Australian Government
Civil Aviation Safety Authority

ADVISORY CIRCULAR
AC 135-13 v1.2

Prescribed single-engine aeroplanes

File ref: D25/348404

September 2025

Acknowledgement of Country

The Civil Aviation Safety Authority (CASA) respectfully acknowledges the Traditional Custodians of the lands on which our offices are located and their continuing connection to land, water and community, and pays respect to Elders past, present and emerging.

Artwork: James Baban.

Advisory circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.

Advisory circulars should always be read in conjunction with the relevant regulations.

Audience

This advisory circular (AC) is relevant to pilots and operators conducting operations in prescribed single-engine aeroplanes (PSEA) that are required to comply with regulation 135.240 of the *Civil Aviation Safety Regulations* (CASR).

Purpose

The purpose of this AC is to provide guidance on compliance with the requirements of Chapter 8 of the Part 135 Manual of Standards (MOS) relating to the operation of PSEA.

For further information

For further information or to provide feedback on this AC, visit CASA's contact us page.

Unless specified otherwise, all subregulations, regulations, Divisions, Subparts and Parts referenced in this AC are references to the *Civil Aviation Safety Regulations 1998 (CASR)*.

Status

This version of the AC is approved by the National Manager, Flight Standards Branch.

> **Note:** Changes made in the current version are annotated with change bars.

Table 1: Status

Version	Date	Details
v1.2	September 2025	New section 3.11 providing advice on dealing with uncommanded engine acceleration events.
v1.1	December 2024	Significant new content added to section 2.2 summarising the rules of particular relevance to PSEA operations under Part 135. New section 2.3 added to summarise when the PSEA rules must be complied with during flights under the IFR and VFR.
v1.0	November 2021	Initial AC.

Contents

1 Reference material

1.1 Acronyms

The acronyms and abbreviations used in this AC are listed in the table below.

Table 2: Acronyms

Acronym	Description
AC	advisory circular
AFM	aircraft flight manual
AOCH	air operator certification handbook
ASETPA	approved single-engine turbine powered aeroplane
ATS	air traffic services
CAO	Civil Aviation Order
CAR	*Civil Aviation Regulations 1988*
CASR	*Civil Aviation Safety Regulations 1998*
FCU	*fuel control unit*
GAF	*graphical area forecast*
IFR	*instrument flight rules*
MOPSC	*maximum operational passenger seat configuration*
MOS	Manual of Standards
MTOW	maximum take-off weight
ONC	operational navigation chart
PSEA	prescribed single-engine aeroplane
RPT	regular public transport
SAR	search and rescue
SID	standard instrument departure
STAR	standard arrival route
STC	supplemental type certificate
TAC	type acceptance certificate
TAF	terminal area forecast
TC	type certificate
VFR	visual flight rules
VMC	visual meteorological conditions

Acronym	Description
WAC	world aeronautical chart

1.2 Definitions

Terms that have specific meaning within this AC are defined in the table below. Where definitions from the civil aviation legislation have been reproduced for ease of reference, these are identified by 'grey shading'. Should there be a discrepancy between a definition given in this AC and the civil aviation legislation, the definition in the legislation prevails.

Table 3: Definitions

Term	Definition
maximum operational passenger seating capacity	for an aircraft, means the maximum passenger seat capacity of the aircraft, excluding crew stations: a. approved by CASA for the operator of the aircraft: i for an operator that is not an Australian air transport operator—under regulation 201.030; or ii for an Australian air transport operator—as part of the approval of the operator's exposition under Part 119; and b. specified in the operator's operations manual (if any). **Note:** This note is not part of the legal definition. Readers are recommended to review CASA's guidance on the interpretation and practical application of this definition in the GM 135.005 entry in v2.5 of the Part 135 AMC/GM document[1].
maximum take-off weight	for an aircraft, means the maximum take-off weight for the aircraft permitted by: a. for an aircraft that is type certificated—the flight manual for the aircraft; or b. for an aircraft that is not type certificated: i if a document, published by the manufacturer of the aircraft setting out the operating limitations for the aircraft, specifies a weight—that document; or ii if the certificate of airworthiness for the aircraft specifies a different weight to the weight specified in the document mentioned in subparagraph (i)—the certificate of airworthiness for the aircraft; or iii if no weight is specified in the document mentioned in subparagraph (i) or in the certificate of airworthiness for the aircraft and the aircraft is a Part 103 aircraft in relation to which a statement of acceptance for the aircraft has been issued by a Part 103 ASAO in accordance with regulation 103.030—the weight specified in the statement of acceptance.
normal cruising speed	for an aeroplane or rotorcraft, means the speed stated in the flight manual for the aeroplane or rotorcraft as a normal cruising speed in International Standard Atmosphere conditions with all engines operating.
prescribed single-engine aeroplane	see regulation 135.240.

[1] The Part 135 AMC/GM v2.5 document is anticipated to be published in September or October 2025.

Term	Definition
	Note: Subregulation 135.240(3) of CASR refers to section 8.03 of the Part 135 MOS.
suitable forced landing area	see regulation 135.015.
turn-back manoeuvre	for the aeroplane, means a manoeuvre pre-determined by the aeroplane's operator, taking into account the minimum altitude and indicated airspeed required for the manoeuvre, by which the pilot in command of the aeroplane turns the aeroplane around after take-off and executes a glide approach to, and landing on, any part of the aerodrome from which the aeroplane took off.
uncommanded engine acceleration event	A situation where an engine accelerates without pilot input with an increase in engine speed, fuel flow or torque, or any combination of these parameters.

