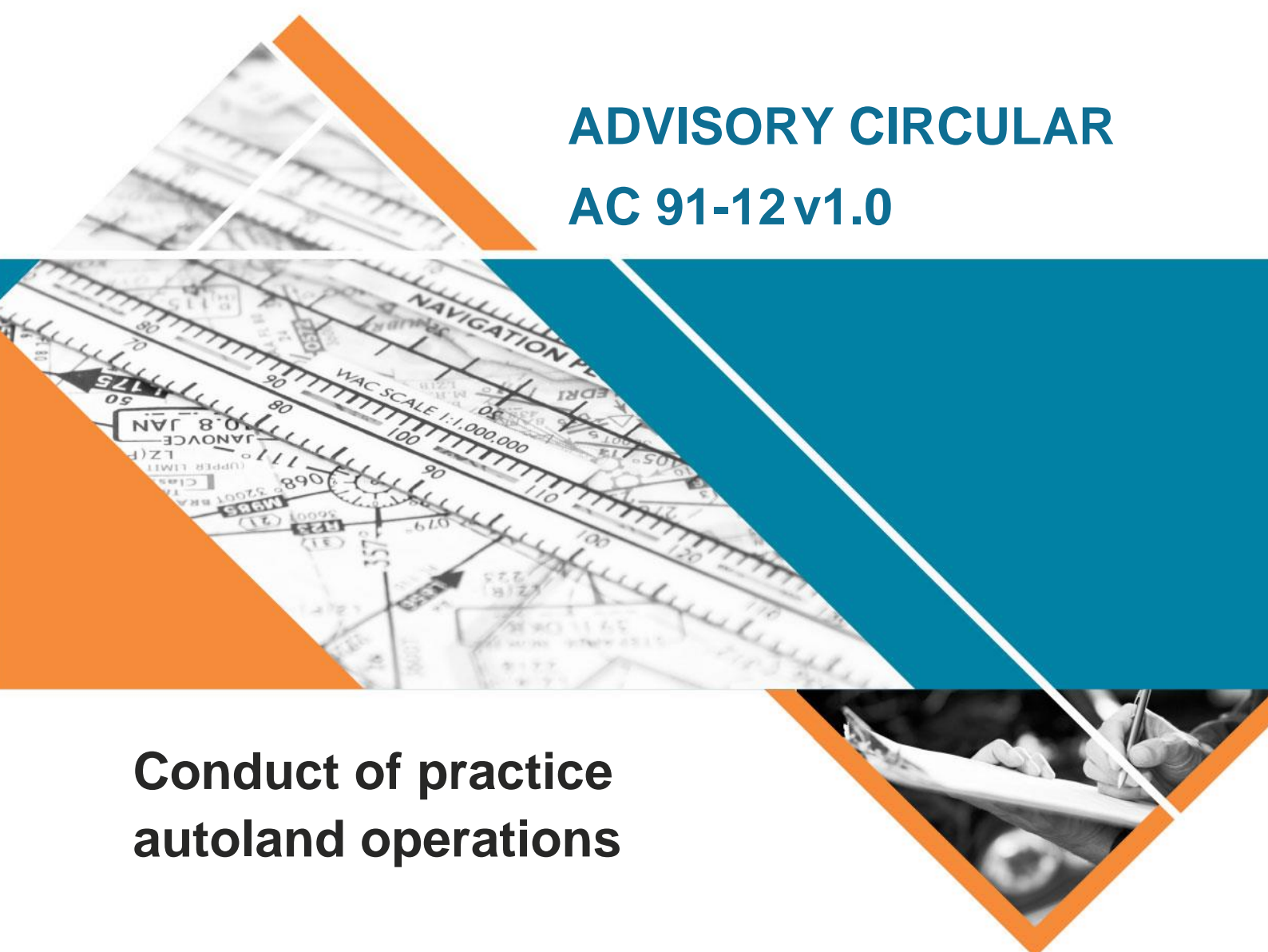




# ADVISORY CIRCULAR

## AC 91-12v1.0



# Conduct of practice autoland operations

<b>Date</b>	December 2021
<b>Project</b>	OS 99/08
<b>File ref</b>	D19/406403

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) applies to aircraft operators conducting practice automatic landing (autoland) operations.

