flight crew compartment - general presentation, pilot seats and their mechanism, emergency exits, storage;

h) required cabin crew stations;

i) flight crew compartment security - general: door components and use;

j) access to avionics bay where relevant;

k) lavatories - general: doors, systems, calls and sign;

l) least risk bomb location;

m) description of the cabin configuration including:

(i) required and additional cabin crew stations - location (including direct view), restraint systems, control panels;

(ii) passenger seats - general presentation and associated operator's specific features and equipment;

(iii) designated stowage areas;

(iv) lavatories - operator's specific features, equipment and systems additional to the aircraft type specific elements;

(v) galley - location, appliances, water and waste system, including shut-off, sinks, drains, stowage, control panels, calls and signs.

n) crew rest areas - location, systems, controls, safety and emergency equipment (when applicable);

o) cabin dividers, curtains, partitions (when applicable);

p) lift location, use, controls (when applicable);

q) stowage for the containment of waste (when applicable);

r) passenger hand rail system or alternative means (when applicable).

7.6 Annual training and checking

7.6.1 For the purpose of training programmes, syllabi and the conduct of training and checking on equipment, ***safety equipment*** and ***emergency equipment*** have been defined in the Preliminary section of this MOS.

7.6.2 Every year the emergency and safety equipment training programme must include the following where applicable:

a) actual donning of a life-jacket;

b) actual donning of protective breathing equipment;

c) instruction and actual handling of fire extinguishers of the type used;

d) instruction on the location, use and handling of all emergency and safety equipment carried in the aircraft;

e) the operation and actual opening of all normal and emergency exits, including the associated procedures, for passenger evacuation;

f) instruction on the location, use and handling of universal precautions kits, first-aid and emergency medical kits;

g) stowage of articles in the cabin;

h) incident and accident review;

i) human factors principles and non-technical skills.

7.6.3 Training for each piece of equipment shall be based on the following, if applicable:

a) general description;

b) use;

c) location(s);

d) pre-flight serviceability check(s);

e) removal from stowage;

f) operation;

g) conditions for operation;

h) operational limitations and duration of use;

i) precautions for use (including under adverse conditions);

j) post-use procedures (including relocation of equipment, if applicable).

7.6.4 Safety and emergency equipment mentioned in 7.6.2(d) may include, but is not limited to items such as:

a) portable fire extinguishers;

b) axe;

c) protective gloves;

d) smoke goggles;

e) protective breathing equipment (***PBE***);

f) portable oxygen equipment (bottles, passenger mask, full face mask, flight deck oxygen mask);

g) emergency flashlight;

h) megaphone;

i) adult/child and infant life jackets, or other individual flotation device;

j) baby survival cots;

k) survival kit;

l) installed/portable emergency signalling system (e.g. beacon, emergency locator transmitter, radio locator beacon);

m) child restraint systems;

n) extension seat belt;

o) restraining device;

p) first-aid kit, universal precaution kit, and medical kit;

q) automated external defibrillator and associated equipment (CPR masks, shields, resuscitator bags, etc.);

r) any other equipment (including any additional equipment suited to the likely environment e.g. arctic gear).

7.6.5 Training on the operation of normal and emergency doors/exits must cover failure of power assist systems where fitted and other door/exit failures. This should include the actions and forces required to operate and deploy evacuation slides, and additional training when relevant for cabin crew members responsible for a pair of doors/exits.

7.6.6 Emergency and safety equipment training shall, as far as practicable, include joint practice in aircraft evacuations procedures with flight crew so that all who are involved are aware of the duties other crew members should perform. When such practice is not possible, combined cabin crew and flight/technical crew training should include joint discussion of emergency scenarios.

7.6.7 Emergency and safety equipment training shall, as far as practicable, take place in conjunction with flight/technical crew undergoing similar training with emphasis on coordinated procedures and two-way communication between the flight crew compartment and the cabin.

7.7 3 Yearly training and checking

7.7.1 In addition to the requirements for annual training, every 3 years the recurrent training programme must include the following:

a) instruction or demonstration of the method used to operate a slide where fitted;

b) fire-fighting drills using all firefighting equipment, including protective clothing, representative of that carried in the aircraft;

c) instruction or demonstration of the effects of smoke in an enclosed area;

d) actual handling of pyrotechnics and other survival signalling equipment, real or simulated, where applicable;

e) demonstration on the use of life-rafts where fitted, including training on actual equipment (wet or dry);

f) training to assist an incapacitated pilot.