1.3 References

Legislation

Legislation is available on the Federal Register of Legislation website https://www.legislation.gov.au/

Table 4: Legislation references

Document	Title
Part 21 MOS	Part 21 Manual of Standards
Part 91 of CASR	General operating and flight rules
Regulation 121.005 of CASR	Application of Part 121
Subpart 121.Z of CASR	Certain single-engine aeroplanes
Regulation 135.240 of CASR	Prescribed single-engine aeroplanes
Part 135 MOS Chapter 8	Prescribed single-engine aeroplanes
CASA EX74/24	Part 121 – Single Pilot Aeroplane (MOPSC 10-13) Operations – Exemptions and Directions Instrument 2024 **Note:** CASA EX74/24 replaced CASA EX97/22 Part 121 – Single Pilot Aeroplane (MOPSC 10-13) Operations – Exemptions Repeal, Remake, and Direction Instrument 2022 from 2 December 2024.

Advisory material

CASA's advisory materials are available at https://www.casa.gov.au/publications-and-resources/guidance-materials

Table 5: Advisory material references

Document	Title
AC 91-09	Ditching
AC 91-22	Aircraft checklists

Document	Title
AMC/GM Part 135	Acceptable means of compliance and guidance material - Australian air transport operations—smaller aeroplanes

Other

Table 6: Other references

Document	Title
NZ CAA AC125-2	Ditching - Techniques, Hazards, and Survival: A Basis for Assessing Risk
Flight Safety Digest	September 2003 - February 2004, Waterproof Flight Operations
SKYbrary	Ditching: Fixed Wing Aircraft

2 Introduction

2.1 Historical rules before 2 December 2021

2.1.1 Under the pre-2 December 2021 rules, certain single-engine turbine powered aeroplanes were permitted to operate in passenger-carrying charter and RPT operations. These aircraft were referred to as Approved Single-Engine Turbine Powered Aeroplanes (ASETPA). The pre-2 December 2021 rules prohibited passenger charter and RPT flights in other single-engine aircraft.

2.1.2 Civil Aviation Order (CAO) 100.5 provided requirements for an aeroplane to be approved as an ASETPA, and only aeroplane makes and models that met certain technical criteria were considered for approval.

2.1.3 Paragraph 174B(2)(d) of the *Civil Aviation Regulations 1988* (CAR) allowed CASA to approve operators to carry out passenger-carrying charter under the VFR at night. Paragraph 175A(1)(d) of CAR allowed CASA to approve operators to carry out passenger-carrying charter and RPT operations under the IFR. These regulations required these flights to be conducted in ASETPA, as approved by CASA under Appendix 2 of CAO 100.5.

2.1.4 CAR 174B and 175A were repealed on 2 December 2021.

2.1.5 Obtaining an old approval was contingent on meeting certain flight operations-related conditions that were specified in the Air Operator Certification Handbook (AOCH) Volume 2 Chapter 16 (as in force at the time), and aircraft airworthiness, maintenance and equipment requirements contained in CAO 100.5.

2.1.6 Approvals issued by CASA for ASETPA operations were aircraft and operator specific.

2.2 Current prescribed single-engine aeroplane rules

2.2.1 Under Part 135, the aeroplanes previously referred to as ASETPA are called prescribed single-engine aeroplanes (PSEA).

2.2.2 Unlike under the rules in force before 2 December 2021, no separate approval is required under Part 135 to operate a PSEA.

2.2.3 Section 8.03 of the Part 135 MOS states the kinds of single-engine aeroplanes that are PSEA. To operate a PSEA for Part 135 flights, an operator's exposition must contain the material prescribed by the Part 135 MOS, and use an aeroplane with an STC, TAC or TC allowing PSEA flights that conforms to the equipment requirements contained in CAO 100.5.

2.2.4 The specific airworthiness requirements for PSEA are the same as they were for ASETPA and are still contained in CAO 100.5, which was amended from 2 December 2021 to use the PSEA terminology in place of old ASETPA.

2.2.5 For a single-engine aeroplane with a maximum take-off weight (MTOW) of 8618 kg or less and a maximum operational passenger seat configuration (MOPSC) of 10 or more, a combination of the rules in Subpart 121.Z and Part 135 apply, with operators permitted to modify some of the Subpart 121.Z rules if they are using exemption CASA EX74/24.

2.2.6 For a single-engine aeroplane with a maximum take-off weight (MTOW) of 8618kg or less and a maximum operational passenger seat configuration (MOPSC) of 9 or less, the rules in Part 135 of CASR apply.

Note: A description of how to apply the definition of MOPSC can be found in the GM 121.005 entry in the Part 121 AMC/GM document and in the GM 135.005 entry in the Part 135 AMC/GM document.

2.2.7 Rules in Part 135 that have specific application to PSEA include the following, but it should be noted that not every flight under Part 135 that uses a PSEA needs to comply with all of these rules:

- regulation 135.015 (in relation to suitable forced landing areas)
- regulation 135.230 (in relation to the aeroplanes that must be used for IFR flights under Part 135)
- regulation 135.235 (in relation to the aeroplanes that must be used for VFR flights by night under Part 135)
- regulation 135.240 (in relation to the specific operational rules uniquely applicable to VFR flights at night, or IFR flights, conducted using a PSEA under Part 135)
- regulation 135.290 (in relation to flights over water).

