European and North
Atlantic Office

EUR Doc 013

EUROPEAN GUIDANCE MATERIAL ON ALL WEATHER OPERATIONS AT AERODROMES

Fourth Edition

For approval by the European Air Navigation Planning Group **September 2012**

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Preamble

History

1. The principles of the Low Visibility Procedures and the basis for All-Weather Operations in Europe have been defined in the ICAO Manual of All-Weather Operations (Doc No. 9365, 2nd Edition, 1991) and previously in ECAC.CEAC Doc No. 17.

2. When the requirement to implement the ICAO Global Strategy for introduction and application of non-visual aids to approach and landing was set up, the European Air Navigation Planning Group (EANPG) established the All Weather Operations Group (AWOG) which was tasked to deal with the related matters and manage the transition in the EUR region.

3. At the first meeting of AWOG (AWOG/1) in March 1996 information was presented concerning the status of Low Visibility Procedures (LVP) in the EUR Region and variations in the application of these procedures at various aerodromes. As a result, the AWOG established a Project Team on Low Visibility Procedures (PT/LVP) with the task of reviewing these procedures and identifying areas where further harmonization would be appropriate (Decision 1/6).

4. At AWOG/2 the PT/LVP noted that the existing guidance material in ECAC Doc No. 17 was out of date in some respects. The Project Team recommended that guidance material on Low Visibility Procedures should be further developed, based on ECAC Doc No. 17 Issue 3, dated September 1988. It was also decided to create a new document to hold this updated material and that this new document should also be suitable to contain any additional guidance material that may be required for operations during low visibility conditions utilizing new technology approach and landing aids.

5. Furthermore, the introduction in the JAR-OPS documents (Joint Aviation Requirements - Operations, Subpart E), of the term LVP as a set of procedures established at certain aerodromes in support of CAT II/III approach and landing and of take-off with RVR below 400 m, has reinforced the urgent need to define common and standardized practices within the ICAO European Region.

6. The ECAC.CEAC Doc No. 17 covered three principal areas. These were the aeroplane and its flight crew, the aerodrome facilities and the Air Traffic Services Low Visibility Procedures. The PT/LVP felt that the requirements for the aeroplane and its crew were adequately covered in current regulations as established by States within the Region, developed by agencies such as the Joint Aviation Authorities (JAA) and the Federal Aviation Administration (FAA), and that these bodies provided sufficient guidance on these matters.

7. In order to ensure that up-to-date guidance on all aspects of operations during low visibility conditions previously covered by ECAC.CEAC Doc No. 17 is available and timely maintained, the EANPG tasked the AWOG to develop a regional guidance material on the aerodrome facilities and ATS Low Visibility Procedures. While this EUR document was elaborated, the JAA worked, starting from ICAO Annex 6, Part I, to define Joint Aviation Requirements for operators regarding operations during low visibility conditions, which has led to definitions and some associated values which are not totally in agreement with those contained in this EUR Guidance Material on All Weather Operations at Aerodromes. Although the two documents could stand alone, because addressed to different users, it is felt that it would be preferable if common parameters could be agreed upon.

8. The adoption by ICAO of new SARPS related to non-visual aids to precision approach and landing means that this document includes procedures for MLS. The Guidance Material only addresses MLS procedures for ILS look-alike approaches, as these are the only type of operation currently being planned in the European Region.

9. Global ICAO provisions require that a safety assessment be carried out in respect of significant changes in the provision of ATS procedures applicable to an airspace or an aerodrome, and for the introduction of new equipment, systems or facilities.

10. In order to accommodate the desire of States for early implementation of MLS, provisions have been developed in this Guidance Material to permit States to undertake the safety assessment and to develop the specific procedures they require to perform these operations. In a safety assessment of MLS systems and procedures, account should be taken of all relevant material contained in previous studies by States and international organizations (*e.g.* Netherlands, United Kingdom, United States and European Community). Safety assessments undertaken by individual States as well as experience from initial MLS operations will be used to further refine the procedures as appropriate. In order to maintain this Guidance Material as a living document, States are requested to share the outcome of any safety assessments as well as operational experience from the implementation of MLS systems and procedures, for the benefit of other States wishing to implement MLS.

11. Low Visibility Procedures refer to specific procedures applied at an aerodrome to support precision approach CAT II/III operations as well as departure operations in RVR conditions less than a value of 550 m specifically referred to as *Low Visibility Departure Operations* within this Guidance Material. In addition, the PANS-ATM (14th edition, applicable 1 November 2001) have introduced the requirement for procedures for low visibility operations whenever conditions are such that all or part of the manoeuvring area cannot be visually monitored from the control tower. (PANS-ATM Chapter 7, 7.12.1).

12. At AWOG/16, the PT/LVP was requested to extend the scope of this document. PANS-ATM requires appropriate provisions to be established and these be applied whenever conditions are such that all or part of the manoeuvring area cannot be visually monitored from the control tower (PANS-ATM, Chapter 7, 7.12.1). The term Reduced Aerodrome Visibility Conditions (RAVC) has been established to define these conditions. The scope of this Guidance Material covers the provisions that are to be applied when Reduced Aerodrome Visibility Conditions exist, regardless of the category of aircraft flight operations (e.g., CAT I or CAT II) taking place at the aerodrome.

13. This revised scope also covers the new approach types defined by EASA, notably Lower Than Standard CAT I (LTS CAT I), Other Than Standard CAT II (OTS CAT II). In addition, developments in GBAS are progressing and guidance on the implementation of GBAS has been included. The concept of Optimised Operations to support new technology approach and landing aids (MLS and GBAS) is also described.

14. Nothing in this Guidance Material should be construed as contradicting or conflicting with ICAO Standards and Recommended Practices and Procedures contained in the Annexes and PANS.

Table of Contents

1 **About This Guidance Material** ... 1
1.1 Purpose ... 1
1.2 Scope ... 1
1.3 Structure of this guidance material ... 2
1.4 Supporting summary tables ... 2

2 **Regulatory Framework** ... 5
2.1 Applicable regulations ... 5

3 **Introduction to All Weather Operations** ... 7
3.1 General ... 7
3.2 Reduced Aerodrome Visibility Conditions ... 7
3.3 Aerodrome operations while RAVC exist ... 9
3.4 Low Visibility Procedures (LVP) ... 10
3.5 Roles and responsibilities ... 14

4 **Provisions to Support All Weather Operations** ... 17
4.1 General ... 17
4.2 Aerodromes ... 18
4.3 Meteorological services ... 32
4.4 AIS ... 34
4.5 Communications systems ... 35
4.6 Non-visual aids ... 35
4.7 Surveillance systems ... 36
4.8 ATS ... 37
4.9 Information to pilots ... 39
4.10 Air Traffic Flow Management ... 40

5 **Preparing a Local All Weather Operations Plan** ... 43
5.1 Introduction ... 43
5.2 Organisation ... 43

6 **Reduced Aerodrome Visibility Procedures** ... 47
6.1 Introduction ... 47
6.2 Objectives of RAVP ... 47
6.3 Provisions to be considered for RAVP ... 47

7 **Low Visibility Procedures** ... 55
7.1 Introduction ... 55
7.2 Objectives of LVP ... 55
7.3 Initial establishment of LVP ... 55
7.4 Deployment of LVP ... 57
7.5 LVP Phases ... 57
7.6 Application of LVP over large operational areas ... 63
7.7 Autoland operations when LVP are not in operation ... 63
7.8 Guided take-off ... 64

8 **Optimised Operations** ... 65
8.1 Introduction ... 65
8.2 Current requirements ... 65
8.3 Applicability ... 67

8.4 Current operations 67
8.5 Optimised operations concept..... 68
8.6 Identify the changes to Low Visibility Procedures..... 69

9 **GBAS**..... 71
9.1 Introduction to GBAS..... 71
9.2 Mixed equipage operations with more than one approach aid 73

10 **Safety Management for All-weather Operations** 75
10.1 Introduction..... 75
10.2 General..... 75
10.3 Safety management of All Weather Operations (AWO)..... 76
10.4 Scope..... 76
10.5 Frameworks for safety management in European aviation..... 77
10.6 Approach to managing the safety risks of All Weather Operations 78
10.7 Key activities 78
10.8 Sources of hazards to be considered..... 79
10.9 Reference material 80

Appendix A – **AIP Examples**..... A-1

Appendix B – **Equipment Failure Tables** B-1

Appendix C – **Examples of AWO Checklists**..... C-1

References

ICAO Annex 3	Meteorological Service for International Air Navigation
ICAO Annex 6	Operation of Aircraft Part 1 — International Commercial Air Transport — Aeroplanes
ICAO Annex 10	Aeronautical Telecommunications Volume I (Radio Navigation Aids)
ICAO Annex 11	Air Traffic Services
ICAO Annex 14	Aerodromes Volume I (Aerodrome Design and Operations)
ICAO Annex 15	Aeronautical Information Services
ICAO Doc 4444	Procedures for Air Navigation Services Air Traffic Management (PANS-ATM)
ICAO Doc 7030	Regional Supplementary Procedures
ICAO Doc 8168	Procedures for Air Navigation Services Aircraft Operations (PANS-OPS)
ICAO Doc 9157	Aerodrome Design Manual Part 2 — Taxiways, Aprons and Holding Bays Part 5 — Electrical systems
ICAO Doc 9328	Manual of Runway Visual Range Observing and Reporting Practices
ICAO Doc 9365	Manual of All-Weather Operations
ICAO Doc 9476	Manual of Surface Movement Guidance and Control Systems
ICAO Doc 9774	Manual on Certification of Aerodromes
ICAO Doc 9830	Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual
ICAO Doc 9859	Safety Management Manual (SMM) (2nd Edition)
ICAO Doc 9870	Manual on the Prevention of Runway Incursions
ECAC.CEAC Doc No. 17 (Issue 3), 9/88	Common European Procedures for the Authorisation of Category II and III Operations
EU-OPS	European Commission Implementing Regulation (EU) No 1035/2011 of 17.11.2011
ESARR 3	Use of Safety Management Systems by ATM Service Providers *Note.— In some States of the ICAO EUR region, ESARR 3 was superseded by Commission Regulation (EC) No 2096/2005 of 20.12.2005, which laid down the Common Requirements for the*

	Provision of Air Navigation Services. Commission Regulation (EC) No 2096/2005 was itself repealed by European Commission Implementing Regulation (EU) No 1035/2011 of 17.11.2011, which is now the effective normative reference for affected States (refer to §3 of Annex II to (EU) No 1035/2011).
ESARR 4	Risk Assessment and Mitigation in ATM Regulation (EC) No 2096/2005 of 20.12.2005 laying down Common Requirements for the Provision of Air Navigation Services *Note.— In some States of the ICAO EUR region, ESARR 4 was superseded by Commission Regulation (EC) No 2096/2005 of 20.12.2005, which laid down the Common Requirements for the Provision of Air Navigation Services. Commission Regulation (EC) No 2096/2005 was itself repealed by European Commission Implementing Regulation (EU) No 1035/2011 of 17.11.2011, which is now the effective normative reference for affected States (refer to §3 of Annex II to (EU) No 1035/2011).*
EAPPRI	European Action Plan for the Prevention of Runway Incursions
Safety Assessment: Optimised Operations	Safety Assessment of Optimised Operations in Low Visibility Conditions utilising landing clearance delivery position and/or landing clearance line concept – Eurocontrol, v1.5 (Draft, proposed for issue), 15 Dec 2010.
Safety Argumentation: Landing Clearance Line Determination	Landing Clearance Line Determination – Eurocontrol, v1.4 (Final, proposed for release), 21 Dec 2010.
Operational Evaluation: A-SMGCS HMI to Confirm Runway Vacated	D5 & D6: Operational Evaluation on A-SMGCS HMI to Confirm Runway Vacated – Eurocontrol, v1.0 (Released issue), 26 June 2009.
Simulation Report: A-SMGCS VIS2 – VIS3 Transition Simulation Report	A-SMGCS VIS2 – VIS3 Transition Simulation Report – Eurocontrol, v1.0 (Released issue), 31 January 2005.

Definitions

Note.— Definitions of terms which are not self-explanatory in that they do not have accepted dictionary meanings are presented below. A definition does not have an independent status but is an essential part of the paragraph of the Guidance Material in which the term is used, since a change in the meaning of the term would affect the provision.

Note.— Most of the definitions and terms used throughout this Guidance Material are taken from the relevant ICAO Annexes, PANS and Manuals (reference to ICAO Docs is indicated in brackets for each term). However, several terms have been defined specifically for this EUR Document and this is indicated by an "".*

When the following terms are used in this Guidance Material, they have the following meaning:

Aerodrome. (Annex 14) A defined area on land or water (including any buildings, installations, and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

Aerodrome Operating Minima. (Annex 6) The limits of usability of an aerodrome for:

a) take-off, expressed in terms of runway visual range and/or visibility and, if necessary, cloud conditions;

b) landing in precision approach and landing operations, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H) as appropriate to the category of the operation;

c) landing in approach and landing operations with vertical guidance, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H); and

d) landing in non-precision approach and landing operations, expressed in terms of visibility and/or runway visual range, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions.

Aerodrome traffic density. (Doc 9830)

Traffic density is measured from the mean busy hour independent of visibility condition:

a) Light: No more than 15 movements per runway or typically less than 20 total aerodrome movements;

b) Medium: 16 to 25 movements per runway or typically between 20 to 35 total aerodrome movements; and

c) Heavy: 26 or more movements per runway or typically more than 35 total aerodrome movements.

Aeronautical Information Publication (AIP). (Annex 15) A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

Aircraft stand. (Annex-14) A designated area on an apron intended to be used for parking an aircraft.

Air traffic service. (Annex 11) A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).

Air traffic services unit. (Annex 11) A generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office.

All-Weather Operations. (Doc 9365 - foreword) Any taxi, take-off or landing operations in conditions where visual reference is limited by weather conditions.

Approach and landing operations using instrument approach procedures. (Annex-6) Instrument approach and landing operations are classified as follows:

Non-precision approach and landing operations. An instrument approach and landing which utilizes lateral guidance but does not utilize vertical guidance.

Approach and landing operations with vertical guidance. An instrument approach and landing which utilizes lateral and vertical guidance but does not meet the requirements established for precision approach and landing operations.

Precision approach and landing operations. An instrument approach and landing using precision lateral and vertical guidance with minima as determined by the category of operation.

Note.— Lateral and vertical guidance refers to the guidance provided either by:

a) a ground-based navigation aid; or

b) computer generated navigation data.

Categories of precision approach and landing operations:

Category I (CAT I) operation. A precision instrument approach and landing with:

a) a decision height not lower than 60 m (200 ft); and

b) with either a visibility not less than 800 m or a runway visual range not less than 550 m.

Category II (CAT II) operation. A precision instrument approach and landing with:

a) a decision height lower than 60 m (200 ft), but not lower than 30 m (100 ft); and

b) a runway visual range not less than 300 m.

Category IIIA (CAT IIIA) operation. A precision instrument approach and landing with:

a) a decision height lower than 30 m (100 ft) or no decision height; and

b) a runway visual range not less than 175 m.

Category IIIB (CAT IIIB) operation. A precision instrument approach and landing with:

a) a decision height lower than 15 m (50 ft), or no decision height; and

b) a runway visual range less than 175 m but not less than 50 m.

Category IIIC (CAT IIIC) operation. A precision instrument approach and landing with no decision height and no runway visual range limitations.

Note.— Where decision height (DH) and runway visual range (RVR) fall into different categories of operation, the instrument approach and landing operation would be conducted in accordance with the requirements of the most demanding category (e.g. an operation with a DH in the range of CAT IIIA but with an RVR in the range of CAT IIIB would be considered a CAT IIIB operation or an operation with a DH in the range of CAT II but with an RVR in the range of CAT I would be considered a CAT II operation).

In addition, (EC) N.859/2008 defines

Lower then Standard Category I Operation (LTS CAT I): A Category I Instrument Approach and Landing Operation using Category I DH, with an RVR lower than would normally be associated with the applicable DH [(EC) N.859/2008 OPS 1.435].

Other than Standard Category II Operation (OTS CAT II). A Category II Instrument Approach and Landing Operation to a runway where some or all of the elements of the ICAO Annex 14 Precision Approach Category II lighting system are not available [(EC) N.859/2008 OPS 1.435].

Apron. (Annex 14) A defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fuelling, parking or maintenance.

Apron Management Service. (Annex 14) A service provided to regulate the activities and the movement of aircraft and vehicles on an apron.

Automatic Terminal Information Service (ATIS). (Annex 11) The automatic provision of current, routine information to arriving and departing aircraft throughout 24 hours or a specified portion thereof:

Data link-automatic terminal information service (D-ATIS).
The provision of ATIS via data link.

Voice-automatic terminal information service (Voice-ATIS).
The provision of ATIS by means of continuous and repetitive voice broadcasts.

Categories of aeroplanes. (Doc 9365) The following five categories of typical aeroplanes have been established based on 1.3 times the stall speed in the landing configuration at maximum certificated landing mass:

Category A	-	less than 169 km/h (91 KT) IAS
Category B	-	169 km/h (91 KT) or more but less than 224 km/h (121 KT) IAS
Category C	-	224 km/h (121 KT) or more but less than 261 km/h (141 KT) IAS
Category D	-	261 km/h (141 KT) or more but less than 307 km/h (166 KT) IAS
Category E	-	307 km/h (166 KT) or more but less than 391 km/h (211 KT) IAS

Note.— Current Category E aircraft are not normally civil transport aircraft and their dimensions are not necessarily related to Vat at maximum landing mass. For this reason, they should be treated separately on an individual basis.

Ceiling. (Annex 2) The height above the ground or water of the base of the lowest layer of cloud below 6 000 m (20 000 ft) covering more than half the sky.

Decision altitude (DA) or decision height (DH). (Annex 6) A specified altitude or height in the precision approach or approach with vertical guidance at which a missed approach must be initiated if the required visual reference to continue the approach has not been established.

Note 1.— Decision altitude (DA) is referenced to mean sea level (MSL) and decision height (DH) is referenced to the threshold elevation.

Note 2.— The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In Category III operations with a decision height the required visual reference is that specified for the particular procedure and operation.

Note 3.— For convenience where both expressions are used they may be written in the form "decision altitude/height" and abbreviated "DA/H".

Guided take-off. (*) A take-off in which the take-off run is not solely controlled with the aid of external visual references, but also with the aid of instrument references (*e.g.*: ILS localizer guidance).

Height. (Annex 2) The vertical distance of a level, a point or an object considered as a point, measured from a specified datum.

ILS critical area. (Annex 10) An area of defined dimensions about the localizer and glide path antennas where vehicles, including aircraft, are excluded during all ILS operations. The critical area is protected because the presence of vehicles and/or aircraft inside its boundaries will cause unacceptable disturbance to the ILS signal-in-space.

ILS sensitive area. (Annex 10) An area extending beyond the critical area where the parking and/or movement of vehicles, including aircraft, is controlled to prevent the possibility of unacceptable interference to the ILS signal during ILS operations. The sensitive area is protected to provide protection against interference caused by large moving objects outside the critical area but still normally within the airfield boundary.

Intermediate holding position. (Annex 14) A designated position intended for traffic control at which taxiing aircraft and vehicles shall stop and hold until further cleared to proceed, when so instructed by the aerodrome control tower.

Low Visibility Departure. (*) A departure operation in RVR conditions less than a value of 550 m.

Low Visibility Procedures (LVP). (*) Specific procedures applied at an aerodrome for the purpose of ensuring safe operations during Lower than Standard Category I, Other than Standard Category II, Category II and III approaches and/or departure operations in RVR conditions less than a value 550 m.

Low Visibility Take-Off (LVTO). ((EC) No 859/2008, OPS 1.435) A take-off where the runway visual range (RVR) is less than 400 m.

Manoeuvring area. (Annex 14) That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.

MLS critical area. (Annex 10) An area of defined dimensions about the azimuth and elevation antennas where vehicles, including aircraft, are excluded during all MLS operations. The critical area is protected because the presence of vehicles and/or aircraft inside its boundaries will cause unacceptable disturbance to the guidance signals.

MLS sensitive area. (Annex 10) An area extending beyond the critical area where the parking and/or movement of vehicles, including aircraft, is controlled to prevent the possibility of unacceptable interference to the MLS signals during MLS operations.

Movement area. (Annex 14) That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s).

NOTAM. (Annex 15) A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

Obstacle. (Annex 14) All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that:

a) are located on an area intended for the surface movement of aircraft; or

b) extend above a defined surface intended to protect aircraft in flight; or

c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.

Obstacle Free Zone (OFZ). (Annex 14) The airspace above the inner approach surface, inner transitional surfaces, and balked landing surface and that portion of the strip bounded by these surfaces, which is not penetrated by any fixed obstacle other than a low-mass and frangibly mounted one required for air navigation purposes.

Reduced Aerodrome Visibility Conditions (RAVC). (*) Meteorological conditions such that all or part of the manoeuvring area cannot be visually monitored from the control tower.

Reduced Aerodrome Visibility Procedures (RAVP) (*) Specific procedures applied at an aerodrome for the purpose of ensuring safe operations during RAVC.

Runway. (Annex 14) A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft

Runway-holding position. (Annex 14) A designated position intended to protect a runway, an obstacle limitation surface, or an ILS/MLS critical/sensitive area at which taxiing aircraft and vehicles shall stop and hold, unless otherwise authorised by the aerodrome control tower.

Runway Visual Range (RVR). (Annex 3) The range 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.

State of the Aerodrome. (Doc 9365) The State in whose territory the aerodrome is located.

State of the Operator. (Annex 6) The State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.

Touchdown zone (TDZ). (Annex 14) The portion of a runway, beyond the threshold, where it is intended landing aeroplanes first contact the runway.

Visibility. (Annex 3) Visibility for aeronautical purposes is the greater of:

a) the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognized when observed against a bright background;

b) the greatest distance at which lights in the vicinity of 1 000 candelas can be seen and identified against an unlit background.

Note. — The two distances have different values in air of a given extinction coefficient, and the latter b) varies with the background illumination. The former a) is represented by the meteorological optical range (MOR).

Visibility Conditions: (Doc 7030)

Visibility condition 1. Visibility sufficient for the pilot to taxi and to avoid collision with other traffic on taxiways and at intersections by visual reference, and for personnel of control units to exercise control over all traffic on the basis of visual surveillance.

Visibility condition 2. Visibility sufficient for the pilot to taxi and to avoid collision with other traffic on taxiways and at intersections by visual reference, but insufficient for personnel of control units to exercise control over all traffic on the basis of visual surveillance.

Visibility condition 3. Visibility sufficient for the pilot to taxi but insufficient for the pilot to avoid collision with other traffic on taxiways and at intersections by visual reference, and insufficient for personnel of control units to exercise control over all traffic on the basis of visual surveillance. For taxiing, this is normally taken as visibilities equivalent to an RVR of less than 400 m but more than 75 m.

Visibility condition 4. Visibility insufficient for the pilot to taxi by visual guidance only. This is normally taken as a RVR of 75 m or less.

Note 1. — The above visibility conditions apply for both day and night operations.

Note 2. — (Doc7030 amendment awaiting publication) — For the purpose of describing the provision of an aerodrome control service in the context of varying visibilities, four (4) visibility conditions are defined. Criteria for determining the transition between visibility conditions are a function of local aerodrome and traffic characteristics.

Note 3. — See Chapter 6 for more details of the transition between visibility conditions.

Acronyms/Abbreviations

The acronyms/abbreviations used in this document have the following meanings:

AD	Aerodrome
AIC	Aeronautical information circular
AIP	Aeronautical information publication
AMS	Apron Management Service
AMU	Apron Management Unit
ANSP	Air Navigations Service Provider
A-SMGCS	Advanced surface movement guidance and control system(s)
ATC	Air traffic control *(in general)*
ATCO	Air traffic controller
ATFM	Air traffic flow management
ATIS	Automatic terminal information service
ATS	Air traffic services
AWOG	All Weather Operations Group of the EANPG
CAT	Category
CFMU	Central Flow Management Unit of Eurocontrol
cm	Centimetre
CRM	Collision Risk Model
CSA	Critical and Sensitive Areas
DA/H	Decision altitude/height
D-ATIS	Data link automatic terminal information service
DME	Distance measuring equipment
EANPG	European Air Navigation Planning Group
EASA	European Aviation Safety Agency
ECAC	European Civil Aviation Conference
EUR	European Region of ICAO
EVS	Enhanced Vision System
FAA	Federal Aviation Administration of the United States
FHA	Functional Hazard Analysis
FMP	Flow management position
FPL	Filed flight plan
ft	feet
GBAS	Ground based augmentation system
GLONASS	GLObal NAvigation Satellite System (Russian Federation)
GNSS	Global Navigation Satellite System
GPS	Global Positioning System (United States)
IAS	Indicated airspeed
ICAO	International Civil Aviation Organization
IFPP	Instrument Flight Procedure Panel
ILS	Instrument landing system
JAA	Joint Aviation Authorities
LCD	Landing Clearance Delivery
LCL	Landing Clearance Line
LSA	Localizer sensitive area
LVP	Low visibility procedures
LVTO	Low visibility take-off
m	Metre(s)
MDA/H	Minimum descent altitude/height
MET	Meteorological or meteorology
MLS	Microwave landing system
MOR	Meteorological optical range

NM	Nautical miles
OCP	Obstacle Clearance Panel
OFZ	Obstacle free zone
PA	Precision Approach
PT/LVP	AWOG Project Team on Low Visibility Procedures
RAVC	Reduced Aerodrome Visibility Conditions
RAVP	Reduced Aerodrome Visibility Procedures
RPL	Repetitive flight plan
RTF	Radiotelephone
RVR	Runway visual range
SA	Sensitive Area
SARPS	Standards and Recommended Practices
SMGCS	Surface movement guidance and control systems
SMR	Surface movement radar
SR	Safety Requirement
TDZ	Touchdown zone
Voice-ATIS	Voice-automatic terminal information service

Chapter 1

About This Guidance Material

1.1 Purpose

1.1.1 The purpose of this Guidance Material is to assist EUR States in the development of procedures to be applied in Reduced Aerodrome Visibility Conditions (RAVC) and the implementation of Low Visibility Procedures (LVP) in a harmonised way.

1.1.2 With due account taken to provisions enacted by the appropriate authorities, this Guidance Material may also be used by aerodrome operators, and those responsible for providing other facilities and equipment, to assess the suitability of an aerodrome for All Weather Operations (AWO), to determine the steps to be taken to prepare an aerodrome for AWO, and to maintain these operations safely. Similarly, this Guidance Material may also be used by providers of ANS & Apron Management Services to ensure that the relevant procedures required for such operations comply with requirements established by the appropriate authorities. This document will provide guidance on the interpretation and application of these requirements to achieve these aims and objectives.

1.1.3 This document is also intended to be used to assist aircraft operators in assessing the suitability of an aerodrome for operations that require LVP to be in force, and ensuring that the various requirements applicable to the aircraft and its crew are fulfilled and documented in the aircraft operations manual as appropriate. Thereafter it is expected that the pilot will determine the minima for a particular operation in accordance with the aircraft operations manual.

1.2 Scope

1.2.1 The title of this Guidance Material refers to “All Weather Operations" (AWO) because the material refers not only to the framework for LVP (including the Preparation and Termination phases, which respectively precede and conclude a period when LVP are in force), but also the provisions to be applied to support safe and efficient aerodrome ground operations when Reduced Aerodrome Visibility Conditions (RAVC) exist.

1.2.2 This Guidance Material describes:

a) the framework supporting All Weather Operations (such as those relating to visual and non-visual aids), and highlights the most important elements, including a description of the requirements applicable to these elements:

b) any special provisions required to support the safe, orderly and efficient operation of the aerodrome whenever conditions are such that all or part of the manoeuvring area cannot be visually monitored from the control tower (when Reduced Aerodrome Visibility Conditions exist);

c) Low Visibility Procedures including:

   i. the initiation and conduct of preparatory activities to bring the LVP into force, and activities to facilitate the orderly termination of LVP; and

   ii. the LVP procedures that must be in force when certain defined flight operations are taking place.

d) the safety management activities to be undertaken as a component of the initial establishment of LVP and RAVP.

1.2.3 This guidance material recognises the role of all stakeholders at the airfield, such as the ANSP, Apron Management Service, Aerodrome Operator, those responsible for the visual and non-visual aids as well as the many other parties (such as vehicle drivers, police and Rescue and Fire Fighting services), who all play an important role in achieving the safety, regularity and efficiency of AWO. Therefore this document takes a broad view, and includes guidance and information relating to the operation of the aerodrome as a whole, with the focus on providing guidance to ensure the safety of air traffic while at the same time facilitating orderly and efficient operations under conditions of reduced visibility.

1.3 Structure of this guidance material

Chapter 1: **About this guidance material**: describes the purpose and scope of this Guidance Material.

Chapter 2: **Regulatory framework**: identifies the supporting regulatory framework which must also be considered in the development of All Weather Operations.

Chapter 3: **Introduction to All Weather Operations**: provides an introduction to the concepts and procedures that are used in conjunction with All Weather Operations.

Chapter 4: **Provisions to support All Weather Operations**: this section details the requirements relating to the need for (but not operation of) any equipment, facilities, services, and procedures that have to be in place before AWO can take place in accordance with the applicable ICAO frameworks.

Chapter 5: **Preparing a local All Weather Operations Plan**: A description of an organisation to establish and maintain the All Weather Operations Plan.

Chapter 6: **Reduced Aerodrome Visibility Procedures**: Describes the procedures to support operations in Reduced Aerodrome Visibility Conditions.

Chapter 7: **Low Visibility Procedures**: Describes the LVP required when specific types of departure and approach and landing operations take place.

Chapter 8: **Optimised Operations**

Chapter 9: **GBAS**

Chapter 10: **Safety Management of All Weather Operations**

Appendix A: **Samples of AIP Entries**

Appendix B: **Equipment Failure Tables**

Appendix C: **Examples of AWO Checklists**

1.4 Supporting summary tables

1.4.1 Throughout this document, a number of tables have been used to provide a straightforward summary of the requirements and recommendations to be considered for AWO.

1.4.2 In the tables "shall" statements drawn from ICAO Annexes are listed as "required", reflecting the status of ICAO standards with associated compliance and notification requirements.

1.4.3 "Should" statements from the ICAO Annexes, and "shall" material drawn from the ICAO PANS are shown as "recommended", reflecting respectively the status of ICAO recommended practice, or material which is approved and recommended for application.

1.4.4 Other material, such as "should" material drawn from ICAO PANS, is identified as "good practice", providing guidance as to practices that are referenced in ICAO material which can be useful to support the safety, regularity and efficiency of operations.

1.4.5 To aid with clarity in understanding compliance obligations, references back to the source material are provided wherever possible. These point to the "highest" level of precedence. For example, if a "should" statement in a PANS document refers to a "shall" statement in an Annex, then the reference to the Annex will be provided.

1.4.6 Additional explanatory narrative and notes are provided wherever it is seen as beneficial to promote harmonised understanding and application in order to achieve the objectives of safety, regularity and efficiency in operations.

