



## PRINCIPLE

# (OPS.12) Aircraft low visibility operations

April 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 the places to which we travel for work. We also acknowledge the Traditional Custodians' continuing connection to land, water and community. We pay our respects to Elders, past and present.

Inside front cover artwork: James Baban.

© Civil Aviation Safety Authority

All material presented in this Guidance document is provided under a Creative Commons Attribution 4.0 International licence, with the exception of the Commonwealth Coat of Arms (the terms of use for the Coat of Arms are available from the [It's an Honour website](#)). The details of the relevant licence conditions are available on the Creative Commons website, as is the full legal code for the CC BY 4.0 license.



Attribution

Material obtained from this document is to be attributed to CASA as:

© Civil Aviation Safety Authority 2023.

# Contents

|                                                                                |           |
|--------------------------------------------------------------------------------|-----------|
| <b>Terminology</b>                                                             | <b>5</b>  |
| Acronyms and abbreviations                                                     | 5         |
| Definitions                                                                    | 7         |
| Reference to regulations                                                       | 8         |
| Reference to operator                                                          | 9         |
| Reference to flight operations documentation                                   | 9         |
| <b>1. Assessment scope</b>                                                     | <b>10</b> |
| 1.1 Assessment of initial application                                          | 10        |
| 1.2 Assessment of a significant change application                             | 10        |
| 1.3 Assessment worksheet user instructions                                     | 11        |
| <b>2. Aircraft assessment</b>                                                  | <b>12</b> |
| 2.1 General                                                                    | 12        |
| 2.1.1 Previous CAT II and/or CAT III experience                                | 12        |
| 2.1.2 Variation to an existing LVO approval                                    | 12        |
| 2.1.3 Onsite inspection                                                        | 13        |
| 2.1.4 Aircraft eligibility                                                     | 13        |
| 2.1.5 Aircraft certification and modification status for LVO                   | 13        |
| 2.1.6 Operational credit: Head-up display guidance and enhanced vision systems | 13        |
| <b>3. Airworthiness assessment</b>                                             | <b>14</b> |
| 3.1 Airworthiness documentation                                                | 14        |
| 3.2 Maintenance programs                                                       | 14        |
| 3.3 Maintenance personnel training                                             | 15        |
| 3.4 Defect and reliability reports                                             | 15        |
| <b>4. Flight operations assessment</b>                                         | <b>16</b> |
| 4.1 Flight operations documentation                                            | 16        |
| 4.1.1 Operational considerations                                               | 16        |
| 4.1.2 Example flight operations documentation                                  | 17        |
| 4.2 LVO operational credits                                                    | 18        |
| 4.2.1 Low visibility take-off (LVTO)                                           | 18        |
| 4.2.2 Precision approach – special authorisation category I (SA CAT I)         | 19        |
| 4.2.3 Precision approach – category II (CAT II)                                | 20        |
| 4.2.4 Precision approach – special authorisation category II (SA CAT II)       | 21        |
| 4.2.5 Precision approach – category III (CAT III)                              | 22        |
| 4.3 LVO outside Australian territory                                           | 24        |
| 4.4 LVO validation                                                             | 24        |
| 4.5 Aircraft monitoring                                                        | 24        |
| <b>5. Required aerodrome/runway facilities</b>                                 | <b>26</b> |
| 5.1 Failed or downgraded equipment                                             | 26        |
| <b>6. Flight crew qualifications and training</b>                              | <b>29</b> |
| 6.1 Experience                                                                 | 29        |
| 6.2 Flight crew training and checking                                          | 29        |
| 6.2.1 Training facilities                                                      | 30        |

|           |                                      |           |
|-----------|--------------------------------------|-----------|
| 6.2.2     | Ground training syllabus             | 30        |
| 6.2.3     | FSTD training syllabus               | 31        |
| 6.2.4     | Supervised line flying syllabus      | 32        |
| 6.3       | Recurrent training/competency        | 32        |
| 6.4       | Re-qualification training/competency | 33        |
| 6.5       | Aircraft type/differences training   | 33        |
| 6.6       | Command upgrade training             | 33        |
| 6.7       | Recency                              | 33        |
| <b>7.</b> | <b>Revision history</b>              | <b>35</b> |

---

# Terminology

## Acronyms and abbreviations

Table 1. List of acronyms and abbreviations

| Acronym/abbreviation | Description                                         |
|----------------------|-----------------------------------------------------|
| AC                   | advisory circular                                   |
| AFM                  | aircraft flight manual                              |
| AH                   | alert height                                        |
| AIP                  | Aeronautical Information Publication                |
| ALS                  | approach lighting system                            |
| AMP                  | approved maintenance program                        |
| ATC                  | air traffic control                                 |
| Autoland             | automatic landing                                   |
| CASA                 | Civil Aviation Safety Authority                     |
| CASR                 | <i>Civil Aviation Safety Regulations 1998</i>       |
| CAT                  | category                                            |
| DH                   | decision height                                     |
| DME                  | distance measuring equipment                        |
| END                  | runway stop-end reporting location (related to RVR) |
| EVS                  | enhanced vision system                              |
| FAA                  | Federal Aviation Administration                     |
| FATAOC               | Foreign Air Transport Air Operator's Certificate    |
| FGS                  | flight guidance system                              |
| FO                   | fail-operational                                    |
| FP                   | fail-passive                                        |
| FSTD                 | flight simulator training device                    |
| GPS                  | global positioning system                           |
| HGS                  | head-up guidance system                             |
| HUD                  | head-up display                                     |
| ICAO                 | International Civil Aviation Organization           |

| Acronym/abbreviation | Description                                          |
|----------------------|------------------------------------------------------|
| ILS                  | instrument landing system                            |
| LVO                  | low visibility operations                            |
| LVP                  | low visibility procedures                            |
| LVTO                 | low visibility take-off                              |
| MEL                  | minimum equipment list                               |
| MID                  | runway mid-point reporting location (related to RVR) |
| MOS                  | Manual Of Standards                                  |
| NAA                  | National Aviation Authority                          |
| NOTAM                | Notice To Airmen                                     |
| OEM                  | Original Equipment Manufacturer                      |
| OPC                  | operator proficiency check                           |
| Ops Spec             | Operations Specification                             |
| PF                   | pilot flying                                         |
| PIC                  | pilot-in-command                                     |
| PM                   | pilot monitoring                                     |
| RA                   | radio altimeter                                      |
| RCLL                 | runway centre line light(s)                          |
| RCLM                 | runway centre line marking(s)                        |
| REDL                 | runway edge light(s)                                 |
| RTO                  | rejected take-off                                    |
| RV                   | runway visibility                                    |
| RVR                  | runway visual range                                  |
| SA CAT               | special authorisation category                       |
| STC                  | supplemental type certificate                        |
| TDZ                  | touchdown zone                                       |

## Definitions

**Note:** Most of these terms are taken from International Civil Aviation Organisation (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 ‘\*\*’