2.2.8 Specific guidance for the rules mentioned in paragraph 2.2.5 above can be found in the following document entries:

- regulation 135.015 (in the GM 135.015 entry in the Part 135 AMC/GM document, and in section 3.10 of this AC)
- regulation 135.230 (in the GM 135.230 entry in the Part 135 AMC/GM document)
- regulation 135.235 (in the GM 135.235 entry in the Part 135 AMC/GM document)
- regulation 135.240 (this AC is the primary source, with limited information in the GM 135.240 entry in the Part 135 AMC/GM document)
- regulation 135.290 (in the GM 135.290 entry in the Part 135 AMC/GM document).

2.3 PSEA intersection with conducting IFR or VFR flights

2.3.1 An aircraft certified as a PSEA does not always need to be used in accordance with the PSEA rules in Part 135. The following scenarios outline Part 135 PSEA rule compliance requirements.

Scenario 1

The single-engine aeroplane has a MOPSC of 10 or more, is conducting an Australian air transport operation and is operating under Subpart 121.Z and Part 135 (instead of operating under exemption CASA EX74/24 and Part 135).

The single-engine aeroplane cannot conduct an air transport operation under the VFR flight by night due to regulation 121.780.

If the single-engine aeroplane is conducting an air transport operation under the IFR, the Part 135 PSEA rules must be followed.

If the single-engine aeroplane is conducting an air transport operation under the VFR by day, the Part 135 PSEA rules do not have to be followed.

Scenario 2

The single-engine aeroplane has a MOPSC of 10 to 13 inclusive, is conducting an Australian air transport operation and is operating under exemption CASA EX74/24 and Part 135 (instead of operating under Subpart 121.Z and Part 135).

If the single-engine aeroplane is conducting an air transport operation under the IFR, or the VFR by night, the Part 135 PSEA rules must be followed.

If the single-engine aeroplane is conducting an air transport operation under the VFR by day, the Part 135 PSEA rules do not have to be followed.

Scenario 3

The single-engine aeroplane has a MOPSC of 9 or less and is conducting an Australian air transport operation under Part 135.

If the single-engine aeroplane is conducting an air transport operation under the IFR, or the VFR by night, the Part 135 PSEA rules must be followed.

If the single-engine aeroplane is conducting an air transport operation under the VFR by day, the Part 135 PSEA rules do not have to be followed.

Scenario 4

The single-engine aeroplane is an operation other than an Australian air transport operation.

The Part 135 PSEA rules do not have to be followed.

3 Prescribed kinds and matters for a PSEA

3.1 Purpose and definition (MOS sections 8.01 and 8.02)

3.1.1 The kinds of aircraft that are prescribed by the Part 135 MOS as PSEA must conform to airworthiness and reliability standards that seek to minimise the likelihood of engine or systems failures or malfunctions that could jeopardise the safety of IFR or VFR at night passenger-carrying operations.

3.1.2 The continuing maintenance requirements articulated in CAO 100.5 ensure that a PSEA continues to conform to its type certificated standards while engaged in Australian air transport operations.

3.1.3 Subregulation 135.240(2) requires an operator to publish procedures in their exposition to deal with the emergency or abnormal occurrences listed in sections 8.04 to 8.09 of the Part 135 MOS. The prescribed matters only apply to PSEA flights under the IFR or VFR at night, however, some operators may decide, at their discretion, publish these procedures for all flights in PSEA for consistency and reduced confusion for pilots.

3.1.4 The prescription of certain matters in the Part 135 MOS requires an operator to develop, implement and publish in their exposition appropriate operational procedures that deal with critical emergencies in a timely manner. Pilot application of these procedures can mitigate the safety risks of PSEA flights.

3.1.5 In developing procedures for their exposition, it is recommended that an operator use manufacturer's data, where available, as the primary source of information. Where manufacturer's data does not include procedures for the matters listed, operators should use any relevant information including engine or system-specific manufacturer's data as necessary to ensure the effectiveness of their procedures.

3.1.6 If procedures to deal with emergency or abnormal occurrences are mentioned in the flight manual, the flight manual process must be followed (refer to AC 91-22 for more information on flight manuals and checklists). In some cases, operators might add additional clarifying action items to these kinds of procedures (e.g., when to consider a turn-back, or how to navigate to the nearest suitable forced landing area).

3.2 Prescribed kinds of single-engine aeroplane (MOS section 8.03)

3.2.1 This section of the MOS has the effect of allowing aeroplanes approved or eligible for ASETPA operations pre-2 December 2021 to become prescribed single-engine aeroplanes (PSEA) under the post-2 December 2021 rules.

3.2.2 The MOS mentions a new option for a type certificate for an aircraft to state that it is eligible to be a PSEA. The airworthiness requirements for the issue of a type certificate are unchanged in CAO 100.5.

3.2.3 CASA no longer requires or issues specific approvals for an aircraft to be operated as a PSEA. Operators are required to determine if the aircraft and its equipment comply with the relevant CASR and MOS provisions relating to the intended operation.

3.3 Engine malfunction or failure - take-off and initial climb (MOS section 8.04)

3.3.1 The exposition must detail procedures for pilot actions in the event of an engine malfunction or failure during the take-off roll and in the initial climb stage. The procedures must consider the three most likely options available to the pilot after take-off, namely use of a suitable forced landing area, use of the most suitable terrain if such an area is not available, or executing a 'turn-back' to the airport environment.