1.4.7 Within this document the term “separation” is considered to:

- Relate to mandatory criteria applied for the purposes of directly preserving aircraft safety, including:
  - Collision prevention, such as between aircraft, between aircraft on the manoeuvring area and obstructions on that area, or with respect to the OFZ; or
  - Wake turbulence; or
  - Protection against interference of the integrity of radio navigation signals-in-space (such as ILS Critical or Sensitive Areas);

    Note.— An example of this would be a requirement to give landing clearance at 2 NM in respect of LSA protection criteria.
  - Defined separation minima, or other means (such as visual separation as determined by ATC or maintained by pilots).

1.4.8 Within this document the term “spacing” is considered to relate to a broader range of criteria, which are established to facilitate the orderly achievement of separation requirements or to assist the realisation of other provisions, such as aircraft acceptance / movement rates.

Note.— An example of this would be the application of 8 NM spacing required to achieve the LSA protection requirement between successive landing aircraft.

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Chapter 2

Regulatory Framework

2.1 Applicable regulations

2.1.1 *Aerodromes*

2.1.1.1 Aerodromes used for international operations shall be certified by the State of the Aerodrome (Annex 14, Volume I, 1.4). It is also recommended that all aerodromes open to public use be certified.

2.1.1.2 The suitability of the aerodrome for operations which require LVP to be in force should be assessed by the State of the Aerodrome. As part of the certification process, States should ensure that, prior to granting the aerodrome certificate, the applicant has submitted for approval/acceptance an aerodrome manual providing all pertinent information including, among other items, Low Visibility Procedures.

2.1.1.3 The appropriate ATS authority shall establish provisions at the aerodrome to support departure operations in RVR conditions less than a value of 550 m as well as precision approach CAT II/III operations (PANS-ATM, 7.12.2.1). Such provisions relate mainly to aerodrome traffic and include, for example, procedures for control of traffic on the manoeuvring area as well as applicable spacing between successive approaching aircraft. LVP are also required where runways are used for departure operations in RVR conditions less than a value of 550 m, even if the runway is not equipped for CAT II/III approach and landing.

2.1.1.4 At aerodromes that wish to operate when RAVC exists, there is a need to develop procedures to ensure that operations during RAVC can be undertaken safely. These procedures may not need to be complex or extensive. At an aerodrome with low traffic levels, this may be achieved by a simple set of control measures (e.g. using position reports from pilots and vehicle drivers to confirm the position of traffic not visible from control units). At large, high density aerodromes, these procedures are likely to be more extensive to ensure that aircraft and vehicles are handled safely and that capacity is managed according to the conditions when visibility is restricted.

2.1.1.5 When upgrading and maintaining the facilities used to support aerodrome surface movements or flight operations taking place when Reduced Aerodrome Visibility Conditions exist, or to support flight operations which require LVP to be in force, consideration must be given to all relevant requirements. This Guidance Material highlights those requirements that need to be considered by aerodrome authorities when determining the suitability of the aerodrome for LVP.

2.1.2 *Navigation facilities*

2.1.2.1 Navigation facilities should be established in accordance with Annex 10, and be appropriately designated, and details shall be published in the AIP.

2.1.3 *Aircraft*

2.1.3.1 The authorisation of an aircraft operator to carry out specific operations in LVP is given by the State of the Operator.

2.1.3.2 Aircraft operators establish operating procedures and minima taking into account the applicable regulations (established by the relevant authority such as FAA, EASA etc) and depending upon the aerodrome facilities, aircraft equipment and performance, and crew qualifications. These are published in the aircraft operations manual. It is the responsibility of the pilot in command to determine the appropriate type of operation and minima applicable to a specific operation in accordance with standard operating procedures.

Chapter 3

Introduction to All Weather Operations

3.1 General

3.1.1 This chapter provides an introduction to the various factors that should be considered in preparation for, and during the undertaking of All Weather Operations. These factors are:

- The prevailing or forecast MET conditions;
- The ability of control personnel to visually monitor the manoeuvring area;
- The ability of the pilots to manoeuvre the aircraft on the ground by visual means;
- The aerodrome equipage and the status of this equipment;
- The requirement for additional equipment and procedures to support certain types of All Weather Operations;
- The ability of the aircraft to perform approach, landing and departure operations in the prevailing conditions. This will in turn be dependent on the aircraft equipage, aircraft certification, crew qualifications and training.

3.2 Reduced Aerodrome Visibility Conditions

3.2.1 Reduced Aerodrome Visibility Conditions exist when all or part of the manoeuvring area cannot be visually monitored from the control tower and consequently the personnel of the control units are unable to exercise visual control over the traffic in the area.

3.2.2 To describe the ability of the personnel of the control units to exercise visual control over all traffic and of the pilots to avoid other traffic, four different visibility conditions are defined from Visibility Condition 1 through to Visibility Condition 4. The following graphic shows the relationship between the various Visibility Conditions.

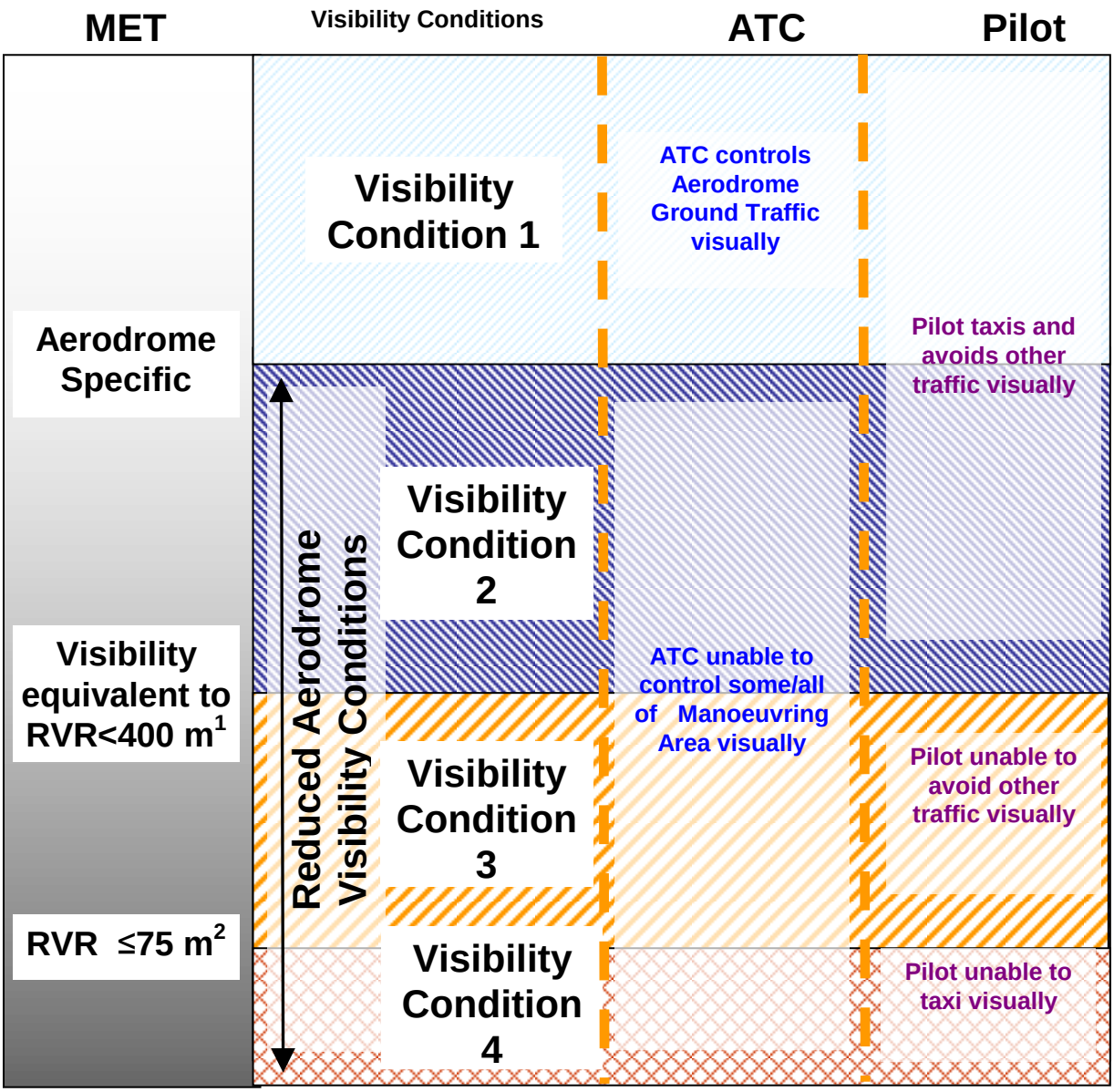

Figure 3.1 The relationship between ICAO Visibility Conditions.

Note 1.— For taxiing, this value is normally taken as visibilities equivalent to an RVR of less than 400 m but more than 75m. The value of 400 m is provided as an example in Doc 7030. Criteria for determining the transition between visibility conditions are a function of local aerodrome and traffic characteristics. See 3.2.3 and 3.2.4 for more details of the transition between visibility conditions.

Note 2.— This value is normally taken as an RVR of 75 m or less.

3.2.3 The transition from Visibility Condition 1 to Visibility Condition 2 occurs when meteorological conditions deteriorate to the point that personnel of control units are unable to exercise control over traffic on the basis of visual surveillance and in practice defines the entry to Reduced Aerodrome Visibility Conditions (RAVC). The transition will be different for each aerodrome, depending on factors such as the location and height of the ATC tower and the size and layout of the manoeuvring area. Reduced ground visibility will normally be the determining factor for this transition. However at some locations, such as those with tall control towers, low cloud may be a prevalent factor requiring consideration. The process of determining the boundary between Visibility Condition 1 and Visibility Condition 2, and

hence the entry to RAVC, will be an aerodrome-specific exercise. Further details are provided at 6.3.11.

3.2.4 The transition from Visibility Condition 2 to Visibility Condition 3 will be determined locally depending on factors such as the layout and complexity of the taxiway system, the types of aircraft operating. For taxiing this is normally taken as visibilities equivalent to an RVR of less than 400 m (Doc 9476).

3.2.5 A study was conducted by Eurocontrol to assess the transition from visibility condition 2 to visibility condition 3. The main conclusion of the study is that the visibility threshold below which pilots are unable to comply with ATC instructions based on traffic information requiring him to see and avoid traffic is somewhere between 200 m and 300 m. Traffic information becomes less effective from visibility 300 m and below, reaching its efficiency limit at visibility 100 m (Eurocontrol A-SMGCS VIS2 – VIS3 Transition Simulation Report).

3.3 Aerodrome operations while RAVC exist

3.3.1 Special provisions are established to cover cases where there is a requirement for aircraft or other aerodrome surface traffic to operate on the manoeuvring area while RAVC exist – these are known as Reduced Aerodrome Visibility Procedures (RAVP).

3.3.2 RAVP are intended to support ground movements even though LVP are not in force, either because the aerodrome is not certified for operations that require LVP, or these operations are not currently being conducted.

3.3.3 In developing RAVP several factors are considered, including the characteristics of the aids available for surveillance and control of ground traffic, the complexity of the aerodrome layout and the characteristics of the aircraft using the aerodrome.

3.3.4 The purpose of RAVP is to support the safety, regularity and efficiency of aircraft operations on the manoeuvring area, including the protection of the runway(s) in use for take-off and landing.

3.3.5 When considering the provisions to be incorporated within the RAVP, the principle events to be considered relate to when all or part of the manoeuvring area is not visible to staff of control units.

3.3.6 At smaller aerodromes with light or medium traffic levels, the RAVP may involve the increased use of position reports by pilots and vehicle drivers in order for ATC and/or Apron Management staff to maintain situational awareness of the positions of traffic on the manoeuvring area and aprons. This may be accompanied by limitations on traffic movement rates to ensure that traffic can manoeuvre safely in areas not visible from the tower and/or apron management.

3.3.7 At busier aerodromes, there may be benefits in providing additional facilities such as intermediate holding positions on taxiways and installing a surveillance system (A-SMGCS) in order to safely sustain higher movement rates. The decision to upgrade the airfield will need to be based on appropriate safety cases and a business case.

3.3.8 Further details on the prerequisites to be considered when developing aerodrome infrastructure and operating rules, and the MET, AIS and CNS/ATM equipment & procedures to be utilised when RAVC exist, are located at Chapter 5.

3.3.9 Further detail on the conduct of aerodrome ground operations, including aircraft taxi, take-off and landing operations, while RAVC exist are located at Chapter 6.

3.4 Low Visibility Procedures (LVP)

3.4.1 The Objectives of LVP include:

- the protection of the runway(s) in use for take-off and landing against incursions; and
- maintaining the accuracy and integrity of ground-based navigation signals used during the specified departure and approach & landing operations.

3.4.2 In addition to the infrastructure, equipment, rules and procedures established to support aerodrome ground operations as detailed above (refer to 3.3), special provisions, called Low Visibility Procedures (LVP), are established to support the following aircraft flight operations:

a) Departure operations in RVR conditions less than a value of 550 m;

b) CAT II and III approach and landing operations;

c) Other Than Standard CAT II approach and landing operations;

d) Lower Than Standard CAT I approach and landing operations.

The following graphic shows the relationship between the specified aircraft flight operations and Low Visibility Procedures.

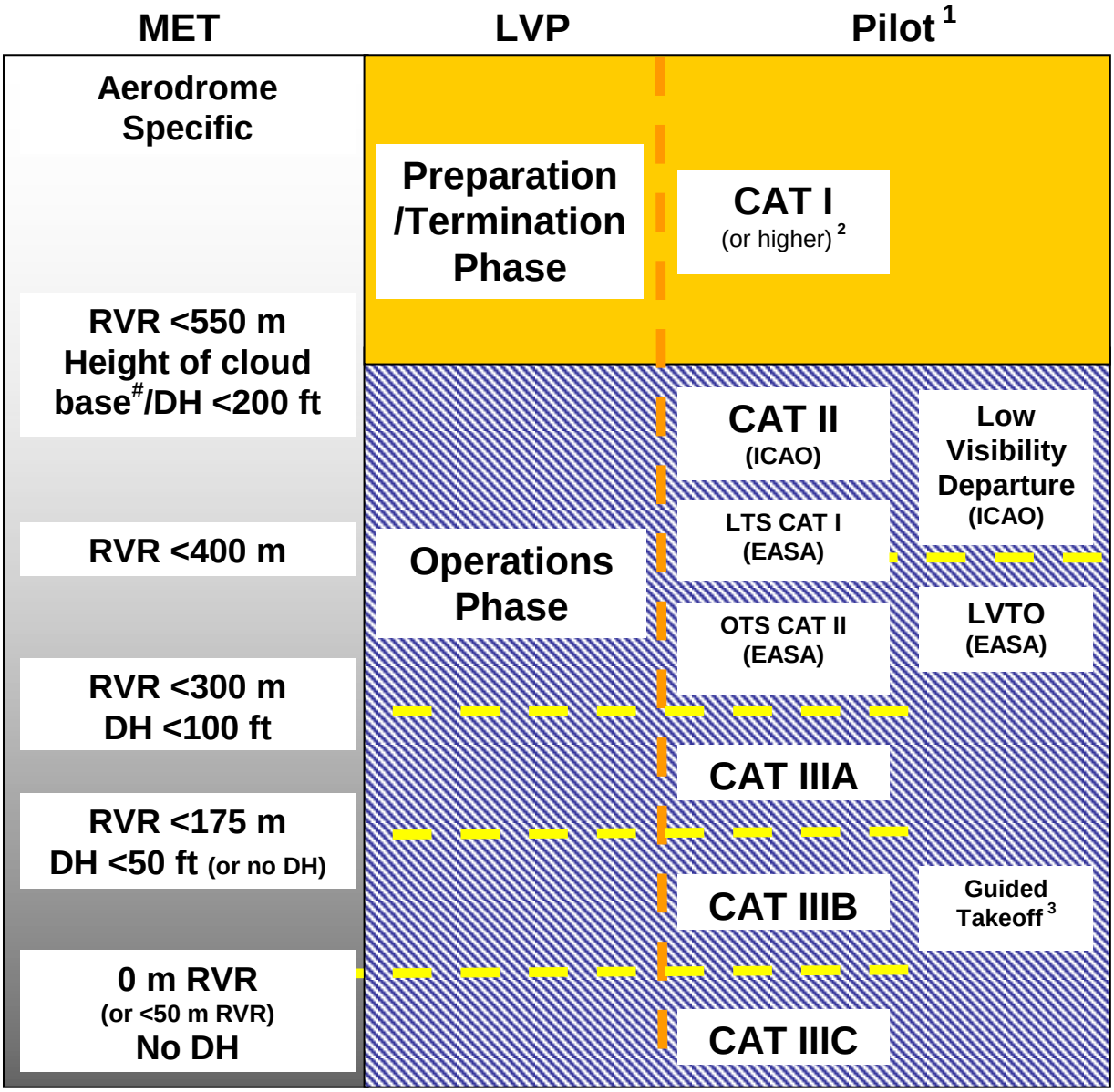

Figure 3.2 The relationship between the specified aircraft flight operations and Low Visibility Procedures.

Note 1.— The approach category or departure operation is selected by the pilot according to the airline operations manual. This will depend on a number of factors outside the scope of this diagram, such as the status of the ground and airborne equipment and pilot qualifications.

Note 2.— Other types of approach (e.g. NPA, APV or even a visual approach) may be suitable, depending on the weather conditions and aerodrome equipment.

Note 3.— In some States it is mandatory for the pilot to conduct a guided take-off below 125 m RVR (150 m for Cat D aircraft).

3.4.3 LVP are defined in 3 phases:

***Preparation Phase*:** This phase is commenced when deteriorating meteorological conditions reach, or are forecast to reach, specified height of cloud base or ceiling and/or visibility/RVR values.

Note.— These triggering values are determined and specified for each aerodrome depending on the flight operations to be supported by LVP, local weather patterns, and considering local factors such as the lead times needed to prepare the aerodrome and to bring the Operations Phase of LVP into force.

***Operations Phase*:** This phase must be in force prior to the commencement of any of the specific operations for which LVP are required. The Operations Phase is brought into force only once all preparatory activities are complete. Flight operations requiring LVP must only commence once the LVP are in force.

***Termination Phase*:** This phase is established to facilitate a smooth transition back to normal operations.

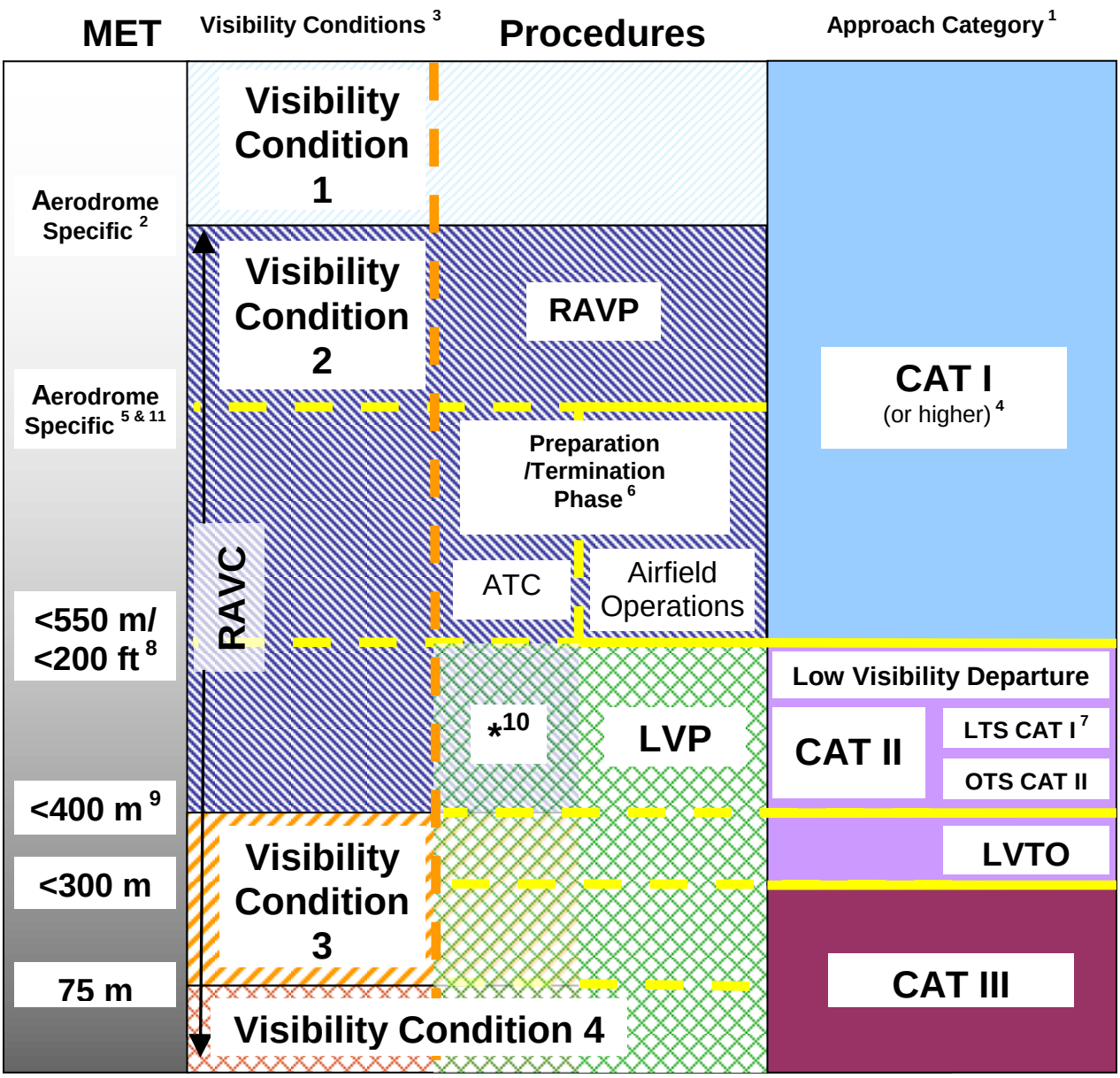

Figure 3.3 The relationship between Visibility Conditions, Low Visibility Procedures and Approach Categories.

Note 1.— The approach category is selected by the pilot according to the airline operations manual. This will depend on a number of factors outside the scope of this diagram, such as the status of the ground and airborne equipment and pilot qualifications.

Note 2.— Entry into Visibility Condition 2 occurs when all or part of the manoeuvring area is not visible from the control tower. This value is locally determined depending on the size of the aerodrome. Entry into Visibility Condition 2 may also be due to low cloud, particularly for airfields with tall control towers.

Note 3.— Further information on ICAO Visibility Conditions is provided in Chapters 6 & 7.

Note 4.— Other types of approach (e.g. NPA, APV or even a visual approach) may be suitable, depending on the weather conditions and aerodrome equipment.

Note 5.— The MET conditions for the commencement of the preparation phase are locally determined dependant on factors such as the size of the aerodrome and the extent of the preparations required. In the event that the weather conditions are deteriorating rapidly,

there may be a requirement to commence the preparation phase earlier. The intent is that LVP are in force at the latest when height of cloud base# falls below 200 ft and/or RVR is below 550 m.

Note 6.— There may be a number of parties undertaking specific aspects of the Preparation Phase such as ATC, Apron control, Airfield operations, and other agencies.

Note 7.— At some locations, LTS CAT I may commence above RVR 550 m, in which case LVP should be established accordingly.

Note 8.— LVP should be in force at the latest when height of cloud base# falls below 200 ft and/or RVR is below 550 m. If the preparation phase is not complete (e.g. due to rapidly deteriorating weather conditions), then pilots are to be informed and operations that require LVP cannot be commenced.

Note 9.— The commencement of Visibility Condition 3 will be determined locally depending on factors such as the size and complexity of the taxiway layout and the types of aircraft operating.

Note 10.— RAVP may be in operation to support ground movements even though LVP is not in operation, either because the aerodrome is not certified for operations that require LVP, or these operations are not currently being undertaken.

Note 11.— The Termination Phase will take place when the weather conditions improve to the point that LVP are no longer required. These weather criteria are likely to be different to the Preparation Phase, depending on the actual conditions at the time.

Further details on the prerequisites to be considered when developing LVP are located at Chapter 5.

Further detail on the application and conduct of LVP are located at Chapter 7.

3.5 Roles and responsibilities

3.5.1 *States*

3.5.1.1 *State of the aerodrome*

3.5.1.1.1 It is the responsibility of the State of the aerodrome authority to assess the suitability of an aerodrome, and to ensure that adequate runway protection measures, surface movement guidance and control, emergency procedures, apron management, and MET services & equipment exist to support those flight operations which require LVP to be established and in force. Ensuring that all requirements supporting initial and on-going certification are met is also the responsibility of the state of aerodrome.

3.5.1.2 *State of the aircraft operator*

3.5.1.2.1 The authorisation of an aircraft operator to conduct CAT II/III approach and landing operations, departure with RVR below 550 m (or equivalent take-off or approach and landing operations) is given by the State of the Operator.

3.5.1.2.2 States may also require that pilots ensure that LVP have been established and are in force before undertaking certain approach and landing or departure operations.

3.5.1.2.3 States should establish specific operating procedures for aircraft operators, which may include the term Low Visibility Take-Off (LVTO) with RVR below 400 m (as defined in EC No.859/2008 OPS 1.435).

3.5.2 ***Aerodrome operators***

3.5.2.1 As a condition of aerodrome certification, the aerodrome operator is responsible for developing, establishing and maintaining Low Visibility Procedures. LVP are developed in conjunction with ATC.

3.5.2.2 When upgrading and maintaining the facilities used to support aerodrome surface or flight operations taking place when Reduced Aerodrome Visibility Conditions exist, or to support flight operations which require LVP to be in force, the Aerodrome Operator must take into account the SARPS detailed in Annex 14.

3.5.2.3 The aerodrome operator should establish operational procedures to support the LVP Preparation Phase. The activation of the LVP Preparation Phase is initiated by ATC when it is assessed that LVP are likely to be required. The coordination of activities undertaken as part of safeguarding the movement area would be the responsibility of the aerodrome operator. It is the responsibility of the aerodrome operator to ensure that all required operational measures are in place before advising ATC that LVP can be declared to be in force.

3.5.3 ***Aircraft operators***

3.5.3.1 Aircraft operators establish aerodrome operating minima and procedures taking into account the applicable regulations (established by the relevant authority such as FAA, EASA etc) and depending upon the aerodrome facilities, aircraft equipment and performance, and crew qualifications. These are published in the aircraft operations manual (EC No 859/2008, OPS 1.225).

3.5.3.2 It is not intended that the specifications in Annex 14 limit or regulate the operation of an aircraft (Annex 14, Volume 1, Chapter 1, Introductory Note).

3.5.3.3 Requirements to be considered by the aircraft operator in establishing the aerodrome operating minima are defined in EC No 859/2008, OPS 1.430.

3.5.3.4 Requirements detailing the permissible conduct of Lower than Standard Category I, Category II, Other than Standard Category II or Category III operations are defined in (EC) No 859/2008, OPS 1.440.

3.5.3.5 EC No 859/2008, OPS 1.445 requires that an operator verifies that low visibility procedures (LVP) have been established, and will be enforced, at those aerodromes where operations detailed in 3.4.2 above are to be conducted.

3.5.3.6 The aircraft operator should ensure as far as possible that all suitable measures, such as those described at 3.5.1.1, have been taken.

3.5.4 ***Flight crew***

3.5.4.1 The decision to undertake a specific type of operation, and the minima to be applied, is the responsibility of the pilot based on standard operating procedures, as published in the aircraft operations manual.

3.5.5 ***ATS authorities***

3.5.5.1 *Reduced Aerodrome Visibility Procedures*

3.5.5.1.1 Any special provisions that are to apply when all or part of the manoeuvring area cannot be visually monitored from the control tower are initiated by or through the aerodrome control tower (PANS-ATM, 7.12.3).

3.5.5.2 *Low Visibility Procedures*

3.5.5.2.1 The appropriate ATS authority establishes provisions applicable to the start and continuation of approach & landing and takeoff and departure as specified at PANS-ATM 7.12.2.1.

3.5.5.2.2 ATC is responsible for advising the aerodrome operator that the activation of LVPs is likely to become necessary and for initiating the LVP Preparation Phase.

3.5.5.2.3 During the Preparation Phase a pre-defined set of preparatory activities are undertaken by nominated aerodrome agencies such as:

- ATC;
- Aerodrome Authority;
- Those responsible for the visual and non-visual aids; and
- Other agencies as directed by the appropriate authorities.

3.5.5.2.4 Once it has been confirmed that these activities are complete the LVP Operations Phase is declared to be in force by ATC; ATC is thereafter responsible for advising pilots of the status of LVP.

3.5.5.2.5 While LVP are in force ATC is also responsible for monitoring the status of specified facilities and equipment (unless this is delegated to an appropriate responsible authority). Whenever any of the specified facilities or equipment do not meet a defined minimum performance level or becomes unserviceable, ATC shall advise aircraft and maintenance units accordingly, including the provision of information to aircraft via the ATIS and/or RTF.

Chapter 4

Provisions to Support All Weather Operations

4.1 General

4.1.1 This chapter details the prerequisites to be considered in the development and implementation of infrastructure, facilities, equipment and procedures that will be used to support the ground operation of aircraft & vehicles on the aerodrome when RAVC exist, as well as the requirements to support specified take-off & departure and approach & landing operations that require LVP to be in force.

4.1.2 It may be desirable that RAVP are developed to support operations when controlling authorities are unable to visually monitor the manoeuvring areas.

4.1.3 The appropriate ATS authority is required to establish provisions applicable to the start and continuation of departure operations in RVR conditions less than a value of 550 m as well as precision approach category II/III operations (PANS-ATM, 7.12.2.1). Some States permit Lower Than Standard CAT I (LTS CAT I) and Other Than Standard CAT II (LTS CAT II) operations, in which case LVP are also required to be in force for these operations.

4.1.4 When considering the equipment requirements and the operations that take place on the aerodrome, it is important to appreciate the relationship between the existing provisions developed by the various agencies involved in the process.

4.1.5 The specific equipment and procedures which need to be provided for the safe conduct of these ground operations depends on the aerodrome operating minima chosen and the extent to which aircraft and vehicles may come into conflict. Conflicting traffic may be reduced or eliminated by restricting the number and type of movements and selection of facilities appropriate for the particular aerodrome lay-out and traffic density planned. The means adopted will vary with the size and complexity of the manoeuvring area and with the movement rate required.

4.1.6 Further detail on the matters to be considered in the development and establishment of local AWO plans is located at Chapter 5.

4.1.7 The European Action Plan for the Prevention of Runway Incursions (EAPPRI) details recommendations for implementation throughout the ECAC area. The objective of these recommendations is to enhance the safety of runway operations through the combined efforts of organisations involved in all areas of aerodrome operations. The EAPPRI provides a sound reference for consideration during the development and establishment of those provisions to apply during conditions of reduced aerodrome visibility.

4.1.8 The ICAO Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476) details operational requirements for basic surface movement guidance and control systems.