CHAPTER 8: (Subpart 121.V – Emergency evacuation procedures)

8.1 Emergency evacuation procedures

8.1.1 **Requirements**

Emergency evacuation procedures must assume that the aeroplane is carrying the number of passengers that corresponds to the aeroplane's maximum operational passenger seating configuration.

8.1.2 The emergency evacuation procedures must include procedures for evacuations:

a) on the ground; and

b) in water.

8.1.3 The operator's emergency evacuation procedures must ensure that the certification standards for evacuation (if any) of the aeroplane can be met.

8.2 Demonstrations

8.2.1 A partial demonstration of emergency evacuation procedures may be required by CASA (under 27AD of the Civil Aviation Act) in the following circumstances:

a) initial introduction of a type and model of aeroplane;

b) changing the number, location or emergency evacuation duties or procedures of crew members;

c) changing the number, location, type of emergency exits or type of opening mechanism on emergency exits available for evacuation;

d) upon a major change in passenger cabin interior configuration that will affect the emergency evacuation of passengers.

8.3 Purpose of the demonstration

8.3.1 The purpose of the exercise is for the operator to demonstrate to CASA the effectiveness of the proposed aircraft evacuation procedures and training of cabin crews.

8.3.2 In order to satisfy CASA in this matter, in this exercise the operator will be required to:

a) demonstrate the ability of cabin crew to recognise and react to a simulated emergency situation by operating appropriate emergency exits in compliance with timing requirements for a partial evacuation demonstration exercise;

b) demonstrate the system of initiating and managing an emergency evacuation in simulated conditions using cabin crew procedures;

c) demonstrate the ability of cabin crew to assess and brief passengers seated in unattended emergency exit rows to ensure that the passengers operate the exits in a manner appropriate to the simulated emergency situation; and

d) demonstrate the cabin crew procedures and associated training would ensure the simulated evacuation of passengers.

8.3.3 While CASA will be observing and validating, the exercise itself will be planned, coordinated and conducted by the operator.

8.4 Timing criteria

8.4.1 The evacuation demonstration exercise will be assessed against the timing performance criteria contained in the FAA Document 8900.1, Volume 3-General Technical Administration, Chapter 30-Emergency Evacuation and Ditching Demonstrations, Section 3-Aborted Take-off Demonstration Procedures. For the purpose of this exercise, CASA accepts the timing criteria for exit availability as outlined by the FAA. Otherwise, the evacuation demonstration must be assessed against:

a) the timing criteria detailed in the original certification of the aircraft type as acceptable by CASA for the purpose of this exercise; or

b) where no timing criteria has previously been specified, the timing criteria agreed to by CASA.

8.4.2 The demonstration of floor level exit operation must result in the designated exits being opened within the specified timeframe of the evacuation signal being delivered.

8.4.3 (Where applicable) The deployment and inflation characteristics of the escape slides are specified in Title 14 of the Code of Federal Regulations (14 CFR) and 25.810 and are referenced in Technical Standard Order (TSO) C69c. CASA has determined that the inflation of slides is not material to the demonstration and the effective availability of exits can be calculated in conjunction with timing of the door opening sequence.

8.4.4 For the purposes of this exercise, that is the point at which the door latches against the fuselage indicates the door being opened with appropriate momentum to deploy and commence inflation of the escape slide.

8.4.5 (Where actual timings are not being used) FAA Document 8900.1 Volume 3 General Technical Administration Chapter 30 Emergency Evacuation and Ditching Demonstrations Section 3 Aborted Take-off Demonstration Procedures records the timing criteria for floor level exit availability as 15 seconds from the completion of the evacuation command.

8.4.6 In order that the application of the timing criterion referenced above is clear to all parties: for the purpose of this exercise, the operator cabin crew using the documented procedures in the exposition must ensure that on all useable doors the door opening is completed up to the point the gust lock engages within the agreed timeframe from the completion of the evacuation command.

8.4.7 In the advent that only one exit is used the following timings for the Type 1 doors will apply:

a) Example: The extension of stairs contacting the ground of the forward left hand door within the agreed timeframe of the evacuation signal;

b) Example: The door latched onto the fuselage on the forward right hand side and [simulated] slides being available for use within the agreed timeframe of the evacuation signal.