**Table 2. List of definitions**

| Term                                   | Definition                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| appointed person                       | A person appointed by an aerodrome operator as a runway visibility assessor in accordance with the Part 139 Manual of Standards (MOS) section 23.08.                                                                                                                                                                                         |
| alert height                           | A height above the runway threshold, based on the characteristics of the aeroplane and its fail-operational landing system, above which a category III operation would be discontinued, and a missed approach initiated if a failure occurred in one of the redundant parts of the landing system or in the relevant ground equipment. [FAA] |
| better weather conditions              | Weather conditions (cloud ceiling height and visibility) better than the minima specified for CAT I.                                                                                                                                                                                                                                         |
| 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]                                                                                                                                                                                                  |
| controlling zone RVR                   | In relation to RVR or runway visibility (RV), means the reported value of one or more RVR or RV reporting locations (touchdown, mid-point, and stop-end) used to determine whether operating minima are or are not met. *                                                                                                                    |
| enhanced vision system (EVS)           | A system to display electronic real-time images of the external scene achieved through the use of image sensors. [ICAO]                                                                                                                                                                                                                      |
| experienced                            | CAT II - an operator who has held an approval for CAT II operations with RVR minima of 300 m or less for at least 1 year.<br>CAT III - an operator who has held an approval for CAT III operations with RVR minima of 175 m or less for at least 1 year.                                                                                     |
| fail-operational flight control system | A system capable of completing the specified phases of an operation, following the failure of any single system component, after passing a point designated by the applicable safety analysis (e.g. alert height) [FAA].                                                                                                                     |

| Term                                                    | Definition                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| fail-passive flight control system                      | A system which, in the event of a failure, causes no significant deviation of aircraft flight path or attitude. [FAA].                                                                                                                                                                                                                                                             |
| head-up display (HUD)                                   | A display system that presents flight information into the pilot's forward external field of view. [ICAO]                                                                                                                                                                                                                                                                          |
| low-visibility precision approach                       | means an approach using minima for a runway that are below the category I precision approach minima for the runway published in the AIP.                                                                                                                                                                                                                                           |
| low-visibility operation                                | means:<br>a low-visibility take-off; or<br>a low-visibility precision approach.                                                                                                                                                                                                                                                                                                    |
| low visibility procedures                               | Procedures applied at an aerodrome for protecting aircraft operations during low visibility operations. *                                                                                                                                                                                                                                                                          |
| low-visibility take-off                                 | means a take-off with a runway visual range lower than 550 m.*                                                                                                                                                                                                                                                                                                                     |
| radio altimeter (RA) height                             | The indication on a radio altimeter of the vertical distance between a point on the nominal glidepath at the decision height and the terrain directly beneath this point.                                                                                                                                                                                                          |
| runway visual range (RVR)                               | means the range, measured using an electronic instrument, over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.<br><br>Note: Within Australia, the term runway visual range (RVR) is used exclusively in relation to RVR measured by an instrumented system. |
| runway visibility (RV)                                  | The distance along a runway over which an appointed person can see and recognise a visibility marker or runway lights. *                                                                                                                                                                                                                                                           |
| simulator                                               | A flight simulator certified to a least level C, in accordance with Part 60 Manual of Standards (MOS), with:<br>flight management and guidance systems relevant to the LVO conducted by the operator<br>relevant low visibility runway modelling and lighting standards for taxiways, runways, and approach lighting systems. *                                                    |
| 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:<br>a DH lower than 200 ft, but not lower than 100 ft<br>an RVR not less than 300 m.*                                                                                                                                    |

## Reference to regulations

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



## Reference to operator

In this principle the term 'operator' refers to an organisation or individual.

## Reference to flight operations documentation

In this principle the term 'flight operations documentation' refers to an operations manual, exposition or other documentation to support low visibility operations (LVO).

# 1. Assessment scope

## 1.1 Assessment of initial application

An approval to conduct low visibility operations (LVO) under regulation 91.315 can be granted to an operator under Part 119, Part 138, Part 141 or Part 142, or to an individual that conducts operations under Part 91.

To be assessed for approval, the applicant must provide:

- evidence that the aircraft is eligible and has type certification or a supplemental type certificate (STC) to support the LVO approval requested
- the flight operations documentation or other documentation to support the approval.

Take-off and landing minima are established by Division 91.D.4 of CASR. The take-off and landing minima requirements are contained in the Part 91 Manual of Standards (MOS).

The lowest of the prescribed standard minima (operational credits) permitted without a specific LVO approval are:

- for take-off – a visibility not less than 550m runway visual range (RVR)
- for landing – not less than precision approach Category I (CAT I) minima.

The following types of LVO (operational credits) require an assessment prior to the grant of an approval:

- low visibility take-off (LVTO) for a take-off visibility less than 550m RVR
- precision approach—special authorisation category I (SA CAT I)
- precision approach—category II (CAT II)
- precision approach—special authorisation category II (SA CAT II)
- precision approach—category III (CAT III) – including CAT IIIA and CAT IIIB where applicable.

**Note:** ICAO, and many States, are no longer required to refer to CAT IIIA, B or C. CAT III is the term used to cover all CAT III precision approach operations. In accordance with ICAO, for CAT III, the highest category with the lowest minima is the limiting precision approach operation required to be placed on the Operations Specification (Ops Spec). Foreign operators are less likely to refer to CAT IIIA/B.

Where reference is made to enhanced vision systems (EVS) and head up display/head up guidance systems (HUD/HGS), approval to use these specific systems for operational credit is subject to a separate specific approval assessment for each type of system.

**Note:** CASA currently does not provide operational credit for EVS.

## 1.2 Assessment of a significant change application

An approval under regulation 91.045 to conduct LVO, including a variation to a current approval, is a significant change under regulations 119.020, 138.012, 141.025 and 142.030. Inspectors must complete the approval data sheet to support the significant change.

## 1.3 Assessment worksheet user instructions

An LVO application will require a flying operations inspector and an airworthiness inspector to complete the worksheet.

This principle provides guidance to the inspector(s) when using the associated *Worksheet (OPS.12) Aircraft low visibility operations*. The worksheet provides inspectors with a regulation-based tool for recording the outcomes of the assessment. It is set out as follows:

- user instructions
- assessment worksheets
- assessment summary
- approval data sheet.

## 2. Aircraft assessment

### 2.1 General

The extent of the assessment for an initial LVO approval is based on the specific types (category) of LVO applied for in the application form (CASA-04-5691).

The application may be for an LVTO approval only, or a combination of an LVTO approval and other types/category of LVO (e.g. LVTO and SA CAT I etc.).

The assessment of an initial LVO approval is applicable to operators with no previous LVO experience (refer AC 91-11). The operator and flight crew will have, as a minimum, the following experience with the aircraft type prior to applying for an initial LVO approval:

- a six-month demonstration of maintenance and flight crew operations
- if the requested DH is 50ft or higher, at least 30 landings in CAT I conditions (or better) using the low visibility landing procedures and the system installed in each applicable aircraft type or variant
- if the requested DH is less than 50ft, at least 100 landings in CAT I conditions (or better) using the low visibility landing procedures and the system installed in each applicable aircraft type or variant.

#### 2.1.1 Previous CAT II and/or CAT III experience

A fast track LVO approval may be considered depending on previous operator experience in conducting LVO, including experience in other aircraft types.

The inspector should refer to the recommendations in sections 8.7.6 to 8.7.18 of AC 91.11 (where applicable) when considering fast track LVO approvals based on operator's previous CAT II and/or CAT III operations.

An operator with previous CAT II LVO experience may apply for a reduction in the requirements for:

- CAT III approval for existing aircraft type
- CAT II approval for new aircraft type.

An operator with previous CAT III LVO experience may apply for a reduction in the requirements for:

- CAT III approval at different airports and runways
- CAT III approval for new upgraded aircraft systems
- CAT III approval for new type or variant of the same type
- CAT II approval for new type of variant of the same type
- SA CAT II and SA CAT I.

To be suitable the inspector should consider the following:

- before approving CAT II – operator has 6 months experience of CAT I operation
- before approving CAT III with DH less than 100ft – operator has conducted at least 100 approaches
- before approving CAT III no DH – operator has 6 months of CAT II/III operational experience.