4.1.9 The systems described in Doc 9476 are not always capable of providing the support to aircraft operations as necessary to enable the required levels of capacity and safety, especially under low visibility conditions. The ICAO Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual (Doc 9830) provides additional guidance intended to support the provision of adequate capacity and safety in relation to specific weather conditions, traffic density and aerodrome layout by making use of modern technologies and a high level of integration between the various functionalities.

4.2 Aerodromes

4.2.1 This section details the aerodrome facilities and infrastructure necessary to support aerodrome ground and aircraft operations.

4.2.2 Requirements relating to Visual Aids, including markings, signs, and aerodrome lighting supporting aircraft and ground vehicle operations, are detailed at 4.2.7.

4.2.3 When aircraft or aerodrome ground operations are planned to take place while RAVC exist, all the facilities of the aerodrome must be considered and assessed for their suitability for such operations. Special procedures, and, in some instances, additional equipment, may be required to ensure that these operations can be conducted safely.

4.2.4 The physical characteristics of the runways and taxiways, as well as the requirements for obstacle clearance, the protection of the defined areas surrounding a runway, and the characteristics of pre-threshold terrain need to be carefully considered in order to ensure that low visibility departure and approach operations can be conducted safely.

4.2.5 *General*

Construction and maintenance activities

Recommended

Restrict construction or maintenance activities in the proximity of aerodrome electrical systems whenever low visibility procedures are in force. *Annex 14, Volume I, 10.4.13*

4.2.6 *Secondary power supplies*

4.2.6.1 Requirements & recommendations for the provision of power supplies for aerodrome lighting and other essential facilities & equipment, including changeover times for secondary supplies, are specified in Annex 14, Volume I, 8.1. Guidance material in the Aerodrome Design Manual (Doc 9157), Part 4. Annex 10, Volume I, Attachment C to Part I, describes how to achieve the changeover times specified.

General

Recommended

Provide a secondary power supply for aerodrome facilities specified in Annex 14, Volume 1, 8.1.10.

Departure operations

Runway used for take-off when RVR <800 m

Required

Provide secondary power supplies in accordance with Annex 14, Volume1, 8.1.

Maximum switch over times detailed at Annex 14, Volume I, Table 8-1.

Approach and landing operations

Precision approach runways

Required

Provide secondary power supplies in accordance with Annex 14, Volume 1, 8.1.

Maximum switch over times detailed at Annex 14, Volume I, Table 8-1.

4.2.7 *Visual aids*

4.2.7.1 The need for visual aids will depend on the type of operations to be undertaken under various visibility conditions, the traffic density to be supported, and the complexity of the aerodrome layout and ground operations.

4.2.7.2 As visibility conditions deteriorate, appropriate visual aids may be required to enable pilots and vehicle drivers to identify their position and required routings on the movement area, and to assist them in avoiding other traffic.

4.2.7.3 Requirements & recommendations relating to visual aids at aerodromes are detailed at Annex 14, Volume I, Chapter 5.

General

Required

Publish details of the taxiway guidance system in the appropriate sections of the AIP.

Annex 15, Appendix 1, AD 2.9

A surface movement guidance and control system shall be provided at an aerodrome.

Annex 14, Volume 1, 9.8.1

Recommended

The design of a surface movement guidance and control system should take into account:

Annex 14, Volume 1, 9.8.2

a) the density of air traffic;

b) the visibility conditions under which operations are intended;

c) the need for pilot orientation;

d) the complexity of the aerodrome layout; and

e) movements of vehicles.

Good practice

Consider providing location and guidance signs, markings and traffic lights on service roads.

Note.— Guidance on surface movement guidance and control systems is contained in the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476).

4.2.7.4 *Aerodrome markings*

4.2.7.4.1 Requirements & recommendations relating to aerodrome markings are specified in Annex 14, Volume I, 5.2.

General

Required

Provide each runway-holding position with a runway-holding position marking. Annex 14, Volume I, 5.2.10

Recommended

Provide aircraft stand markings for designated parking positions on a paved apron and on a de-icing/anti-icing facility. Annex 14, Volume I, 5.2.13

Provide safety lines on a paved apron as required by the parking configurations and ground facilities, to define the areas intended for use by ground vehicles and other aircraft servicing equipment, etc., to provide safe separation from aircraft. Annex 14, Volume I, 5.2.14

Provide aircraft stand manoeuvring guidance lights to facilitate the positioning of an aircraft on an aircraft stand on a paved apron or on a de-icing/anti-icing facility intended for use in poor visibility conditions, unless adequate guidance is provided by other means. Annex 14, Volume I, 5.3.26

Provide continuous guidance (including aircraft stand lead in line and manoeuvring guidance lights) from the runway to the stand. Annex 14, Volume I, 5.2.8

Good practice

Surface markings that are the sole runway or taxiway centre line reference to the users during LVP, or other essential markings used in connection with LVP, to be sufficiently conspicuous to the users throughout the taxi routes, and kept free of contamination.

Runway holding positions installed for use while LVP are in force to provide protection for:

- *relevant localiser and glidepath critical & sensitive areas; and*
- *the obstacle free zone (OFZ).*

Intermediate holding position markings at taxiway intersections and intermediate holding position markings of holding positions along a taxiway other than at taxiway intersections may assist in ensuring adequate spacing between taxiing aircraft while LVP are in force.

Annex 14, Volume I, 5.2.11

Provide service roads and emergency access roads with adequate markings to enable drivers of emergency response vehicles to establish their position and route in the lowest visibility conditions in which the aerodrome maintains operations.

Low visibility departure operations

Required

Runway centre line marking. *Annex 14, Volume I, 5.2.3.1*

Guided take-off

Required

For RWYs used for guided take-off, the location of holding bays, runway-holding positions and road-holding positions protect the critical/sensitive area(s). *Annex 14, Volume 1, Table 3-2*

Annex 10, Volume I, Attachments C and G

Approach and landing operations

Instrument approach runways

Required

Runway centre line marking. *Annex 14, Volume I, 5.2.3.1*

Threshold marking at the threshold of a paved instrument runway, and of a paved non-instrument runway where the code number is 3 or 4 and the runway is intended for use by international commercial air transport. *Annex 14, Volume I, 5.2.4*

Aiming point marking at each approach end of a paved runway where the code number is 2, 3 or 4. *Annex 14, Volume I, 5.2.5.2*

Recommended

Provide an aiming point when additional conspicuity of the aiming point is desirable for a runway code number 1. *Annex 14, Volume I, 5.2.5.3*

Precision instrument approach runways

Required

As for Instrument Approach Runways, plus:

Provide touchdown zone markings on paved runways, where code number is 2, 3 or 4

Annex 14, Volume I, 5.2.6.1

Good practice

Touchdown zone markings use pattern B with distance coding. *Annex 14 Volume I, 5.2.6*

CAT II & CAT III

Required

Holding bay, runway-holding position and road-holding positions provided and sited to protect the critical/sensitive area(s) associated with RWYs used for CAT II/III approach and landing operations. *Annex 14, Volume 1, Table 3-2*

Annex 10, Volume I, Attachments C and G

4.2.7.5 *Lighting*

4.2.7.5.1 Requirements & recommendations relating to lighting systems are specified in Annex 14, Volume I, Chapter 5.3

4.2.7.5.2 Refer also to section 4.2.7.5.3 for details relating to Runway Stop Bars.

General

Required

Automatic monitoring and relay to ATSUs of lighting systems that are used for aircraft control purposes. *Annex 14, Volume 1, 8.3.2*

Runway edge lights provided for a runway intended for use at night. *Annex 14, Volume I, 5.3.9.1*

Recommended

Provide automatic monitoring of lighting systems. *Annex 14, Volume 1, 8.3.4 and 8.3.5*

Provide an indication of the operational status of lights within defined response times. *Annex 14, Volume 1, 8.3.3*

Runway threshold identification lights should be installed at the threshold of a non-precision runway when additional threshold conspicuity is necessary or where it is not practicable to provide other approach lighting aids. *Annex14, Volume I, 5.3.8.1*

Good practice

Refer to Aerodrome Design Manual (Doc 9157), Part 5 for guidance on air traffic control interface and visual aids monitoring.

Low visibility departure operations

Recommended

Provide runway edge lights on runways intended for take-off below an RVR in the order of 800 m during daytime. *Annex 14, Volume I, 5.3.9.2*

Provide runway centre lights on a runway intended to be used for take-off with an operating minimum of an RVR of the order of 400 m or higher when used by aeroplanes with a very high take-off speed, particularly where the width between the runway edge lights is greater than 50 m. *Annex 14, Volume I, 5.3.12.4*

Required

Provide runways equipped with edge lights with runway end lights. *Annex 14, Volume I, 5.3.9.1 and 5.3.11.1*

Runway edge lights spaced at intervals of not more than 60 m. *Annex 14, Volume I, 5.3.9.6*

Spacing of runway centreline lights determined in accordance with Annex 14, Vol. I, 5.3.12.5.

The spacing of runway edge lights and runway centreline lights published in AIP. *Annex 15, Appendix. 1, AD 2-14*

Recommended

Runway lighting systems automatically monitored to provide an indication when the serviceability levels of any element, falls below the minimum serviceability level specified in Annex 14, Volume 1, 10.4.7 to 10.4.11. This information should be automatically relayed to the maintenance crew. *Annex 14, Volume 1, 8.3.4*

Runway lighting systems automatically monitored to provide an indication when the serviceability level of any element falls below the minimum level specified by the appropriate authority below which operations should not continue. This information should be automatically relayed to the air traffic services unit and displayed in a prominent position. *Annex 14, Volume I, 8.3.5*

RVR <400 m

Required

Provide runway centre line lights on runways intended to be used when RVR < 400 m. *Annex 14, Volume I, 5.3.12.3*

Approach and landing operations

Runway lighting

Required

Implement approach lighting systems in accordance with Annex 14, Volume I, 5.3.4.

Runway edge lights uniformly spaced in rows at intervals of not more than 60 m.
Annex 14, Volume I, 5.3.9.1 and 5.3.9.6

Spacing of runway edge lights published in the AIP. *Annex 15, Appendix 1, AD 2.14*

Runway threshold lights spaced in accordance with Annex 14, Volume I, 5.3.10.1 and 5.3.10.4.b.

Configuration of runway threshold lights determined in accordance with Annex 14, Volume I, 5.3.10.1 and 5.3.10.4.b.

Configuration of runway end lights determined in accordance with Annex 14, Volume I, 5.3.11.1, 5.3.11.2 and 5.3.11.3.

Configuration of runway centre line lights determined in accordance for Cat II/III with Annex 14, Volume I, 5.3.12.5.

Spacing of runway centre line lights published in the AIP. *Annex 15, Appendix 1, AD 2.14*

Recommended

Provide runway threshold lights configured in accordance with Annex 14, Volume 1, 5.3.11.3.

Configuration of runway centre line lights determined in accordance for CAT I with Annex 14, Volume I, 5.3.12.5.

Good practice

Strobe Lighting (sequenced or not), if installed, should not be used when CAT II and III operations are in progress.

CAT II & CAT III

Required

Provide runway centreline lights. *Annex 14, Volume I, 5.3.12.1*

Runways centreline lights located from the threshold to the end at longitudinal spacing of approximately 15 m. Where the serviceability level of the runway centreline lights specified as maintenance objectives in Annex14, Volume 1, 10.4.7 or 10.4.11, as appropriate, can be demonstrated and the runway is intended for use in runway visual range conditions of 350 m or greater, the longitudinal spacing may be approximately 30 m. *Annex14, Volume I, 5.3.12.5*

Provide runway touchdown zone lights. *Annex 14, Volume I, 5.3.13*

Ground lighting

Taxiway lighting

Required

Provide taxiway centre line lights for use when RVR < 350 m. *Annex 14, Volume I, 5.3.16.1*

Refer to Annex 14, Volume I, Figure 5-25 for design and configuration of centre line lights on a rapid exit taxiway.

Refer to Annex 14, Volume I, Appendix 2, Figures 2-12, 2-13 and 2-14 for the design and configuration the centre line lighting for taxiways intended to be used for operations in visibility conditions corresponding to RVR of less than 350 m.

> *Note:— Guidance on the design of taxiways, including the cockpit centre line tracking technique, is given in the Aerodrome Design Manual, Part 2.*

Apply special design criteria relating to taxiway lighting highlighting ILS critical/sensitive areas and the transitional surfaces. *Annex 14, Volume I, 5.3.16.7*

Recommended

Provide taxiway centre line lights on taxiways intended for use at night in runway visual range conditions of 350 m or greater, and particularly on complex taxiway intersections and exit taxiways, except that these lights need not be provided where the traffic density is light and taxiway edge lights and centre line marking provide adequate guidance. Annex 14, Volume I, 5.3.16.2

Provide rapid exit taxiway indicator lights (RETILs) on a runways intended for use when RVR < 350 m, and/or where the traffic density is heavy. Annex 14, Volume 1, 5.3.14.1

Good practice

Switchable or additional lighting may assist the correct identification of the nominated runway turn-off.

To make best use of the capacity of a runway and to assist pilots in the assessment of their relative position along the runway, the conspicuity of the approach to a rapid exit taxiway should be enhanced.

During LVP, the remaining distances to rapid exit taxiways should be identified by appropriate marking and lighting.

Experience has shown that low intensity lighting is of little use in daylight. Centre line lighting with an intensity of 80 candelas have been found to be effective at night with RVR down to 350 m, but higher intensity lights are recommended by day in visibilities of this order on complicated taxi routes.

The location and spacing of taxiway lighting requires particular attention and closer spacing should be provided for operations in lower RVR conditions and on tighter radius turns.

Taxiway edge lights combined with taxiway centre line marking are adequate for operations in visibility conditions corresponding to RVR down to 350 m. Annex 14, Vol. I, 5.2.8

For operations with RVR less than 350 m, centre line lighting is essential to provide continuous guidance between the runway centre line and aircraft stands, except where the traffic density is light and taxiway edge lights and centre line marking provide adequate guidance. Annex 14, Volume I, 5.3.16.1

Where there may be a need to delineate the edges of a taxiway, e.g. on a rapid exit taxiway, narrow taxiway or in snow conditions, this may be done with taxiway edge lights or markers.

Intermediate holding position lights

Required

Provide lighting for any intermediate holding position defined for use in visibility conditions corresponding to RVR below 350 m. Annex 14, Volume I, 5.3.20.1

Recommended

Intermediate holding position lights should be provided at an intermediate holding position where there is no need for stop-and-go signals as provided by a stop bar.

Annex 14, Volume I, 5.3.20.2

Good practice

Provide lighting for all intermediate holding positions on an aerodrome for which ground movements are intended to be conducted while RAVC exist.

Road-holding position lights

Required

Provide lighting for each road-holding position serving a runway intended to be used when RVR < 350 m. Annex 14, Volume I, 5.3.27.1

Recommended

Provide lighting for each road-holding position serving a runway when it is intended that the runway will be used in runway visual range conditions of values between 350 m and 550 m.

Annex 14, Volume I, 5.3.27.2

Good practice

Provide lighting for each road-holding position serving a runway that may be used while RAVC exist.

Aircraft stand manoeuvring guidance lights

Required

Refer to Annex 14, Volume I, 5.3.26 regarding the colours of aircraft stand manoeuvring guidance lights.

Recommended

Provide effective guidance to aircraft manoeuvring on the apron during all visibility conditions in which the aerodrome is used. *Annex 14, Volume I, 5.3.25*

Unless adequate guidance is provided by other means, provide aircraft stand manoeuvring guidance lights for stands intended for use in poor visibility conditions. *Annex 14, Volume I, 5.3. 26*

4.2.7.5.3 *Stop bars*

4.2.7.5.3.1 The primary safety function of stopbars is to assist in the prevention of inadvertent penetrations of active runways and OFZ by aircraft and vehicles when visibility is reduced.

4.2.7.5.3.2 A stop bar is switched on to indicate that traffic stop, and switched off to indicate that traffic may proceed.

Note.— Except when specific local procedures - such as those supporting "follow the greens" operations - are in force, an aircraft may not proceed beyond an intermediate holding position unless a clearance to do so has been received from ATC. Crossing intermediate holding positions is permissible for such "follow the greens " types of operations, because taxi clearances issued in the form "Follow the greens, hold at A1" constitute a clearance to cross the intermediate holding positions up until the nominated clearance limit. Nevertheless, even when systems and local procedures are in place to enable an aircraft to cross intermediate holding positions, an aircraft may never proceed beyond a nominated clearance limit, or cross a runway holding point, unless an explicit clearance to do so has been received from ATC.

4.2.7.5.3.3 The key elements relating to the design and operation of Stop Bars are detailed in Annex 14, Volume I, 5.3.19.

General

Required

Provide a stop bar at each runway-holding position when it is intended that the runway will be used when RVR < 550 m. *Annex 14, Volume I, 5.3.19.1 and 5.3.19.2*

Exceptions:

Where:

- *appropriate aids and procedures are available to assist in preventing inadvertent incursions of aircraft and vehicles onto the runway; or*
- *operational procedures exist to limit, in runway visual range conditions less than a value of 550 m, the number of:*
  - *aircraft on the manoeuvring area to one at a time; and*
  - *vehicles on the manoeuvring area to the essential minimum.*

Refer to Annex 14, Volume I, 5.3.19.13 for design requirements relating to stop bar lighting circuits.

Note: further guidance is available in the Aerodrome Design Manual, Part 5.

Except where a stop bar has been installed, provide intermediate holding position lights at intermediate holding positions intended for use when RVR < 350 m. *Annex 14, Volume I, 5.3.20.1*

Recommended

Where the normal stop bar lights might be obscured (from pilots view), for example, by snow or rain, or where a pilot may be required to stop the aircraft in apposition so close to the lights that they are blocked from view by the structure of the aircraft, then a pair of elevated lights should be added to each end of the stop bar. *Annex 14, Volume I, 5..3.19.4*

When it is desired to provide traffic control by visual means or to supplement markings, provide stop bars at intermediate holding positions. *Annex 14, Volume I, 5.3.19.3*

Unless the aerodrome layout, traffic density and applied procedures enable protection by other means as determined by the responsible authority, provide stop bars at all taxiways giving access to runways that will be used by aircraft conducting take-off or landing operations which require LVP to be in force. *Doc 9365, 5.2.9*

Good practice

Where deemed necessary to assist in preventing inadvertent access of vehicles or aircraft to a taxiway, provide a stop bar as a no-entry bar across a taxiway which is intended to be used as an exit only taxiway. *Doc 9476, 5.3.2*

Consider the provision of stop bars at runway-holding positions for use at night and when RVR >550 m. *Annex 14, Volume I, 5.3.19, Note 2*

Unless contingency measures are in force, aircraft shall not be instructed to cross illuminated stop bars when entering or crossing a runway. *Recommendation 1.5.6 of EAPPRI*

Use stop bars (where provided) at least when RVR < 400 m. *Doc 9365, 5.2.9*

Establish contingency measures to cover cases where the stop bars or controls are unserviceable. Publish such contingency measure in the AIP.

Runway-holding position markings, signs and stop bars may not by themselves be adequate during conditions of reduced visibility and runway guard lights are recommended as reinforcement.

Consider partial automating the operation of stop bars, reducing the need for operating personnel to manually intervene on each occasion; for example, a " limited visibility" setting on the control panel might automatically illuminate stop bars closing access to taxiways which are not to be used when visibility is reduced or, following a manual switch-off of a stop bar, the stop bar would automatically switch back on triggered by the crossing aircraft. *Doc 9365, 5.2.9*

4.2.7.5.4 *Runway guard lights*

4.2.7.5.4.1 Runway-holding position markings, signs and stop bars may not by themselves be adequate during conditions of reduced visibility and runway guard lights are recommended as reinforcement.

4.2.7.5.4.2 Runway guard lights are provided to warn pilots, and drivers of vehicles, when they are operating on taxiways that they are about to enter an active runway. Material relating to Runway guard lights is detailed in Annex 14, Volume I, 5.3.22.

General

Required

Provide runway guard lights, Configuration A, at each taxiway/runway intersection associated with a runway intended for use: *Annex 14, Volume I, 5.3.22.1*

- *where the traffic density is heavy, when RVR < 1,200 m; and*
- *where a stop bar is not installed, whenever RVR < 550 m.*

Note: details of the configurations of runway guard lights are available at Annex 14, Volume I, Figure 5-23.

Recommended

Runway guard lights, Configuration A or Configuration B or both, should be provided at each taxiway/runway intersection where enhanced conspicuity of the taxiway/runway intersection is needed, such as on a wide-throat taxiway, except that Configuration B should not be ollocated with a stop bar. *Annex 14, Volume I,* 5.3.22.3

4.2.7.5.5 *Road-holding position lights*

General

Required

Provide road-holding position lights at each road-holding position serving a runway when it is intended that the runway will be used when RVR < 350 m. *Annex 14, Volume I, 5.3.27.1*

Recommended

Provide road-holding position lights at each road-holding position serving a runway when it is intended that the runway will be used when RVR < 550 m. *Annex 14, Volume I, 5.3.27.2*

4.2.7.5.6 *Rapid exit taxiway indicator lights (RETILs)*

General

Recommended

Provide RETILs on a runway intended for use in runway visual range conditions less than a value of 350 m and/or where traffic is heavy. *Annex 14, Volume I, 5.3.14.1*

Good practice

Provide RETILs in low visibility conditions to provide the pilot with useful situational awareness cues regarding the runway centre line. *Annex 14, Volume I, Attachment A, 14.2*

4.2.7.6 *Signs*

4.2.7.6.1 Key elements relating to the location and characteristics of signs are specified in Annex 14, Volume I, Section 5.4 and Appendix 4.

General

Required

Provide mandatory instructions signs, information signs and location signs for the use of pilots and vehicle drivers to assist awareness of their position and of the direction to follow.
Annex 14, Volume I, 5.4.2

Provide runway exit signs where there is an operational need to identify a runway exit.
Annex 14, Volume I, 5.4.3.3

Provide runway vacated signs where the exit taxiway is not provided with taxiway centre line lights and there is a need to indicate to a pilot leaving a runway the perimeter of the ILS/MLS critical/sensitive area or the lower edge of the inner transitional surface, whichever is farther from the runway centre line. *Annex 14, Volume 1, 5.4.3.4*

Illuminate signs in accordance with the provisions of Appendix 4 of Annex 14 when intended for use: *Annex 14, Volume 1, 5.4.1.7*

a) in runway visual range conditions less than a value of 800 m; or
b) at night in association with instrument runways; or
c) at night in association with non-instrument runways where the code number is 3 or 4.

Good practice

Consider the need to provide visual clues to pilots under very low visibilities.

Designate taxiways, exits and entries in a manner which simplifies orientation on the aerodrome. *Annex 14, Volume I, 5.4*

Provide service roads and emergency access roads with adequate signs to enable drivers of emergency response vehicles to establish their position and route in the lowest visibility conditions in which the aerodrome maintains operations.

Determine the location of signs laterally from the taxiway pavement edge, and the dimensions of the signs, considering the minimum visibility during which the aerodrome is used and the most restrictive aircraft type expected to operate at the aerodrome.

Low visibility departure operations

Required

Provide runway exit signs where there is an operational need to identify a runway exit.

Annex 14, Volume I, 5.4.3.3

Where the exit taxiway is not provided with taxiway centre line lights and there is a need to indicate to a pilot leaving a runway the perimeter of the ILS/MLS critical/sensitive area or the lower edge of the inner transitional surface (whichever is farther from the runway centre line) provide runway vacated sign. *Annex 14, Volume I, 5.4.3.4*

Illuminate signs in accordance with the provisions of Appendix 4 of Annex 14 when intended for use: *Annex 14, Volume 1, 5.4.1.77*

a) in runway visual range conditions less than a value of 800 m; or

b) at night in association with instrument runways; or

c) at night in association with non-instrument runways where the code number is 3 or 4.

Good practice

Consider limiting the number of runway exits, taking into account the traffic density and the availability of adequate means to control ground operations.

Approach and landing operations

CAT II

Required

Provide runway exit signs where there is an operational need to identify a runway exit.

Annex 14, Volume I, 5.4.3.3

Where the exit taxiway is not provided with taxiway centre line lights and there is a need to indicate to a pilot leaving a runway the perimeter of the ILS/MLS critical/sensitive area or the lower edge of the inner transitional surface (whichever is farther from the runway centre line) provide runway vacated sign. *Annex 14, Volume I, 5.4.3.4*

Good practice

Consider limiting the number of runway exits, taking into account the traffic density and the availability of adequate means to control ground operations.

Provide runway vacated signs in all cases.

4.2.8 ***Aerodrome ground operations***

4.2.8.1 *Unserviceable areas*

4.2.8.1.1 Provisions relating to management of unserviceable areas during All Weather Operations are detailed at Annex 14, Volume I, 7.4.

Good practice

During LVP:

- *Display movement area unserviceability lights on any areas used by aircraft while LVP are in force.*
- *Do not operate lighting on a closed runway or a closed or unauthorised taxiway or portion thereof while LVP are in force.*
- *Use mobile closure devices, positioned in such a way as to meet the appropriate obstacle/obstruction clearance, frangibility and ILS/MLS localizer sensitive area clearance requirements.*

4.2.8.2 *Movement area*

Protecting the movement area

Good practice

Establish arrangements to:

- *ensure that, in good time prior to the bringing LVP Operations Phase into force, all airlines and other organisations with access to movement areas are notified; and*
- *prevent unauthorised vehicular traffic from entering the movement area when RAVC exist or while LVP are in force.*

4.2.8.3 *Aircraft ground operations*

Aircraft ground operations when RAVC exist

Good practice

Refer to ICAO Doc 9476 - Manual of SMGCS, and ICAO Doc 9830 - Manual on A-SMGCS.

In determining restrictions to apply when RAVC exist, consider the pilot's ability to taxi, taking into account:

- *taxiway lighting and markings;*
- *the availability, location and characteristics of position and information signs.*

Consider the need to limit aerodrome declared capacity and movement rates taking into account items such as the effects of reducing visibility, the physical layout of the aerodrome, supporting/enabling facilities such as signs and lighting, the availability of ground surveillance systems.

Establish defensive measures against runway incursions, such as limiting the choice of taxi-routing, additional procedures and/or radar monitoring, stopbars at runway access/holding points, or other technical means.

4.2.8.4 *Vehicles & pedestrians*

4.2.8.4.1 The general provisions relating to the on-aerodrome operation of vehicles are detailed at Annex 14, Volume I, Section 9.7 (Aerodrome vehicle operations).

4.2.8.4.2 Further guidance on aerodrome vehicle operations is contained in Annex 14, Volume 1, Attachment A, Section 18, and on traffic rules and regulations for vehicles in the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476).

4.2.8.4.3 The general provisions relating to the knowledge and qualification requirements for operators of vehicles are detailed at Annex 14, Volume I, Attachment A, Section18.

4.2.8.4.4 The general provisions relating to the control of vehicles and pedestrians on the manoeuvring area are detailed at PANS-ATM, 7.6.3.2.

General

Required

The driver of a radio-equipped vehicle shall establish satisfactory two-way radio communication with the aerodrome control tower before entering the manoeuvring area and with the appropriate designated authority before entering the apron. The driver shall maintain a continuous listening watch on the assigned frequency when on the movement area.

Annex 14, Volume I, 9.7.5

Recommended

All vehicles employed on the manoeuvring area shall be capable of maintaining two-way radio communication with the aerodrome control tower, except when the vehicle is only occasionally used on the manoeuvring area and is either accompanied by a vehicle with the required communications capability, or employed in accordance with a pre-arranged plan established with the aerodrome control tower. *PANS-ATM, 7.6.3.2.3.1*

Good practice

Refer to the EAPPRI (European Action Plan for the Prevention of Runway Incursions) for consideration of those provisions to apply during conditions of reduced aerodrome visibility.

Operators of vehicles

Good practice

If special procedures apply for operations in low visibility conditions, verify an operator's knowledge of the procedures through periodic checks. *Annex 14, Volume I, Attachment A, 18.4*

Vehicles and other mobile objects

Required

Vehicles (excluding aircraft) operating on the manoeuvring area during conditions of low visibility to be lighted. *Annex 14, Volume I, 6.1.6*

Rescue and fire fighting services

Recommended

At locations where it is planned that taxi, take-off or landing operations will be permitted in conditions where visual reference is limited by weather conditions, establish and/or provide suitable guidance, equipment and/or procedures to enable and support the provision of rescue and fire fighting services in less than optimum conditions of visibility. *Annex 14, Volume I, 9.2.26*

Vehicle documentation

Good practice

All vehicles allowed onto the manoeuvring areas while RAVC exist equipped with an airfield chart permanently displayed in the drivers cab clearly showing all taxiways, runways, holding points and vehicle routes marked with their appropriate designation.

Provide written instructions clearly detailing the actions to be taken in the event that the vehicle should break down or that the driver should become unsure of his position on the airfield.

Establishing provisions to support RAVP

Good practice

Establish a driver education and training programme covering:

- *the aerodrome layout, the impacts of reduced visibility (orientation on the aerodrome);*
- *special rules or procedures that will apply when reduced visibility occurs;*
- *the operation of LVP;*
- *the meaning of all markings, signs and aerodrome lighting; and*

- *where appropriate, standard RTF phraseology.*

Ensure drivers are aware of defined boundaries of their approved area(s) of operations under various conditions.

Provide practical training to facilitate visual familiarisation of airside service roads, taxiway crossings and any restrictions during low visibility. *Doc 9870, Appendix D, 2.1*

Conduct training of those personnel who are intended to operate on the manoeuvring area during conditions of reduced visibility:

- *This training may include actual or simulated exercises;*
- *Conduct this training in close co-ordination with ATC, in order that such personnel may become familiar with the level of assistance which can be provided by ATC.*

Periodically verify vehicle operators knowledge of any special procedures to be applied in low visibility conditions. *Annex 14, Volume I, Attachment A, 18.4*

Operations when RAVC exist

Good practice

Restrict persons and vehicles to the essential minimum. *Doc 9476, 3.2.16*

The aerodrome control tower maintains a record of vehicle and persons operating on the manoeuvring area.

Provisions for LVP

Required

Restrict persons and vehicles to the essential minimum. *Annex 14, Volume I, 9.5.4*

Prior to bringing the LVP Operations Phase into force, the aerodrome control tower establishes a record of vehicles and persons on the manoeuvring area and maintains this while LVP are in force. *PANS-ATM, 7.12.6*

Good practice

Conduct training of personnel operating on the manoeuvring area during conditions of reduced visibility in close co-ordination with ATC, so that such personnel may become familiar with the level of assistance which can be given by ATC, and other special characteristics of LVP.

4.2.8.5 *Aerodrome emergency response*

4.2.8.5.1 When RAVC exist, establishing and reporting the accurate location of aircraft for the benefit of emergency response agencies takes on increased importance.

General

Good practice

Consider providing guidance for emergency vehicles responding during periods of low visibility.

Annex 14, Volume I, Attachment A,, 17.4.4

Aerodrome emergency response while RAVC exist

Good practice

Establish strategically located fire stations and/or stand-by positions on the movement area, locations determined to assist preserving emergency response times under various visibility conditions.