## Purpose

This AC provides guidance on the conduct of practice autoland operations on CAT I runways, or on CAT II/III runways that are not subject to Air Traffic Control (ATC) protection of relevant instrument landing system (ILS) critical and sensitive areas.

This AC also provides information on risks, systems, procedures and practices that aircraft operators should consider when conducting autoland operations to unprotected runways in CAT I or better weather conditions.

## For further information

For further information, contact CASA's Flight Standards Branch (telephone 131 757).

Overseas operators: Contact CASA International Operations on +61 2 6217 1111 or [International\\_Ops@casa.gov.au](mailto:International_Ops@casa.gov.au).

## Status

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

Version	Date	Details
v1.0	December 2021	This AC replaces CAAP 257-EX-02(0) - Conduct of practice autoland operations to align with the implementation of the CASR flight operations regulations.

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

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# 1 Reference material

## 1.1 Acronyms

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

Acronym	Description
ATC	Air Traffic Control
Autoland	Automatic Landing
CAT	Category
CASA	Civil Aviation Safety Authority
CASR	<i>Civil Aviation Safety Regulations 1998</i>
DH	Decision Height
ILS	Instrument Landing System
LVO	Low-Visibility Operation
RDH	Reference Datum Height
SA CAT	Special Authorisation Category

## 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.

Most of the terms used in this AC are taken from ICAO source documents, or documents produced by overseas regulatory authorities. In such cases, the source is shown in brackets for each term. However, some terms have been uniquely defined for the Australian context and these definitions are indicated by an '\*'.

Term	Definition
Category I (CAT I) operation	A precision approach operation with a decision height (DH) not lower than 200 ft and either a visibility not less than 800 m or a runway visual range (RVR) not less than 550 m. [ICAO]
Category II (CAT II) operation	A precision approach operation with a DH lower than 200 ft, but not lower than 100 ft; and an RVR not less than 300 m. [ICAO]
Category IIIA (CAT IIIA) operation	A precision approach operation with a DH lower than 100 ft or no decision height, and an RVR not less than 175 m. [ICAO]
Category IIIB (CAT IIIB) operation	A precision approach operation with a DH lower than 50 ft, or no decision height, and an RVR less than 175 m but not less than 50 m. [ICAO]
flight manual	See CASR dictionary
low-visibility approach	means an approach using minima for a runway that are below the category I

Term	Definition
	precision approach minima for the runway published in the AIP.
low-visibility operation	means: <ul style="list-style-type: none"> <li>a low-visibility take-off; or</li> <li>a low-visibility approach.</li> </ul>
low-visibility take-off	means a take-off with a runway visual range of less than 550 m.*
low-visibility procedures	Procedures applied at an aerodrome for protecting aircraft operations during low-visibility operations.*
simulator	A flight simulator certified to a least level C in accordance with Part 60 Manual of Standards, with: <ul style="list-style-type: none"> <li>flight management and guidance systems relevant to the LVO operations conducted by the operator</li> <li>relevant low-visibility runway modelling and lighting standards for taxiways, runways and approach lighting systems.*</li> </ul>
special authorisation category I (SA CAT I) operation	A precision approach CAT I operation with a DH lower than 200 ft, but not lower than 150 ft; and an RVR not less than 450 m.*
special authorisation category II (SA CAT II) operation	A precision approach operation to a runway where some or all of the elements of the precision approach CAT II lighting system are not available, and with: <ul style="list-style-type: none"> <li>a DH lower than 200 ft, but not lower than 100 ft</li> <li>an RVR not less than 350 m.*</li> </ul>

## 1.3 References

### Legislation

Legislations are available on the Federal Register of Legislation website <https://www.legislation.gov.au/>

Document	Title
Part 91 of CASR	General operating and flight rules
Part 139 MOS	Part 139 (Aerodromes) Manual of Standards 2019
Regulation 91.055 of CASR	Aircraft not to be operated in a manner that creates a hazard
Regulation 91.307 of CASR	IFR take-off and landing minima

### Advisory material

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

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Document	Title
AC 91-11	Approval to conduct low visibility operations <b>Note:</b> This AC has not yet been issued as at the publication of this document.
CAAP 257-EX-01(0)	Approval to conduct low visibility operations <b>Note:</b> This CAAP will be replaced by AC 91-11 (planned for Q1 2022).