#### 2.1.2 Variation to an existing LVO approval

The extent of the assessment for a variation to an existing LVO approval is based on the additional types/category of LVO applied for in the application form (CASA-04-5691).

The application may be to add an LVTO approval with a lower take off RVR minima or a combination of an additional amended LVTO approval and additional types/category of LVO (e.g. LVTO to a lower take off minima and addition of SA CAT II etc.).

### 2.1.3 Onsite inspection

Depending on the operator's maturity and previous LVO experience, CASA may require the operator to successfully complete a validation assessment of the flight simulator training device (FSTD) and/or the specific aircraft. (Refer to section 4.4 of this principle)

### 2.1.4 Aircraft eligibility

Initial assessment of the aircraft eligibility is required before the LVO specific approval assessment can continue. Normally CASA accepts certification processes by recognised foreign States, however, in some circumstances may certify an individual aircraft. The inspector must confirm that the aircraft flight manual (AFM) for the aircraft states that the aircraft is certified for the operational credits requested.

### 2.1.5 Aircraft certification and modification status for LVO

The inspector must confirm that the specific aircraft is type certified for the requested LVO (e.g. LVTO for a specific RVR and/or approach and landing category).

The operator is required to provide evidence that the specific aircraft, or aircraft type and model, is certified by the State of design and that the Original Equipment Manufacturer (OEM) has provided evidence in the AFM, or other equivalent documentation, that the aircraft is certified to support the requested LVO.

In circumstances where the aircraft has been modified by an engineering organisation other than the OEM, evidence must be provided to CASA that a valid STC, or equivalent, has been issued for the specific aircraft/equipment in support of the requested LVO.

All limitations and/or conditions placed on the aircraft by the OEM, and/or issued STC, must be reflected in the flight operations documentation, and where required, annotated in the LVO section of the Ops Spec.

If the aircraft is not certified for the requested LVO, then the approval cannot proceed. The inspector should refer the application to the Airworthiness and Engineering Branch (AEB) for further information.

### 2.1.6 Operational credit: Head-up display guidance and enhanced vision systems

Operational credit may be granted if the operator has specific approval for the use of HUD/HGS and/or approval to conduct operations with EVS.

Note: EVS are not CASA approved for operational credit.

## 3. Airworthiness assessment

To support the LVO approval, specific airworthiness processes and procedures are required to be implemented, along with adequate training for all relevant personnel engaged in the maintenance and continuing airworthiness. (Refer to section 4 of AC 91.11)

The operator is required to provide specific documentation to support the requested LVO.

The airworthiness assessment must be conducted in accordance with AC 91-11—Aeroplane low visibility operations.

### 3.1 Airworthiness documentation

The operator's airworthiness documentation must outline the LVO specifications conducted by the operator and include a description of the arrangements for managing continuing airworthiness of the operator's aircraft.

The operator, should have continuing airworthiness control maintenance documentation / maintenance control manual (or equivalent suite of documents) detailing the management of the airworthiness of the operator's aircraft in support of the LVO. Example documents may include:

- aircraft maintenance program
- system of maintenance
- reliability program.

The airworthiness documentation should include the following in support of the requested LVO:

- reference to the required onboard aircraft equipment
- maintenance personnel responsible for ensuring ongoing compliance and effectiveness of the continuing airworthiness of the aircraft.

In circumstances where the operator's specific aircraft minimum equipment list (MEL) considers the requested LVO, and where aircraft systems interface with other systems, the specific aircraft MEL should address the impact of the unserviceable equipment on the other systems and the effect on the requested LVO.

### 3.2 Maintenance programs

In support of the requested LVO, the operator is required to provide evidence of an implemented and approved maintenance program (AMP), approved systems of maintenance or a maintenance schedule specific to the aircraft and onboard aircraft systems. (Refer to section 4.2.4 of AC 91.11)

The operator must ensure that the contracted maintenance organisation has the appropriate training, tooling and facilities to conduct maintenance of on-board equipment and aircraft systems in support of the requested LVO.

The operator's maintenance program is required to ensure that aircraft systems are maintained and calibrated in accordance with the airworthiness approval for the requested LVO.

The operator is required to have processes and procedures in place to ensure that, during any maintenance activity, only compliant parts and/or components, including software, are installed in accordance with the airworthiness approval.

The operator's AMP should include instructions for continuing airworthiness of those components and/or equipment issued by the type certificate or STC holder.

Reliability programs, when required, should monitor the applicable status of the equipment fitted to the aircraft to support the requested LVO.

If the operator does not have a reliability program, the inspector should ensure the operator's maintenance program includes applicable requirements, scaled for the specific operation, to monitor the status of the equipment fitted to the aircraft in support of the requested LVO.

In circumstances where an aircraft no longer complies with the airworthiness requirements to support LVO, the flight operations documentation should detail processes and procedures to allow notification to flight crew and flight dispatchers to facilitate flight planning.

### **3.3 Maintenance personnel training**

In support of the requested LVO, the operator, and/or Part 145 approved maintenance organisation, is required to ensure that applicable initial qualifications, and recurrent and requalification training programs are provided for the relevant maintenance personnel.

A syllabus of training should be provided for review as part of the LVO approval assessment process.

### **3.4 Defect and reliability reports**

Defect reporting and reliability to support LVO are managed by the aircraft continuing airworthiness program. Flight operations documentation should provide guidance to flight crew to report the successful conduct, or otherwise, of an autoland operation. To be suitable, the flight operations documentation should provide advice to flight crew on what constitutes a successful autoland. For example:

- maximum distance from centre line
- landing in the correct touchdown zone (TDZ)
- quality of autoland touchdown.

## 4. Flight operations assessment

To support LVO approval, specific LVO flight operations processes and procedures are required to be implemented, along with the training and checking requirements.

The operator is required to provide specific documentation to support the requested LVO operational credits.

The flight operations assessment must be conducted in accordance with referencing AC 91-11—Aeroplane low visibility operations.

### 4.1 Flight operations documentation

The operator's flight operations documentation must outline the LVO conducted by the operator.

Flight operations documentation includes the following:

- Aircraft Flight Manual (AFM)
- Flight Crew Operating Manual (FCOM)
- Quick Reference Handbook (QRH)
- Flight Crew Training Manual (FCTM)
- Minimum Equipment List (MEL) – operator/aircraft specific
- Route manual – including approved aerodromes for LVO, approach chart provider and details of the relevant LVO aerodrome operating minima.

The flight operations documentation must provide instructions and procedures to support LVO, including as a minimum:

- normal procedures
- checklists
- crew co-ordination and monitoring requirements
- standard call outs
- crew briefings
- non-normal procedures
- special environmental considerations for LVO.

#### 4.1.1 Operational considerations

The flight operations documentation must provide detailed operational information, including air traffic control (ATC) and aerodrome requirements.

To be suitable, the flight operations documentation should include:

- RVR minima and/or, for LVTO, required pilot assessed RVR
- aerodrome required equipment (e.g. instrument landing system (ILS))
- aerodrome lighting requirements
- visual segment
- required RVR reporting points (i.e. Touchdown, Mid, End)
- runway protection requirements
- lateral guidance system (if required for LVTO)
- procedures for manual approach and landing
- procedures for autopilot approach and landing (e.g. autoland)
- fail-passive (FP) as it effects the operation



- fail-operational (FO) as it effects the operation
- decision height (DH)
- alert height (AH) where applicable
- planning minima for normal operations
- planning minima (if taking LVO into account for EDTO)
- alternate minima
- low visibility taxi procedures
- recency requirements for LVO – including LVTO
- procedures for the conduct of LVO at international destinations and selected alternate aerodromes outside Australia – considering specific requirements of the State.