Consider the desirability at very large or complicated aerodromes of temporarily relocating RFFS vehicles to strategic points while RAVC exist.

Establish facilities and procedures enabling continuous communication between ATC and leading response agencies (such as Rescue and Fire Fighting vehicles).

Provide service roads and emergency access roads with adequate signs and markings which enable drivers to establish their position and route in the lowest visibility conditions in which the aerodrome maintains operations.

Aerodrome control agencies use all available aids, including ground surveillance aids (such as Surface Movement Radar and A-SMGCS where available), to assist emergency response agencies proceed quickly to an emergency site.

4.2.8.6 *Apron management service*

4.2.8.6.1 At some aerodromes an Apron Management Service is established to manage the movement of aircraft, vehicles and persons over the apron areas. The safe and effective movement of aircraft and vehicles requires both management and traffic regulation. The demand for traffic regulation will considerably increase in very low visibility where pilots and drivers of vehicles are hampered in identifying position and routing and in their ability to avoid other traffic. Therefore, special procedures should be developed by the unit operating the Apron Management Service to manage the movement of aircraft and vehicles on the apron for the lowest visibility conditions under which the aerodrome will maintain operations.

4.2.8.6.2 The interface between the Apron Management Service and ATC is particularly important during LVP. A formal agreement between ATC and the Apron Management Service should define the LVP to be used and clearly state the tasks and responsibilities of each party in LVP, in particular including provisions for the movement of vehicles on the apron.

4.2.8.6.3 Provisions relating to the establishment and provision of Apron Management Services (AMS) are detailed at Annex 14, Volume I, 9.5.

4.2.8.6.4 Further guidance on an apron management service is given in the Airport Services Manual (Doc 9137), Part 8, and in the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476).

Apron operations when RAVC exist, and/or while LVP are in force

Required

Where low visibility procedures are in force, restrict persons and vehicles operating on an apron to the essential minimum. *Annex 14, Volume I, 9.5.4*

Recommended

When warranted by the volume of traffic and operating conditions, provide an appropriate apron management service. *Annex 14, Volume I, 9.5.1*

Good practice

When meteorological conditions limit visual reference, restrict persons and vehicles operating on an apron to the essential minimum.

The unit operating the Apron Management Service to develop special procedures to manage the movement of aircraft and vehicles on the apron for the lowest visibility conditions under which the aerodrome will maintain operations.

Develop and establish formal arrangements between ATC and the Apron Management Service defining the procedures to be used, and clearly stating the tasks and responsibilities of each party when RAVC exist, and/or while LVP are in force, in particular including provisions for the movement of vehicles on the apron.

4.3 Meteorological services

4.3.1 The provision of MET forecasts to ATC is fundamental to the successful initiation of the LVP Preparation, Operations and Termination phases.

4.3.2 To recognise the required use of automated MET equipment in conjunction with runways intended for Category II and III instrument approach and landing operations (Annex 3, 4.1.5) the generic term "Ceiling" is no longer used in meteorological observation, and has been replaced by the term "Height of Cloud Base". In the past, states have used the generic term "Ceiling" in association with LVP. Many States have now found that the use of the term "Height of Cloud Base" is more appropriate and use this in place of previous requirements relating to Ceiling. Within this document, the term "Height of Cloud Base[#]" is generally used however there are still some cases where the term "Ceiling" is found in this document, reflecting the continued use of this term in other documents and contexts.

Required

At aerodromes with runways intended for Category II and III instrument approach and landing operations, install automated equipment – as required to support approach and landing and take-off operations – for measuring or assessing, as appropriate, and for monitoring and remote indicating of: *Annex 3, 4.1.5*

- *surface wind;*
- *visibility;*
- *runway visual range;*
- *height of cloud base[#];*
- *air and dew-point temperatures; and*
- *atmospheric pressure.*

Recommended

Cloud observations for local routine and special reports representative of the approach area.

Annex 3, 4.6.5.2

Cloud observations for METAR and SPECI representative of the aerodrome and its vicinity.

Annex 3, 4.6.5.3

For aerodromes with precision approach runways, sensors for determining cloud reported in local routine and special reports sited to give the best practicable indications of the height of cloud base and cloud amount at the middle marker site of the instrument landing system or, at aerodromes where a middle marker beacon is not used, at a distance of 900 m to 1 200 m (3 000 ft to 4 000 ft) from the landing threshold at the approach end of the runway.

Annex 3, Appendix 3, 4.5.1

Good practice

Establish a co-ordination process to:

- *familiarise MET with the requirements for LVP; and*
- *provide ATC with forecasts which include the probability of visibility and/or ceiling conditions which may require LVP to be undertaken.*

4.3.3 *Secondary power supplies*

General

Recommended

Provide a secondary power supply for all meteorological equipment. *Annex 14, Volume 1, 8.1.10.d)*

[#] In some States height of cloud base or ceiling may be used according to local requirements.

4.3.4 *Runway Visual Range (RVR)*

4.3.4.1 Arrangements for observation and reporting RVR are detailed at Annex 3, 4.6.3, and ICAO Manual of Runway Visual Range Observing and Reporting Practices (Doc 9328).

General

Required

Use instrumented systems based on transmissometers or forward-scatter meters to assess runway visual range on runways intended for Category II and III instrument approach and landing operations. *Annex 3, Appendix 4.3.2.1*

Use the averaging periods defined in Annex 3, Appendix 3, 4.3.4.

Inform units providing air traffic service and aeronautical information service for an aerodrome without delay of changes in the serviceability status of the automated equipment used for assessing runway visual range. *Annex 3, 4.6.3.5*

Recommended

Use instrumented systems based on transmissometers or forward-scatter meters to assess runway visual range on runways intended for Category I instrument approach and landing operations. *Annex 3, Appendix 3, 4.3.2.2*

Assess and report RVR for all runways intended for use during periods of reduced visibility. *Annex 3, 4.6.3.2*

(Note: this includes:

- *precision approach runways intended for Category I instrument approach and landing operations; and*
- *runways used for take-off and having high-intensity edge lights and/or centre line lights.)*

Refer to Annex 3, Appendix 3, 4.3.4 for details of criteria for averaging RVR values.

Good practice

Use standard reporting intervals for transmitting RVR on the ATIS:

- *At locations where the ATIS is recorded manually, update RVR values every 30 minutes unless the Standards of Annex 11, Chapter 4, 4.3.6.1 b) require immediate updates,*
- *In the case of a deterioration, update RVR values immediately;*
- *In the case of an improvement, update RVR values only if the improvement lasts for 10 minutes.*

Approach and landing operations

CAT I approach and landing runways

Required

Where RVR is provided, RVR is representative of the touchdown zone. *Annex 3, 4.6.3.4*

CAT II approach and landing runways

Required

Provide RVR representative of the touchdown zone and the mid-point. *Annex 3, 4.6.3.4*

CAT III approach and landing runways

Required

Provide RVR representative of the touchdown zone, the mid-point and stop-end of the runway. *Annex 3, 4.6.3.4*

4.4 AIS

4.4.1 Samples of "AIP entries on LVP" are presented in Appendix A to this Guidance Material.

AIP

Required

Publish the general conditions under which the Low Visibility Procedures (applicable to Cat II/III operations) are applied. *Annex 15, Appendix 1, AD 1.1, 4*

When low visibility procedures are established at an aerodrome, publish at AD 2.22 a detailed description of the LVP, including: *Annex 15, Appendix 1, AD 2.22*

1) runway(s) and associated equipment authorised for use under low visibility procedures;

2) defined meteorological conditions under which initiation, use and termination of low visibility procedures would be made; and

3) description of ground marking/lighting for use under low visibility procedures.

When low visibility procedures are established at a heliport, publish at AD 3.21 a detailed description of the LVP, including: *Annex 15, Appendix 1, AD 3.21*

1) touchdown and lift-off (TLOF) area(s) and associated equipment authorised for use under low visibility procedures;

2) defined meteorological conditions under which initiation, use and termination of low visibility procedures would be made; and

3) description of ground marking/lighting for use under low visibility procedures.

Recommended

Provide detailed information relating to specific aerodromes.

Publish standard taxi routes in the AIP at AD 2.20 (Local traffic regulations).
PANS-ATM, 7.6.3.1.1.3 and Annex 15, Appendix 1, AD 2.20

Provide information that is comprehensive enough to avoid the need for additional enquiries from individual operators.

Where there are a number of aerodromes in a State at which Low Visibility Procedures may be carried out, provide a general entry in the AD section.

At locations for which aircraft operators are required to obtain authorisation for CAT II or CAT III operations, provide an AIP an entry describing the procedure by which aircraft operators can obtain authorisation.

Detail the conditions under which guided take-offs are available.

Publish the normal interval of updating the ATIS.

Good practice

Aerodrome charts to provide sufficient detail and clarity to enable pilots to navigate around the aerodrome in reduced visibility conditions.

NOTAM

Recommended

The wording of NOTAMs to provide a full description of each part of the system which is available, including a description of any special procedures which will be applied as part of the LVP, together with the trigger point at which they will be implemented by the air traffic service.

In NOTAMs, avoid giving the impression that operations are dependent on the availability of any particular part of the ground system.

Good practice

Refer to PANS-ATM, 7.12.5 for details of the provisions to be specified in relation to operations undertaken while RAVC exist, or when LVP are in force. .

4.5 Communications systems

4.5.1 *Secondary power supplies*

4.5.1.1 The specifications for secondary power supply for the ground elements of communications systems are given in Annex 10, Volume I, Chapter 2.

4.6 Non-visual aids

4.6.1 The full text of SARPS related to non-visual aids at aerodromes appears in Annex 10, Volume 1.

4.6.2 *Secondary power supplies*

4.6.2.1 The specifications for secondary power supply for radio navigation aids are given in Annex 10, Volume I, Chapter 2.

4.6.3 *Operating requirements*

4.6.3.1 Guidance material for the protection of the ILS critical and sensitive areas is provided in Annex 10 Volume I, Attachment C.

ILS installations

Required

Suppress the identification signal of the localiser whenever the transmissions are not available for operational use, as, for example, after removal of navigation components, or during maintenance or test transmissions. *Annex 10, Volume 1, 3.1.3.9.4*

Recommended

Whenever an ILS is unavailable for use the ident should be suppressed. *Annex 10, 3.1.3.9.4*

When a glide-path signal is transmitted for test or tuning purposes, switch off the associated localizer system.

When localizer signal is radiated for test or tuning purposes, switch off the associated glide-path system.

Good practice

When an ILS localiser or glidepath signal is being radiated for test or tuning purposes, ATC advises pilots before an approach is commenced.

Conduct periodic monitoring of the signal-in-space in order to detect interference.

Investigate pilots reports of signal disturbances.

Conduct special flight checks when there is reason to believe that serious interference is occurring.

Joint ILS / MLS / GBAS installations

Good practice

Refer to Chapter 8 of this Guidance Material (Optimised Operations) to assist the development of ATC procedures to support the efficiency of flight and aerodrome operations where mixed ILS/MLS and GBAS environments exist.

Take-off and departure operations

Required

Refer to Annex 10 Volume I, Attachment C for guidance relating to the protection of localiser critical and sensitive areas.

ILS critical and sensitive areas protected for guided take-offs. *Annex 10, Volume I, Attachment C, 2.1.9.1*

Precision approach and landing operations

Required

Refer to Annex 10 Volume I, Attachment C for guidance relating to the protection of ILS critical and sensitive areas.

ILS/MLS critical areas protected at all times. — *Annex 10 Volume I, Attachment C, 2.1.9.1 and Annex 10 Volume I, Attachment G, 4.3.1*

Good practice

No personnel permitted in the critical areas.

CAT II / III approach and landing operations

Required

ILS/MLS localiser and glidepath sensitive areas protected when landing aircraft are close to the runways. — *Annex 14, 3.12.6, 3.12.9 and Table 3-2*

ILS/MLS critical and sensitive areas protected from infringement by aircraft and vehicles on the ground. — *Annex 10 Volume I, Attachment C, 2.1.9.1 and Annex 10 Volume I, Attachment G, 4.3.1*

Recommended

LVP specify the minimum ILS/MLS equipment requirements. — *PANS-ATM, 7.12.5.b*

NOTAM

Good practice

Refer PANS-ATM, 7.12.5 for details of the provisions to be specified in relation to operations undertaken while RAVC exist, or when LVP are in force. .

4.7 Surveillance systems

4.7.1 The general provisions relating to the provision of SMR are contained in Annex 14, Volume I, Chapter 9.

4.7.2 Surface movement radar (SMR) as provided in accordance with the provisions of Annex 14, Volume I, or other suitable surveillance equipment, may be utilised to:

a) monitor the movement of aircraft and vehicles on the manoeuvring area;

b) provide directional information to pilots and vehicle drivers as necessary; and

c) provide advice and assistance for the safe and efficient movement of aircraft and vehicles on the manoeuvring area (Annex 11. 3.10).

4.7.3 Information displayed on an SMR display may be used to assist in:

a) monitoring of aircraft and vehicles on the manoeuvring area for compliance with clearances and instructions;

b) determining that a runway is clear of traffic prior to a landing or take-off;

c) providing information on essential local traffic on or near the manoeuvring area;

d) determining the location of aircraft and vehicles on the manoeuvring area;

e) providing directional taxi information to aircraft when requested by the pilot or deemed necessary by the controller. Except under special circumstances, e.g. emergencies, such information should not be issued in the form of specific heading instructions; and

f) providing assistance and advice to emergency vehicles (PANS-ATM, 8.10.2.2.2).

4.7.4 At locations where aircraft operations that require LVP are conducted, or ground operations are conducted while RAVC exist, additional surveillance equipment may be established to support these operations.

4.7.5 Ground surveillance systems are not a requirement to support LVP, or to undertake aerodrome ground operations while RAVC exist, but may be provided to maintain the safety of surface movement and flight operations while minimising the decline of aerodrome capacity that would otherwise be required to preserve safety.

4.7.6 Accordingly, the capabilities of any ground surveillance system under consideration will depend on a number of factors, such as meteorological characteristics including the frequency and duration of prevailing RAVC, the volume and characteristics of aircraft expected to use the aerodrome while RAVC exist and/or while LVP are in force, and the complexity of the aerodrome layout.

4.7.7 For aerodromes having a medium or light traffic density and/or a system of well segregated ground movement routes, surface movements may be handled without ground surveillance monitoring.

4.7.8 At aerodromes with heavy traffic density, surveillance of the manoeuvring area may be required.

SMR / A-SMGCS

Recommended

Provide SMR for the manoeuvring area of aerodromes intended for use when RVR conditions < 350 m. *Annex 14, Volume I, 9.8.7*

At aerodromes other than above, provide SMR when traffic density and operating conditions are such that regularity of traffic flow cannot be maintained by alternative procedures and facilities. *Annex 14, Volume I, 9.8.8*

While LVP are in force

Good practice

At aerodromes where surveillance display systems (SMR or A-SMGCS) are provided, use such systems whenever LVP are in force.

4.8 ATS

4.8.1 The appropriate ATS authority is required to establish provisions applicable to the start and continuation of precision approach category II/III operations as well as departure operations in RVR conditions less than a value of 550 m (PANS-ATM, 7.12.2.1). Some States permit Lower Than Standard CAT I (LTS CAT I) and Other Than Standard CAT II (LTS CAT II) operations, in which case LVP are also required to be in force for these operations.

General

Recommended

Applicability: whenever conditions are such that all or part of the manoeuvring area cannot be visually monitored from the control tower. *PANS-ATM, 7.12.1*

When there is a requirement for traffic to operate on the manoeuvring area in conditions of visibility which prevent the aerodrome control tower from applying visual separation between aircraft, and between aircraft and vehicles, ATC:

- *applies the longitudinal separation* on taxiways as specified for that particular aerodrome; and*
- *holds aircraft or vehicles operating on taxiways no closer to an intersecting taxiway than the holding position limit defined by a clearance bar, stop bar or taxiway intersection marking.*

** The appropriate ATS authority specifies the longitudinal separation on taxiways applicable for each particular aerodrome under these circumstances. It does so after considering the characteristics of the aids available for surveillance and control of ground traffic, the complexity of the aerodrome layout and the characteristics of the aircraft using the aerodrome.*

Operations taking place when RAVC exist, or which require LVP to be in force, are initiated by or through the aerodrome control tower.

Tower advises Approach when LVP will be applied.

Prior to a LVP coming into force, the aerodrome control tower establishes a record of vehicles and persons currently on the manoeuvring area, and maintains this record while the LVP are in force. *PANS-ATM, 7.12.1*

Provisions applicable to operations taking place when RAVC exist, or which require LVP to be in force specify: *PANS-ATM, 7.12.5*

a) the RVR value(s) at which the low visibility operations procedures shall be implemented;

b) the minimum ILS/MLS equipment requirements for category II/III operations;

c) other facilities and aids required for category II/III operations, including aeronautical ground lights, which shall be monitored for normal operation;

d) the criteria for and the circumstances under which downgrading of the ILS/MLS equipment from category II/III operations capability shall be made;

e) the requirement to report any relevant equipment failure and degradation, without delay, to the flight crews concerned, the approach control unit, and any other appropriate organization;

f) special procedures for the control of traffic on the manoeuvring area, including:

1) the runway-holding positions to be used;

2) the minimum distance between an arriving and a departing aircraft to ensure protection of the sensitive and critical areas;

3) procedures to verify that aircraft and vehicles have vacated the runway;

4) procedures applicable to the separation of aircraft and vehicles;

g) applicable spacing between successive approaching aircraft;

h) action(s) to be taken in the event low visibility operations need to be discontinued, e.g. due to equipment failures; and

i) any other relevant procedures or requirements.

When there is a requirement for traffic to operate on the manoeuvring area in conditions of visibility which prevent the aerodrome control tower from applying visual separation between aircraft, and between aircraft and vehicles, ATC:

- *applies the longitudinal separation on taxiways as specified for that particular aerodrome;*
- *holds aircraft or vehicles operating on taxiways no closer to an intersecting taxiway than the holding position limit defined by a clearance bar, stop bar or taxiway intersection marking; and*
- *The appropriate ATS authority is required to specify the longitudinal separation on taxiways for each particular aerodrome after considering the characteristics of the aids available for surveillance and control of ground traffic, the complexity of the aerodrome layout and the characteristics of the aircraft using the aerodrome.*

Operations taking place when RAVC exist are initiated by or through the aerodrome control tower.

Tower advises Approach when RAVP will be applied. *PANS-ATM, 7.12.1*

4.9 Information to pilots

4.9.1 Special attention shall be given to the rapid dissemination of information to pilots by ATIS or RTF as appropriate whenever the operating performance of any part of the ground facilities falls below the level at which it has been promulgated (Annex 11, Chapter 4, 4.2.1.d), further details of the information to be passed can be found in Appendix B of this Guidance Material. This is particularly important if the MET conditions are such that CAT II or III operations are likely.

4.9.2 The wording of NOTAM or AIP entries should not give the impression that such operations are dependent on the availability of any particular part of the ground system, but should give a full description of each part of the system which is available. This should include a description of any special procedures which will be applied as part of the LVP, together with the trigger point at which they will be implemented by the air traffic service.

Note.— Details of the provisions which should be specified regarding low visibility operations are listed in PANS-ATM, 7.12.5.

4.9.3 Where there are a number of aerodromes in a State at which Low Visibility Procedures may be carried out, a general entry should be included in the AD section of the AIP in addition to the detailed information relating to specific aerodromes. The description of the LVP should be comprehensive enough to avoid the need for additional enquiries from individual operators. Two samples of "AIP entries on LVP" are presented in Appendix A to this Guidance Material.

4.9.4 It is also recommended that in the AIP an entry should be made which describes the procedure for aircraft operators to obtain authorization for CAT II or CAT III operations, if an authorization is required.

4.9.5 When any part of the system supporting Low Visibility Procedures is unserviceable or downgraded, a NOTAM shall be issued, provided the failure time complies with the NOTAM issuance requirements, giving a full description of what is unserviceable or downgraded (Annex 15, Chapter 5). The NOTAM shall also include any additional measures or restrictions that have been taken in the LVP as a result of the downgrading.

4.9.6 ATIS broadcasts are provided at aerodromes where there is a requirement to reduce the load on RTF communication channels and therefore reduce the workload on both controllers and pilots. This is particularly beneficial in LVP where additional information about the status of LVP and the aerodrome facilities should be provided. Pilots can receive the information required before they are in RTF contact with approach control units or before start-up. The information provided by ATIS broadcasts in LVP can assist pilots in planning for the approach and, should the need arise, any diversions in a timely manner.

4.9.7 The status of LVP shall be passed to pilots by means of the ATIS broadcast (Annex 11, Chapter 4, 4.3), where available, except for short notice changes which shall be passed by RTF (Annex 11, Chapter 4, 4.2).

4.9.8 Information may be passed automatically to ATIS and ATC display systems from other independent systems (e.g. RVR). It is essential that the correct information arrives in a timely manner. Automated systems (e.g. Voice-ATIS and D-ATIS) should include error checking to ensure that the information provided is accurate and reliable, and that erroneous information is not transmitted to users (pilots and ATC). In case of failure, a warning should be displayed to ATC who should inform pilots by RTF. The failure of an ATIS system may place considerable burdens on the controllers required to transmit this information to each aircraft and consequently reduce airport traffic capacity. Consideration should be given to providing backup or duplicate systems to ensure that a failure will not result in a loss of the ATIS broadcast.

4.9.9 The inclusion of the RVR in the ATIS broadcast may create operational problems. Manual systems require the message to be re-recorded every time a significant change occurs. In this case, frequently changing RVR values may make it impractical to issue a new ATIS broadcast for every change. Automated systems are able to update the RVR values very frequently and this interval should be harmonized.

4.9.10 In order to resolve these problems and harmonize the transmission of RVR on the ATIS, standard reporting intervals should be used. The RVR should be averaged over a one minute interval according to the criteria for the local routine and special reports (Annex 3, Appendix 3, 4.3.4). This average figure should be broadcast on the ATIS (Annex 11, 4.3.6.1.g). Unless the Standards of Annex 11, 4.3.6.1 b) require immediate updates, these should be done every 30 minutes where the ATIS is recorded manually. Local special reports should be transmitted as soon as specified conditions occur. However, by local agreement, they do not need to be issued in respect of: any element for which there is in the local ATS unit a display corresponding to the one in the MET station, and where arrangements are in force for the use of this display to update information included in local routine and special reports; and for RVR, when all changes of one or more steps on the reporting scale in use are being reported to the local air traffic services unit by an observer on the aerodrome (Annex 3, Appendix 3, 3.2.2). When automatic ATIS systems are in use, in order to avoid frequent updates, the ATIS should only be updated when the one minute average values reach or pass through the criteria for the issuance of special reports in the SPECI code form. In the case of a deterioration, the RVR values should be updated immediately and in the case of an improvement, the RVR values should only be updated if this improvement lasts for 10 minutes. The normal interval of updating should be published in the AIP.

4.10 Air Traffic Flow Management

4.10.1 Operations, particularly at aerodromes where traffic density is high, may be seriously affected by MET related phenomena such as LVP. In such circumstances, appropriate forecasting and close co-ordination by ATC with MET offices and ATFM is essential to enable any capacity reductions to be implemented in time to be effective. Equally, significant changes and/or termination of these reductions to ensure that the actual ATC traffic load is at the optimum level, require similar close co-ordination not only to maintain safety but also to minimize any impact on the aircraft operators in terms of delay.

4.10.2 During the process of planning local procedures to be implemented whenever LVP are initiated/terminated, ATC together with their Flow Management Position (FMP) and other concerned aerodrome operational agencies, should be required to take into account the impact LVP have on the capacity of the aerodrome and should determine these capacities for each type of category which may be declared. Consideration should be given to determining figures for the total capacity, together with the arrival/departure capacities within the total figure.

4.10.3 The provision of MET forecasts to ATC is fundamental to the successful planning of LVP. A co-ordination process should be established to familiarise MET with the requirements for LVP and to provide ATC with forecasts which include the probability of visibility and/or Height of Cloud Base# conditions which may require LVP to be undertaken. These forecasts should be regularly reviewed in order to provide updates of the relevant conditions and advance warning of the expected termination of LVP.

4.10.4 Taking into account forecasts from MET, ATC shall co-ordinate with ATFM to manage the traffic (PANS-ATM, 3.2.5.2) in order to achieve optimum capacity for the aerodrome in the prevailing and expected conditions. The responsible ATS unit, in co-operation with the FMP and the unit providing ATFM services, should determine if ATFM measures are required. The timing of the implementation of any ATFM measures is also considered critical in

ensuring a smooth transition from full capacity to the reduced capacity due to LVP, and equally in the return to normal operations/capacity. Given the very variable nature of factors that affect visibility, experience has shown that it is often necessary to apply ATFM measures early and with a capacity which should be quite restrictive but which can be increased as conditions stabilize/improve. However capacity/acceptance rate should be increased only when there is a reasonable assurance that the MET condition will improve. Such decisions should be taken in close co-ordination with the relevant MET, ATS and FMP units.

4.10.5 The attention of all parties is drawn to the need for aircraft operators to strictly comply with any ATFM measures in force, including the provision of accurate aerodrome operating minima for individual flights, when requested, with absolute honesty. It should not be forgotten that in RAVC, the need to ensure safety is paramount.

4.10.6 Where ILS and MLS operations are in operation at an aerodrome, the units providing ATFM services may apply enhanced ATFM measures. Details of the aircraft ILS/MLS equipage can be obtained from item 10 of the ICAO Flight Plan Form (FPL).

4.10.7 In the event of low visibility at the destination airfield, the Eurocontrol CFMU applies a regulation to traffic within their area of responsibility based upon the reduced capacity of the destination airfield and following the principles listed below:

- Suspend flights with unknown RVR capability;
- Delay flights with insufficient RVR capability until the end of the low visibility period;
- Slot flights with sufficient RVR capability within the low visibility period.

General

Good practice

Aerodrome operators, in consultation with local ATS authorities, determine the movement rate that they wish to sustain, and develop LVP that will support the desired movement rate.

During the process of planning local procedures to be implemented whenever LVP are initiated/terminated ATC, together with their Flow Management Position (FMP) and other concerned aerodrome operational agencies, take into account the impact LVP have on the capacity of the aerodrome and should determine these capacities for each type of category which may be declared.

Consider determining figures for the total capacity, together with the arrival/departure capacities within the total figure.

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Chapter 5

Preparing a Local All Weather Operations Plan

5.1 Introduction

5.1.1 Due to the more demanding nature of aerodrome and flight operations during conditions of reduced visibility, restrictions curtailing aerodrome operations will normally be required. While this may be acceptable at airports with low traffic density, aerodromes with higher numbers of traffic may need additional means, such as improved lighting systems or ground surveillance (such as SMR or A-SMGCS), to maintain optimal capacity. The development of the AWO plan should consider the operational requirements of the aerodrome, and assess the need for additional measures to achieve the desired capacity while preserving the required level of safety.

5.2 Organisation

5.2.1 To ensure that all ground elements are properly integrated into the total system, the airport operator should convene a working group comprising representatives from all sections concerned with equipment or services associated with All Weather Operations.

5.2.2 These should include, but not be limited to, air traffic services, apron management, meteorological services, the engineering section(s) responsible for establishment and/or maintenance of visual and non-visual aids and power supplies, rescue and fire fighting services, airport security, ground support providers and major operators. The size and organisation of the working group should be adjusted to accommodate changing circumstances, but at all times be composed to ensure adequate involvement of key stakeholders as determined by the scope of airport operations.

5.2.3 Benefits may be also gained by adopting a "total system approach" to the safety management of AWO. The total system approach is based on the understanding that individual components of the air navigation system – aircraft operators, air crews, aerodromes, ATS, AIS, MET, CNS providers, apron managers, ground handlers & vehicle operators, and network management functions (such as ATFM) – whether on the ground or in the air, are all part of a single network.

5.2.4 The working group should be tasked with ensuring that infrastructure, facilities and equipment, and local instructions and inter-agency agreements fulfil legislative and regulatory requirements, and any operational or safety requirements that may also be identified. The terms of reference should include, as a minimum:

a. The initial establishment of the AWO plan;

b. The review of any incidents and safety related reports to ensure that the safety and operational objectives of the plan are maintained;

c. Initiating corrective actions when deviations from described standards are detected; and

d. The regular review of the AWO plan and associated provisions contained in the local instructions of various agencies, and maintenance in light of changes to the aerodrome's operating environment.

5.2.5 The group should appoint a coordinator to be responsible for coordinating the whole task.

5.2.6 The coordinator should as a first priority scope and document the activities needed to establish a programme encompassing all issues related to the successful development and establishment of a local AWO plan. The scope should include a timetable for completion of preliminary studies, the installation and verification of visual and non-visual aids and any

other necessary facilities or infrastructure, for the development and delivery of procedures and training necessary to ensure safe All Weather Operations.

5.2.7 Items for consideration during the initial study of the aerodrome operating environment should include:

a. Examination of movement statistics for aircraft and vehicles, including:

i. Examination of documentation, investigation, and reporting procedures covering movement data, serviceability of equipment and systems as well as incidents;

ii. Evaluation of impact on airport capacity during conditions of reduced visibility on the aerodrome; and

iii. Determination of desired movement rates.

b. Evaluation of airport lay-out with particular attention to taxi routes between aprons and runways, ground traffic routes, service roads, ground traffic control points, movement area entrances and existing aids;

c. Evaluation of records of runway incursions and taxiway junction incidents;

d. Evaluation of existing airport security measures;

e. Evaluation of marking and equipment of vehicles to be permitted on the movement area during conditions of reduced visibility;

f. Evaluation of the requirements for aeronautical information services, including the need for AIP entries and aeronautical charts necessary to support AWO and communication facilities such as ATIS;

g. Meteorological elements, such as:

i. Examination of documentation, investigation, and reporting procedures covering meteorological data, serviceability of equipment and systems as well as incidents;

ii. Examination of aeronautical meteorological records to establish the requirements for additional facilities and services for AWO;

iii. Examination of instrument, measuring and recording equipment and procedures used by meteorological services; and

iv. Establishment of meteorological limits for variations or discontinuation of aerodrome operations when RAVC exist, or while flight operations which require LVP to be in force are in progress.

h. Evaluation of the obstacle environment against limitations surfaces determined in accordance with PANS-OPS, and examination of terrain conditions in the final approach areas for impact on radio altimeter indications;

i. Evaluation of requirements for communications between ATC and aircraft, vehicles, rescue and fire fighting services, meteorological services, engineering support, security, apron control, other ATC units, air traffic flow management and other units/authorities/services affected by AWO;

j. Evaluation of approach, runway and taxiway lighting, runway taxiway and apron markings as well as access control and signage for suitability to support aerodrome operations during periods of RAVC and LVP;

k. Examination of non-visual guidance systems, including:

i. particularly all components of ILS and associated monitoring systems, including calibration records, for the intended type(s) of operation; and

ii. Determination of critical and sensitive areas for ILS components;

l. Examination of surveillance systems for ground movements;

m. Evaluation of instructions to, and recording systems employed by, engineering support services responsible for visual and non-visual aids, meteorological instrumentation and power supply;

n. Evaluation of existing ATC local instructions and operational Letters of Agreement for suitability for AWO;

o. Evaluation of impact on rescue and fire-fighting services' ability to perform in a timely and efficient manner;

p. Identification of operational requirements for the safe provision of ground support services, such as refuelling, cleaning, maintenance, cargo and baggage handling and catering services; and

q. Evaluation of experience and training requirements for operational staff.