3.3.2 Subsection 8.04(2) of the Part 135 MOS defines the term *turn-back manoeuvre* as follows:

turn-back manoeuvre, for the aeroplane, means a manoeuvre pre-determined by the aeroplane's operator, taking into account the minimum altitude and indicated airspeed required for the manoeuvre, by which the pilot in command of the aeroplane turns the aeroplane around after take-off and executes a glide approach to, and landing on, any part of the aerodrome from which the aeroplane took off.

3.3.3 Some flight manuals may not discuss the use of an emergency power lever or similar control that a PSEA may possess, or may not refer to it in a manufacturer's emergency checklist. In this instance the exposition should detail a standard sequence of actions the pilot should take to deal with the possible scenarios. These immediate actions should be framed as "recall" actions that do not require reference to a written checklist.

3.3.4 Some flight manuals may not include information about conducting turn-backs. The decision to execute a turn-back manoeuvre and how to conduct it will be dependent on the aerodrome and its surroundings, the environmental conditions, and the position and altitude of the aircraft at the power loss point. To facilitate timely and accurate decision-making, it is highly recommended that the exposition specifies the minimum altitude, position, speed and configuration criteria for commencement of a turn-back.

3.3.5 Many factors will influence the viability of the turn-back procedure, such as the presence of populous or adverse terrain areas, or the visibility (including whether it is day or night). While it is impractical to have procedures for every possible circumstance, where certain aerodromes are frequently used it is recommended that location-specific procedures be developed for these aerodromes.

3.4 Decision point (MOS section 8.05)

3.4.1 A 'decision point' for a take-off abort, as defined in subsection 8.05(2) of the Part 135 MOS, must be determined for every take-off. The term refers to the last point in the take-off where aborting a take-off on a discretionary basis will result in a safe stop in the available runway. On long runways, this point may be after lift-off.

3.4.2 The rationale behind requiring a pre-determined decision point is that it can reduce the time taken for the decision-making process involving an abort by nominating an easily recognised go/no-go point. This reduces the likelihood of a runway over-run in the event of a delayed abort decision, or of a pilot continuing a take-off when a malfunction or failure could have been more safely dealt with on the ground.

3.4.3 Typical events that might trigger a discretionary abort are warning or caution messages, or annunciator illuminations, for a non-critical system. One example might be certain kinds of electrical system warnings.

3.4.4 It would not be feasible for an exposition to provide procedures for every possible event; however, operators should provide guidance for pilots on the appropriate actions to take prior to the decision point.

3.4.5 There are two recommended options for the determination of a decision point:

- For departure runways at commonly used aerodromes or those used for scheduled flights, operators could determine the point applicable to each runway and publish it in an exposition

location that is easy for pilots to reference, such as a cockpit route guide or ready reckoner. It might also contain adjustments for ambient conditions and aircraft loading, or other commonly variable factors that affect the selection of the point.

- For non-scheduled flights to ad-hoc destinations, operators could include in the exposition a process to be followed by pilots to determine the point, and how pilots can recall and identify the point on the take-off roll.

3.4.6 Decision points are likely to be dependent on runway length, terrain, weather and aircraft weight. For example, on a long runway with slippery weather conditions at MTOW, the decision point might be closer to the start of the take-off roll than for a lightly loaded aircraft in dry conditions with a strong headwind.

3.5 Forced landing (MOS section 8.06)

3.5.1 The exposition must contain procedures for the conduct of a forced landing above 1 000 ft AGL during climb, en-route, descent and approach, and for a forced landing from altitudes of not more than 1 000 ft AGL. These procedures would be followed in the event of an engine failure after the take-off and initial climb segment. The procedure may also involve turn-backs from outside the circuit area if appropriate.

3.5.2 The same emergency power lever and turn-back considerations applicable to the after take-off engine malfunction or failure situation apply to power loss events above 1 000 ft AGL.

3.5.3 It is recommended that operators publish standard flight procedures with climb, descent and approach routes and vertical profiles that place the aeroplane in a favourable position for a forced landing at a suitable area for as much time as possible.

3.5.4 For instrument departures, if there is an option to plan or request a departure track that either keeps the aeroplane within gliding distance of the departure aerodrome or minimises the time the aeroplane is over built-up areas or inhospitable terrain, it is recommended that the exposition should specify its use if possible.

3.5.5 Similarly, for descent, approach and landing under IMC or at night, it is recommended that preference be given to the use of a descent profile, instrument approach or circuit pattern that is the most favourable in the event of an engine failure.

3.5.6 It is recommended that the operator, via the exposition procedures, encourage pilots to request routing from ATC, or adjust their flight path in non-controlled airspace where possible, to follow the most favourable routes and climb/descent profiles.

3.5.7 The exposition must also contain procedures for executing a forced landing from any point on a route. Since there may be times when the aeroplane may be outside gliding range of a suitable forced landing area, the exposition must include procedures for pilot actions in the event of a forced landing in hostile terrain, at night, in water, or in circumstance where visual reference to the ground cannot be assured.

3.5.8 The flight manual will detail pilot procedures for managing power loss situations in flight, and it would be expected that operators will use these procedures as a basis for their exposition content. However, a flight manual would not normally state the specific procedures necessary to navigate the aeroplane to the nearest suitable forced landing area since this is dependent upon operator circumstances and equipment.