In addition to normal procedures to support the LVO, operators should include, in detail, the required procedures for situations of downgraded and/or failed aerodrome equipment/systems. The processes and procedures should include specific reference to FP and FO and the effect of the downgraded and/or failed aircraft equipment on the relevant LVO.

#### 4.1.2 Example flight operations documentation

To be suitable, the flight operations documentation should include the following information relating to the LVO operational credits:

- definitions relevant to LVO
- normal and non-normal LVO procedures
- low visibility take-off
- LVO approach and landing:
  - specific airport authorisations
  - modes of operation
  - status of aircraft approach recency
  - specific minima for the applicable LVO
  - LVO specific briefings
  - taxiing in low visibility conditions
  - statement that autopilot/flight director must be used wherever possible
  - dispatch planning
  - fuel considerations for LVO
  - minimum visual references for take-off, approach and landing
  - approach ban and RVR requirement
  - aircraft performance considerations
  - crosswind limits
  - effect of pre-threshold terrain
  - stabilised approach criteria
  - correct eye/seating position
  - clearly defined 'pilot flying' and 'pilot not flying' duties
  - use of automatic flight control systems
  - LVO checklist and crew responsibility
  - radio communications and crew responsibility

- monitoring and cross-checking requirements of instrument and radio aids
- LVO standard call outs
- standard missed approach procedures.
- contingency procedures, including:
  - MEL status
  - system/equipment downgrades (both aircraft and aerodrome)
  - failures above and below DH/AH
  - ILS deviation warnings
  - autopilot disconnect
  - auto throttle disconnect
  - autobrake failure
  - electrical failures
  - engine failure, including failure prior to and above V1
  - failures and loss of visual reference at or below DH/AH
  - pilot incapacitation.

## 4.2 LVO operational credits

To be suitable, the inspector must ensure the flight operations documentation includes the following – as relevant to the operational credit requested:

- low visibility take-off (LVTO)
- precision approach – special authorisation category I (SA CAT I)
- precision approach – category II (CAT II)
- precision approach – special authorisation category II (SA CAT II)
- precision approach – category III (CAT III).

### 4.2.1 Low visibility take-off (LVTO)

An applicant can apply for an approval to conduct LVTO without applying for an approval for LVO approach and landing. An LVTO approval is required when requesting to operate with a take-off reported visibility of less than 800 m or an RVR reported or assessed visibility of less than 550 m.

LVTO can be approved to 125 m RVR, below which specific aircraft equipment is required to gain operational credit for visibilities down to no lower than 75 m RVR. An example of aircraft equipment that can be used to gain operational credits is a HUD guidance system, or an approval lateral guidance system.

At aerodromes not equipped with RVR equipment, or where one or more RVR sensors are unserviceable, a runway visibility (RV) assessment may, under certain circumstances, be substituted to assess visibility. (Refer to AC 91-11)

An RV assessment is a report on the visibility in the TDZ and MID reporting location, by an appointed person in accordance with the procedures implemented by the aerodrome operator. The lower limit of RV permitted to be reported is 350 m. However, if the RV is below 350 m, the RV can still be reported as 'less than 350 m'.

An RV assessment cannot be used as a substitute for a required RVR observation, and cannot be used for the conduct of LVTO in visibility less than 350 m.

A pilot may assess the RVR, or permitted RV, in the initial part of the take-off run, provided the flight operations documentation includes instructions to facilitate the assessment by the pilot.

To be approved for LVTO, the applicant must detail the procedures for use of specific aircraft equipment, aerodrome lighting, low visibility taxi and (if required) advising ATC of the need to protect guidance provided by an ILS.

Refer to AC 91-11 for the specific requirements.

**Table 3. LVTO operational credits**

| LVTO minima  | Requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>350 m</b> | Illuminated runway edge lighting (REDL) at spacing intervals not exceeding 60 m.<br>Runway centre line markings (RCLM) or illuminated runway centre line lighting (RCLL).<br>RVR or RV: TDZ and either MID or END information.                                                                                                                                                                                                                                                                                    |
| <b>200 m</b> | Illuminated high intensity REDL <sup>1</sup> at spacing intervals not exceeding 60 m.<br>Illuminated RCLL.<br>RVR: TDZ and either MID or END information.                                                                                                                                                                                                                                                                                                                                                         |
| <b>150 m</b> | Illuminated high intensity REDL at spacing intervals not exceeding 60 m.<br>Illuminated RCLL.<br>RVR: TDZ, MID and END information.                                                                                                                                                                                                                                                                                                                                                                               |
| <b>125 m</b> | Illuminated high intensity REDL at spacing intervals not exceeding 60 m.<br>Illuminated RCLL at spacing intervals not exceeding 15 m.<br>RVR: TDZ, MID and END information.                                                                                                                                                                                                                                                                                                                                       |
| <b>75 m</b>  | Aircraft equipped with a certified lateral guidance system (including a HUD or other approved systems) for take-off.<br>If lateral guidance system requires GLS/ILS localiser input, then, runway protection, and localiser facilities equivalent to CAT IIIB (ILS classification III/E/4) landing operations need to be provided.<br>Illuminated high intensity REDL at spacing intervals not exceeding 60 m.<br>Illuminated RCLL at spacing intervals not exceeding 15 m.<br>RVR: TDZ, MID and END information. |

## 4.2.2 Precision approach – special authorisation category I (SA CAT I)

SA CAT I is the procedure for when an otherwise approved precision approach – CAT II operation can conduct a CAT I approach operation to a lower minima than standard CAT I.

Aircraft are eligible for SA CAT I operations if they are certified for CAT II operations and equipped with either:

- a HUD system used at least until the DH or initiation of missed approach (HUD is certified for at least CAT II operations)
- an approved FO or FP autoland system used at least until touchdown.

SA CAT I approaches should be conducted in accordance with the following provisions as detailed in flight operations documentation:

- the TDZ RVR is required and is controlling
- a MID RVR report can't be substituted for the TDZ RVR report in SA CAT I operations.
- the pilot-in-command (PIC) should not continue an approach below the SA CAT I DH unless the following visual references have been established and can be maintained:
  - at least 3 consecutive longitudinally aligned lights – being either the centreline of the approach lighting system (ALS), the TDZ lights, RCLL, REDL, or a combination of these lights

<sup>1</sup> High intensity REDL is also known as high-intensity runway lighting (HIRL).

- a lateral element of lighting – being either an approach lighting crossbar, landing threshold or a barrette of TDZ lights (unless the approach is conducted using a HUD ).

## Approach ban

The TDZ RVR is controlling with visibility of 450m. MID and END RVR values are advisory unless the operator prescribes otherwise and makes them controlling. Refer to AC 91-11 for the specific requirements.

**Table 4. SA CAT I operational credits**

| DH (RA) | TDZ RVR | MID RVR (advisory) | END RVR (advisory) |
|---------|---------|--------------------|--------------------|
| 150 ft  | 450 m   | 125 m              | 75 m               |

Note: An RV assessment cannot be used as a substitute for required RVR.

## 4.2.3 Precision approach – category II (CAT II)

CAT II approach minima are designed to allow sufficient visual reference to permit a manual landing.