8.4.8 If the assessment requires the operation of a pair of floor level exits by a single cabin member, the second exit must be opened within an agreed timeframe from the initial signal. The figures will be calculated by:

a) the timings recorded at the certification evacuation demonstration for the time taken from the initial evacuation signal until the crew member reached the door.

b) as the cabin crew member will already be out of their seat and standing after operating the first door, three seconds of time taken to conduct the initial actions for opening the second exit will be subtracted from the total allocated time.

c) therefore a total of the time mentioned in paragraph (a), minus 3 seconds is calculated as the stipulated period of time in which the designated exits must be opened with simulated slide and/or stair availability (where applicable).

8.4.9 Type III (over-wing) exit operation will be undertaken by persons (‘passengers’) selected and briefed according to the operator’s procedures and should be opened and removed onto the wing within 15 seconds.

8.4.10 Prior to the exercise the operator will agree with CASA on the coordination of the timing processes to ensure the accurate timing of the exercise. In the event of any disparity in timing between CASA and the operator, CASA will rely on the timing conducted by CASA personnel.

8.5 Relevant information

8.5.1 While CASA will be observing and validating, the exercise itself will be planned, coordinated and conducted by the operator in order to demonstrate the adequacy of their procedures and training.

8.5.2 The range of experience of cabin crew participating in the exercise should approximate that of a standard cabin crew complement. The cabin crew must be representative of a normal line operating crew. The available cabin crew list including names, position & length of service should be provided to CASA one week prior to the exercise.

8.5.3 Cabin crew taking part in the exercise must receive only the level of training afforded to all cabin crew in order the exercise can provide evidence that the training received by the 'average' cabin crew member is adequate for the cabin crew to conduct relevant duties appropriately. Accordingly, the participating cabin crew must not include any cabin crew trainer or instructor.

8.5.4 CASA has no objection to other cabin crew or training personnel being present as observers provided they take no part in the exercise.

8.5.5 The operator must not provide any further training and/or rehearsal of the exercise to any participating cabin crew unless the operator incorporates such training and/or rehearsal as the ongoing standard for all cabin crew.

8.5.6 Based on the conditions outlines immediately above, the performance standard achieved during the exercise will be deemed a representation of the knowledge, skills, proficiency and attitudes of the operator cabin crew members.

8.5.7 A briefing of participants including CASA should be conducted by the operator, prior to the commencement of the exercise. The briefing must cover the requirements of the exercise together with the safety, OH&S, and non-normal aspects of the demonstration.

8.5.8 Cabin crew should be briefed that they are to take part in an exercise to demonstrate the efficacy of procedures and training. It should be emphasised to cabin crew that while the exercise is a simulation, they are to treat the exercise as a live test of procedures and training.

8.5.9 CASA acknowledges that the operator must brief cabin crew members on the non-normal aspects of the exercise including the indication for exit availability, the doors remaining disarmed and the power assist not engaging, however cabin crew must not be specifically informed they are to take place in an evacuation demonstration.

8.5.10 Passengers taking part must be appropriately naïve that is, they must have no extra familiarity of the aircraft beyond that of an average passenger. Passengers must not be advised of the detail of the exercise in advance.

8.5.11 Passengers can be informed they are to take part in an exercise to demonstrate the efficacy of The operator' procedures and training and that some activity may take place which may require their active involvement, however they must not be specifically informed they are to take place in an evacuation demonstration.

8.5.12 (Where applicable) A minimum of eligible passengers as noted in the operator's procedures for the unattended exit capability segment should be available at each window exit.

8.5.13 The operator must not provide any further briefing and/or rehearsal other than the standard over-wing exit briefing detailed in the operations manual to any participating passengers unless the operator incorporates such briefing and/or rehearsal into the operations manual as the ongoing standard.

8.5.14 The operator must be responsible for the scheduling and conduct of briefings and de-briefings of participants and crew and must advise the details of such briefings to CASA prior to the exercise. CASA must attend all such briefings.

8.5.15 The operator must provide all equipment required for the exercise and will be responsible for making safe any aircraft equipment to be used in this exercise.

8.5.16 CASA personnel will provide their own equipment to record timing during the exercise.

8.5.17 CASA must advise the operator of the names of CASA staff to be in attendance during the exercise.

8.6 Performance criteria

8.6.1 A satisfactory exercise (pass) will be achieved when exits designated as useable are operated effectively and opened within the designated time period.