5.2.7 This study should be completed as the first stage of the development process. The general picture derived from the study should identify mitigation measures to be established as an integral part of the AWO plan, along with the range of supporting operational policy and procedures for the aerodrome and other agencies.

5.2.8 The working group should then start work on developing and establishing the provisions needed to support the safe conduct of All Weather Operations.

5.2.9 In determining the aerodrome equipment and facilities established to support pilot situational awareness in conditions of reduced visibility, emphasis should be put on the means (and specifications) necessary to enable the pilot to locate their position (location signs, stopbars) and to follow a defined taxi-route (e.g. selective taxiing centre line lights, guidance signs). Aerodrome charts should be of sufficient detail and clarity with all relevant items identified for navigational purposes (e.g. permanently disused or closed taxiways and roadways if still in place) to enable pilots to navigate in these conditions. In that respect, special attention should also be given to specifying an unacceptable level of deficiencies of the required visual aids, the monitoring criteria including the presentation to the ATC unit, and the action to be taken when the movement rate is being affected.

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Chapter 6

Reduced Aerodrome Visibility Procedures

6.1 Introduction

6.1.1 This Chapter provides consolidated guidance specifically related to the development, establishment, and use of Reduced Aerodrome Visibility Procedures (RAVP), which are specific procedures applied at an aerodrome for the purpose of ensuring safe operations while meteorological conditions are such that all or part of the manoeuvring area cannot be visually monitored from the control tower.

6.1.2 These procedures will relate to the relevant visibility condition existing (for example, Visibility Condition 2 or Visibility Condition 3). Further information regarding the requirements for low visibility operations can be found in the Air Traffic Services Planning Manual (Doc 9426), the All-Weather Operations Manual (Doc 9365) and Manual of Surface Movement Guidance and Control Systems (Doc 9476).

6.2 Objectives of RAVP

6.2.1 The objectives of RAVP are to:

a) protect active runways against incursions by aircraft, vehicular and pedestrian traffic;

b) support the efficient flow of aircraft, mainly between terminal buildings and runways, but also between other areas, such as aprons and maintenance facilities;

c) reduce the possibility of conflicts between the aircraft, vehicular and pedestrian traffic;

d) assist ATC and/or Apron Management staff to maintain situational awareness of the positions of traffic on the manoeuvring area and aprons; and

e) facilitate coordinated action by various agencies, including the aerodrome and aircraft operators, rescue and fire fighting services, vehicle operators and drivers, MET and AIS providers, and ATS.

6.3 Provisions to be considered for RAVP

6.3.1 The general provisions relating to provision, design and characteristics of aerodrome surface movement guidance and control systems are detailed at Annex 14, Volume I, 9.8.

6.3.2 The general provisions relating to operation of vehicles on the aerodrome are detailed at Annex 14, Volume I, 9.7.

6.3.3 The general provisions relating to the control of vehicles and pedestrians on the manoeuvring area are detailed at PANS-ATM, 7.6.3.2.

6.3.4 ***General***

6.3.4.1 Before starting to develop the facilities, equipment and procedures necessary to support aerodrome operations in conditions of reduced visibility, the aerodrome operating authority will need to coordinate with aerodrome stakeholders as described in Chapter 5.

6.3.4.2 If the decision is made to proceed the appropriate authority will need to:

a) establish the lowest visibility conditions under which the aerodrome intends to operate;

b) complete a comprehensive safety and security assessment of the total aerodrome movement area and its operations;

c) provide any additional and/or more reliable ground aids and equipment;

d) provide for more comprehensive control of ground traffic;

e) assess the RFF deployment and response time; and

f) provide appropriate training and qualification of relevant personnel (Doc-9476 – Manual of SMGCS, 5.5.1 h)).

6.3.5 *Use of facilities & equipment to support ground operations while RAVC exist*

6.3.5.1 In RAVC, the ability to visually monitor the manoeuvring area is limited. Without any ground surveillance capability, it is likely that more stringent control techniques and practices will be needed, e.g. increased position reporting by pilots. Such changes combined with decreased situational awareness, particularly with respect to unplanned deviations by pilots and vehicles, will result in restrictions to aerodrome capacity.

6.3.5.2 In order to maintain capacity while ensuring safety, it may be desirable to consider the installation of a surveillance system. There are significant differences between SMR and A-SMGCS.

6.3.5.3 SMR provides surveillance of the aerodrome with a number of defined limitations (Doc 9476, 4.6.5 and PANS-ATM, 8.10.2). SMR is used to augment visual surveillance, but not to replace it. As a result, it can provide controllers with improved situational awareness of the traffic situation and potentially contribute to the safety of the operation e.g. by monitoring traffic crossing or vacating the runway prior to issuing a take-off clearance, or landing clearance to a following aircraft.

6.3.5.4 A-SMGCS is a system which comprises co-operative (e.g. Mode S multilateration, ADS-B) and non-cooperative (e.g. primary radar such as SMR) surveillance equipment. A-SMGCS provides the detection, display and identification of traffic, which, if used in conjunction with defined identification and operational procedures, enables controllers to use the information displayed as the basis for ATC functions. When authorised by and subject to conditions prescribed by the appropriate ATS Authority, A-SMGCS may be used to replace visual observation of traffic (Doc-7030, EUR section, 6.5.6), which may enable a higher capacity in Visibility Condition 2 than otherwise would be possible for a lesser ground surveillance capability. In Visibility Condition 3 there are likely to be greater restrictions on ground operations due to the inability of pilots to avoid other traffic visually.

6.3.5.5 New surveillance technologies are currently being developed, for example based on cameras, but these are not yet sufficiently mature for inclusion within this guidance material. When these systems become approved by the appropriate authorities they may provide additional surveillance capabilities.

6.3.5.6 Guidance on the use of SMR is contained in the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476), the Advanced-Surface Movement Guidance and Control Systems (A-SMGCS) Manual (Doc 9830), PANS-ATM (Doc 4444) 8.10.2, and in the Air Traffic Services Planning Manual (Doc 9426), Part II.

6.3.5.7 For conditions governing to the use of A-SMGCS, refer to Doc7030, EUR section, 6.5.6.

Recommended

In low visibility conditions augment visual observation with ATS surveillance system (when available). *PANS-ATM, 7.1.1.2*

Good practice

Use SMR to provide surveillance of traffic on those parts of the manoeuvring area which cannot be observed visually. *PANS-ATM, 8.10.2.2.1*

Use the information displayed on an SMR display to assist in: *PANS-ATM, 8.10.2.2.2*

- *determining the location of aircraft and vehicles on the manoeuvring area;*
- *monitoring of aircraft and vehicles on the manoeuvring area for compliance with clearances and instructions;*
- *determining that a runway is clear of traffic (aircraft, vehicles or obstructions) prior to a landing or take-off;*
- *providing information on essential local traffic on or near the manoeuvring area;*
- *providing directional information to pilots or vehicle operators when requested or deemed necessary by the controller; and*
- *providing assistance and advice to emergency vehicles.*

Information displayed on an SMR display may be used to: *Doc 9426, Part2, Section5, 4.3.3*

- *ensure that the departing aircraft is lined up on the correct runway;*
- *ensure that the arriving aircraft has vacated the runway;*
- *ascertain that the departing aircraft has commenced take-off run;*
- *monitor the manoeuvring area and identify optimum taxiing routes that reduce congestion and assist in expediting the flow of traffic during periods of low visibility;*
- *confirm a pilot or vehicle operator position report;*
- *assist in the timing of landing and take-off clearances in low visibility conditions to maximise runway utilisation;*
- *provide detection and guidance information to an aircraft uncertain of its position;*
- *assist in detecting runway intrusions; and*
- *ensure that approving of requested push-back will not conflict with traffic on the manoeuvring area.*

6.3.5.8 When an essential component of the surface movement equipment is temporarily unserviceable or does not meet the minimum performance or technical requirements, then the operational use of the aerodrome should be restricted and, as a consequence, the traffic movement rate may be limited (contingency measures in force). The air traffic flow management unit should be advised of any restriction to traffic flow and a new flow rate declared together with, where possible, the anticipated period of time that the restriction will be in force.

6.3.6 *The use of RVR for ground operations*

6.3.6.1 The provision of RVR information is intended to support aircraft landing and take-off operations and not aerodrome ground operations when RAVC exist. The term RVR cannot strictly be applied to ground operations, but the basis for these procedures can be described in terms of visibility conditions that correspond to certain RVR values.

6.3.6.2 Since it may not be practical or cost effective to measure the visibility on taxiways the RVR information from one or more observation positions may be considered to be representative for nearby taxiways. The suitability of RVR sources will depend on local circumstances.

6.3.6.3 At aerodromes where taxi-routes are extensive, the RVR observation positions may not be representative of the particular aircraft ground operations due to large distances and local meteorological factors. Such factors should be considered when determining the provisions governing ground operations.

Note.— In such cases, aerodrome authorities may consider installing additional means of determining ground visibility (e.g., forward-scatter meters) at critical areas to support decision making related to the ground operations.

6.3.6.4 The determination of the applicable visibility conditions on an aerodrome will depend on a number of local factors such as the size of the aerodrome, the configuration and layout of the movement area, the siting of the ATC tower in relation to the manoeuvring area and/or

the apron management service in relation to the aprons, and the height of control positions above the aerodrome surface.

6.3.6.5 In some cases, Visibility Condition 2 may be triggered by low cloud when the control tower is in cloud, but visibility on the surface is sufficient for pilots and vehicle drivers to manoeuvre and avoid other traffic. In this case, it is likely that the whole airfield will be in Visibility Condition 2. In other cases, the visibility may gradually decrease and the furthest points of the airfield may cease to be visible from the control tower. In these cases, only those parts of the airfield not visible from the control tower will be in Visibility Condition 2. Whatever the cause of Visibility Condition 2 or Visibility Condition 3, when special procedures are applied in RAVC, these procedures may be applied only to those portions of the aerodrome subject to that Visibility Condition rather than the whole aerodrome.

6.3.7 ***Determination of the visibility conditions***

6.3.7.1 The criteria for determining the transition between visibility conditions should be established by the appropriate ATS authority (Doc7030, EUR section, 6.5.7.2, Note).

6.3.8 ***Reduced Aerodrome Visibility Procedures (RAVP)***

6.3.8.1 When developing procedures to accommodate ground operations while RAVC exist, consideration should be given to the visibility over the aprons and taxiways. The use of certain procedures (e.g. the use of certain elements of an A-SMGCS or additional visual aids) or the use of other elements of the ground procedures (e.g. the application of low visibility taxi-routes) will be dependent on the visibility conditions.

6.3.8.2 Additionally, RAVP may be applied to support ground movements even though LVP are not in force, either because the aerodrome is not certified for operations that require LVP, or these operations are not currently being undertaken.

6.3.9 ***Operations in Visibility Condition 2***

6.3.9.1 The measures needed to support operations in Visibility Condition 2 will depend mainly on the dimensions of the aerodrome and the position of the control tower in relationship to the manoeuvring area, the visual aids available to the pilot to determine position and follow the correct route, and the equipment available to ATC to determine and issue correct control instructions & information and to monitor & support correct pilot navigation around the aerodrome and in relationship with other traffic.

6.3.9.2 Pilots can be expected to see and avoid other ground traffic in Visibility Condition 2. ATC should provide pilots and vehicle drivers with instructions and information to enable them to navigate and to avoid other traffic by visual reference. Control instructions and information may be derived from A-SMGCS, where available (Doc7030, EUR section, 6.5.7.1).

Operations when Visibility Condition 2 exists

Recommended

The appropriate ATS authority for each particular aerodrome to specify the longitudinal separation on taxiways taking into account the characteristics of the aids available for surveillance and control of ground traffic, the complexity of the aerodrome layout and the characteristics of the aircraft using the aerodrome. *from PANS-ATM, 7.12.1.1.2*

Establish procedures specifying: *PANS-ATM, 7.12.5*

- *the ground visibility value(s), or other circumstances, under which these special procedures shall apply;* *from PANS-ATM, 7.12.5 a)*
- *Operations when RAVC exist initiated by or through the aerodrome control tower;* *PANS-ATM, 7.12.3*
- *the aerodrome control tower shall, prior to a period of application of RAVP, establish a record of vehicles and persons currently on the manoeuvring area and maintain this record during the period of application of these procedures;* *from PANS-ATM, 7.12.6*

- *that an aircraft or vehicle on a taxiway holds no closer to the another taxiway than the holding position limit defined by a clearance bar, stop bar or taxiway intersection marking; PANS-ATM, 7.12.1.1.1*
- *the longitudinal separation on taxiways, taking into account the characteristics of the aids available for surveillance and control of ground traffic, the complexity of the aerodrome layout and the characteristics of the aircraft using the aerodrome; PANS-ATM, 7.12.1.1.2*
- *special procedures for the control of traffic on the manoeuvring area, including: PANS-ATM, 7.12.5 f)*
  - *the runway-holding positions to be used;*
  - *procedures to verify that aircraft and vehicles have vacated the runway; and*
  - *procedures applicable to the separation of aircraft and vehicles;*
- *the requirement to report any relevant equipment failure and degradation, without delay, to the flight crews concerned, the approach control unit, and any other appropriate organisation; and PANS-ATM, 7.12.5 e)*
- *action(s) to be taken in the event that equipment failures or other contingencies occur requiring restriction of aircraft movements or aerodrome traffic. from PANS-ATM, 7.12.5 h)*

Good practice

Establish documented procedures for operations in RAVC to:

- *be clearly defined and published in the instructions for ATC, Apron Control, Aerodrome operations departments; and*
- *ensure coordination with all the parties involved as the visibility deteriorates.*

Consider establishing restrictions to ground movements, to apply where and when RAVC exists, unless some additional aids, such as Ground Surveillance Systems, are available to sustain the desired movement rates while preserving the required safety levels.

Establish provisions to:

- *Specify the equipment or other means to be used to monitor aircraft progress and other traffic operating on the manoeuvring area;*
- *Specify monitoring criteria and deficiencies in visual aids and that can be accepted without further affecting the movement rate;*
- *Specify the reduction in movement rates when unacceptable deficiencies in visual aids and surveillance equipment occurs ;*
- *Restrict access to the manoeuvring area to those vehicles and personnel essential to aerodrome operations;*
- *Ensure that all movements on the manoeuvring area are subject to specific individual clearance (for example, no blanket or "at own discretion" clearances);*
- *Activate defensive measures to protect against runway incursions, for example, reduced visibility taxi routes, reduce the number of runway access or crossing points to be used, and/or the mandatory use of stop-bars (where provided);*
- *Ensure that instructions and information provided to pilots and vehicle drivers are sufficient to enable them to navigate and to avoid other relevant traffic by visual reference;*
- *Stop any temporary works-in- progress on the manoeuvring area; and*
- *Require that work areas be vacated and either be returned to operational condition or clearly marked/lit and notified as unavailable for use.*

6.3.10 ***Operations in Visibility Condition 3***

6.3.10.1 During ground operations in Visibility Condition 3, the visibility is considered insufficient to enable pilots to rely on visual reference to avoid vehicles or other aircraft.

6.3.10.2 To enable the desired movement rates to be sustained while preserving the required safety levels, additional equipment and procedures may be required.

6.3.10.3 In the event that the same level of equipment and procedures are in place as for Visibility Condition 2, a reduction in the aerodrome capacity should be anticipated, and ATFM arrangements will need to be established accordingly.

6.3.10.4 Reports of visibility, such as visual observations by MET observers, or pilot reports from taxiing aircraft, if available, should be considered when deciding to declare Visibility Condition 3, and activate the appropriate procedures.

6.3.10.5 When Visibility Condition 3 exists, ATC clearances and instructions should be formulated, and procedural control techniques employed, to positively control and de-conflict all traffic. This may require the use of techniques such as clearing aircraft to intermediate holding positions until confirmation is received that all other traffic is clear of the intended route of the aircraft in question. In some cases this may result in traffic restrictions enabling only one aircraft movement at a time. Control instructions and information may be derived from A-SMGCS, where available (Doc7030, EUR section, 6.5.7.1).

Operations when Visibility Condition 3 exists

Good practice

*As for Visibility Condition 2, **plus***

Determine the need additional provisions to take into account the inability of pilots to avoid other traffic visually.

Consider the ability and need for ATC to accept increased responsibility for ground movements, for example to assist in guiding rescue and fire fighting services to the scene of an accident or incident.

In the absence of ground surveillance capability suitable for the control of all aircraft and vehicular traffic, consider establishing a single or conflict-free route(s) from apron to runway, and runway to apron. Consider closing intermediate taxiway intersections, and using only prescribing runway holding and entry points, and establishing separate exit taxiway and return route for landings or rejected takeoffs.

Establish provisions to:

- *Where ground surveillance capability permits; Increase the provision of traffic information to assist pilot situational awareness;*
- *Implement simplified taxi routes for use in Visibility Condition 3;*
- *Ensure that conflict free taxi routes, clearances and instructions are used and issued whenever possible;*
- *Exclude the use of "Conditional Clearances";*
- *Specify the minimum distance to be maintained between taxiing aircraft; and*
- *Clearly identify any additional restrictions to aerodrome capacity and aircraft movement rates, considering both normal surveillance capability and contingency / degraded surveillance modes.*

6.3.11 *Operations in Visibility Condition 4*

6.3.11.1 Reports of visibility, such as visual observations by MET observers, or pilot reports from taxiing aircraft, if available, should be considered when deciding to declare Visibility Condition 4, and activate the appropriate procedures.

Operations when Visibility Condition 4 exists

Good practice

*As for Visibility Condition 3, **plus***

Determine the need additional provisions to take into account the inability of pilots to taxi visually. Consider closing all non-prescribed runway access or crossing points, including via use of stop-bars, physical barriers or unserviceability markers.

Establish provisions to:

- *Provide for the use of "Follow Me" vehicles; and*
- *Clearly identify any additional restrictions to aerodrome capacity and aircraft movement rates.*

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Chapter 7

Low Visibility Procedures

7.1 Introduction

7.1.1 This Chapter provides consolidated guidance related to the initial establishment and implementation of Low Visibility Procedures.

7.2 Objectives of LVP

7.2.1 The objectives of LVP are to:

a) protect active runways against incursions by aircraft, vehicular and pedestrian traffic;

b) facilitate the availability of various support equipment and facilities (including for example, RVR equipment and aerodrome lighting) to prescribed levels of availability and redundancy, to support those flight operations which require LVP to be in force;

c) preserve the accuracy of radio navigation aids, for example via protection of ILS Critical and Sensitive Areas;

d) support the efficient flow of aircraft, mainly between terminal buildings and runways, but also between other areas, such as aprons and maintenance facilities;

e) reduce the possibility of conflicts between the aircraft, vehicular and pedestrian traffic;

f) assist ATC and/or Apron Management staff to maintain situational awareness of the positions of traffic on the manoeuvring area and aprons;

g) facilitate coordinated action by various agencies, including the aerodrome and aircraft operators, rescue and fire fighting services, vehicle operators and drivers, MET and AIS providers, and ATS; and

h) ensure that accurate and timely information is available to pilots regarding the status of relevant supporting systems, including equipment, facilities, metrological conditions and the LVP themselves.

7.3 Initial establishment of LVP

7.3.1 Development and establishment of the provisions necessary to achieve these objectives will require the cooperative efforts of many aerodrome stakeholders, including but not be limited to, the aerodrome operator, airport safety and security agencies, ground support providers and major operators, technical and engineering section(s) responsible for establishment and/or maintenance of visual and non-visual aids and power supplies, meteorological services, air traffic services, and the rescue and fire fighting services.

7.3.2 Before starting to develop the facilities, equipment and procedures necessary to support aerodrome operations that require LVP to be in force, the aerodrome operating authority will need to coordinate with aerodrome stakeholders to ascertain the:

a) incidence of low visibility conditions;

b) volume of traffic expected to operate in such conditions;

c) assessment of current needs and equipment; and

d) justification for such operations.

7.3.3 If the decision is made to proceed, the appropriate authorities will need to:

a) establish the worst conditions (lowest visibility/RVR &/or height of cloud base# at which the aerodrome intends to operate;

b) complete a comprehensive safety and security assessment of the total aerodrome movement area and its operations;

c) provide any additional and/or more reliable ground aids and equipment;

d) provide for more comprehensive control of ground traffic;

e) provide specific Low Visibility Procedures and regulations for implementation by the relevant affected agencies;

f) assess the RFF deployment and response time; and

g) provide appropriate training and qualification of relevant personnel.

7.3.4 In developing Low Visibly Procedures, various factors need to be considered, including, for example:

- Determination of the aircraft flight operations to be supported by LVP;
- Determination of desired movement rates, and evaluation of impacts on airport capacity while LVP are in force;
- Evaluation of aerodrome visual aids, existing and as required to support operations that require LVP, including assessment of aerodrome markings, lighting systems and signs for suitability; and
- Evaluation and establishment of meteorological elements existing and as required to support operations that require LVP:
    - Determination of the limits for initiating and terminating LVPs;
    - Examination of available meteorological equipment used by meteorological services; and
    - Evaluate the need to establish the additional meteorological facilities and services for the desired flight operations.
- Evaluation of AIS and FIS requirements, such as requirements for change to the AIP, such as aeronautical charts and AIP entries required to support LVP, and the need for ATIS facilities;
- Evaluation of requirements for communications between ATC and aircraft, vehicles, rescue and fire fighting services, meteorological services, engineering support, security, apron control, other ATC units, air traffic flow management and other units/authorities/services affected by LVP;
- Determination of the non-visual aids to navigation needed to support operations that require LVP, particularly all components of ILS and associated monitoring systems;
- Determination of critical and sensitive areas for ILS/MLS glidepath and localisers;
- Evaluation of the support arrangements and requirements for visual and non-visual aids, meteorological instrumentation and power supplies;
- Evaluation of the suitability of existing, or need for new surveillance systems for ground movements;
- Evaluation of existing airport access control measures;
- Evaluation of ground and access restrictions that would be necessary to preserve the safety of aircraft operations while LVP are in force, considering ground support

services, such as re-fuelling, cleaning, maintenance, cargo and baggage handling and catering services;

- Evaluation of the risk of runway incursions, including a review of the history of runway incursions and taxiway conflict incidents (runway hotspots, runway safety team);
- Evaluation of airport layout with particular attention to taxi routes between aprons and runways, ground traffic routes, service roads, access control points, access point to the movement area, and existing control mechanisms;
- Evaluation of existing ATC and AMS rules and procedures for compatibility with LVP;
- Evaluation of the suitability of inter-unit Letters of Agreement for supporting LVP;
- Evaluation of training and competence requirements for operational staff (for example, safety officers, airside drivers, RFFS, maintenance crews, technicians, AMS & ATC); and
- Evaluation of impact of LVP on rescue and fire-fighting services on emergency response times.

7.4 Deployment of LVP

7.4.1 Once Low Visibility Procedures have been approved by the appropriate authorities, they shall be published in the appropriate local instructions and also in the AIP in the AD section (Annex 15, Appendix 1, Part III). At this point the LVP have been established. The LVP must then activated and brought into in force & applied whenever the following types of operations are in progress:

a) Departure operations in RVR conditions less than a value of 550 m;

b) CAT II and III approach and landing operations;

c) Other Than Standard CAT II approach and landing operations;

d) Lower Than Standard CAT I approach and landing operations.

7.5 LVP Phases

7.5.1 Initiation of the LVP preparation phase is determined by reference to height of cloud base[#] and visibility. Visibility criteria may be based on RVR or visibility reported by MET, depending on the equipment available at the aerodrome and the type of operations being conducted. The aerodrome LVP should include the specific MET criteria for the implementation of LVP, and these shall be published in the relevant AIP (Annex 15, Appendix 1).

7.5.2 The transition phases for both the initiation and termination of LVP are in many ways the most important from an operational point of view and it is during these phases that some States have found that the most problems may occur. Any confusion or misunderstanding as to the status of LVP may have safety implications and the change in the status of the operations creates additional demands on pilots and controllers. Careful planning and clear procedures during these phases will reduce the risk of an incident occurring.

7.5.3 Prediction of conditions for initiation and termination of LVP is dependent on specific co-ordination with MET. The timescale for this co-ordination will vary according to the type of traffic expected, but for airfields handling significant amounts of long-haul traffic this process may have to commence much more than 12 hours in advance. MET forecasts and

any subsequent updates are needed in order to plan the introduction of LVP and to determine the optimum traffic capacity for the aerodrome in the expected conditions.

7.5.4 The aerodrome control tower shall co-ordinate with FMP and other ATC units (Approach Control, Area Control) as required to determine, as far as possible, the maximum traffic acceptance rate. This allows the unit providing ATFM services ample time to allow for the regulation of traffic rates and the efficient introduction of LVP.

7.5.5 ***LVP Preparation Phase***

7.5.5.1 The LVP Preparation Phase is initiated by the ATC Control Tower, triggered when the height of the cloud base or ceiling or visibility, is below, or is forecast to reduce below predetermined values. Because aircraft operators have specific minima, by preference generic values are determined at each aerodrome for triggering LVP preparations and safeguarding activities. The timing of initiating the LVP Preparation Phase will vary from one aerodrome to another due to various tactical factors such as:

- the amount of lead time needed to prepare the aerodrome and implement safeguarding measures;
- the expected rate of weather deterioration; and
- planned aircraft movements.

7.5.5.2 The intent is that safe-guarding measures will be initiated in time to meet the objective that the procedures and associated safeguarding measures are in force at the latest before the MET conditions fall below CAT I limits or the limits for departure operations in RVR conditions less than a value of 550 m. The trigger points for initiating the Preparation Phase must be clearly defined and included in the LVP. It is normally related to specific MET criteria reached in a worsening MET situation. If the weather is deteriorating rapidly, the procedures may be initiated at a higher value of RVR, the precise value being a matter for judgement based on experience at the aerodrome and the extent of the preparations required. All persons involved with LVP must be informed when this phase is initiated.

7.5.6 ***LVP Operations Phase***

7.5.6.1 The point at which LVPs are in force must be clearly defined in terms of a specific RVR and/or height of cloud base# and must be promulgated in the LVP. LVP should be in force at the latest when the MET conditions deteriorate below the lower limit of CAT I operations at the specific aerodrome (the lowest being height of cloud base# below 200 ft and/or RVR less than 550 m). In the case of departures only, LVP should be in force at the latest when the RVR deteriorates below 550 m.

7.5.6.2 *Aircraft spacing requirements*

7.5.6.2.1 A landing aircraft should not stop taxiing until well past the end of the coded taxiway centre line lights. Runway exit points should be kept clear of any aircraft or vehicles to allow landed aircraft to move out of the ILS localizer sensitive area with no delay. Instructions to controllers should state that if a landed aircraft is not entirely clear of the ILS localizer sensitive area then the runway is not usable for CAT II or III operations even though the obstructing aircraft may well be clear of the runway itself.

7.5.6.2.2 If an aerodrome surveillance display system (i.e. SMR or A-SMGCS) is available, the procedures should require that it should be used to monitor the clearance of the ILS localizer sensitive area. If it is not available, traffic should be directed to leave the runway where there is a positive indication to the pilot that the aircraft is clear of the ILS localizer sensitive area and pilots be required to report when the entire aircraft is clear of this area.

7.5.6.2.3 Wake turbulence separation must always be taken into account.

7.5.6.2.4 The spacing should be varied according to the actual MET and runway conditions at the time. As these conditions deteriorate, pilots will need to taxi more slowly when exiting or crossing the runway and when lining up for take-off. The spacing on final approach should be increased as the MET conditions deteriorate in order to achieve the required objectives. The availability of an adequate surveillance display system (i.e. SMR or A-SMGCS) and appropriate procedures will also be a factor in the choice of final approach spacing. This will enable the position of aircraft entering and leaving the runway to be monitored and an adequate level of situational awareness to be maintained. The actual spacing depends upon the configuration and conditions on the runway and the available exit points.

7.5.6.2.5 The procedures should accommodate the requirement for aircraft to be able to carry out a stabilized approach; accordingly, they should allow the approaching aircraft to intercept the ILS localizer or MLS/GBAS approach course at a range of typically 10 NM from touchdown.

7.5.6.3 *Low visibility departure operations*

7.5.6.3.1 LVP should ensure that the runway is protected against incursions while an aircraft is conducting a departure operation in RVR conditions less than a value of 550 m. This may be achieved through the use of suitable holding positions (e.g. where stopbars are installed). At aerodromes with light traffic this may, in the most restrictive case, be achieved by only allowing one aircraft movement at a time and no vehicle movements.

7.5.6.3.2 Where the ILS localizer guidance is used for guided take-offs, the ILS localizer critical and sensitive areas should be kept clear while an aircraft is conducting a guided take-off until it has overflown the ILS localizer antenna. A subsequent departing aircraft should not be cleared for take-off until the preceding departure has overflown the ILS localizer antenna. The ILS localizer sensitive area behind the departing aircraft may be infringed, e.g. to line up or cross the runway.

7.5.6.4 *ILS operations*

7.5.6.4.1 To ensure that the integrity of the guidance signal radiated by the ILS is maintained during aircraft approaches, all vehicles and aircraft on the ground should remain outside the ILS critical and sensitive areas. The ILS critical areas must be clear of all vehicles, persons and aircraft at all times.

7.5.6.4.2 These objectives are normally achieved by providing appropriate spacing between successive landing and/or departing aircraft. This may frequently be in excess of the spacing normally used and this may affect the capacity of the aerodrome. To accord with the basic requirements, the spacing specified should provide sufficient separation between successive approaching aircraft, normally to allow the leading aircraft to land, to vacate the runway, and to clear the ILS localizer sensitive area before the following aircraft reaches a point 2 NM from touchdown. Some States have found that spacing of the order of 10 NM between successive aircraft may be necessary. At aerodromes where the traffic density is low or where the range of the approaching aircraft cannot be monitored by radar, the separation should be increased to enable the leading aircraft to clear the runway and ILS localizer sensitive area before the following aircraft reaches a point 4 NM from touchdown, i.e. about the position of the outer marker (or equivalent DME position).

7.5.6.4.3 When departing aircraft are using the same runway as arriving aircraft, it is essential that the aircraft taking off has passed over the ILS localizer antenna before the arriving aircraft reaches a point on the approach where the interference caused by the overflight will have a critical effect. The aim should be for the departing aircraft to pass over the ILS localizer antenna before the arriving aircraft reaches a point 2 NM from touchdown. The experience in some States is that to achieve this, the departing aircraft must commence its take-off run before the arriving aircraft reaches a point 6 NM from touchdown.