Aircraft are eligible for CAT II operations if certified and equipped with a flight guidance or control system relevant to the operation, which includes:

- For operations with an RVR of not less than 350 m, one of the following:
  - an autopilot certified for precision approach – CAT II operations
  - a HUD system certified for precision approach – CAT II or CAT III operations
  - a flight director system or command guidance information certified for precision approach – CAT II operations that are provided for both pilots.
- For operations with an RVR of not less than 300 m, one of the following:
  - a certified FO or FP autoland system
  - a HUD system certified for precision approach – CAT III operations.

CAT II approaches should be conducted in accordance with the following provisions:

- TDZ RVR is required and is controlling
- MID RVR or END RVR is required
- the PIC should not continue an approach below the precision approach CAT II DH unless the following visual references have been established and can be maintained:
  - at least 3 consecutive longitudinally aligned lights – being either the centreline of the ALS, the TDZ lights, RCLL, REDL, or a combination of these lights
  - a lateral element of lighting – being either an approach lighting crossbar, landing threshold or a barrette of TDZ lights (unless the approach is conducted using HUD to touchdown).

## Approach ban

The TDZ RVR is controlling with visibility of 350 m or 300 m. The MID and END RVR values are advisory unless the operator prescribes otherwise and makes them controlling.

Refer to AC 91-11 for the specific requirements.

Table 5. CAT II operational credits

| Aircraft flight guidance certification                  | DH (RA) | TDZ RVR | MID RVR | END RVR |
|---------------------------------------------------------|---------|---------|---------|---------|
| <b>CAT III (autoland or HUD to touchdown)</b>           | 100 ft  | 300 m   | 125 m   | 75 m    |
| <b>CAT II (flight guidance or control system to DH)</b> | 100 ft  | 350 m   | 125 m   | 75 m    |

Note: An RV assessment cannot be used as a substitute for required RVR.

#### 4.2.4 Precision approach – special authorisation category II (SA CAT II)

SA CAT II approach permits an otherwise approved CAT II operation where some or all the elements of the CAT II lighting system are not available, provided additional mitigating measures are implemented and assured.

Aircraft are eligible for SA CAT II operations if certified for precision approach CAT III operations and equipped with either:

- an autoland system certified FO or FP to touchdown
- a HUD system certified to touchdown.

SA CAT II approaches should be conducted in accordance with the following provisions:

- TDZ RVR is required and is controlling
- MID RVR or END RVR is required
- the PIC should not continue an approach below the precision approach SA CAT II DH unless the following visual references have been established and can be maintained:
  - at least 3 consecutive longitudinally aligned lights – being either the centreline of the ALS, the TDZ lights, RCLL, REDL, or a combination of these lights
  - a lateral element of lighting – being either an approach lighting crossbar, landing threshold or a barrette of TDZ lights (unless the approach is conducted using HUD to touchdown).

#### Approach ban

The TDZ controlling RVR visibility applicable to the aircraft category MID and END RVR values are required but not controlling unless the operator prescribes otherwise and makes them controlling.

Refer to AC 91-11 for the specific requirements.

Table 6. SA CAT II operational credits

| Aircraft category | DH (RA) | TDZ RVR <sup>2</sup> | MID RVR | END RVR |
|-------------------|---------|----------------------|---------|---------|
| <b>A – C</b>      | 100 ft  | 350 m                | 125 m   | 75 m    |
| <b>D</b>          | 100 ft  | 400 m                | 125 m   | 75 m    |

<sup>2</sup> Actual minimum TDZ RVR limited if runway is not provided with RCLL or TDZ lights. See Table 8.

Note: An RV assessment cannot be used as a substitute for required RVR.

## 4.2.5 Precision approach – category III (CAT III)

CAT III approval is split between CAT IIIA and CAT IIIB, depending on certification and whether the autoland/rollout system is FO or FP. CAT III approaches are generally characterised by the absence of visual reference, necessitating automatic landing capability and in some circumstances rollout capability.

Aircraft are eligible for CAT IIIA operations if they are certified for CAT III operations and equipped with either:

- an FO or FP autoland system
- an FO or FP manual flight guidance system (FGS) – providing suitable head-up or head-down command guidance and suitable monitoring capability at least to touchdown
- a hybrid system using autoland capability as the primary means of landing.

Aircraft are eligible for CAT IIIB operations with an RVR in any reporting location of not less than 125 m if they are certified for CAT III operations and equipped with a flight guidance or control system that includes either:

- an FO landing system with an FO or FP automatic rollout system
- an FO hybrid autoland and rollout system with compatible manual FGS, using autoland capability as the primary means of landing.

Aircraft are eligible for CAT IIIB operations with an RVR of not less than 75 m if they are certified CAT III operations and equipped with **both**:

- a flight guidance or control system that includes one of the following:
  - an FO autoland system
  - a manual FGS certified to meet FO system criteria
  - a hybrid system in which both the FP automatic system and the monitored manual flight guidance components provide approach and flare guidance to touchdown, and in combination provide full FO capability.
- an FO rollout guidance or control system that can assure safe rollout to taxi speed, consisting of either:
  - an FO automatic rollout control system or FO manual flight guidance rollout system
  - a hybrid system consisting of at least a FP automatic rollout system and compatible FP manual flight guidance rollout control system.

CAT III approaches should be conducted in accordance with the following provisions:

- All RVR location reports are required, except in the following circumstances when RVR reporting locations are inoperative:
  - for operations using an FP landing system with an FP or FO rollout system – if either the MID or END RVR is temporarily inoperative, the operation may be conducted using the TDZ and remaining RVR reporting location
  - for operations using FO landing systems with an FP or FO rollout system – if any one of the RVR reporting locations is temporarily inoperative, the operation may be conducted using the 2 remaining RVR reporting locations.
- Visual reference CAT III (FP or FO) with a DH:
  - for CAT III operations utilising an FO landing system with a DH – the PIC must not continue an approach below the DH unless at least 1 centreline light has been established and can be maintained
  - for CAT III operations utilising an FP landing system with a DH – the PIC must not continue an approach below the DH unless at least 3 consecutive longitudinally aligned lights, being either the

centreline of the ALS, the TDZ lights, RCLL, REDL, or a combination of these lights, has been established and can be maintained

- for CAT III operations utilising an FO hybrid landing system with a DH – the PIC must not continue an approach below the DH unless at least 3 consecutive lights of the RCLL have been established and can be maintained.
- Visual reference CAT III FO with no DH:
  - the PIC is not required to see the runway prior to touchdown
  - the permitted RVR is dependent on the level of aircraft equipment
  - the CAT III runway may be taken to support operations with no DH unless notified or reported as unable, such as published in the Aeronautical Information Publication (AIP) or a Notice to Airmen (NOTAM).
- Landing CAT IIIA approach:
  - the flight guidance or control system (including a HUD) must be used until touchdown
  - if an FP or FO rollout system is required, the flight guidance or control system shall be used through touchdown and rollout.
- Landing CAT IIIB approach:
  - the flight guidance or control system must be used until touchdown and rollout.

Note: The minimum RVR approved by CASA is 75 m.

## Approach ban

CAT III operations TDZ RVR is controlling. MID and END RVR values are required but not controlling unless the operator prescribes otherwise and makes them controlling.

If TDZ RVR is not provided due to unserviceability, and it is permitted that the approach can be conducted using the MID and END RVR, then the substituted runway location RVR is required to be controlling.

Refer to AC 91-11 for the specific requirements.