8.6.2 The exercise will be assessed as unsatisfactorily (fail) if any of the following occurs:

a) a cabin crew member or passenger opens an exit designated as unusable; or

b) a cabin crew member or passenger fails to open an exit designated as usable; or

c) the time from the initiation evacuation signal to a cabin crew member's primary exit being deemed ready for evacuation exceeds the agreed certified timeframe

Note: a cabin crew member must not move the door handle away from the closed position of a door exit designated as unusable)

8.6.3 CASA may declare the exercise invalid should any of the following occur:

a) CASA has reason to believe that the operator did not take all reasonable steps to ensure the cabin crew were unaware of the purpose of the exercise;

b) any of the operator's personnel, inadvertently or otherwise provides information to an operating cabin crew member about the usability of an exit prior to the initial "Evacuate" command.

8.6.4 Should the operator not succeed in the first attempt at the exercise, depending on the reason for the failure the operator may be permitted a second attempt at the discretion of CASA without the requirement for further training.

8.6.5 Should a second attempt be undertaken, a different cabin crew team and passengers seated in the exit rows will be required. As the flight crew's role in the evacuation is limited, they may be used on a second attempt.

8.6.6 Should the operator not succeed in the second attempt, the operator will be required to investigate the circumstances and plan a further exercise at a later date.

8.7 Aircraft environment

8.7.1 The aircraft seating and relevant cabin fixtures (inclusive of emergency equipment documented as installed at the cabin crew station) are to be configured as described in the operator's exposition. CASA will conduct a cabin inspection prior to the commencement of the exercise to ensure the equipment is installed as documented in the exposition.

8.7.2 The operator will be responsible for making safe any automatic devices at exits. The operator must ensure all doors/slides remain disarmed for the exercise.

8.7.3 If the exercise is to be conducted in a hangar, the hangar lighting is to be adjusted to ensure a reduced light environment in the cabin. If the exercise is to be conducted in an area other than a hangar, the operator must take adequate steps such as the closure of aircraft window shades to ensure a reduced light environment is reproducible in the cabin.

8.7.4. Ground power should be provided to the aircraft.

8.7.5. Steps (where applicable) should be in position at all floor level exits.

8.7.6. No crew member or passengers will leave the aircraft during the course of the exercise.

8.8 Exit indicators

8.8.1 The operator must devise a method of indicating the usability of exits. With the agreement of CASA, the operator may use any reasonable means to identify a simulated exterior hazard which renders the exit unusable.

8.8.2 Past experience has indicated that operators have successfully conveyed the usability of exits by assigning an 'Exit Indicator Person' to each aircraft exit, and the providing to each 'Exit Indicator Person' an indicator mechanism that is external to the aircraft. The method of indicating usability of exits must not be visible to crew inside the cabin prior to the signal to evacuate being given.

8.8.3 The cabin crew and the passengers in the over-wing emergency exit rows should be given a familiarisation of the manner in which exit availability is to be indicated during pre-exercise briefings. Cabin crew members and passengers should be able to determine whether or not to use the exit in a simulated emergency situation from the information provided in the pre-exercise briefings.

8.8.4 To prevent cabin crew or passenger pre-conditioning as to which exits are available the CASA coordinator will nominate exit availability during the simulated taxiing of the aircraft.

8.9 Additional requirements

8.9.1 The operator must be responsible for the logistics and planning of the exercise. The operator must assume responsibility for the safety of all personnel involved in the exercise. The operator must provide all necessary personnel including a coordinator, safety marshal/s and persons to indicate exit availability to participants. The operator's coordinator should liaise closely with the CASA coordinator for the purposes of the exercise. The safety marshal/s should be empowered to terminate the exercise using an appropriate signalling method.

8.9.2 The operator must devise an audible termination signal in order the exercise can be halted quickly to prevent risk of harm to participants or equipment. Past experience has demonstrated that a portable air horn provides an audible termination signal which can be heard above the noise of evacuation commands.

8.9.3 During the briefings detailed in section 5 of this document, participants must be informed of the audible termination signal to be used in the event that the exercise is terminated on safety grounds. The role and responsibilities of the safety marshals should be emphasised.

8.9.4 Operating cabin crews should be in uniform. Other staff and CASA observers should wear high visibility vests. Passengers should be casually dressed.