7.5.6.4.4 Landing clearance should normally be given to an approaching aircraft when the runway and the ILS localizer sensitive area are clear, normally before the time it reaches a point 2 NM from touchdown; exceptionally a clearance may be delayed until 1 NM from touchdown, provided that the pilot is warned to expect a late landing clearance and also provided that the position of the approaching aircraft can be monitored.

7.5.6.5 *RVR reports*

7.5.6.5.1 ATC shall ensure that the current RVR values for the runway in use are passed to pilots of arriving and departing aircraft (PANS-ATM, 6.4.1 and 6.6.1). When multiple values are available, these shall always be given in the order of the landing or take-off direction (i.e. TDZ, mid-point and stop-end) (PANS-ATM, 11.4.3.2.3 and 12,3,1,7f).

7.5.6.5.2 When values for three or more positions are passed, the positions need not be identified provided that the values are given in the correct order, but when only two reports are given, the positions should be identified. If it is not possible to report the RVR for any reason, the MET visibility should be given instead, and identified accordingly.

7.5.6.5.3 LVP should include the requirements for setting the correct runway light intensity during RVR conditions to ensure that correct RVR values are obtained (Annex 3, Appendix 3, 4.3.5).

7.5.6.5.4 Provisions to be considered when developing LVP are detailed below.

General

Required

In conditions where low visibility procedures are in force: *Annex 11, 3.8.2*

- *Restrict persons and vehicles operating on the manoeuvring area of an aerodrome to the essential minimum;*
- *protect the ILS/MLS sensitive area(s) when Category II or Category III precision instrument operations are in progress;*
- *protect the ILS/MLS sensitive area(s) when guided take-offs are in progress;*
- *determine the minimum separation between vehicles and taxiing aircraft taking into account the aids available;*
- *when mixed ILS and MLS Category II or Category III precision instrument operations are taking place to the same runway continuously, protect the more restrictive ILS or MLS critical and sensitive areas.*

Recommended

The appropriate ATS authority for each particular aerodrome to:

- *specify the longitudinal separation on taxiways taking into account the characteristics of the aids available for surveillance and control of ground traffic, the complexity of the aerodrome layout and the characteristics of the aircraft using the aerodrome; and* *PANS-ATM, 7.12.1.1.2*
- *establish provisions applicable to the start and continuation of precision approach category II/III operations as well as departure operations in RVR conditions less than a value of 550 m.* *PANS-ATM, 7.12.2.1 and 7.12.4*

Establish procedures specifying: *PANS-ATM, 7.12.3, 7.12.4, 7.12.5 and 7.12.6*

- *Low visibility procedures initiated by or through the aerodrome control tower;*
- *that the aerodrome control tower to inform the approach control unit concerned when procedures for precision approach category II/III and low visibility operations will be in force and also when such procedures are no longer in force;*
- *that the aerodrome control tower shall, prior to a period of application of low visibility procedures, establish a record of vehicles and persons currently on the manoeuvring area and maintain this record during the period of application of these procedures;*

- *the RVR value(s) and height of cloud base# values at which LVP shall be initiated and brought into force;*
- *the minimum ILS/MLS equipment requirements for category II/III operations;*
- *other facilities and aids required for category II/III operations, including aeronautical ground lights, which shall be monitored for normal operation;*
- *the criteria for and the circumstances under which downgrading of the ILS/MLS equipment from category II/III operations capability shall be made;*
- *the requirement to report any relevant equipment failure and degradation, without delay, to the flight crews concerned, the approach control unit, and any other appropriate organization;*
- *special procedures for the control of traffic on the manoeuvring area, including:*
  - *the runway-holding positions to be used;*
  - *the minimum distance between an arriving and a departing aircraft to ensure protection of the sensitive and critical areas;*
  - *procedures to verify that aircraft and vehicles have vacated the runway; and*
  - *procedures applicable to the separation of aircraft and vehicles;*
- *applicable spacing between successive approaching aircraft;*
- *action(s) to be taken in the event low visibility operations need to be discontinued, e.g. due to equipment failures; and*
- *any other relevant procedures or requirements.*

Establish provisions specifying: *Doc-7030, EUR section, 6.5.7.4*

- *that the ATIS is updated by adding the "Low Visibility Procedures [CAT II or CAT III] in operation [Runway XX]" message;*
- *the requirement to inform the flight crews:*
  - *that LVPs are in operation; and*
  - *when LVPs are cancelled;*
- *the applicable spacing between successive arriving and/or departing aircraft to ensure protection of the sensitive and critical areas; and*
- *any ATFM measures to be implemented.*
- *Prior to bringing the LVP Operations Phase into force, the aerodrome control tower establishes a record of vehicles and persons on the manoeuvring area.* *PANS-ATM, 7.12.6*
- *While LVP are in force, the aerodrome control tower maintains a record of vehicles and persons on the manoeuvring area.* *PANS-ATM, 7.12.6*

Good practice

The provision of the equipment on the ground to be supported by detailed procedures covering the use of the equipment and clearly defined responsibilities for those involved in the procedures such as pilots, controllers, vehicle drivers, apron management personnel and other departments on the aerodrome.

In visibility conditions corresponding to RVRs of less than 400 m, use stop bars where provided. *Doc 9365, 5.2.9*

ATC units establish fall back procedures covering the failure of essential components of the SMGCS or A-SMGCS.

Establish a co-ordination process to familiarise MET with the requirements for LVP and to provide ATC with forecasts which include the probability of visibility and/or ceiling conditions which may require LVP to be initiated.

Include a description of the responsibilities of the various sections which have a part to play, for example:

- *the sections responsible for the functioning of the visual and non-visual aids should be informed by ATC when LVP are in force;*
  - *they immediately advise ATC if the performance of those aids deteriorates below the level promulgated;*
- *ATC advises all sections responsible for the implementation of any safeguarding requirements that the LVP prescribe;*
  - *they in their turn should advise ATC when such safeguarding actions are complete; and*
- *ATC informs all relevant agencies (e.g. Rescue and Fire Fighting, Police, Apron Management, etc) when LVP is brought into force and when they are no longer in force.*

Include procedures for the termination of LVP to ensure an efficient return to normal operations.

7.5.7 *LVP Termination Phase*

7.5.7.1 The Termination Phase will be initiated when the weather conditions improve to the point that LVP are no longer required. Depending on the actual conditions at the time, criteria applied may be different to those which trigger the Preparation Phase.

7.5.7.2 The termination phase of LVP should be carefully managed in order to ensure a smooth transition back to normal operations. Specific co-ordination with MET should include MET forecasts and any subsequent updates with the objective of predicting the conditions for the termination of LVP.

7.5.7.3 Commercial interests of operators mean that they consider it desirable for LVP to be removed as soon as conditions allow in order to increase airport capacity and reduce delays. The LVP should include procedures developed for the termination of LVP to ensure an efficient return to normal operations. A common phenomenon of poor visibility is a temporary improvement in visibility, followed by a subsequent reduction in visibility. The removal of LVP before a sustained improvement is evident, can result in the need to re-instate the LVP again when the MET conditions deteriorate.

7.5.7.4 When the relevant MET conditions improve and it is expected that LVP are to be withdrawn then co-ordination with the unit providing ATFM services is essential. They should be provided with the expected improvement in flow rates and the time from which this improvement will be achieved.

7.5.7.5 Pilots must be advised of the cancellation of LVP. Where possible, it is of assistance to inform approaching aircraft in advance that LVP will be cancelled at a certain time. This will assist pilots to plan their approaches accordingly, in particular where autoland is involved. For an aircraft which has passed the outer marker, (or equivalent DME position), no changes to the status of LVP should be made.

General

Good practice

Manage the LVP Termination Phase of LVP so as to ensure a smooth transition back to normal operations.

Coordinate with MET office to obtain and maintain up-to-date forecasts enabling early preparation in anticipation of conditions enabling the termination of LVP.

When MET conditions are expected to improve such that LVP will no longer be necessary, coordinate with the unit providing ATFM services; advise the expected improvement in flow rates and the time from which this improvement can be expected.

If possible, advise pilots in advance that LVP will be terminated.

Once LVP are terminated:

- *advise pilots immediately, individually if necessary;*
- *Update the ATIS by removing the "Low Visibility Procedures [CAT II or CAT III] in operation" message; and*
- *Consider that, depending on the conditions at the time, some or all of the manoeuvring area may not be visible to control units, in which case procedures applicable to Visibility Condition 2 may still be applicable.*

7.6 Application of LVP over large operational areas

7.6.1 The application of LVP is considered in respect of the operation of an aerodrome, including all runways. At certain aerodromes with large geographic areas, MET conditions may vary considerably between different parts of the manoeuvring area. At these aerodromes, there may be a need to consider the possibility that different types of operation could take place on each runway, e.g. CAT I on one runway and CAT III on another runway. This would normally be driven by the need to avoid unnecessary capacity restrictions on a runway where the MET conditions were better than the CAT I minima.

7.6.2 Where requirements exist for different categories of operation on various parts of the aerodrome, considerable care must be taken when establishing the LVP. The safety assessment (see Chapter 10) must consider the whole aerodrome and will depend on local factors such as the physical layout of the aerodrome, the facilities available and environmental issues. The ground movement capacity and the associated SMGCS and A-SMGCS facilities must also be considered to permit any increased movement rate to be handled safely.

7.6.3 The specific requirements for each runway must include the runway protection measures and the protection of the guidance signals of the non-visual aids. Pilots must be aware if LVP are in operation for that runway. The prime objective is to ensure that there is no confusion between the pilot and ATC regarding the category of operation being undertaken and the level of protection in place.

7.7 Autoland operations when LVP are not in operation

7.7.1 ILS installations may be subject to signal interference by aircraft and other objects. In order to protect the ILS signal during operations in LVP, the sensitive area is protected to ensure that the accuracy of the ILS signal is maintained.

7.7.2 There are a number of occasions when pilots wish to perform autoland operations when LVP are not in operation. These may be for pilot qualification and recency, for operational demonstration and in-service proving flights and for system verification following maintenance. In particular, some aircraft operators recommend that their pilots perform autoland operations routinely in order to reduce pilot work load during marginal MET conditions and after long haul flights.

7.7.3 When LVP are not in operation, it is possible that aircraft and vehicles may cause disturbance to the ILS signal. This may result in sudden and unexpected flight control movements at a very low altitude or during the landing and rollout when the autopilot attempts to follow the beam bends. As a result pilots are advised to exercise caution during these operations according to the instructions provided in their Operations Manual.

7.7.4 Pilots should inform ATC if they wish to conduct an autoland with protection of the LSA. In this case, ATC must inform the pilot if protection of the ILS/MLS sensitive area will or will not be provided. In some States, the hours where practice autolands are permitted are published in the AIP.

7.8 Guided take-off

7.8.1 Some aircraft are equipped with a take-off guidance system that provides directional guidance information to the pilot during the take-off. This operation is referred to as a guided take-off. Whenever an aircraft is conducting a guided take-off, the guidance signal (normally the ILS or MLS localizer) must be protected. In some States it is mandatory for the pilot to conduct a guided take-off below 125 m RVR (150 m for Cat D aircraft), but a pilot may request to conduct a guided take-off at any time. ATC must then inform the pilot if the guidance signal is or is not protected. The conditions under which guided take-offs are available should be published in the AIP.

Chapter 8

Optimised Operations

8.1 Introduction

8.1.1 The Optimised Operations concept has been developed to reduce the impact of LVP on runway capacity. It specifically addresses the case of a landing aircraft following a landing aircraft on a runway equipped with a precision approach landing aid that has a very small sensitive area, or no sensitive area in the vicinity of the runway, and is particularly applicable to MLS and GBAS.

8.1.2 The capacity of a runway in Low Visibility Procedures is limited by a number of factors. There are two factors that are addressed in this concept. The first is the location of the CAT II/III holding positions and the second is the position at which ATC give landing clearance to arriving aircraft.

8.1.3 There are other restrictions on aircraft operations in LVP such as the requirement for departing aircraft to overfly the ILS localiser and slower taxiing speeds which leads to an increase in runway occupancy time, but these are outside the scope of the concept.

8.1.4 The purpose of this chapter is to:

- Describe the new concept of operation based on the use of a landing clearance line;
- Describe the new landing clearance delivery position;
- Explain the safety arguments to justify the revised concept of operation; and
- Identify the changes to Low Visibility Procedures.

8.2 Current requirements

8.2.1 The relevant requirements are the location of the runway holding positions and the design of the Obstacle Free Zone (OFZ).

8.2.2 The following diagrams describe the relevant distances defined in Annex 14.

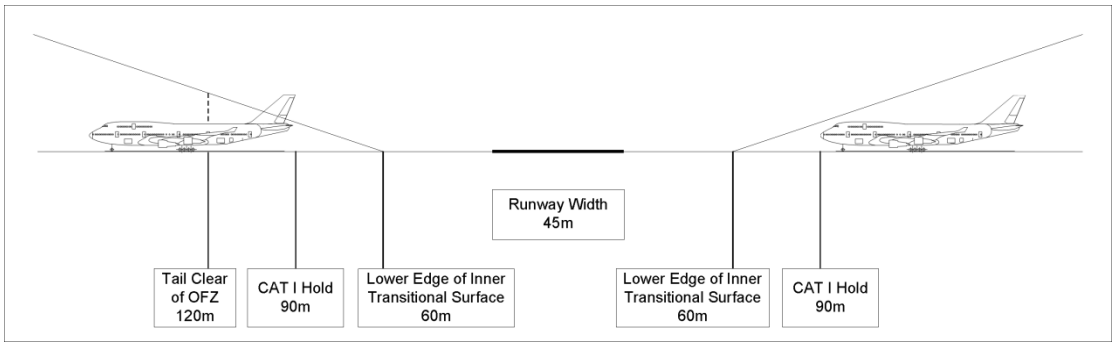

Figure 8.1: Code E Runway (Boeing B747-400)

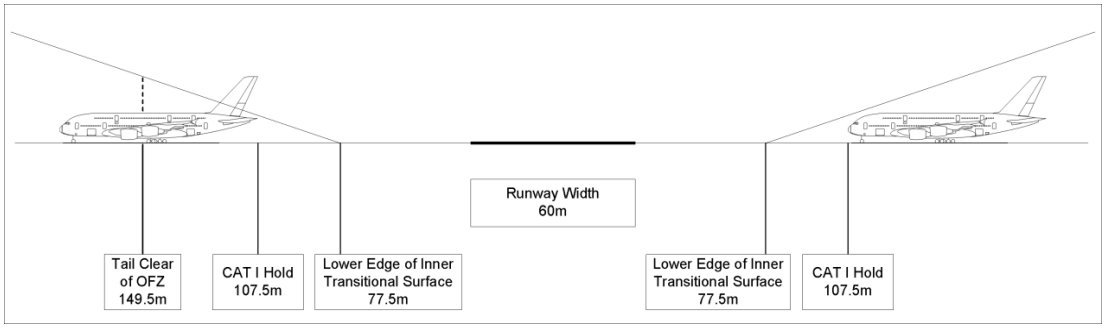

Figure 8.2: Code F Runway (Airbus A380-800)

8.2.3 The rationale for the location of these items can be summarised as follows:

- Lower edge of the inner transitional surface: This is the location at which the OFZ intersects the ground and the position is based on the wingspan of the largest aircraft using the runway.
- CAT I holding position: This is designed to protect the runway and OFZ. It is based on the aircraft holding at an angle of 45° or more in respect of the runway centreline and facing towards the runway. The location is based on a defined nose height and tail height of the largest aircraft using the holding position.
- As can be seen from the diagrams, the tail of a landing aircraft vacating the runway will still infringe the OFZ when the entire aircraft is clear of the CAT I holding position. In order for the tail of the aircraft to fully vacate the OFZ, the tail must be 120 m from the centreline for a B747-400 or 149.5m from the centreline for an A380.
- CAT II/III holding position: The location of the holding position ensures that the holding aircraft does not infringe the critical and sensitive areas of the approach and landing aids (e.g. ILS/MLS).

8.2.4 The holding points are located to protect the critical and sensitive areas of the supporting navigation aids (currently ILS) and the Obstacle Free Zone (OFZ). To date, for ILS operations, the sensitive areas have generally been larger than the OFZ and by default the OFZ has been protected by the larger ILS sensitive areas.

Note.— The ILS Localiser Sensitive Area (LSA) is calculated specifically for each runway depending on local factors such as the type of ILS antenna, but is typically in the order of 150 m each side of the runway centreline.

8.2.5 The other factor that limits capacity in LVP is the position at which ATC issue a landing clearance to arriving aircraft. This is normally at 2 NM from touchdown. Exceptionally the landing clearance can be delayed until 1 NM providing that the position of the approaching aircraft can be monitored and the pilot has been warned to expect a late landing clearance (See 7.5.6.4.2).

8.2.6 Navigation aids are being introduced with smaller or no sensitive areas around the runways (e.g. MLS and GBAS). Where the sensitive area is smaller than the OFZ any potential capacity benefit is limited by the OFZ dimensions. Because the size of the ILS sensitive area and the OFZ are similar, the potential benefits of new landing aids with a smaller sensitive area may be limited by the need to protect the OFZ.

8.2.7 The Optimised Operations concept utilises the concept of a landing clearance line and a revised landing clearance delivery position to maximise runway capacity with new technology approach and landing aids. Using these elements allows the spacing between aircraft on final approach to be reduced, so increasing runway capacity above that achieved in current LVP operations with ILS.

8.3 Applicability

8.3.1 The objective of Optimised Operations is to improve the landing rate during LVP by reducing spacing between aircraft on final approach. The concept is based on the basic assumption that suitable approach and landing aids are installed. These are generically any landing aid where the sensitive area is significantly smaller than the OFZ (or has no sensitive area around the runway). This could in theory apply to an ILS system with a very small sensitive area, but in practice applies to MLS and GBAS.

8.3.2 It is also assumed that there is sufficient demand for aircraft movements that the runway capacity in LVP becomes a limiting factor. Optimised Operations could be introduced at any airfield equipped with suitable landing aids, but in practice the additional requirements for Optimised Operations in terms of equipment and controller training means that the concept is only likely to be adopted by high capacity airfields where additional runway capacity is required in LVP.

8.3.3 The concept is based on the use of A-SMGCS to determine when the aircraft vacating the runway has passed a defined point on the taxiway, at which point it is safe to give landing clearance to a following aircraft. The concept therefore only applies to aerodromes equipped with a minimum of Level 1 A-SMGCS. The concept also requires a surveillance system capable of monitoring the position of aircraft on final approach.

8.3.4 The concept defines how landing clearance is given to an arriving aircraft following a preceding landing aircraft and so only applies to the arrival/arrival case. It is not applicable to the situation where an arriving aircraft is approaching the runway after a previous departing aircraft.

8.4 Current operations

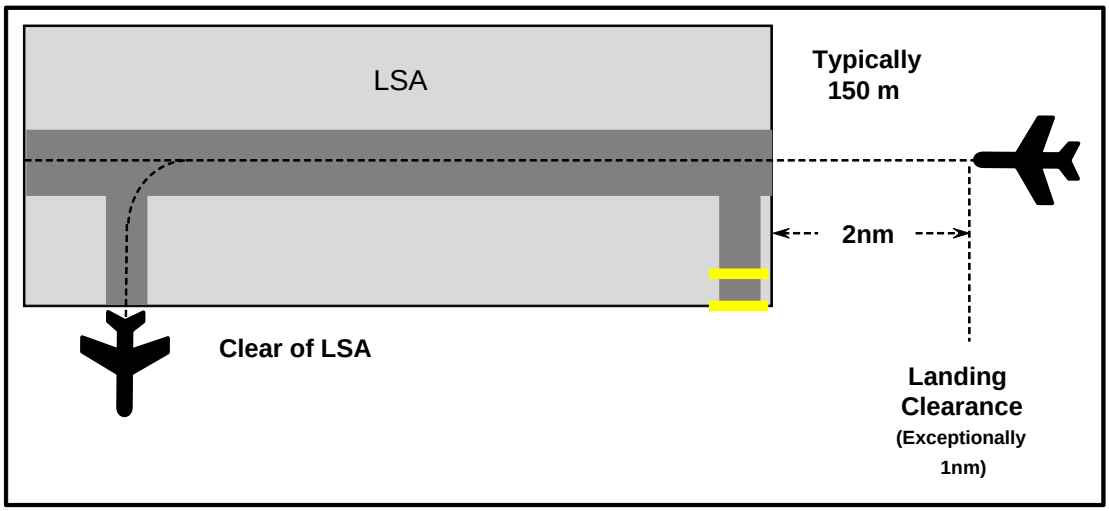

Figure 8.3: requirements to give landing clearance in current operations

8.4.1 In current operations, issuing landing clearance is based on the preceding landing aircraft being clear of the Localiser Sensitive Area (LSA) at which point ATC issue landing clearance to the following landing aircraft, subject to the following aircraft being no closer than 2 NM from the threshold (may exceptionally be reduced to 1 NM). This in turn defines the final approach spacing between these aircraft, which must be sufficient to allow time for the preceding aircraft to vacate the LSA before the following aircraft reaches 2 NM from touchdown.

8.5 Optimised operations concept

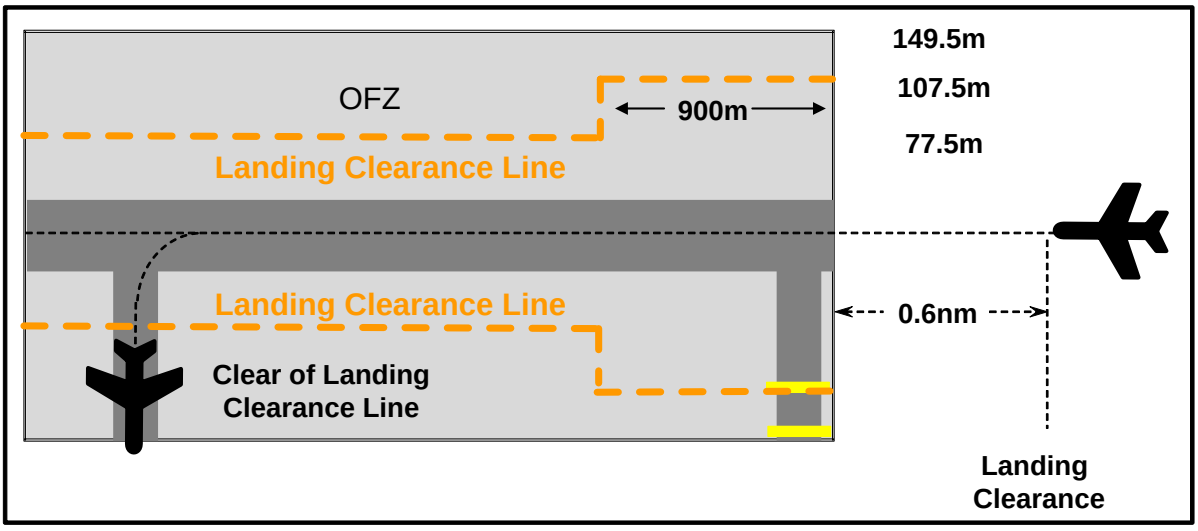

Figure 8.4. Distances defined for a Code F runway

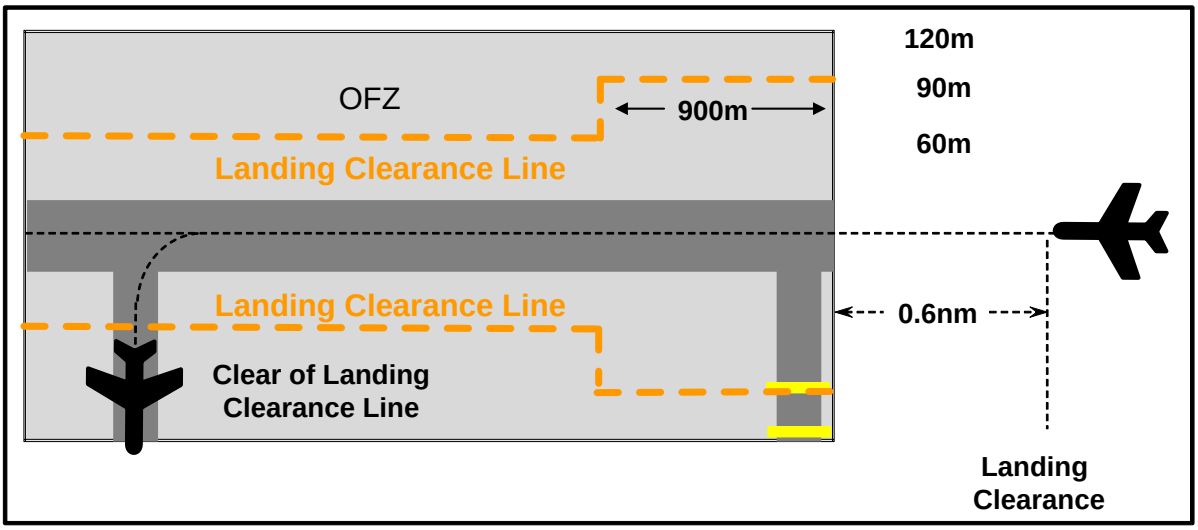

Figure 8.5. Distances defined for a Code E runway
where no New Large Aircraft (NLAs) e.g. No A380's operate

8.5.1 A Landing Clearance Line is defined. This line is not marked on the airfield by any signs or markings. It is only displayed on the A-SMGCS to identify to the controller the point the aircraft vacating the runway must have reached in order to issue landing clearance to a subsequent landing aircraft.

8.5.2 Secondly, the latest point at which it is safe to issue a landing clearance to a following aircraft is also defined (0.6 NM).

8.5.3 The concept requires the controller to monitor the progress of the landing aircraft on A-SMGCS and once the landing aircraft is observed to be fully clear of the Landing Clearance Line, the controller issues landing clearance to the following aircraft, subject to the following aircraft being no closer than 0.6 NM from the threshold.

8.5.4 Because the Landing Clearance Line is closer to the runway than current CAT II/III holding points, and the minimum distance for the issuance of landing clearance is closer to the threshold, the final approach spacing between aircraft may be reduced accordingly resulting in an increase in runway capacity.

Note.— This minimum spacing shall never be less than radar separation minima or wake vortex separation requirements.

8.5.5 The position of the Landing Clearance Line has been defined based on two elements. Firstly, the fact that that preceding aircraft is still within the OFZ at the time that landing clearance is issued to the following aircraft creates a potential risk of collision in the case of a missed approach or baulked landing by the following aircraft. Secondly, once the following aircraft has landed, it may in some cases travel behind the aircraft on the taxiway and the landing clearance line must ensure wingtip clearance between the aircraft on the runway and the aircraft on the taxiway in this event. If the landing system has a sensitive area on the runway (e.g. MLS) then the landing clearance line must also protect this sensitive area.

8.5.6 A detailed assessment of these factors has been carried out by Eurocontrol and full details on how to establish the position of the landing clearance line can be found in the Eurocontrol document "Landing Clearance Line Determination".

8.5.7 Typically, the landing clearance line will be located at the lower edge of the inner transitional surface (60 m for a Code E runway or 77.5m for a Code F runway) unless the sensitive area of the landing system is larger than this.

8.5.8 Due to the higher collision risk within the OFZ close to the runway threshold, the trigger line will normally be "tailored" to ensure that an acceptable collision risk is maintained throughout the length of the runway. This will result in the landing clearance line being further away from the runway for the first 900 m from the threshold. This in particular protects aircraft and vehicles crossing the runway close to the threshold.

8.5.9 According to ICAO AWO Manual (Doc 9365) an aircraft manoeuvring on the ground, for example when clearing the runway after landing, should be clear of the critical and sensitive areas before an aircraft approaching to land has descended to a height of 60 m (200 ft) above the runway. 200 ft above the threshold equates to approximately 0.6 NM from touchdown, therefore this is the latest point that the preceding aircraft must have crossed the landing clearance line in the case of any landing system that has a critical or sensitive area around the runway (e.g. ILS/MLS). Even if the landing system has no critical or sensitive areas around the runway, the preceding aircraft must have cleared the landing clearance line before the following aircraft descends to the height of the OFZ to meet the collision risk requirements, therefore 0.6 NM has been selected as the latest point at which landing clearance can be given.

8.5.10 A safety assessment of the concept has also been carried out and details can be found in the Eurocontrol document "Safety Assessment of Optimised Operations in Low Visibility Conditions utilising landing clearance delivery position and/or landing clearance line concept".

8.6 Identify the changes to Low Visibility Procedures

8.6.1 In order to implement the Optimised Operations concept the following operational changes have been identified.

8.6.2 The issuing of the landing clearance is based on the assessment of the preceding aircraft position in respect of the landing clearance line instead of holding points for landing aircraft vacating the runway and for aircraft/vehicles crossing the runway.

8.6.3 The location of the landing clearance line is determined based on a number of safety requirements namely:

- The landing clearance line shall be established no closer than 77.5m from runway centreline on runways where Code F aircraft operate;

- The landing clearance line shall be established no closer than 60 m from runway centreline on runways where only Code E and smaller aircraft operate;
- The current holding positions as specified in Annex 14 are used to define the location of the landing clearance line up to a distance of 900 m after the threshold;
- The location of the landing clearance line shall lie outside any landing system protection area on the runway (e.g. MLS Localiser Sensitive Area);
- The landing clearance line is displayed on the A-SMGCS controllers HMI.

8.6.4 The delivery of the landing clearance to the following aircraft is based on ensuring that both the following conditions are met:

- All aircraft/vehicles crossing or vacating the runway are completely clear of the landing clearance line assessed by observation of A-SMGCS;
- The landing clearance is given to the approaching aircraft before reaching 0.6 NM from the threshold based on observation of a suitable surveillance means.

8.6.5 These are the procedural elements that will be required to deliver the expected capacity benefit. In addition a controller training and/or familiarisation program is likely to be required.

Note.— These changes (the landing clearance line and revised position for the delivery of landing clearance) can be implemented independently and would still deliver some benefit.

Chapter 9

GBAS

9.1 Introduction to GBAS

9.1.1 The Ground Based Augmentation System (GBAS) is an augmentation system to a satellite navigation system. GBAS provides an enhanced level of service supporting all phases of approach and landing within the systems area of coverage. In particular, the main driver for the installation of GBAS will normally be to provide a precision approach service (CAT I, II, or III).

9.1.2 The GBAS is divided into three distinct sub-systems:

a) The satellite constellation, which provides both the aircraft GNSS receiver and the GBAS ground station with ranging information. Current developments of GBAS use GPS and/or GLONASS, and will potentially use other constellations (such as Galileo) in the future;

b) The GBAS ground station, which monitors the satellite signals, calculates and broadcasts a number of parameters and corrections to improve the accuracy and integrity of the signals. The GBAS ground station also broadcasts the Final Approach Segments (FAS) data which defines the final approach path in space (both laterally and vertically) to enable Precision Approach operations. GBAS broadcasts are normally via VHF Datalink (VDL); and

c) The aircraft receiver, which receives both the satellite signals and the GBAS datalink signals, supplying navigation output/guidance to both the pilots' displays and to the autopilot.