3.5.9 Subsection 8.09(3) of the Part 135 MOS requires that positions of aerodromes and suitable forced landing areas for a route must be programmed into the aeroplane's area navigation system. The exposition should detail the process a pilot should follow to access this data and navigate to the most appropriate landing site.

3.5.10 Since in most cases time will be of the essence when gliding to a landing site without power, operator expositions should seek to amalgamate and condense the vital actions necessary to carry out trouble checks, configure the aeroplane for the glide, and configure the navigation system to track direct to the landing site.

3.5.11 It is recommended that these procedures be designed as memory or recall items, and reinforced in operator training and checking systems.

3.5.12 When designing the procedures for conducting a forced landing from altitudes below 1 000 ft AGL, it is highly recommended, due to the very limited time available, that these procedures be simple memory items able to be rapidly executed, thereby enabling the pilot to maximise the chances of a successful outcome.

3.6 Engine ignition and performance (MOS section 8.07)

3.6.1 The events mentioned in subsection 8.07(1) of the Part 135 MOS include items that would normally be addressed in the flight manual. If the detail in the flight manual is insufficient, or impracticable for an operator's flights, operator customisation for the exposition is encouraged provided that the mandatory matters in the flight manual are still included in their correct order.

3.6.2 Procedures should be developed where necessary to deal with potentially false activations of chip detector system warnings or fire warnings, or potentially false indications of engine parameter exceedances. Where possible, the exposition should detail the cross-check or secondary evidence required before significant pilot actions are taken in response to these events. This is intended to reduce the possibility that a false warning may trigger a response by the pilot that may place the aeroplane in more immediate danger than necessary.

3.6.3 Some flight manuals may not detail the use of an emergency power lever or similar to deal with a failure of a hydromechanical FCU or its sensing system. In these instances, the use of these systems should be embedded in exposition processes for power loss events near the ground. The use of simple flow charts and drills may enable improved pilot performance during these occasions.

3.6.4 Some emergency systems cannot be operated for training purposes, or may require maintenance action if used for practice. If this is the case, expositions should include suitable alternative processes where pilot competence in operating these systems in an emergency can be maintained, such as touch drills and the like.

3.7 Suitable route and forced landing areas (MOS section 8.08)

3.7.1 A PSEA operating an IFR flight or a VFR flight at night can only be outside the glide range of suitable forced landing area for 15 minutes at normal cruising speed (with some exceptions as detailed in section 3.9 of this AC below). The exposition must have procedures for determination of a route that complies with this limitation, and for how a pilot continues to comply with the limitation in flight.

3.7.2 During the planning stage, the pilot should calculate the distance the aeroplane will cover in 15 minutes at normal cruising speed for the planned altitude and then plan and carry out the flight such that the aeroplane is never more than this distance outside the glide range of a suitable forced landing area.

Note: 'Normal cruising speed' is defined in the CASR Dictionary (also refer to the definitions section of this AC).

3.7.3 Since the cruising altitude above any proposed forced landing area has a direct influence on the glide range, it is recommended that the exposition include details of the glide range of the aeroplane at all usable altitudes and that this information is readily available at the flight planning stage and in flight.

3.7.4 For improved efficiency of frequently flown routes, it is recommended that operators carry out a process to assess and publish standard routes with minimum altitudes that allow the flight to comply with the 15 minute limitation without further pilot consideration. This information should be in the exposition as part of the standard route and aerodrome guidance provided to flight planners and pilots. If possible, this route guidance should include preferred departure, arrival and instrument approach routes that minimise, or eliminate, the time the aeroplane is outside the glide range.

3.7.5 For routes that are infrequently flow, or for operators who frequently fly ad-hoc routes, it is recommended that the operator include in the exposition a system that can be used by pilots at the planning stage to select route and altitude combinations that comply with the 15 minute limitation. These systems could be a part of software programs such flight planning applications, or paper based in the form of maps or charts, or overlays on maps and charts.

3.7.6 It is recommended that the exposition specify the process to carry out route selection including who will execute the process if persons other than the pilot exercise operational control functions.

3.7.7 For flights over land areas where there is limited availability of suitable forced landing areas, flights can be planned whereby the aeroplane can be "leap-frogged" between glide range areas, provided that the time that the aeroplane is outside the glide range does not exceed 15 minutes in any one instance.

3.7.8 If an aircraft is taking advantage of the 15 minute rule, the pilot is not assured of being able to glide to a known location with the reasonable expectation to land there without injury. It is recommended that additional suitable forced landing areas are identified and planned for so that the use of the 15 minute rule is minimised wherever possible. The risks involved in conducting a forced landing under the IFR, or at night under the VFR, without a known landing site may be reduced with prior planning.

3.7.9 Operators may map known aerodromes or landing sites with realistic glide range rings (considering typical cruise altitudes) around them. Where terrain prohibits nomination of additional suitable forced landing areas, route selection can be used to limit exposure to areas along a route where the 15-minute distance would need to be used. The diagram in Figure 1 illustrates how this could be applied.

3.7.10 The planned distance flown during the 15 minutes at normal cruise speed is not meant to be corrected for known or forecast wind; however, expositions should detail that wind during a flight will affect the distances possible between glide range coverage, and a glide into a strong headwind will significantly reduce the distance the aeroplane will be able to actually achieve in the event of an engine failure.