8.10 Conducting the exercise

8.10.1 Flight crew members should board the aircraft. Service interphone communication with the ground is recommended. If service interphone communication with the ground is unavailable appropriate flight deck to ground communications should be established.

8.10.2 Cabin crews should board the aircraft and commence the normal pre-flight duties ready for passenger embarkation.

8.10.3 CASA timekeepers and the operator's staff/ observers/ monitors should board and assume positions in the aircraft.

8.10.4 When the cabin is ready for boarding, the passengers should board the aircraft and take up pre-assigned seats in the over-wing emergency exit rows.

8.10.5. The exit row seats should be occupied by the number of passengers proposed in the operator's exposition (e.g. a minimum of 2 passengers per exit row per side is required).

8.10.6 The CASA coordinator will disembark the aircraft and the main entry door to the aircraft should be closed. This is the signal which indicates that the cabin is correctly set up and ready to continue.

8.10.7 Inside the aircraft cabin crew should continue with their normal pre take off duties as per SOPs however the operator must ensure that all slides are disarmed.

8.10.8 The pre-flight safety briefings including the safety demonstration should be conducted according to standard operating procedures. When the final check of the cabin is complete, the Cabin Manager (however called) should make the standard 'cabin ready' signal to the Captain. On receipt of this advice, the Captain should give his/her introductory PA. When the captain's PA is complete, the captain should advise the operator ground personnel by headset that the aircraft is "Ready". This triggers the dimming of hangar lights, if required.

8.10.9 In order to assist cabin crew and passengers participating in the exercise to achieve situational awareness, the PIC should make standard PAs and provide situational cues in the way of announcements at appropriate intervals.

Note: For example, 'undergoing push back', 'engine start-up' or 'taxi-ing out').

8.10.10 While the aircraft is undergoing a simulated taxi, the CASA coordinator will move around the outside of the aircraft and signal to each to "Exit Indicating Person' indicate whether each exit is to be useable or not. Every effort will be made by all parties to ensure the operating cabin crew and passengers are not made aware of the useability of the exits at this time. To ensure there is no confusion, the Exit Indicator Person will confirm the useability or not of the exit back to the CASA Coordinator

8.10.11 The PIC should continue with the simulated taxi, announcing that the aircraft has commenced lining up on the runway and take-off roll. For the benefit of this scenario, at this point a simulated collision occurs with another aircraft and the Captain will immediately call for the aircraft to be evacuated via the PA using the operator unprepared evacuation procedures. To be clear, there must be no "Alert" phase during the simulated scenario. Timing parameters require cabin crew to be seated at their station with their harness on when the signal to evacuate is given.

8.10.12 Immediately prior to commencement of the "Evacuate" commands, the PIC/Co-pilot should take action that results in the failure of the cabin lighting (such as advising ground personnel to disconnect ground power) and the illumination of the emergency lighting.

8.10.13 Each CASA timekeeper will commence timing upon the completion of when the Captain delivers the evacuation signal. That is, timing would then commence once the operator's signal to evacuate has been announced.

8.10.14 Cabin crews and passengers will commence procedures for evacuation including observation of external conditions, commands and use of equipment.

8.10.15 Passengers at over-wing window exit rows will be expected to react according to requirements of the pre-flight safety briefings received from the cabin crew and in accordance with whether the exit is usable or unusable.

8.10.16 Immediately following the successful opening of the over-wing exits, the passengers at over-wing window exit rows will be reminded by Exit Indicator Persons outside the aircraft that they are NOT to leave by the over-wing exits and remain seated.

8.10.17 The cabin crew should continue to use evacuation procedures and commands until the operator's coordinator calls a halt to the exercise.

8.10.18 For each CASA time keeper timing will cease when either the exit door is fully opened and latched onto the fuselage and (where appropriate) at the exit door, extension of stairs contacts the ground (or both) and the over-wing exit is opened and removed.

8.10.19 At the completion of the exercise, the CASA team will adjourn to a private area to collate the outcomes and consider the relevant aspects of the exercise.

8.10.20 Following this the operator's coordinator should approach the CASA coordinator with an appropriate claim of compliance with the evacuation demonstration or acknowledge the failure of the exercise and request a second attempt, as applicable.

8.10.21 The operator should make available to CASA the cabin crew members and passengers for a short debriefing, if required.