9.1.3 GBAS is part of the medium to long term strategy as a technology to support landing and take-off operations in the European region. In the medium term GBAS operations need to be envisaged in a "mixed equipage" operational scenario (i.e. some aircraft using ILS, some aircraft using GBAS). In the long term, GBAS may potentially replace ILS.

9.1.4 The benefits of GBAS operations compared to ILS operations are listed below:

a) Siting Criteria: Contrary to ILS, which may only be installed adjacent to the runway, GBAS offers more flexibility in the vicinity of the airfield, however certain siting and signal protection criteria must still be met. The GBAS protection area is named Local Object Consideration Area (LOCA). This may still present a challenge at highly congested airfields;

b) Multipath: The need to protect the ILS signal from multi-path effects places restrictions on building developments and aircraft movements. In ILS CAT II/III operations a large LSA is required to protect these operations. The GBAS ground station must be sited to avoid multipath effects, but this is likely to be less onerous than the requirements for ILS and the GBAS ground station is likely to be situated away from the runway;

c) LSA: The biggest restriction on runway capacity during ILS CAT II/III operations is normally the LSA. This restriction does not apply to GBAS (as the GBAS Ground Station can be located farther away from the runway); therefore, potentially allowing higher movement rates than ILS during LVP (although it is considered unlikely that rates equivalent to the full CAT I movement rate will be possible in CAT II/III operations due to other considerations such as the need to protect the OFZ and the

position at which landing clearance is given). The concept of Optimised Operations uses this benefit to maximise capacity in LVP at high density airfields;

d) False capture: ILS localizer false captures are situations where the aircraft prematurely initiates a turn onto the localizer centreline. This phenomenon of false capture cannot happen with GBAS;

e) Single GBAS ground station: A single GBAS ground station can serve multiple runways, potentially reducing installation and maintenance costs compared to ILS;

f) Flight Inspection: GBAS should need significantly less periodic flight inspections than ILS as most of the checks can be realised on the ground; and fewer checks are required; and

g) Enabling "All runway ends": With GBAS all runway ends can be enabled simultaneously, allowing a higher flexibility in runway operation at a given airfield with single or multiple runways. It is also possible to select and de-select specific approaches according to operational needs.

9.1.5 GBAS will be implemented as an "ILS look alike" straight in approach. This greatly simplifies the transition phase from other approach aids due to:

a) Standardisation of precision approach procedures;

b) Limited requirements for pilot training;

c) Lower cost aircraft architecture implementation;

d) The certification process is reduced; and

e) Changes to ATC procedures and training requirements are minimised.

9.1.6 Implementation of GBAS CAT I has commenced and development of GBAS CAT II/III is underway.

9.1.7 The differences between ILS and GBAS operations are minimised by the use of "ILS look alike" approaches, but there are still some significant operational differences:

a) The system is dependent on the satellite constellation and GBAS ground station rather than the ground based navaid (ILS or MLS);

b) One GBAS ground station can serve multiple runways. This has the benefit of providing maximum operational flexibility, however the failure of the GBAS ground station could affect multiple approaches;

c) For the foreseeable future multiple systems (ILS, MLS and GBAS) may be providing precision approach and landing operations for one runway, requiring procedures to support mixed equipage operations;

d) Positioning of the GBAS ground station should ensure that GBAS is not sensitive to multipath around the runways, but suitable protection will be required around the GBAS antennae; and

e) Different chart terminology and phraseology; the GBAS approach is referred to as GLS (GBAS Landing System).

9.1.8 From the ATC point of view, a GLS is considered to be operationally identical to an ILS approach to the same runway. ATC operational procedures are the same, e.g. with ATC vectoring the aircraft to intercept the final approach track in the same manner as for the ILS. The only difference is that the aircraft is “cleared GLS approach”.

9.1.9 The term “localiser” is replaced with the term “approach course”.

9.1.10 Runway changes may be easier and more efficient due to the ability to broadcast the approaches to all runways. The facility to disable certain selected approaches will be provided where required (e.g. to disable the approach to a closed runway).

9.1.11 There are likely to be changes to LVP to accommodate the mixed equipage operations (ILS/MLS and GBAS) particularly if special procedures such as Optimised Operations are used to maximise capacity.

9.1.12 The position of CAT II/III runway-holding positions may be reviewed. As GBAS does not have a critical or sensitive area around the runway, on a GBAS only runway, the CAT II/III holding position may be located closer to the runway (e.g. at the same position as the CAT I holding position). The size of the OFZ must also be taken into consideration. This is only likely once the ILS has been removed. In the interim period, the ILS LSA is likely to be the factor controlling the location of the CAT II/III holding position.

9.1.13 From the pilots perspective, the ILS Look-alike concept uses similar operational procedures for all landing functions so as to minimise the impact on the crew. The cockpit interface is the same, except that the pilot selects the GLS approach rather than the ILS or MLS approach and the aircraft performance is the same.

9.2 Mixed equipage operations with more than one approach aid

9.2.1 The introduction of new technology approach and landing aids (MLS and GBAS) will, in many cases, be on runways which are already equipped with ILS. Due to the length of time required for fleet equipage or renewal, operations with mixed equipage are likely to be required for a considerable period of time.

9.2.2 Other cases where new technology can provide benefits are at runways where no precision approach currently exists. GBAS can reduce the risk of Controlled Flight Into Terrain (CFIT) and may improve the regularity of service with reduced aircraft operating minima.

9.2.3 Where GBAS is introduced, one GBAS ground station may enable new or improved approach and landing operations on more than one runway. For example, with mixed equipage GBAS and ILS operations on the primary runway, but with a new GBAS approach on a subsidiary runway where previously no approach aid was available, or a lower category of approach was available (e.g. NPA on the subsidiary runway upgraded to GBAS CAT I).

9.2.4 The upgrading of any runways to a higher approach category will require the full range of facilities (e.g. AGL) and runway holding positions to be re-assessed based on the new category of operations.

9.2.5 On runways with mixed equipage ILS/MLS/GBAS operations, the requirements for all the approach aids will need to be considered carefully, in particular the protection requirements for the landing aids, as ILS, MLS and GBAS may all have different sized critical and sensitive areas (GBAS may have none in the vicinity of the runway). The most practical

solution in most cases will be for the runway holding positions to be established to protect the most demanding protection requirements (the largest areas). Separate CAT I and CAT II/III holding positions may be required.

9.2.6 When conducting mixed equipage operations the pilot needs to be informed of the status of the approach aids. This information may be provided individually to each aircraft or via ATIS. The pilot should then request the preferred approach aid and the controller clears the aircraft for this type of approach.

9.2.7 Controllers should be provided with information on the aircraft equipage either automatically (e.g. flight plan information displayed on the flight strip or radar data block) or manually via RTF. In cases where an automated system is provided, the actual type of approach being flown should be confirmed by the pilot. The controller then clears the aircraft for the appropriate type of approach.

9.2.8 At airfields which are not capacity limited, the most straightforward mode of operations would be to protect the most restrictive areas regardless of the type of approach being conducted (e.g. to protect the ILS LSA even when aircraft are using GBAS). This has the advantage that a single and simplified set of procedures can be applied to all aircraft. The disadvantage is that this may be unnecessarily restrictive and have an impact on runway capacity.

9.2.9 For airfields where there is a need to maximise runway capacity in LVP, the concept of Optimised Operations has been developed (See Chapter 8).

Chapter 10

Safety Management for All-weather Operations

10.1 Introduction

10.1.1 Due to the more demanding nature of aerodrome operations conducted in conditions of reduced visibility the safety management of AWO warrants special consideration. The complexity of managing these risks to an acceptable level is multiplied because of the interactions associated with the number and diverse range of specialist organisations actively involved in All Weather Operations (AWO).

10.1.2 This chapter provides guidance on the key elements to be considered in managing the safety risks associated with the conduct of All Weather Operations at aerodromes.

10.2 General

10.2.1 The objective of safety risk management is to assess (identify, analyse, and evaluate) the risks associated with identified hazards and, where appropriate, develop and implement effective mitigations.

10.2.2 Safety management is a set of coordinated activities that direct and control a course of action to identify risks and ensure that suitable procedures and other mitigations are in place to ensure that the intended operations can be conducted at an acceptable level of safety. The process involves the systematic application of policies, procedures and practices to the activities of communicating, consulting, establishing the context, and identifying, analysing, evaluating, treating, monitoring and reviewing risk. Risk identification involves the identification of sources of risk (hazards), outcomes (incidents or accidents), their causes, and their potential consequences. This allows the safety risk to be expressed in terms of predicted probability and severity of the consequences of a hazard.

10.2.3 In terms of the management of safety risks in aviation, safety management activities:

a) identify safety hazards;

b) ensure the implementation of remedial action necessary to maintain agreed safety performance;

c) provide for continuous monitoring and regular assessment of the safety performance; and

d) aim at a continuous improvement of the overall performance of the safety management system.

10.2.4 It is intended that safety management activities are conducted in such a way as to continuously ensure that any new hazards or risks are rapidly identified, that mitigation actions are suitable and, where mitigations are found to be ineffective, they are revised.

10.2.5 An increasing emphasis in safety management in aviation is to approach risk management activities in a systematic fashion, and in a proactive way that attempts to anticipate potential hazards in order to reduce the likelihood of an accident. A key principle in the safety management of aviation is to remove or eliminate hazards, and to mitigate any residual hazardous factors so as to reduce the potential for active failures.

10.3 Safety management of All Weather Operations (AWO)

10.3.1 Risk management activities contributing to the safe conduct of AWO relate primarily, but not exclusively, to aircraft and aerodrome operations, air traffic management, and the management of vehicle movements on the manoeuvring area and apron.

10.3.2 The successful conduct of AWO relies on close cooperation not only between pilots, air traffic controllers, aerodrome management and vehicle drivers, but with and between many additional supporting or enabling stakeholders, such as the navigation and surveillance domains, meteorological service providers, AIS, and network management (ATFM) functions.

10.3.3 Consequentially, the safety management of AWO will involve many stakeholders in addition to air navigation service providers, including for example regulators, aerodrome designers & planners, aerodrome operators, instrument flight procedures designers, aircraft operators & pilots, and ground vehicle handling/operating agencies.

10.3.4 Although runway incursions and the associated potential for collisions are considered to be the most significant risks in aerodrome operations, the safety-related objectives of AWO more broadly include, in addition to the protection of the runway(s) in use for take-off and landing against incursions by aircraft, vehicular and pedestrian traffic:

- maintaining the accuracy and integrity of ground-based navigation signals used during specified departure and approach & landing operations;
- reducing the possibility of conflicts between the aircraft, vehicular and pedestrian traffic;
- assisting ATC and/or Apron Management staff to maintain situational awareness of the positions of traffic on the manoeuvring area and aprons; and
- Facilitating coordinated action by various agencies, including the aerodrome and aircraft operators, rescue and fire fighting services, vehicle operators and drivers, MET and AIS providers, and ATS.

10.3.5 Safety management activities supporting All Weather Operations must assess and treat hazards that may result in unacceptable certainty that these safety-related objectives can and will be achieved.

10.4 Scope

10.4.1 The effective and efficient safety management of AWO, and specifically of those operations that take place in accordance with published RAVP and LVP, will require the inputs from a diverse ranges of specialty areas, domains, and stakeholders. To ensure that these inputs are efficiently obtained and managed in order to facilitate balanced and effective outcomes, a coordinated and interdisciplinary approach is necessary.

10.4.2 As a minimum, the key areas represented in the safety management of AWO will be: aerodrome management, aircraft operators & pilots, ATC and apron management, operators and drivers of vehicles operating on the manoeuvring area, and other personnel who operate on or near the runway.

10.4.3 Other stakeholders may also need to be involved from time to time, including AIS/AIM, MET, those agencies responsible for aerodrome perimeter security, and agencies responsible for communications, navigation and surveillance facilities and services associated with the operations on the aerodrome movement area, or with take-off & departure and approach & landing operations.

10.4.4 The scope of safety management activities is not constrained to an assessment of the conduct of AWO for compliance with the relevant ICAO SARPs or other

legislative/regulatory requirements, but includes continuous monitoring and regular assessment of actual "in use" safety performance, and specifically of the effectiveness of those operational rules and procedures that result from the implementation of remedial actions that are determined to be necessary to maintain the agreed safety performance.

10.4.5 In this context, the "effectiveness" of the operating rule set is determined with respect to the defined objectives of the RAVP and LVP. Simply, the fundamental questions are: "are these objectives achieved to a level that is acceptably safe? If not, then why not, and what needs to be done to rectify the situation?"

10.4.6 This activity takes place not only in a retrospective context reviewing past performance and "what went wrong" but, of critical importance, with a forward looking stance, proactively assessing "what can go wrong".

10.4.7 It is intended that in addition to lessons arising from investigations into air safety occurrences, proactive safety management of All Weather Operations will result in:

- Improved awareness of potential safety hazards connected with various roles, functions and activities;
- Proposed solutions to eliminate or mitigate identified potential hazards, before they can adversely affect operational outcomes and objectives; and
- Identification of changes that can be made to reduce the likelihood of an air traffic incident resulting in injury to persons or property damage.

10.5 Frameworks for safety management in European aviation

10.5.1 ICAO publishes SARPs on safety management across the Annexes, with those relating to air traffic service providers and aerodromes detailed in Annexes 11 and 14 respectively.

10.5.2 To support the SARPs, ICAO has published ICAO Document 9859 – Safety Management Manual, with the aim to harmonise safety management systems implemented in the aviation sector.

10.5.3 ICAO is currently developing a new Annex (Annex 19), which will collect in one document all the safety management requirements now spread across various documents.

10.5.4 Within Europe, the requirements for safety management systems are detailed in law, notably:

- European Commission Implementing Regulation (EU) No 1035/2011, laying down common requirements for the provision of air navigation services; and
- European Commission Regulation (EC) No. 1315/2007, on safety oversight in air traffic management.

10.5.5 In addition to these generic frameworks, it has been recognised that a key defence in preventing collisions between aircraft during take-off and landing, is minimising the likelihood of runway incursions. Accordingly, the following publications are also relevant in fulfilling the safety-related objectives associated with All Weather Operations:

- ICAO Doc-9870 - Manual for Preventing Runway Incursions; and
- European Action Plan for the Prevention of Runway Incursions (EAPPRI).

10.5.6 The *European Commercial Aviation Safety Team* (ECAST) - a partnership with EASA, other European regulators and the aviation industry - has established a SMS and safety culture working group with the objective of providing its stakeholders with guidance on safety management in support to regulatory materials being developed by ICAO and EASA. The materials developed by the group can be found at: http://easa.europa.eu/essi/ECAST_SMS.htm.

10.5.7 For those not yet directly subject to specific regulatory or legislative regimes, there are other relevant contemporary aviation-related safety management methodologies, such as "*The ARMS Methodology for Operational Risk Assessment in Aviation Organisations*", which may have already been adopted by non-ANSP stakeholders who are active in the AWO domain, such as airlines or ground-service providers. *Refer to 10.9 Note 1 for further details of the ARMS methodology.*

10.6 Approach to managing the safety risks of All Weather Operations

10.6.1 It is imperative that effective interface arrangements are established between all parties involved in All Weather Operations. It is also essential that, despite any organisational differences, roles and responsibilities for the various elements within the AWO plan and framework, and for the associated safety management activities, are clearly defined and allocated.

10.6.2 In addition to the institutional and inter-organisational arrangements identified above, all organisations or agencies involved in AWO should ensure that:

- all personnel are aware of the potential safety hazards connected with their duties (safety awareness);
- the lessons arising from safety occurrence investigations and other safety activities are disseminated within the organisation at management and operational levels (lesson dissemination);
- all personnel are actively encouraged to identify any safety issues in their operational area, and to propose solutions to identified hazards; and
- changes are made to improve safety where they appear needed (safety improvement).

10.6.3 In the establishment and conduct of activities supporting the safety management of AWO, there may be direct benefits in utilising existing inter-organisational groups that are already working towards the safety of aerodrome operations, such as Local Runway Safety Teams.

10.6.4 Benefits may be also gained by adopting a "total system approach" to the safety management of AWO.

10.6.5 The total system approach seeks to eliminate risks arising from safety gaps or overlaps, and to avoid conflicting requirements and confused responsibilities. By adopting a total system approach, benefits may also be achieved through a common shared understanding that the objective is to reduce the overall systemic risk, in preference to simply reducing the risk for, to, or of an individual sub-element of the ANS/ATM functional system (such as ATC) via the transfer of that risk to another sub-element (such as to the air crew).

10.7 Key activities

10.7.1 There are a number of fundamental activities that reflect good practice to be considered as the basis for any framework established for managing the safety risks associated with All Weather Operations.

10.7.2 As guidance, for an aerodrome conducting, or planning to conduct, All Weather Operations:

- **Establish** a common AWO safety risk management ***policy*** (including the mandate and commitment of the various parties), agreed by those parties involved in the safety management of All Weather Operations at that location, addressing:
    - Commonly shared or visible ***vocabulary*** for the management of the safety risks of AWO;
    - ***Roles*** and ***Responsibilities***;

- ***Risk Criteria***;
- An AWO ***Safety Risk Management Plan***, addressing such things as:
  - frequency of meetings & reviews, or other activities; and
  - identification of events that would trigger special activities, for example extra-ordinary meetings or reviews due to incidents / accidents, or due to the change of the AWO *risk profile* beyond acceptable limits.

- **Establish** a Safety Risk Management ***Process***, including:
  - Establishing the operational ***Context***:
    - baselining the existing or proposed AWO operational environment;
  - Risk ***Assessment***:
    - ***Identification***, ***Analysis***, and ***Evaluation***;
  - Risk ***Treatment***;
  - ***Communication*** and ***Consultation***;
  - ***Monitoring*** and ***Review***;
- **Maintain** the local AWO ***Risk Profile*** (Risk Register);
- **Undertake** the development and ***Continuous Improvement*** of the safety risk management policy, process and profile:
  - Designing and implementing a safety risk management framework;
  - Monitoring and reviewing the safety risk management framework;
  - ***Continual improvement***, including, for example, maintaining the operational *context* and *risk profile* in light of changing circumstances, and incremental refinement of the *management plan*, *vocabulary*, *roles* & *responsibilities*, *risk criteria*, *monitoring* & *review* activities, *communication* & *consultation* activities in accordance with evolving understanding and needs.

Refer to 10.9 Note 2 for details of the source references used as the basis for defining these key activities.

10.8 Sources of hazards to be considered

10.8.1 The following factors listed in the ICAO Safety Management Manual (Doc-9859 2nd Edition) are examples of common hazard sources in aviation, and may usefully be considered in assessing the hazards and risks associated with All Weather Operations:

- Design factors, including equipment and task design;
- Procedures and operating practices, including their documentation and checklists, and their validation under actual operating conditions;
- Communications, including the medium, terminology and language;
- Personnel factors, such as company policies for recruitment, training, remuneration and allocation of resources;
- Organisational factors, such as the compatibility of production and safety goals, the allocation of resources, operating pressures and the corporate safety culture;
- Work environment factors, such as ambient noise and vibration, temperature, lighting and the availability of protective equipment and clothing;

- Regulatory oversight factors, including the applicability and enforceability of regulations; the certification of equipment, personnel and procedures; and the adequacy of oversight;
- Defences, including such factors as the provision of adequate detection and warning systems, the error tolerance of equipment and the resilience of equipment to errors and failures; and
- Human performance, restricted to medical conditions and physical limitations.

10.8.2 In addition, a number of factors specific to AWO will need to be considered. These include:

- The probability of runway incursions, taking into account the ability of vehicles and aircraft to navigate in reduced visibility, including the records of previous runway incursions;
- The suitability of existing and/or planned future RAVP and LVP;
- Consideration of the aerodrome layout, taxiway and apron routings and runway entrances and exits;
- Consideration of meteorological records and airfield movement statistics;
- The suitability of airport security measures;
- The size and protection requirements for the Critical and Sensitive areas of the approach and landing aids;
- The protection of the OFZ; and
- The suitability of the SMGCS and A-SMGCS.

10.9 Reference material

ICAO Annex 11 – Air Traffic Services

ICAO Annex 14 – Aerodromes

ICAO Doc-9859 – Safety Management Manual

ICAO Doc-9870 – Manual for Preventing Runway Incursions

European Commission Implementing Regulation (EU) No 1035/2011, laying down common requirements for the provision of air navigation services

European Commission Regulation (EC) No. 1315/2007, on safety oversight in air traffic management

European Action Plan for the Prevention of Runway Incursions

The ARMS Methodology for Operational Risk Assessment in Aviation Organisations – *refer to Note 1 below*.

ISO-31000:2009 Risk Management — Principles and Guidelines (published by the International Standards Organisation) – *refer to Note 2 below*.

Note 1.— The Airlines Risk Management Solutions (ARMS) Working Group was created and tasked to produce a useful and cohesive Operational Risk Assessment method for airlines and other aviation organisations. The ARMS methodology is considered as best practice by ECAST (the European Commercial Aviation Safety Team). ECAST is a partnership between EASA, other European regulators and the aviation industry, and cooperates with equivalent bodies in the US, and with other major safety initiatives worldwide, in particular the ICAO Regional Aviation Safety Group (RASG) and Cooperative Development of Operational Safety and Continuing Airworthiness Programme (COSCAP).

Note 2.— Key activities are summarised from the international standard on Risk Management, ISO-31000:2009, published by the International Standards Organisation. This risk management standard is not specific to any industry or sector, but is designed to be used by any public or private enterprise or group, and can be applied to a wide range of activities, operations, processes, and services.

In the context of managing safety risks specific to aviation, ISO-31000 provides a common approach in support of standards dealing with specific risks and/or sectors, but does not replace those standards. In the context of All Weather Operations, ISO-31000 addresses the key elements of a safety management framework and system as defined in ICAO Doc-9859 (Safety Management Manual), and provides a common approach for fulfilling the requirements for Safety Management Systems applicable to the providers of ATS, as established in law by European Commission Implementing Regulation (EU) No 1035/2011 (refer Annex II of this Implementing Regulation). In addition, ISO-31000 provides a generic framework which encompasses the key elements of other contemporary aviation-related safety management methodologies, such as "The ARMS Methodology for Operational Risk Assessment in Aviation Organisations" (refer Note 1, above), which may have already been adopted by non-ATS agencies which are active in the AWO domain, such as airlines or ground-service providers.

In summary, it may be useful to consider ISO-31000 as the basis for a safety risk management framework for common use by different organisations that are working jointly towards a common goal, but which may already have their own SMS established differently to fulfil various diverse regulatory/legislative &/or operational requirements.

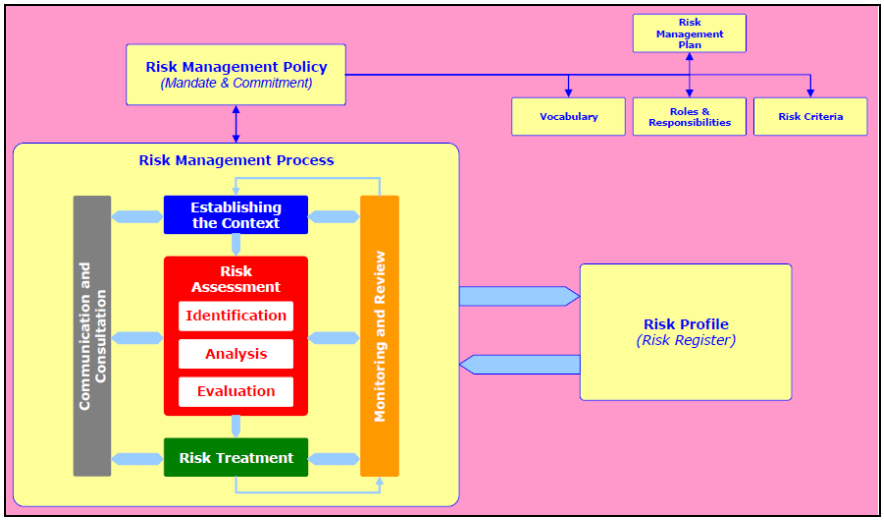

Figure 10.1: Graphic illustrating the structure of a generic risk management framework, in alignment with ISO-31000:2009

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Appendix A – AIP Examples

SAMPLES
of
AIP entries on LVP
(paragraph 4.4.1 refers)

SAMPLE 1 and SAMPLE 2 are sample generic AIP entries for large and small aerodromes respectively to assist States and Aerodromes in the preparation of local AIP entries.

SAMPLE N°1

EZZZ AD 2.22 Flight and ground procedures

Low Visibility Procedures

1. **Runways and associated equipment**

1.1 Runways 08 and 26 are equipped with ILS and MLS and are approved for CAT III operations, including guided take-off. Runway 21 is equipped with ILS and is approved for CAT II operations. Runway 03 is equipped with ILS and is approved for CAT I operations.

2. **Criteria for the initiation and termination of LVP**

2.1 The preparation phase will be implemented when visibility falls below 1 200 m and/or height of cloud base# is at or below 300 ft and CAT II/III operations are expected.

2.2 The operations phase will be commenced when the RVR falls to 600 m or the height of cloud base# is below 200 ft.

2.3 LVP will be terminated when RVR is greater than 600 m and height of cloud base# is greater than 200 ft and a continuing improvement in these conditions is anticipated.

3. **Description of ground marking and lighting**

3.1 Runway exits for Runways 08 and 26 are equipped with green/yellow coded taxiway centre line lights.

3.2 Aircraft landing on Runway 21 must only exit via the SOUTH taxiway where white flashing lights indicate the boundary of the ILS localizer sensitive area.

4. **Description of LVP**

a) Pilots will be informed by ATIS or RTF when LVP are in operation.

b) Pilots must request an MLS on first contact with EZZZ Approach.

c) Aircraft will be vectored to intercept the ILS/MLS at least 10 NM from touchdown.

d) The ILS localizer sensitive area will be protected when an ILS landing aircraft is within 2 NM from touchdown. ATC will provide suitable spacing between aircraft on final approach to achieve this objective. It is anticipated that for CAT II operations this spacing will be in the order of

6 NM and for CAT III operations this spacing will be in the order of 8 NM. Spacing in front of an aircraft conducting an MLS approach will be in the order of 5 NM.

e) Guided take-off may be conducted on Runways 08 and 26. Whenever LVP are in operation the ILS localiser sensitive area will be protected for all departing aircraft.

4.1 Departing aircraft are required to use the following CAT II and CAT III holding positions:

Runway 08 – D2 (CAT III)
Runway 26 – A3 or B3 (CAT III)
Runway 21 – E2 (CAT II)

4.2 Intersection take-offs are not permitted.

4.3 Taxiing is restricted to taxiways equipped with centre line lights as indicated on the aerodrome chart. On receiving taxi clearance aircraft must only proceed when a green centre line path is illuminated. In the event of failure of the taxiway lights or stopbars, aircraft are only to taxi on the direction of a “follow me” vehicle.

4.4 Aircraft taxiing for departure on Runway 26 must use Taxiway Bravo to avoid infringing the ILS sensitive area.

4.5 Restrictions on traffic flow

The following hourly traffic rates are anticipated in LVP:

RVR 600 m to 350 m = 15 arrivals / 12 departures.

RVR less than 350 m = 12 or less arrivals / 10 or less departures.

It is expected that these figures will increase according to the proportion of MLS equipped aircraft.

4.6 Multiple use of both Runway 21 and Runway 26 is not permitted in LVP. ATC will designate the runway in use according to the prevailing wind and RVR conditions.

SAMPLE N°2

EXXX AD 2.22 Flight and ground procedures

Low Visibility Procedures

1. **Runways and associated equipment**

1.1 Runway 24 is approved for departure operations in RVR conditions less than a value of 550 m.

2. **Criteria for the initiation and termination of LVP**

2.1 LVP operations will be provided when requested by an aircraft operator to conduct departure operations in RVR conditions less than a value of 550 m. This request should be made a minimum of 30 minutes in advance to permit the appropriate preparations by the aerodrome authority.

3. **Description of ground marking and lighting**

3.1 Entry and exit to Runway 24 is only permitted via Taxiway Alpha.

4. **Description of LVP**

Aircraft and vehicle movements will be restricted to one aircraft movement at a time while departure operations in RVR conditions less than a value of 550 m are conducted in order to ensure protection of the runway.

Aircraft movements on the apron must only be carried out with the direction of a marshaller.

4.1 Use the holding position for Runway 24 on Taxiway Alpha.

4.2 Taxiing is normally restricted to one aircraft movement at a time. Operation of vehicles on the manoeuvring area is not permitted when departure operations in RVR conditions less than a value of 550 m are in progress. The only taxiway available is Taxiway Alpha to the threshold of Runway 24. This taxiway is equipped with green taxiway centre line lights.

Example AIP Entry

This Appendix contains an example AIP entry provided by one State. This AIP entry should not be considered as definitive. The specific operational requirements of each aerodrome will be different. As part of the process for the establishment and safety assessment of the procedures, each item in the AIP entry should be considered for applicability and implementation at the particular aerodrome.

The following AIP entry for Milan Linate is based on material provided by ENAV.

1) General

LVP will be applied to CAT II/III and departure operations at the following conditions:

a) when the runway visual range (RVR) reported at touch down zone (TDZ) is 550 m or below;

b) when cloud base height is below 200 ft according to the meteorological local report;

c) when the rapid deterioration of weather conditions recommends so.

Pilots will be informed by ATIS and/or RTF when LVP are in force.

RWY 36 is suitable for ILS CAT II/III operations by operators whose minima have been accepted by the Civil Aviation Authority (for CAT IIIB minimum RVR of 75 m is required) and it will be used for departure operations with RVR less than 550 m.

Pilots wishing to conduct CAT II/III approaches and landing for training purposes shall inform ATC in advance.

In case of poor visibility conditions a reduced airport capacity can be expected due to the required increase in spacing between arriving aircraft and the restrictions applied to ground movements.

2) Ground movement (Ref. LVP Chart)

Whenever conditions are such that all or part of the m manoeuvring area cannot be visually monitored from the TWR, taxiing operations shall be carried out according to TWR instructions/information and through the opportune use of the established Intermediate Holding Positions (IHP).

The following reference points are available for aircraft movements:

a) Holding Position RWY 36 CAT II/III (RHP T2)

b) IHPs on the manoeuvring area:
- TWY T, IHP: T5 (bidirectional), T4 and T3 (North- South direction)
- TWY N, IHP: N1, N2, N3, N4, N5, N6 (bidirectional)
- TWY K, IHP: K3 and K1 (East-West direction)

c) IHPs on North Apron:
- Apron TWY B, IHP: B1 (North-South Direction)
- Apron TWY D, IHP: D1 and D2 (North-South Direction)
- Apron TWY E, IHP: E1 (East-West direction)
- Apron TWY A, IHP: A1 (South-North direction)

d) Arriving aircraft

Landing aircraft shall vacate the runway:
- preferentially via TWY K to the West Apron
- only via TWY G to the North Apron
- TWY J not available

Aircraft shall report to the TWR when the ILS sensitive area has been vacated (identified by the end of the green/yellow colour coded TWY centreline lights) and when the assigned stand has been reached.

e) Departing aircraft
- Aircraft shall enter RWY 36 via TWY T only
- TWY J not available

Holding Bay RWY 36 not available

When RVR, measured on any available transmissometer, is below 400 m follow-me assistance is:

- mandatory on West Apron
- on pilot's request on North Apron

In case of failure of the Surface Movement Radar (SMR) with RVR, measured on any available transmissometer, below 400 m only one aircraft movement at the time is allowed and follow-me assistance always mandatory.