**Table 7. CAT III operational credits**

| Approach Category    | Landing System | Rollout System | DH                                                       | TDZ RVR | MID RVR | END RVR |
|----------------------|----------------|----------------|----------------------------------------------------------|---------|---------|---------|
| CAT III or CAT III A | FO             | None           | < 100 ft or no DH <sup>3</sup>                           | 175 m   | 175 m   | 75 m    |
|                      | FP             | None           | 50 ft                                                    | 175 m   | 175 m   | 75 m    |
|                      | FP             | FP or FO       |                                                          | 175 m   | 125 m   | 75 m    |
| CAT III or CAT III B | FO             | FP             | < 50 ft or no DH <sup>Error! Bookmark not defined.</sup> | 125 m   | 125 m   | 75 m    |
|                      | FO             | FO             |                                                          | 75 m    | 75 m    | 75 m    |

Note: An RV assessment cannot be used as a substitute for required RVR

<sup>3</sup> If no DH is specified, then minimum specified in the AFM is required (e.g. some aircraft require insertion of an AH).

## 4.3 LVO outside Australian territory

Operators intending to conduct LVO outside Australian territory should detail, in their flight operations documentation, the following:

- a requirement to carry a copy of the Ops Spec on board, showing the LVO specific approval issued by CASA
- where applicable, a copy of the approval from the applicable foreign regulatory authority to conduct the relevant LVO.

## 4.4 LVO validation

For each aircraft type and runway combination, the operator should demonstrate a successful approach and landing in CAT II weather conditions (or better) before conducting CAT III operations. The demonstration can be conducted in the aircraft or a suitable FSTD. For the FSTD to be suitable, the inspector should confirm:

- the certification status of the FSTD
- the equipment fitted in the FSTD is the same equipment fitted to the relevant aircraft
- the FSTD has the correct updated runway modelling
- the FSTD software is up to date.

**Note:** Details should be provided of any differences between aircraft systems and those reflected in the FSTD.

For runways with irregular pre-threshold terrain and/or other deficiencies, the aircraft type and runway combination should be validated in the aircraft prior to commencement of LVO precision approaches. The validation should be conducted in CAT I conditions (or better) using the operator's low visibility procedures (LVP).

**Note:** Validation flights may be conducted during line operations.

To be suitable, the number of landings to be demonstrated will depend on:

- the operator's overall experience in LVO
- the number of aircraft available to the operator
- the availability of runways with low visibility precision approach – CAT II or CAT III procedures
- the inability to obtain air traffic services sensitive area protection during periods of non-LVP.

## 4.5 Aircraft monitoring

For precision approach – CAT II, SA CAT II and CAT III operations, the operator should establish and maintain a system for recording approach and/or automatic landing success and failure.

The operator should have an approach and landing recency requirement for each aircraft, based on the continuous monitoring program.

The operator's continuous monitoring program should retain, for the period specified, the following information:

- the total number of approaches, by aircraft type, during which the airborne precision approach – CAT II or CAT III equipment was used to make satisfactory, actual or practice approaches to the applicable precision approach – CAT II, SA CAT II or CAT III minima – retain for a period of 12 months



- reports of unsatisfactory approaches and/or autolands by aerodrome and specific aircraft (registration) in the following categories – retain for a period of 2 years:
  - airborne equipment faults
  - ground facility difficulties
  - missed approaches because of ATC instructions.
- other reasons.

## 5. Required aerodrome/runway facilities

The aerodrome/runway lighting facilities normally required for LVTO are set out in Table 3 of this principle.

Additionally, the aerodrome operator is required to publish the low visibility taxi procedures for the aerodrome – which should also be provided in the operator's flight operations documentation.

The aerodrome/runway facilities normally required for low visibility precision approaches are set out in **Error! Reference source not found.** of this principle, with the effect on landing minima of downgraded and/or failed aerodrome equipment detailed in Table 9 of this principle. The content of Table 8 and Table 9 should be the minimum information provided in the operator's flight operations documentation in relation to required aerodrome and runway facilities and guidance for downgrading of facilities and equipment.

### 5.1 Failed or downgraded equipment

To be suitable, the inspector should confirm that the flight operations documentation includes consideration of:

- failure or downgraded equipment for both pre-flight/dispatch and in-flight
- failed or downgraded equipment when announced prior to and after passing the approach bar
- the effect of failure or downgraded equipment on the approach minima, as set out in Table 9 (should be considered as the minimum information provided in the flight operations documentation).

For approach minima, the following conditions apply to failed and/or downgraded equipment and should be described in the flight operations documentation:

- Multiple failures of runway lighting, other than those permitted in Table 9 **Error! Reference source not found.**, are not acceptable
- deficiencies of approach and runway lights are permitted to be treated separately
- for CAT II and CAT III operations, a combination of deficiencies in runway lights and RVR assessment equipment are not permitted
- other than for ILS transmitter, failures only affect RVR minima requirements (i.e. not DH).

Table 8. Aerodrome facilities required for LVO precision approach

| Component                                                               | SA CAT I                                              | CAT II                                                                                   | SA CAT II                                             | CAT III                                                                                           |
|-------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>Minimum ILS classification<sup>4</sup></b>                           | HUD only:<br>Standard CAT I<br><br>Autoland:<br>I/T/1 | RVR $\geq$ 300 m:<br>II/T/2<br><br>RVR $<$ 300 m:<br>II/D/2                              | II/D/2                                                | RVR $\geq$ 200 m:<br>III/D/3<br><br>RVR $\geq$ 175 m:<br>III/E/3<br><br>RVR $<$ 175 m:<br>III/E/4 |
| <b>CAT I ALS</b>                                                        | Yes                                                   | Not required                                                                             | Yes                                                   | Not required                                                                                      |
| <b>CAT II/III ALS</b>                                                   | Optional                                              | Yes                                                                                      | Optional                                              | Yes                                                                                               |
| <b>Outer Marker, GPS, GLS or ILS Distance Measuring Equipment (DME)</b> | Yes                                                   | Yes                                                                                      | Yes                                                   | Yes                                                                                               |
| <b>Middle Marker</b>                                                    | No                                                    | No                                                                                       | No                                                    | No                                                                                                |
| <b>Inner Marker, GPS, GLS or ILS DME</b>                                | No                                                    | Yes                                                                                      | Yes                                                   | Yes                                                                                               |
| <b>Electronic RVR – TDZ</b>                                             | Yes                                                   | Yes                                                                                      | Yes                                                   | Yes                                                                                               |
| <b>Electronic RVR - MID<sup>5</sup></b>                                 | No                                                    | Yes                                                                                      | Yes                                                   | Yes                                                                                               |
| <b>Electronic RVR – END<sup>5</sup></b>                                 | No                                                    | No                                                                                       | No                                                    | Yes                                                                                               |
| <b>High Intensity REDL</b>                                              | Yes                                                   | Yes                                                                                      | Yes                                                   | Yes                                                                                               |
| <b>TDZ lights</b>                                                       | No                                                    | Yes                                                                                      | For RVR $<$ 450m but $>$ 400 m:<br>TDZ lights or RCLL | Yes                                                                                               |
| <b>RCLL</b>                                                             | No                                                    | RVR $\geq$ 350 m:<br>Yes – $\leq$ 30m spacing<br><br>RVR $<$ 350 m:<br>Yes – 15m spacing | For RVR $\leq$ 400 m:<br>RCLL                         | Yes                                                                                               |

<sup>4</sup> The ILS classification for each of the 3 alphanumeric characters specified for the facility must be equal to or better than each of the 3 alphanumeric values specified in the table for the particular procedure. For details of the ILS classification system, refer to Volume I of Annex 10 to the Chicago Convention.

<sup>5</sup> The requirement for both MID and END RVR is specifically determined by the operating minima – in some cases both are not required.