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### Other material

International Civil Aviation Organization (ICAO) documents are available for purchase from <http://store1.icao.int/>

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Document	Title
AIP	Australian Aeronautical Information Publication
ICAO Annex 10 Volume I	Radio Navigation Aids
ICAO Annex 14 Volume 1	Aerodrome Design and Operations
ICAO Doc 9365 AN/910	Manual of All-Weather Operations

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## 2 Overview

### 2.1 What is a practice autoland operation?

2.1.1 Aircraft autoland capabilities are primarily intended for use in low-visibility operations (LVO) on suitably equipped and protected (in this context *protected* means protected from ground traffic generating interference with the instrument approach aids being used) runways.

2.1.2 However, autoland operations also need to be carried out in CAT I or better conditions, or on unprotected runways, to:

- meet pilot recency and currency requirements for autoland operations, especially at times of the year, or in parts of the world, that do not frequently experience meteorological conditions requiring the use of autoland
- or
- mitigate crew fatigue
- or
- verify the successful functioning of the autoland system in a new aircraft prior to using the aircraft in an air transport operation
- or
- ensure the continued performance and reliability of the aircraft system.

**Note:** The aircraft maintenance planning document normally specifies the frequency with which the autoland system should be utilised for the autoland certification to remain valid.

2.1.3 Practice autoland operations, for the purposes of this AC, are operations:

- using instrument landing system (ILS) facilities or runways not equipped for SA CAT I (Special Authorisation Category I [autoland]), SA CAT II, CAT II or CAT III operations
- on runways equipped for low-visibility landings (as mentioned above), but in weather conditions where low-visibility procedures (LVP) are not in force, or where Air Traffic Control (ATC) has not advised they are protecting the relevant ILS critical and/or sensitive areas.

2.1.4 To ensure compliance with regulation 91.055, practice autoland operations must not be carried out:

- in aircraft that are not certified for autoland operations (this information can be found in the aircraft flight manual)
- unless the equipment required to satisfy the certification requirements is functional or operations are conducted in accordance with the relevant provisions of a minimum equipment list (MEL)/dispatch deviations guide (DDG).

### 2.2 CASA approval not required

2.2.1 CASA approval is not required to conduct practice autoland operations in visual meteorological conditions (VMC) or when the meteorological conditions are equal to or better than CAT I minima for the particular runway.

- 2.2.2 However, if the practice autoland operation is being conducted under the auspices of an operator that holds an Australian air transport AOC, an AOC authorising Part 142 activities, an aerial work certificate or a Part 141 certificate, CASA may evaluate the operator's risk controls during surveillance. It could be expected that CASA would evaluate the correlation between identified risks, the operator's SMS and the promulgated exposition or operations manual procedures.
- 2.2.3 If the practice autoland operation is not being conducted under the auspices of an operator required to have an exposition or operations manual, then the pilot in command is recommended to evaluate the risks associated with performing the operation, taking into account the guidance material contained in this AC, to ensure that the operation is compliant with regulation 91.055.



## 3 General guidance

### 3.1 Problems and potential risks

3.1.1 Multiple factors may influence the accuracy of the ILS signal when the ILS autoland system is to be used:

- with an ILS ground facility that does not meet the low-visibility standards  
or
- in conditions where ATC is not protecting ILS critical and/or sensitive areas.

3.1.2 These factors include:

- interference of the ILS signal due to an intrusion within the ILS critical and sensitive areas by:
  - o taxiing aircraft
  - o ground vehicles
  - o over-flight of the ILS localiser.
- switch-over time of the ground aids not being in accordance with the requirements for low-visibility landing operations
- the pre-threshold terrain may contain irregularities that may cause abnormal autopilot behaviour
- the quality of the ILS signal may not support a coupled approach to an autoland landing since this is not a requirement for a CAT I ILS.