Appendix B – Equipment Failure Tables

EQUIPMENT FAILURE TO BE REPORTED

LOW VISIBILITY DEPARTURE OPERATIONS AND ILS/MLS APPROACH AND LANDING OPERATIONS

B.1 Introduction

B.1.1 Under normal circumstances, the appropriate facilities should be provided according to the operations being carried out at the aerodrome. The following paragraphs describe the effect on these operations of failures of the ground equipment. It should not be interpreted as meaning that multiple failures are acceptable or that any part of the ground equipment need not be provided. As a general rule, it is expected that every effort should be made to keep the period of non-availability of the failed equipment to an absolute minimum. It is the responsibility of the State of the Aerodrome to define in the aerodrome regulations the maximum acceptable length of time any failure may be permitted, taking into account the effect on safety and any mitigation means available.

B.1.2 Should the performance of any visual or non-visual aid deteriorate below the level promulgated, ATC shall inform pilots immediately (Annex 11, Chapter 4, 4.2.1 d)). This information shall also be passed to the approach control unit (Annex 11, Chapter 7, 7.2); in addition, it should be reported to any other appropriate organization (PANS-ATM, 7.12.5.e) and these deficiencies should be published by NOTAM.

B.1.3 It is important that the information passed by ATC to pilots is clear and unambiguous. In order to meet the needs of the pilots in determining the effect of the failure on the operation, ATC should report the failure in terms of the category of operations which the ILS/MLS/GBAS can support (CAT I, II or III). As a general rule, a change in the category of operations which the ILS/MLS/GBAS can support (CAT I, II or III), and changes in the status of the aerodrome lighting, ancillary equipment and the RVR assessment equipment, shall be reported to the pilot (Annex 11, Chapter 4, 4.2.1 d)).

B.2 Effects of Approach and Landing Aid deficiencies).

B.2.1 It is recognized that the ILS/MLS/GBAS classification published in the AIP is of a long-term nature; nevertheless, on a day to day basis due to different causes (e.g. equipment defects, environmental effects), the ILS/MLS/GBAS status may be impaired. With regard to equipment failure, two situations can exist: long-term or short-term deficiencies.

B.3 Long-term deficiencies

B.3.1 In the case of long-term ILS/MLS/GBAS deficiencies, as for example environmental effects causing deterioration of the localizer or glide path course structure, the ILS/MLS classification can change and the reduced category of operations which the ILS/MLS can support shall be published, e.g. by NOTAM (Annex 15, Chapter 5, 5.1).

B.4 Short-term deficiencies

B.4.1 It is an absolute necessity to avoid any misunderstanding by the pilot in the case of a reduced category of operations which the ILS/MLS/GBAS can support. Aerodrome control towers and units providing approach control service shall be provided without delay with information on the operational status of radio navigation aids essential for approach, landing and take-off at the aerodrome(s) with which they are concerned (Annex 10, Vol. I, 2.8). For that reason, it is necessary to present clear information to the controller on the maximum category of operation which the ILS/MLS/GBAS can support. In order to provide this information to the controller,

it is recommended that an automatic system is used in order to avoid a controller overload and to facilitate a clear and unambiguous report to the pilot. Therefore, this system should provide unmissable alert to the controller for any downgrading of the category of operations which the ILS/MLS/GBAS can support. It is also essential to report failure of the lighting systems.

B.4.2 In order to assist in determining the category of operations that can be supported in the case of the failure of a component of the ILS/MLS/GBAS system, or a failure of the visual aids, MET equipment and ancillary systems, two tables have been developed to indicate the effect of any failure on the category of operation, as presented in the tables in this Appendix.

B.4.3 The purpose of these tables is to provide ATC and aerodrome operators with information on the items which need to be reported to pilots in case of a failure or downgrading in accordance with paragraphs B.1.2 and B.1.3.

B.4.4 The consequences of equipment failures for flight operations are dependent upon the operational regulations for the individual operator. This is presented in the right hand column of the tables. It should be noted that combinations of failures are only acceptable where specifically authorized in flight operations rules.

EQUIPMENT FAILURE TO BE REPORTED - *LOW VISIBILITY DEPARTURE OPERATIONS*

SYSTEM CONSIDERED	FAILURE TO BE REPORTED ON RTF BY ATC[4]	*EXPECTED EFFECT ON FLIGHT OPERATIONS*
ILS (Where used for guided take-off)	ILS localizer downgraded to CAT II ILS localizer downgraded to CAT I ILS out of service[1]	*No take-off guidance. Guided Take-Off not permitted* *No take-off guidance Guided Take-Off not permitted* *No take-off guidance Guided Take-Off not permitted*
MLS (Where used for guided take-off)	MLS downgraded to CAT II MLS downgraded to CAT I MLS out of service[1]	*No take-off guidance Guided Take-Off not permitted* *No take-off guidance Guided Take-Off not permitted* *No take-off guidance Guided Take-Off not permitted*
RVR	Touchdown RVR system unserviceable (*Other*) RVR systems unserviceable	*Restriction depending on State of aerodrome regulations and operation rules* *Restriction depending on flight operation rules*
LIGHTING SYSTEMS	Runway lighting unserviceable Standby power supply unserviceable[2] Runway centre line lighting unserviceable [3] Runway edge lighting unserviceable [3] Taxiway lighting system unserviceable [3]	*Restriction depending on flight operation rules* *Restriction depending on State of aerodrome regulations and operation rules* *Restriction depending on flight operation rules* *Restriction depending on flight operation rules* *Restriction depending on flight operation rules*
ANCILLARY	Stop bars unserviceable Ceilometer unserviceable Anemometer unserviceable	*No effect if runway protection is ensured by other means* *No effect* *No effect if other sources available otherwise restriction depending on flight operation rules*

(1) - This may be caused by the failure of a component of the complete ILS or MLS system (*e.g.* failure of the localizer/Azimuth or failure of the status monitoring equipment).

(2) - Generally, a single standby power supply is provided for all lighting systems.

(3) - When a portion of the lighting system is unserviceable, then this should be reported as a percentage when evenly distributed and the lighting pattern is not distorted (e.g. if 1 in 4 lights is unserviceable the "*25% of runway centreline unserviceable*") or otherwise the failure should be described in full

(4) - And to be reported on ATIS as appropriate (see para 3.3.3)

EQUIPMENT FAILURE TO BE REPORTED - *APPROACH AND LANDING OPERATIONS*

SYSTEM CONSIDERED	*FAILURE TO BE REPORTED ON RTF BY ATC(4)*	*EXPECTED EFFECT ON FLIGHT OPERATIONS*
ILS	ILS downgraded to CAT II	*Flight operations limited to CAT II*
	ILS downgraded to CAT I	*Flight operations limited to CAT I*
	ILS out of service(1)	*Restricted to non precision approach (or other precision approach aid if available)*
	Outer Marker unserviceable	*No limitation if replaced by published equivalent position, otherwise restricted to non-precision approach*
	Glide path out of service	*Restricted to non-precision approach (e.g. localizer only)*
MLS	MLS downgraded to CAT II	*Flight operations limited to CAT II*
	MLS downgraded to CAT I	*Flight operations limited to CAT I*
	MLS out of service(1)	*Restricted to non-precision approach (or other precision approach aid if available)*
DME	DME (as alternative to marker beacons) unserviceable	*No limitation if replaced by published equivalent position, otherwise restricted to non-precision approach*
RVR	Touchdown RVR system unserviceable	*Restriction depending on State of Aerodrome regulations and operation rules*
	(*Other*) RVR systems unserviceable	*Restriction depending on flight operation rules*
LIGHTING SYSTEMS	Approach lighting unserviceable (3)	*Restriction depending on flight operation rules*
	Runway lighting unserviceable	*Restriction depending on flight operation rules*
	Standby power supply unserviceable(2)	*Restriction depending on State of Aerodrome regulations and operation rules*
	Runway centre line lighting unserviceable (3)	*Restriction depending on flight operation rules*
	Runway edge lighting unserviceable (3)	*Restriction depending on flight operation rules*
	Touch Down Zone lighting unserviceable (3)	*Restriction depending on flight operation rules*
	Taxiway lighting system unserviceable	*Restriction depending on flight operation rules*
ANCILLARY	Stop bars unserviceable	*No effect if runway protection is ensured by other means*
	Ceilometer unserviceable	*No effect*
	Anemometer unserviceable	*No effect if other sources available otherwise restriction depending on flight operation rules*

(1) - This may be caused by the failure of a component of the complete ILS or MLS system (*e.g.* failure of the localizer/Azimuth or failure of the status monitoring equipment).

(2) - Generally, a single standby power supply is provided for all lighting systems.

(3) - When a portion of the lighting system is unserviceable, then this should be reported as a percentage when evenly distributed and pattern is not distorted (e.g. if 1 in 4 lights is unserviceable the "*25% of runway centreline unserviceable*") or otherwise the failure should be described in full.

(4) - And to be reported on ATIS as appropriate (see para 3.3.3)

Appendix C – Examples of AWO Checklists

This Appendix contains example checklists used by three States to assist controllers with the efficient and harmonised implementation of Visibility Condition 2 (VIS2) and LVP. These checklists should not be considered as definitive. The specific operational requirements of each aerodrome will be different. As part of the process for the establishment and safety assessment of the procedures, each item in the checklist should be considered for applicability and implementation at the particular aerodrome.

The following example checklist is based on material provided by ENAV.

Check-lists for TWR personnel

The following templates provide a general framework for checklists intended to support Tower personnel while applying AWO. The templates are not exhaustive on the subject, and are intended to be adapted in local circumstances. All actions must be clearly defined and assigned so as to avoid any doubt as to responsibility, and to avoid task overlapping.

They will be laminated and available in each TWR position (Supervisor, Aerodrome Controller, Ground Control, Clearance Delivery, and so on).

General requirements for a check-list:
- not a summary of published AWO;
- concise and easily readable;
- contains appropriate actions for both LVP phases and VIS 2 conditions.

	Supervisor
PREPARATION	In accordance with MET actual conditions and forecasts
	Inform Airport Operator
	Inform technical maintenance to check required systems
	Inform Supervisor Approach; request FMP to issue appropriate restrictions
	Inform MET personnel
	Check serviceability of airport equipment (e.g. though status monitors)
	Await for acknowledgement by all stakeholders
ACTIVATION	In accordance with MET actual conditions and forecasts
	Inform Airport Operator, MET personnel, technical maintenance
	Inform Supervisor Approach , require appropriate separations
	Request FMP to issue appropriate restrictions
	Check Airport Ground Lighting (stopbars on)
	Notify TWR ATCOs of the current ILS operations category
	Insert appropriate messages in ATIS; advise aircraft by RTF
	Monitor MET forecasts and reports for possible alternate aerodromes
	Note in supervisor logbook: time of activation
CAT III	Initiate any special local requirements (e.g. relocation of Aerodrome Rescue and Fire fighting Services)
DEACTIVATION	In accordance with MET actual conditions and forecasts
	Inform Supervisor Approach, Airport Operator, MET personnel, technical maintenance
	Cancel messages in ATIS; advise aircraft by RTF as required
	Note in supervisor logbook time of deactivation
CANCELLATION	In accordance with MET actual conditions and forecasts
	Inform supervisor Approach , Airport Operator, MET personnel, technical maintenance
	Cancel ATIS message
	Ask FMP to revise/cancel traffic restrictions
	Note in supervisor logbook time of cancellation
VIS.IBILITY COND. 2	Inform Airport Operator and pilots
	Stop-bars on
	Note in supervisor logbook

	ATCOs (may be divided according to available positions)
PREPARATION	Advise supervisor of actual MET conditions
	Remove unnecessary personnel and vehicles from the manoeuvring area
	Keep record of personnel/vehicles inside manoeuvring area
	Check serviceability of airport equipment (e.g. though status monitors)
ACTIVATION CAT II - III	Inform supervisor of actual MET conditions
	Wait for supervisor approval for ILS CAT II/III operations
	Check AGL (Airport/Aerodrome Ground Lighting): Runway Stopbars are on
	Protect ILS sensitive areas
	Inform pilots and vehicle drivers of LVP activation (if no ATIS available)
	Clear departing traffic to CAT II/III holding position
	Check 'sensitive area vacated' report by arriving traffic
	Apply appropriate ground movement routings
	Apply appropriate separation between departing/arriving traffic
	Suspend conditional clearances
	Report devices failure and/or degradation to pilots and supervisor
CAT III	Initiate any special local requirements (e.g. relocation of Aerodrome Rescue and Fire Fighting Services)
DEACTIVATION	Inform supervisor of actual MET conditions
	Report deactivation to aircraft and vehicles
VISIBILITY CONDITION 2	Inform supervisor
	Clear manoeuvring area of unnecessary personnel and vehicles
	Keep record of personnel/vehicles operating on the manoeuvring area
	Suspend conditional clearances
	Inform pilots and vehicle drivers about TWR visibility limitations on manoeuvring area
	Ensure stopbars are ON
	Apply appropriate ground movement routings
	Maintain situational awareness

The following example checklist for Milan Linate is based on material provided by ENAV.

AWO short checklist — **TWR Supervisor** — **SMR 1 and/or SMR 2 ON**

AIP AIRAC 9/11 dated 20 Oct 2011 - Attachment P1 -A3

VIS 2 CONDITIONS

Capacity: 16 ARR / hr - Spacing on FNL: 8nm

Apron Management ..... **Inform Duty Manager**
ACC ..... **Inform / Request appropriate spacing**
FMP ..... **Advise anticipated traffic restrictions**
SPVR logbook ..... **Note timing**

RWY Stopbars TWYs T & G *(to prevent **RWY incursion**)* ..... Check: **ON**
Conditional Clearances ..... Suspended
Vehicles on manoeuvring area ..... Only as necessary / Strip

TWR SPVR checklist ***VIS 2 conditions*** COMPLETED

LVP PREPARATION

RVR TDZ <800m or height of cloud base =200ft

TAM TAM. Alerting system ..... **Set**
ACC ..... **Request appropriate spacing**
FMP ..... **Request implement required traffic restrictions**
Technical Department ..... **Inform**
Aerodrome Equipment ..... **Check & monitor serviceability status**

Vehicles on manoeuvring area ..... Only as necessary / Strip
Traffic situation ..... Inform pilots & drivers
Visibility Conditions ..... Evaluate/Activate → checklists

TWR SPVR checklist ***LVP Preparation*** COMPLETED

LVP ACTIVATION

RVR TDZ ≤550m or height of cloud base <200ft
CAT II: RVR TDZ <550m CAT III: RVR TDZ <300m

TAM TAM. Alerting system ..... **Set**
TWR GND COO ..... **Report activation**
APP / ACC ..... **Request appropriate spacing**
Technical Maintenance ..... **Inform**
Airport Reporting Officer ..... **Inform**
FMP ..... **Request implement traffic flow restrictions**
ATIS ..... **Insert message**

AGL ..... Set to MAX intensity
RWY Stopbars: TWYs T & G *(to protect **sensitive areas**)* ..... Check: **ON**
SPVR logbook ..... Note timing
Equipment status monitors ..... Monitor continuously
RVR TDZ <550m ..... ATIS '*CAT II IN PROGRESS*'
RVR TDZ or MID or END <400m ..... VIS 3 CONDITIONS checklist
RVR TDZ <300m ..... ATIS "*CAT III IN PROGRESS*"

TWR SPVR checklist ***LVP ACTIVATION*** COMPLETED

VIS 3 CONDITIONS

RVR (TDZ or MID or END) <400m
Capacity: 10 ARR / hr - Spacing on FNL: 16nm

Apron Management ..... **Inform Duty Manager**
APP / ACC ..... **Request appropriate spacing**
FMP ..... **Request traffic restrictions**

Manoeuvring area movement ..... 1 a/c per IHP
Apron North movement ..... "FOLLOW ME" vehicle AVBL

TWR SPVR checklist ***VIS 3 conditions*** COMPLETED

LVP DEACTIVATION/CANCELLATION

Deactivation: RVR TDZ >550m and height of cloud base =200ft
Cancellation: RVR TDZ >800m and height of cloud base >200ft

TAM TAM ..... **'LVP DELETED'**
Preparation LVP ..... **Evaluate → Checklist**
VIS conditions ..... **Evaluate → Checklist**
APP / ACC ..... **Appropriate spacing**
FMP ..... **Appropriate flow restrictions**

TWR GND COO ..... Report Deactivation/Cancellation
ATIS ..... Cancel message
SPVR logbook ..... Note timing

TWR SPVR checklist ***LVP Deactivation/Cancellation*** COMPLETED

The following example checklist for Milan Linate is based on material provided by ENAV.

AWO short checklist | **TWR ATCO** | **SMR 1 and/or SMR 2 ON**

AIP AIRAC 9/11 dated 20 Oct 2011 - Attachment P1 -A3

VIS 2 CONDITIONS

Capacity: 16 ARR / hr - Spacing on FNL: 8nm

Supervisor ..... **Report MET conditions**
Conditional Clearances ..... **Suspended**
Stop Bar T1 & G *(to prevent **RWY incursions**)* ..... **ON /check ON**
Flow and appropriate spacing ..... **Coordination by SPVR**

Vehicles on manoeuvring area ..... Only as necessary / Strip
Specified traffic routes on manoeuvring area ..... Inform pilots & drivers
Visibility conditions ..... Inform pilots & drivers
Line up RWY 36 ..... Normally via T; exceptionally via G
Line up RWY 18 ..... Only via G
Vacating RWY 36 ..... Only via G or K
Vacating RWY 18 ..... Only via T
TWY J ..... Not AVBL
Holding Bay RWY 36 ..... AVBL
Radar Monitoring manoeuvring area ..... with position report

Checklist ***VIS 2 conditions*** COMPLETED

LVP PREPARATION

RVR TDZ <800m or height of cloud base =200ft

Supervisor ..... **Report MET conditions**
Aerodrome Equipment ..... **Check and monitor serviceability status**
Flow/Arrival spacing ..... **Coordination by SPVR**

Vehicles in manoeuvring area ..... Only necessary / Strip
Specified traffic routes on manoeuvring area ..... Inform pilots & drivers
Visibility conditions ..... Inform pilots & drivers

Checklist ***LVP Preparation*** COMPLETED

LVP ACTIVATION

RVR TDZ ≤550m or height of cloud base <200ft
CAT II: RVR TDZ <550m CAT III: RVR TDZ <300m

Supervisor ..... **Report met conditions - Await activation acknowledge**
AGL ..... **Check MAX intensity ON**
Stop Bar T - G *(to protect **sensitive areas**)* ..... **ON / CHECK ON**
Conditional Clearances ..... **Suspended**
Flow/Arrival spacing ..... **Coordination by SPVR**

ILS sensitive areas ..... Always clear and protected
DEP traffic ..... Instruct taxi via T2 (T1 AVBL only if no ARRs)
ARR traffic ..... Wait for *'sensitive area vacated'* report
RWY 18 ..... Not AVBL for TKOF or LDG
Line-up RWY 36 ..... normally only via T; exceptionally via G with backtrack
Vacating RWY 36 ..... Only via G or K
TWY J ..... Not AVBL
Holding Bay RWY 36 ..... **Not AVBL**
Equipment failure/degradation checklist ..... on display at operating position
LVP Chart ..... on display at operating position
Ground movements ..... according to VIS conditions

Checklist ***LVP ACTIVATION*** COMPLETED

VIS 3 CONDITIONS

RVR (TDZ or MID or END) <400m
Capacity: 10 ARR / hr - Spacing on FNL: 16nm

Supervisor ..... **Report MET conditions**
LVP activation checklist ..... **Completed**
Flow/Arrival spacing ..... **Coordination by SPVR**

DEP traffic ..... All DEPs: only via T2
Radar Monitoring manoeuvring area ..... with position reports
Manoeuvring area ground movements ..... 1 a/c per IHP
Apron North movement ..... "FOLLOW ME" vehicle AVBL

Checklist ***VIS 3 conditions*** COMPLETED

LVP DEACTIVATION/CANCELLATION

Deactivation: RVR TDZ >550m and height of cloud base =200ft
Cancellation: RVR TDZ >800m and height of cloud base >200ft

Supervisor ..... **Wait for confirmation**
LVP preparation ..... **Checklist**
VIS conditions ..... **Checklist**
Flow & Arrival spacing ..... **Coordination by SPVR**

AGL ..... IAW traffic and conditions

Checklist ***LVP Deactivation/Cancellation*** COMPLETED

The following example checklist is based on material provided by HungaroControl.

ATC procedures at Budapest Liszt Ferenc Aerodrome in limited visibility condition (IMC/LVC)		
Avoiding collision on TWYs: **Shared responsibility** **ATC responsibility:** ensure conflict-free taxi route, determine priority at the intersections and give traffic information if necessary. **Air crew responsibility:** follow the determined taxi route and keep safe distance from the other taxiing aircraft.	**IMC**	GEN VIS < 5000m or CBH < 1500’
	Suspension of VFR flights. Operating the Aeronautical ground lights.	
	PREP	Any RVR ≤ 800 m or CBH ≤ 400’
	Preparation Phase	TWR SV informs the competent services (ATC SV, AOCC, DAM, APRON, Aerodrome Fire Fighting Service). TWR operates the flashing lights of the approach lighting system (which may be switched off by request of the aircrew only). TWR operates the STOPBARS at all RWY holding points. TWR controls the execution of instructions given to aircraft or vehicles by using A-SMGCS. On-going works within the ILS critical areas must be suspended. TWR minimizes the vehicle operations on the manoeuvring area. Preparing for Operations Phase 1: TWR SV informs ATC SV and FMP if the visibility or CBH values are getting worse. *Note: APP shall provide at least 7NM final for the arriving aircraft and shall provide 7NM spacing between them.*
	LVP 1	Any RVR ≤ 600 m or CBH ≤ 200’
	Operations Phase 1.	TWR SV informs the competent services (ATC SV, AOCC, DAM, APRON, Aerodrome Fire Fighting Service). The following text shall be inserted to ATIS: „**ATTENTION! LOW VISIBILITY PROCEDURES PHASE ONE IN FORCE**.” In addition to the PREP procedures: ATC ensures that the ILS critical and sensitive area is clear of any traffic before landing aircraft reaches 2NM distance from threshold and until it uses ILS LLZ guidance for roll-out on RWY or while departing aircraft uses ILS LLZ signal for guidance. In order to ensure this: • ATC shall ensure that departing aircraft overflies the ILS LLZ aerial by the time landing aircraft reaches 2NM distance from threshold. For this reason, departing aircraft must start **take off roll** by the time landing aircraft reaches **6NM** distance from threshold. • ATC ensures continuous taxiing on the exit taxiways serving the landing RWY. • No landing clearance can be given unless the preceding landing aircraft had vacated the ILS critical and sensitive area, even if it has already vacated the RWY. • Vacating the ILS critical and sensitive area shall be checked by using A-SMGCS. **Landing clearance** or missed approach instruction must be given not later than landing aircraft reaches **2NM** distance from threshold. **Information** must be given to following **aircraft** about preceding traffic using same TWY. Preparing for Operations Phase 2: TWR SV informs ATC SV and FMP if the visibility or CBH values are getting worse. *Note: APP shall provide at least 10NM final for the arriving aircraft and shall provide 10NM spacing between them.*

Avoiding collision on TWYs: Full ATC responsibility	**LVP 2**	Any RVR < 400 m
	Operations Phase 2.	TWR SV informs the competent services (ATC SV, AOCC, DAM, APRON, Aerodrome Fire Fighting Service). Addition to ATIS: „**ATTENTION! LOW VISIBILITY PROCEDURES PHASE TWO IN FORCE**." In addition to the LVP1 procedures: ATC shall provide one taxiway-distance spacing between aircraft or between aircraft and vehicles – except between the FOLLOW-ME car and the following aircraft – taxiing on the manoeuvring area. This spacing can be reduced to the distance between two STOPBARs. No intersection take-off's shall be approved. If aircraft's taxi routes cross each other, taxi clearance may be given only until the intersection – except the aircraft which has priority at the intersection. Further taxi clearance may be given only when the crossing aircraft has passed the intersection. Movements of aircraft at an intersection, ATC shall ensure by switching the STOPBARs accordingly.

The following template checklist is based on material provided by Paris (CDG).

ALL CHECK LISTS ARE LAUNCHED BY THE CONTROL TOWER SUPERVISOR (located in the North Tower)

1. PRE LVP (RVR<800m ou/or Pfd<300ft)

(LVP Preparation/safeguarding)(Pfd=ceiling)

CHEF DE SALLE pose de régulations
Approach room supervisor advised. Traffic regulation put in place (preset values in OPS manual)

CHEF APP..... prévenu Coordinator warned
Chief of approach warned, Coordinator warned

Coor VS ..... prévenu
South Tower coordinator warned

CA CAPACITES.....*passées*
Chief of approach checks actual traffic capacities in real time

BALISAGE..... gamme 4 ou 3 (tableau Manuel Chef de Tour § 6.1.2),
RWY/TWY/APP Lights set to level 4 or 3: refer to OPS manual § 6.1.2

..... pas de flash
Flashing lights (Strobe lighting) deselected

..... barres d'arrêt ON → prévenir SOL/LOC
Stop Bars ON: Ground and Local positions warned

..... VERROUILLE
Lighting System LOCKED

ILS..... CAT III, VERROUILLE
CAT III LOCKED

ATIS..... affichage des RVR (ou état des transmissiométres)
RVR displayed (or Transmissometers status displayed)

CTFE..... informé (tel 20017)
ADP power supply department informed

POMPIERS..... état de veille
Fire stations: State of readiness upgraded

CA TECHNIQUE.....*informé*
Chief of approach informs Technical Office supervisor

BDP..... informé
Flight information office informed

PCR/CDM..... informé
ADP Airport Operations centre/CDM centre informed

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2. LVP (RVR ≤ 600m ou/or Pfd ≤ 200ft)

Fiche *PRE LVP*.....vérifiée
Safeguarding check list verified

RIMCAS..... activé mode LOW
A-SMGCS level2 (RIMCAS) put on low mode (to monitor the change in radar spacing minima)

DMAN.....adapter capacités/pressions pistes
Update the capacity figures subject to the planned and real time traffic demand

DECOR..... affichage des lettres **LVP**
All met displays shall display LVP in large bold letters

ATIS..... renseigné
LVP in force message transmitted

Chef APP ..... informé
Chief of approach informed

COOR VS ..... informé
South tower coordinator informed

CQ SOL..... informé
Flight information office Supervisor informed

PCR/CDM..... informé
ADP Airport Operations centre/CDM centre informed

CA CAPACITES ..... *ajustées et Exceptional conditions si besoin*
Chief of approach adjusts declared capacities & considers any exceptional conditions, if required

CA CQ MER..... *informé*
ACC supervisor informed

CA TECHNIQUE..... *informé*
Technical Office supervisor informed

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3. LVTO RVR ≤ 400m

LLZ piste intérieure..... en service et verrouillé
Localiser on the inner runway put into service and locked

DMAN..... adapter capacités/pressions pistes
Update the capacity figures subject to the planned and real time traffic demand

POMPIERS..... état d'alerte
Fire stations: Upgrade to maximum state of alert

CHEF APP..... informé
Chief of approach informed

BDP..... informé
Flight information office informed

PCR/CDM..... informé
ADP Airport Operations centre/CDM centre informed

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4. LEVEE DES LVP

Termination of LVP

Chef APP ..... informé
Chief of approach informed

DMAN ..... adapter capacités/pressions pistes
Update the capacity figures according to the real time traffic demand

CA CAPAS..... *vérifiées*
Chief of approach verifies the declared capacities

CA COOR VS..... *.informé (cadences communiquées)*
Chief of approach informs the South Tower coordinator

DECOR..... effacer **LVP**
Met information display: switch off LVP

ATIS..... renseigné
New standard ATIS message transmitted

CTFE..... informé
ADP power supply department informed

CA TECHNIQUE.....*informé*
Chief of approach informs Technical Office supervisor

CA CQMER ..... *informé*
Chief of approach informs ACC supervisor

POMPIERS..... informé
Fire stations informed

CQ SOL..... informé
Flight information office informed

PCR/CDM..... informé
ADP Airport Operations centre/CDM centre informed

BALISAGE..... DEVERROUILLE
Lighting System UNLOCKED

…… gamme adaptée,
RWY/TWY/APP Lights set according to prevailing visibility conditions

..... barres d'arrêt OFF
Stop bars OFF

.**ILS**.....CAT III, DEVERROUILLE
CAT III unlocked

RIMCAS..... activé mode NORMAL
A-SMGCS level 2 (RIMCAS) activated with standard spacing values

The following example checklist for Milan Linate is based on material provided by ENAV

SHORT CHECK LIST - FAILURE or DEGRADATION of AERODROME EQUIPMENT

FAILURE/DEGRADATION	Cat III B	Cat III A	Cat II	Cat I	ACFT >1 nm	ACFT ≤1 nm
GP WARNING					CAT change + Report Failure	Report Failure
GP ALARM					NO ILS OPS (LOC OPS AVBL) + Report Failure	
LOC WARNING					CAT change + Report Failure	Report Failure
LOC ALARM					NO LOC OPS + Report Failure	
RVR: ALL POINTS					CAT change + Report Failure	Report Failure
RVR: TDZ	Use MID POINT				Report Failure	Report Failure
REL: NGT					NO ILS OPS + Report Failure	
RCL: DAY	RVR ≥300m				Report Failure	Report Failure
RCL: NGT			RVR ≥550m		CAT change + Report Failure	Report Failure
REL and RCL: DAY					CAT change + Report Failure	Report Failure
TDZL: DAY	RVR ≥200m	RVR ≥300m			Report Failure	Report Failure
TDZL: NGT	RVR ≥300m	RVR ≥550m			Report Failure	Report Failure
ALL RWYL: DAY					CAT change + Report Failure	Report Failure
ALL RWYL: NGT					Report Failure: NO TKOF or LDG	
ALS	DH ≤50ft				CAT change + Report Failure	Report Failure
Backup PWR supply: RWYL					CAT change + Report Failure	Report Failure
STOP-BARS with microwave sensors	Additional contingency procedures				In case of incursion alarm **GO AROUND**	
NO ENTRY bars with microwave sensors	Additional contingency procedures					
SMR1 and SMR2	Additional contingency procedures				Report Failure + NOTAM required	

FAILURE/DEGRADATION	Take-Off
REL or ALL RWYL: DAY	Only if RVR >800m
REL or ALL RWYL: NGT	
RCL	Only if RVR >400m
RWYL backup PWR supply	
LIGHTS AUTOMATIC MONITOR SYSTEM	Only if RVR ≥550m
RVR: All points	Pilot discretion
RVR all points + ALL RWYL	