Table 9. Effect on landing minima of failed/downgraded equipment

|                                                            | SA CAT I                                                                             | SA CAT II                           | CAT II                                                          | CAT IIIA                                  | CAT IIIB with DH                                    | CAT IIIB (no DH)   |
|------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------|-------------------------------------------|-----------------------------------------------------|--------------------|
| ILS standby transmitter                                    | No effect                                                                            |                                     |                                                                 |                                           | RVR 200 m                                           | Not allowed        |
| Outer marker                                               | No effect if replaced by height check at a suitable point after glide path intercept |                                     |                                                                 |                                           |                                                     |                    |
| Middle marker                                              | No effect                                                                            |                                     |                                                                 |                                           |                                                     |                    |
| TDZ RVR                                                    | Not allowed                                                                          |                                     |                                                                 |                                           | Not allowed unless any two RVR values are available |                    |
| MID or END RVR                                             | No effect                                                                            |                                     |                                                                 |                                           |                                                     |                    |
| ALS                                                        | RVR 800 m                                                                            | RVR 700 m                           | Not allowed                                                     | Not allowed for operations with DH >50 ft |                                                     | No effect          |
| ALS except the last 210 m                                  | RVR 650 m                                                                            | RVR 600 m                           | Not allowed                                                     | No effect                                 |                                                     |                    |
| ALS except the last 420 m                                  | RVR 550 m                                                                            | RVR 450 m                           | No effect                                                       |                                           |                                                     |                    |
| Standby power for approach lighting                        | No effect                                                                            |                                     |                                                                 |                                           |                                                     |                    |
| Runway edge lights, threshold lights and runway end lights | Day: No effect                                                                       |                                     |                                                                 |                                           |                                                     |                    |
|                                                            | Night: not allowed                                                                   |                                     |                                                                 | Night: RVR 550 m                          | Night: no effect                                    |                    |
| RCLL                                                       | No effect                                                                            | If TDZ lights available: RVR 400 m  | Day: RVR 350 m                                                  | Day: RVR 300 m                            | Not allowed                                         | Day: RVR 200 m     |
|                                                            |                                                                                      | Otherwise: RVR 450 m                | Night: RVR 550 m or RVR 400 m with HUD to touchdown or autoland | Night: RVR 400 m                          |                                                     | Night: not allowed |
| RCLL spacing increased to 30 m                             | No effect                                                                            |                                     |                                                                 |                                           | RVR 150 m                                           |                    |
| TDZ lights                                                 | No effect                                                                            | If RCLL lights available: no effect | Day: RVR 300 m                                                  |                                           | Day: RVR 200 m                                      | No effect          |
|                                                            |                                                                                      | Otherwise: RVR 450 m                | Night: RVR 550 m                                                |                                           | Night: RVR 300 m                                    |                    |
| Taxiway light system                                       | No effect – except delays due to reduced movement rate                               |                                     |                                                                 |                                           |                                                     |                    |

## 6. Flight crew qualifications and training

### 6.1 Experience

The operator's training and checking system must include LVO.

Before conducting CAT II and CAT III LVO operations, it is expected that flight crew have the required minimum experience on the aircraft type. An example of the minimum experience on the aircraft type is:

- 50 hours or 20 sectors on the type, including supervised line flying; and
- 100m added to the applicable LVO RVR minima until 100hrs or 40 sectors, including supervised line flying, has been completed in the aircraft type.

#### Notes

- If the pilot has been previously qualified with another operator for equivalent operations, then 50 hours or 20 sectors on the aircraft type with the current operator is suitable.
- With the use of HUD, sectors are considered more important than hours acquired on type.

The training can be reduced, taking into consideration previous LVO experience, provided the flight operations documentation includes details of acceptable previous experience and the alternate training pathway. To be suitable, the inspector should consider the following:

- for LVTO – the specific number of take-off and landings in the type of aircraft within a 6-month period
- for CAT II – 6 months of previous CAT I operational experience
- for CAT III with DH less than 100ft – 6 months of CAT II operational experience
- for CAT III no DH – 6 months of CAT II/CAT III with DH operational experience.

The flight operations documentation should include a process to manage flight crew LVO qualifications. To be suitable, the process should include:

- the type of LVO and operational credit authorised
- flight dispatchers to have access to the lowest operational credit available for operating flight crew
- if flight crew are conducting international operations, an LVO qualification flight crew record card to be carried with the flight crew licence.

### 6.2 Flight crew training and checking

Training must include training to competency for each flight crew member for their specific operational capacity (i.e. pilot flying and pilot not flying).

The training should include the following phases of training in the aircraft type for the requested operational credits:

- LVO initial training (theory and practical)
- LVO initial competency
- LVO recurrent training and competency
- LVO re-qualification training
- LVO upgrade training
- LVO type transition training.

The required training covering all aspects of LVO, from LVTO through to CAT III with no DH, will vary dependant on the combination of specific types of LVO, the aircraft and the operational environment.

The operator should provide details of the number of approaches and landings, in actual aircraft or in an appropriate accredited simulator, that is required to be demonstrated to ensure competency for each LVO approval required.

In circumstances where supplemental equipment is used for operational credit, such as HUD or EVS, the operator is required to provide the training requirements for the use of the supplemental equipment, including non-normal procedures, in support of operational credit for the requested LVO.

At completion of the training, the training and checking system should include an operator proficiency check (OPC) to confirm competency – prior to supervised line flying.

### 6.2.1 Training facilities

The inspector should confirm that the operator has access to suitable training facilities, including but not limited to:

- classroom/briefing rooms
- an FSTD that is qualified by the relevant National Aviation Authority (NAA) for the required operational credits
- qualified instructors.

In circumstances where there is no FSTD representative of the aircraft type, training specific to the visual scenarios of low visibility approach operations should be conducted in a specifically approved FSTD. A minimum number of 4 approaches is recommended, thereafter type specific training should be carried out in the aircraft.

The operator should have processes and procedures in place to validate the FSTD used to support the requested LVO. The process should include the ability to monitor changes to the FSTD and/or aircraft that may affect the LVO accreditation.

### 6.2.2 Ground training syllabus

To be suitable, the inspector must be satisfied the ground training syllabus covers the aircraft type and operational credits requested. The following syllabus items should be considered:

- general concepts and appropriate definitions
- if required, the importance of AH, actions in the event of failures above and below the AH, and knowledge of aircraft or ground equipment failures not protected by the AH concept
- aerodrome visual aids, markings and lighting system
- the meaning of the phrase 'clear of the runway' with respect to runway exit light colours
- use and limitations of different types of RVR systems
- ILS characteristics, limitations and class of performance classification
- principles of obstacle clearance requirements for landing
- factors affecting the determination of minima
- effect of terrain profiles on radio altimeter readings at DH and on the autoland system
- characteristics of fog – homogeneous and non-homogeneous
- effects of cold temperature on the barometric altimeter's reading for the glide slope check
- effect of precipitation, ice accretion, low level windshear and turbulence
- actions to be taken in the event of airborne or ground equipment failures
- reversionary minima
- an understanding of any special aircraft maintenance requirements for LVO equipment (i.e. HUD ops)
- correct seating position
- qualification requirements for pilots to obtain and retain approval to conduct LVOs.