3.1.3 In these circumstances, sudden and unexpected flight control inputs may occur at any altitude on an unprotected ILS approach. Excessive control inputs are a potential hazard to the approach at low altitude, or during the landing and rollout, when the autopilot attempts to follow the 'beam bends'.

### 3.2 Considerations for practice autoland operations

3.2.1 Practice autoland operations should be conducted:

- only in an aeroplane that is certified for such operations and only in accordance with the aircraft flight manual limitations and procedures
- in accordance with the autoland operational procedures.

3.2.2 Unless the runway is currently approved for SA CAT I (autoland), SA CAT II, CAT II or CAT III operations by the aerodrome's regulatory authority, then the operator should assess each runway for suitability prior to conducting a practice autoland operation.

3.2.3 It would be an acceptable means of compliance (AMC) with regulation 91.055 if the runway was confirmed as having:

- an ILS of at least CAT I transmission quality, with the localiser centreline coincident with the runway centreline
- a nominal glideslope angle is between 2.5°–3.0° inclusive, or as limited by the flight manual

- a glide path reference datum height (RDH) between 48–70 ft inclusive. If the RDH exceeds 59 ft, the LDA should be reduced by the following distance 'D' (m) and published in the operations manual

$$D = \frac{(RDH - 59)}{3.3 \times \tan \theta}$$

where  $\theta$  = Glide path angle

- a runway slope and pre-threshold terrain that complies with the requirements of Chapter 6 of the Part 139 Manual of Standards, in relation to radio altimeter operating area.

3.2.4 Flight crews should be alert to the possibility of abnormal autopilot behaviour and should guard the flight controls (i.e., control wheel, rudder pedals, and thrust levers) throughout all automatic approaches and landings.

3.2.5 When doubt exists regarding the continued integrity of the autoflight system, pilots should be prepared to go-around or disconnect the autopilot and land manually.

3.2.6 ATC should be informed about the crew's intention to conduct an autoland. Pilots should not expect the protection of the ILS, but on receiving advice from the crew of their intention to conduct a practice autoland, ATC may inform the flight crew of any known or anticipated disturbance.

### 3.3 Procedures and instructions

3.3.1 The operator should specify detailed operating procedures and instructions in the operations manual.

3.3.2 The precise nature and scope of procedures and instructions given should depend on the airborne equipment used and the flight deck procedures followed. The operator should clearly define flight crew member duties during approach, flare, and rollout and missed approach in the operations manual or procedures manual.

3.3.3 Pilots should:

- advise ATC of their intention to conduct a practice autoland operation prior to commencing their approach
- plan the approach, taking into account that ATC will not provide protection of the ILS critical/sensitive areas
- maintain vigilance against any sudden flight path divergence (note the considerations in section 3.2).

3.3.4 Particular emphasis should be placed on:

- flight crew responsibilities during transition from non-visual conditions to visual conditions, considering the procedures to be used in deteriorating visibility or when failures occur
- instructions for the flight crew to closely monitor the flight path of the aircraft and be prepared to disconnect the autopilot(s) if the flight path is being compromised.

- 3.3.5 Special attention should be paid to the distribution of flight deck duties to ensure that the workload is not excessive for the pilot making the decision to land or execute a missed approach. This enables that person to concentrate on the supervision and decision-making process.
- 3.3.6 The procedures and instructions should be compatible with the limitations and mandatory procedures contained in the flight manual and cover the following items:
- checks for the satisfactory functioning of the aircraft equipment, both before departure and in flight
  - procedures for the approach, flare, landing, rollout and missed approach
  - procedures to be followed in the event of failures, warnings and other non-normal situations
  - allocation of crew duties to allow the pilot in command to concentrate on supervision and decision making
  - operating limitations resulting from airworthiness certification
  - including the record of practice autoland operations in the operator's system for recording approach and/or automatic landing success and failure
  - any requirements for a technical log entry to be made regarding the system functionality after completing an autoland event.