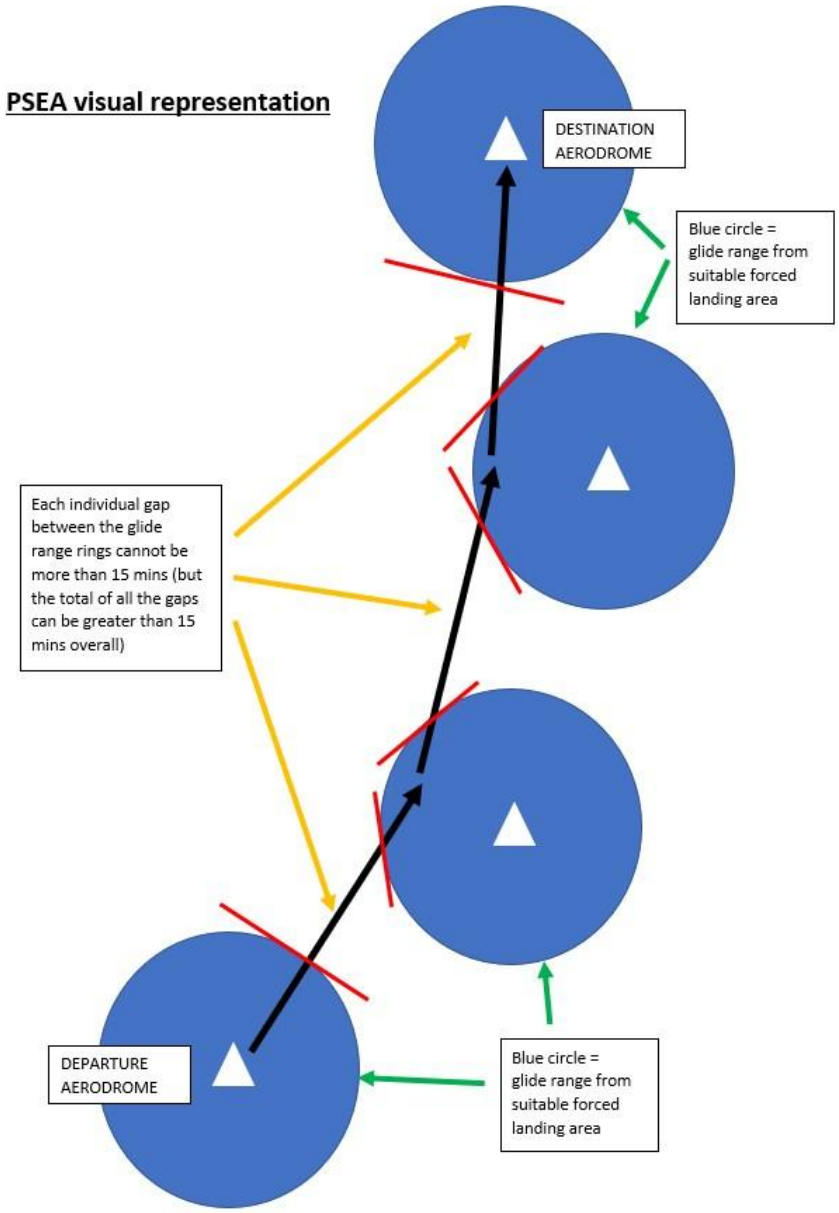

Figure 1: Visual representation of selection of a route to minimise reliance on the 15 minute rule

Note: In Figure 1, a more direct route would be available at the planning stage if suitable forced landing areas were to be identified in the relevant areas not covered by the blue circles.

3.8 Considerations for selecting a suitable route (MOS subsection 8.08(1))

3.8.1 The exposition must have procedures that require the pilot to have regard to the following factors when selecting and maintaining a suitable route for the flight.

3.8.2 Terrain (MOS paragraph 8.08(1)(a))

3.8.2.1 Planning a route over terrain where opportunities exist for a safe forced landing in the event of an engine failure is preferable. In particular, the departure and arrival paths should be selected to avoid areas of water, densely vegetated or mountainous terrain, and populous areas where possible. This practice can minimise the time the aircraft is at low altitude with reduced glide range, with the benefit of maximising pilot decision-making time in the event of an engine failure.

3.8.2.2 If the only feasible option is to overfly unfavourable terrain, operators should advise pilots to adopt maximum angle of climb departures, and high energy descents where possible while conforming to traffic and ATC restrictions.

3.8.3 Weather and environmental factors (MOS paragraph 8.08(1)(b))

3.8.3.1 Expositions should include advice that, in addition to the minimum weather information requirements in regulation 91.230 and the Part 91 MOS, pilots should consider the following additional factors:

- any known seasonal influences that could affect the flight
- proposed cruising levels with respect to minimum heights (as per the Part 91 minimum height rules), freezing level and cloud base
- forecast visibility below the expected cloud base and the feasibility of day and night identification and use of any forced landing area.

3.8.3.2 Consideration of weather conditions which might influence the ability to glide to a forced landing area include:

- thunderstorms, turbulence and icing areas
- headwinds during the glide
- adverse meteorological conditions such as dust, low sun aspect, and seasonal wind conditions such as sea breeze
- oxygen limitations for high-altitude flights.

3.8.4 Flights over water (MOS paragraph 8.08(1)(c))

3.8.4.1 For flights over water, the ditching capability of the aeroplane must be considered. The Part 135 MOS requires conformance with the requirements in regulation 135.015 with respect to the reasonable expectation that the aeroplane can ditch without injuries to the passengers and crew. The exposition should set out the process to ensure an over-water segment complies with the regulation. It is recommended that the following factors be considered:

- aeroplane design and likely ditching characteristics for the make and model
- aircraft weight and configuration
- passenger and cargo load, and the ability to redistribute it
- timely application of processes to identify suitable forced landing areas on water as mentioned in subsection 3.10.7 of this AC.