## 6.2.3 FSTD training syllabus

The following FSTD exercises should be considered in conjunction with the specific exercises in section 6.2.3.2 of this principle:

- normal operations with no failures (including HUD symbology if required)
- instruction on, and general application of, visual cues required for landings – especially CAT II
- check of satisfactory functioning of ground and aircraft equipment
- correct use of MEL and the effect of known unserviceabilities
- effects on minima caused by changes in the status of ground installations
- correct monitoring of automatic flight control systems and annunciators
- reduced operating limitations (i.e. crosswind limits as prescribed in FCOM/company procedures)
- maximum deviation allowed for glide slope and localiser
- actions to be taken in the event of failures or malfunctions of the following:
  - ILS transmitter and ILS receiver(s)
  - radio altimeter(s)
  - autopilot(s) and auto-thrust system
  - engine, electrical, hydraulic, flight control and instrumentation systems
  - autoland system indicated by lack of expected flight mode annunciators (e.g. flare, rollout).
- system failures pertinent to the aircraft type which would prevent an autoland when a failure occurs below the AH (i.e. auto-thrust failure)
- engine-out autoland and engine-out missed approach
- loss of visibility during take-off and below minima during approach
- pilot incapacitation during take-off and approach
- FP automatic landing approach with further system failure below minima
- windshear recovery
- contaminated runway training.

### 6.2.3.1 Specific training – LVTO (RVR less than 550m)

Sufficient exercises to ensure competency in the operational credits requested include:

- normal take-offs at maximum crosswind for conditions, and if fitted, with and without the HUD
- engine failure near V1 rejected take-off (RTO)
- engine failure at V1 (continue)
- loss of visibility at low speed (RTO) and after 80 kts (continue)
- pilot flying (PF) incapacitation
- deliberate runway centreline deviation
- windshear.

### 6.2.3.2 Specific training – SA CAT I, CAT II, SA CAT II and CAT III

Sufficient exercises to ensure competency in the operational credits requested include:

- normal operation
- approaches resulting in missed approaches due to either lack of visual reference at DH or loss of visibility below DH

- aircraft and ground system failures
- incapacitation of the pilot flying
- reversion to manual flight at or below CAT II DH to control flare, landing and rollout or missed approach
- reversion to higher minima
- fail-passive CAT IIIA approach with autopilot disconnect below minima
- engine failure during or before approach.

## 6.2.4 Supervised line flying syllabus

Supervised line flying may be part of the LVO qualification process where some of the LVO elements cannot be replicated in an FSTD.

The approval to use HUD for operational credit may require a certain number of approaches to touchdown in the aircraft in normal operation, and a certain number of landings using HUD for CAT III approach and landings. For SA CAT I, CAT II and SA CATII, when a manual landing or HUD/HGS is specified in the flight manual and used for the approach to touchdown, then to be suitable at least the following training should be carried out:

- 3 landings from an autopilot disconnect at the approach minima
- 4 landings with the HUD/HGS used to touchdown and roll out as appropriate.

For CAT III, where autoland is specified in the flight manual, then to be suitable at least the following training should be carried out:

- at least 2 autoland operations:
  - may be reduced to one landing required if relevant training carried out in a FSTD
  - may not be required if the FSTD used for training is accredited zero flight time for the applicable aircraft type.
- if using a HUD/HGS to touchdown and rollout, at least 4 approach and landings.

## 6.3 Recurrent training/competency

The periodic LVO recurrent training should be in accordance with the applicable sections of the flight operations documentation's training and checking manual. (Refer to section 7.5 of AC 91.11)

To be suitable, recurrent training should include a selection of elements from the initial training syllabus, both theory and practical.

LVO recurrent training should include an assessment of competency, considering aircraft weight and the following limiting conditions:

- minimum approved RVR
- limiting cross wind
- runway surface conditions.

An OPC including the following exercises should be conducted at least annually. If the applicant is an operator with an approved training and checking system, the exercises may be conducted across several OPC's over the 12-month period.

- LVTO:
  - take-off with an engine failure at or after V1
  - RTO near but prior to V1.
- SA CAT I, CAT II, SA CAT II, CAT III:
  - normal approach and landing
  - normal approach and missed approach with minimum RVR at the DH



- approach to landing or a missed approach with relevant aircraft system or flight guidance failure
- where applicable, approach and landing with one engine inoperative
- where applicable, landing using the automatic landing system
- where applicable, an automatic go around at or after DH/AH and before touchdown
- for CAT III with FP flight control system or procedures where dispatch with degraded system from FO to FP – conduct a missed approach because of autopilot failure with RVR 300m or less.

## 6.4 Re-qualification training/competency

Re-qualification training is required when recency requirements have not been maintained or have lapsed for an extended period. (Refer to section 7.6 of AC 91.11)

When the extended period is less than 3 years, completion of the recurrent training syllabus will be an acceptable method of re-establishing recency.

When the extended period is more than 3 years, completion of the initial training syllabus will be an acceptable method of re-establishing recency.

## 6.5 Aircraft type/differences training

Where a new aircraft type or a variant of the same type, the operator will need to determine what level of LVO differences training is required. Training may be conducted as part of a type rating/differences course or a standalone LVO course. The detail of each element of the training will depend on the specific differences across the aircraft and the specific details of the upgrade training. (Refer to sections 7.6, 7.7 and 7.8 of AC 91.11)

For example, the introduction of an aircraft fitted with a HUD/HGS may allow a reduction in the RVR required for take-off and/or landing.

The following is the recommended minimum content for an LVO differences training syllabus:

- consideration of flight crew members previous experience
- different technology used in the FGS
- different handling characteristics
- different operational procedures, including:
  - FP/FO
  - AH
  - manual landing or autoland
  - operations with DH and/or no DH operations.
- competency assessment.

## 6.6 Command upgrade training

In addition to command upgrade training, flight crew may also be authorised to conduct LVO from either the pilot or co-pilot positions. Training programs should include what LVO training is required to ensure competency to conduct LVO from the new position.

## 6.7 Recency

Recency requirements for the conduct of LVO are in addition to those required under Part 61—Flight crew licensing.

**Note:** an LVO approach will meet the recency requirements of Part 61.

If the flight crew member is authorised as pilot flying (PF) and pilot monitoring (PM), the flight crew member should complete the required number of approaches in each PF and/or PM operating capacity.

The inspector should consider the following recency as suitable (refer to section 7.9.4 of AC 91.11):

- For LVTO – the flight crew should have conducted, in the preceding 6 months, one of the following:
  - at least one LVTO
  - at least one take-off using the required LVTO aircraft equipment and procedures.
- To conduct an LVO precision approach, the flight crew must have conducted, in the preceding 90 days, one of the following :
  - at least one LVO precision approach of the same category (SA CAT I, CAT II, SA CAT II or CAT III) to a landing
  - at least one LVO precision approach of a higher category (lower minima) to a landing
  - where aircraft equipment and procedures required do not significantly vary between LVO precision approach category – at least one low visibility precision approach of any category to a landing.
- Recency of a specific LVO can be re-established by any of the following methods:
  - use of an FSTD
  - undertaking LVO recurrent training
  - line operations in visual meteorological conditions
  - during flight with an assigned check pilot
  - any other means specified in the operator's flight operations documentation.

Flight crew should have conducted a landing using automatic systems within the previous 12 months, otherwise recurrent training is required to re-establish recency.

## 7. Revision history

Amendments/revisions for this principle are recorded below in order of the most recent first.

**Table 10. Revision history table**

| Version No. | Date       | Parts / Sections | Details                     |
|-------------|------------|------------------|-----------------------------|
| 1.2         | April 2025 | 4.2.3            | Correction to RVR           |
| 1.1         | May 2024   | All              | Reformat to latest template |
| 1.0         | May 2023   | All              | First issue                 |