Note: If the flight is a medical transport operation to transport medical personnel to and from a place where a person requires emergency medical assistance, the subsection 8.08(1) provisions of the Part 135 MOS referred to above are deferred until 2 December 2022 (refer to subsection 8.08(2)).

3.9 Circumstances in which the time that an aeroplane can be outside the glide range of a suitable forced landing area can exceed 15 minutes (MOS subsection 8.08(3))

3.9.1 The exposition must require the pilot to ensure the flight complies with the 15 minute limitation (no more than 15 minutes outside the glide range from a suitable forced landing area at normal cruising speed). However, the flight can proceed further than this time under the following circumstances which should be articulated in the exposition.

3.9.2 Diversion for medical flights (MOS paragraph 8.08(3)(a))

3.9.2.1 The time can be exceeded in the case of a medical transport operation that is required to divert to a location where a person requires emergency medical assistance. The flight may have been planned to comply with the limitation, and may be operating within the limitation at the time of the proposed diversion. Since such a diversion involves an elevated risk profile over the original planned flight, the exposition should set out what matters the pilot should consider when planning for a diversion where the aircraft will be outside the 15 minute distance.

3.9.2.2 This diversion exception also applies when the aircraft departs the location that it previously arrived at when exercising the privilege of the exception. This allows return flights to locations under these specific circumstances.

3.9.3 Instrument approach and departure procedures (MOS paragraph 8.08(3)(b))

3.9.3.1 The time can be exceeded when carrying out authorised instrument approach and departure procedures, whether in controlled airspace or not. While preferred departure and approach procedures and flight paths may be planned for a flight with reference to the 15 minute limitation, they may not be available as planned after the flight commences. The 15 minute limitation is not intended to prevent the pilot from carrying out SIDs, holding, STARs, or instrument approaches that may place the aircraft in a situation where the 15 minute limitation is exceeded.

3.9.4 Compliance with ATS instructions (MOS paragraph 8.08(3)(c))

3.9.4.1 The time can be exceeded when the pilot is following an ATS instruction that relates to aviation safety. Instructions from ATS relating to aviation safety include changes to departure and approach tracking or altitudes, runway assignments, traffic diversions, route changes, altitude restrictions or holding, or instructions for separation such as speed changes. These instructions would be generated by ATS in response to ATS requirements as they occur.

3.9.4.2 The extension is also available if a pilot requests a change in route or altitude in response to an aviation safety-related circumstance, such as the presence of hazardous weather on the planned route. In these types of circumstances in controlled airspace, a pilot may determine that the continued safety of the aeroplane requires action such as holding, diversion or a level change and requests approval to carry out the change to the flight path from ATC. If ATC grants the request, this becomes an ATC instruction. The pilot can operate the flight outside the 15 minute distance while complying with this type of instruction.

3.9.4.3 This extension of time is not available to the pilot for matters requested by the pilot that are unrelated to aviation safety. An example of this is a change in route to allow direct tracking to shorten flight time. A route change such as this is not permitted if it results in the aeroplane exceeding the 15 minute flight time distance limitation.

3.10 Identification of suitable forced landing areas (MOS subsection 8.08(4))

3.10.1 The Part 135 MOS requires the identification, at the planning stage, of aerodromes and suitable forced landing areas available to the aeroplane when flying on the planned route. The definition of 'suitable forced landing area' is provided by regulation 135.015, and additional guidance is contained in the Part 135 AMC/ GM document under GM 135.015.

3.10.2 The safest option is to always operate in areas where a glide to a known aerodrome or suitable forced landing area is feasible.

3.10.3 To facilitate a pilot determining which aerodromes and suitable forced landing areas are relevant to a particular flight at the planning stage, operators may choose to have these locations programmed into a flight planning database or use some other electronic or paper-based system. The outcome should be that a pilot can readily identify the aerodromes or areas for any particular route so that they can comply with the limitations specified in subsection 8.08(1) of the Part 135 MOS.

3.10.4 However, there will be occasions where a particular route may not have any details in a flight planning application, or such an application may not be available. This will require individual pilot or operator assessment of the planned route to identify the suitable areas. The exposition must detail the process to be used to identify suitable areas, and some suitable methods are articulated below:

- Using satellite imagery services such as “Google Earth” or resources like aerial photographs. Areas outside the glide range of regular routes can be investigated for potential suitable forced landing areas.
- Any additional suitable forced landing areas can be noted and added to navigation databases for immediate use via the "direct to" navigation function when in flight.
- WAC and ONC can provide locations of unlicensed or unused aerodromes, which may still have suitable characteristics.
- Unofficial publications, such as country airstrip guides, may provide useful locations.
- Local knowledge or airborne examination, combined with topographic maps, can be useful to prioritise potential sites.

3.10.5 The ideal situation is for an operator to have the locations of all relevant aerodromes and suitable forced landing areas for their area of operations pre-programmed into a flight planning software system (if used).

3.10.6 In all cases, the aeroplane navigation database (or equivalent) must be serviceable and pre-loaded with suitable forced landing areas that are applicable to the expected route. A procedure to navigate directly to these sites must be established in the exposition. The navigational information required to proceed to the nearest suitable forced landing area must be continuously and immediately available to the pilot.

3.10.7 Considerations for suitable forced landing areas

3.10.7.1 A suitable forced landing area is an area of ground or water where a safe forced landing can be made, day or night as applicable, considering the weather conditions at the time of the landing.

3.10.7.2 For a land aeroplane, an area of water could be a suitable forced landing area in accordance with paragraph 135.015(2)(a) if the requirements specified in subregulations 135.015(3) and (4) are met. These requirements relate to survivability during and after water contact. For passenger transport or medical transport operations, the proximity of the area to SAR services must also be considered. The regulation requires consideration of environmental factors and the capabilities of life rafts on board the aircraft.

3.10.7.3 The following matters should be considered:

- **Ground areas:**
  - The area should have sufficient length to enable the aeroplane to come to a stop, considering the slope and type of surface.
  - Consideration should be given to obstacles and possible local or prevailing winds.
  - For night or IFR operations, large flat non-populated areas with minimal obstacles may be considered acceptable.
- **Water areas:**
  - The area should be of sufficient size and shape with no obstructions to enable the pilot to make a controlled approach.
  - Navigation to the area should place the aeroplane in such a position that the final approach path can be adjusted for the actual surface conditions.
  - The area should be sheltered from commonly expected or forecast wind and swell/sea conditions.
  - Different areas could be established for different surface wind conditions.
  - If the flight is a passenger or medical transport operation, the area must be adjacent to land or a place with SAR capabilities.
  - A current marine wind forecast should be obtained for the area. A GAF or TAF for a nearby location may be useful.

3.10.7.4 Unless additional safety controls and processes are used, it is strongly recommended that areas of water should not be considered suitable by operators if any of the following exist:

- forecast surface wind speed > 10 kt
- swell or sea height more than 0.5 m
- swell direction more than 90º opposed to sea/wind direction
- forecast fog
- adverse tidal flow
- sea surface temperature less than 15º C.

3.10.7.5 A life raft must be on board and able to carry the aircraft occupants safely, supporting their survival in the sea state and environmental conditions at the proposed area for at least until the expected time of rescue.

3.10.7.6 It is recommended that operators consolidate exposition information regarding over-water flights and ditching into one area for ease of reference.

3.10.7.7 Some flight manuals do not include any information about ditching, and others may include only generic advice. An operator's exposition requires detailed guidance specific to the aeroplane and route, based on the best available information. Some information sources on ditching include:

- CASA AC 91-09 - Ditching
- NZ CAA AC125-2 - Ditching - Techniques, Hazards, and Survival: A Basis for Assessing Risk
- Waterproof Flight Operations – Flight Safety Foundation
- Ditching: Fixed wing aircraft – SKYbrary Aviation Safety.

3.11 Procedures in the event of an uncommanded engine acceleration event

3.11.1 Some PSEA equipped with certain PT6A engines have experienced uncommanded engine acceleration events that cannot be controlled by pilot actions.

3.11.2 During these occurrences, the engine power and associated parameters increased above the level set by the pilot. Pilot attempts to reduce the power by retarding the power lever and/or reducing propeller controls and/or activating the emergency fuel controls had no effect on engine power.

3.11.3 While not posing an immediate threat to continued controlled flight, these occurrences require:

a. prompt pilot action to avoid likely airframe overspeed or overstress, inadvertent altitude increases or likely severe engine/propeller damage or failure resulting from continued exceedance of limitations

b. pilot action to manage the eventual approach and landing with limited or no control over engine power.

3.11.4 The AFM and engine manufacturer's documentation may not include information on the detection or recognition of an impending or actual event, or include procedures on how to deal with this circumstance in the abnormal or emergency procedures section of the aircraft checklist. Guidance to the pilot for dealing with these circumstances may be absent from approved and authoritative OEM sources.

3.11.5 CASA **strongly recommends** operators publish guidance in their expositions to pilots regarding recognising these events, plus possible corrective actions and decision-making guidelines for such occurrences.

3.11.6 Exposition content could include information on the following topics:

- **Recognition**
  - engine instrument indications - analogue and EIS
  - warnings/cautions/annunciator displays
  - change in engine/propeller sound
  - abnormal improved performance being achieved such as shorter than normal take-off roll or greater rate of climb.
- **Initial actions**
  - control of the aircraft considering matters such as engine control usage, aircraft configuration and climbing and/or manoeuvring
  - procedures for VMC and IMC situations
  - procedures in CTA and use of PAN PAN call.
- **Decision-making**
  - assessment of likely imminent engine/propeller failure considering severity of exceedance
  - assessment of time available for resolution or engine shutdown
  - formulation of a plan of action.
- **Considerations for approach and landing**
  - ability to land if power remains above the amount to sustain level flight
  - alternative shut-down procedures
  - positioning for a shut-down and glide approach
  - alerting emergency services/ATC

– passenger briefing for landing.

3.11.7 This list is not exhaustive and should be considered general advice only. Operators should seek information from all available sources to assist in formulating procedures and recommendations. These sources could include, but are not limited to:

- engine and aircraft manufacturers
- pilot groups and industry associations
- accident and incident reports.

3.11.8 The root cause of an uncommanded engine acceleration event may be a condition that develops over a period of time, such as a worn component that may continue to function, however may be approaching the point at which it might trigger the event. Pilots should be encouraged by operators to immediately report any abnormal engine/propeller operation or engine instrument anomalies and operators should prioritise active investigation of these events by maintenance personnel.