

LIBERIA CIVIL AVIATION REGULATION



Part 13.2

**Certification of
Aerodromes**

Edition

October 2019



AUTHORITY TO PROMULGATE

CIVIL AVIATION REGULATIONS

PART 13.2 OF THE LIBERIA CIVIL AVIATION REGULATIONS OF 2010 IS DELETED.

IN EXERCISE OF THE POWERS CONFERRED ON THE DIRECTOR GENERAL OF LIBERIA CIVIL AVIATION AUTHORITY UNDER THE LIBERIA CIVIL AVIATION ACT OF 2005 THESE REGULATIONS ARE MADE.

THESE REGULATIONS AS AMENDED SUPERSEDE LIBERIA CIVIL AVIATION REGULATIONS OF 2010.

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DEFINITION OF TERMS

Definition

Meaning

Accident	<p>An occurrence associated with the operation aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which</p> <p>a) a person is fatally or seriously injured as a result of being in the aircraft, or direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or direct exposure to jet blast, except when the injury are from natural causes, self-inflicted, or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew or;</p> <p>b) the aircraft sustains damage or structural failure which adversely affects the structural strength, performance or flight characteristics of the aircraft, and would normally require major repair or replacement of the affected component except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or for damage limited to propellers, wing tips, antennas, tires, brakes, fairings, small dents or puncture holes in the aircraft skin; or</p> <p>c) the aircraft is missing or is completely inaccessible.</p>
Aerodrome	<p>A defined area on land (including any buildings, installation and equipment) used or intended to be used, either wholly or in part, for the arrival, departure and surface movement of aircraft.</p>
Aerodrome beacon	<p>Aeronautical beacon used to indicate the location of an aerodrome from the air.</p>
Aerodrome Certificate	<p>Means The certificate to operate an aerodrome issued under the authority of the Director General subsequent to the acceptance/approval of the aerodrome manual and compliance with other requirements of Part 14 of the SLCR</p>
Aerodrome Elevation	<p>The elevation of the highest point of the landing area.</p>
Aerodrome facilities and equipment	<p>Means any facility or equipment, inside or outside the boundaries of an aerodrome that is constructed, or installed, and maintained for the arrival, departure and surface movement of aircraft.</p>

Aerodrome Manual		The manual that forms part of the application for an aerodrome certificate pursuant to Part 13.2 of LCARs and includes any amendments to the manual accepted by the LCAA
Aerodrome Operator		In relation to a certified aerodrome, means the holder of an Aerodrome Certificate.
Aerodrome Point	Reference	The designated geographical location of an aerodrome.
Manual of Standards	Aerodrome	A document containing the procedures for the certification of Aerodromes; and aerodrome standards, recommended practices and guidance materials pertaining to the planning, operation and maintenance of aerodrome services, facilities, and equipment to be complied with by aerodrome operators.
Aeronautical beacon		An aeronautical ground light visible at all azimuths, either continuously or intermittently, to designate a particular point on the surface of the earth.
Aeronautical Light	Ground	Any light specially provided as an aid to air navigation, other than a light displayed on an aircraft.
Aeronautical Circular	Information	Means a notice containing information which relates to flight safety, air navigation, technical, administrative or legislative matters.
Aeronautical Publication	Information	Means a publication issued by and with the authority of the Aeronautical Information Services and containing aeronautical information of a lasting character essential to air navigation.
Aeronautical Services	Information	Means the services established within the defined area of coverage responsible for the provision of aeronautical information and data necessary for the safety, regularity and efficiency of air navigation and, where appropriate, includes the personnel and facilities employed to provide information pertaining to the availability of air navigation services and their associated procedures necessary for the safety, regularity and efficiency of air navigation.
Airport		This term is used interchangeably with aerodromes.
Apron		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 Service	Management	A service provided to regulate the activities and the movement of aircraft and vehicles on an apron.

Authority	Liberia Civil Aviation Authority
Certified aerodrome	An aerodrome whose operator has been granted an Aerodrome Certificate.
Controlled aerodrome	An aerodrome provided with air traffic control Services
Director General	Means the Director General or Chief Executive of Liberia Civil Aviation Authority
Geoid	<p>The equipotential surface in the gravity field of the Earth which coincides with the undisturbed Mean Sea Level (MSL) extended continuously through the continents.</p> <p><i>Note - The geoid is irregular in shape because of local gravitational disturbances (wind tides, salinity, current, etc.) and the direction of gravity is perpendicular to the geoid at every point.</i></p>
Geoid undulation	<p>The distance of the geoid above (positive) or below (negative) the mathematical reference ellipsoid.</p> <p><i>Note - In respect to the World Geodetic System – 1984 (WGS-84) defined ellipsoid, the difference between the WGS-84 ellipsoidal height and orthometric height represents WGS-84 geoid undulation.</i></p>
Heliport	An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.
Instrument runway	<p>One of the following types of runways intended for the operation of aircraft using instrument approach procedures:</p> <p>a) <i>Non-precision approach runway.</i> An instrument runway served by visual aids and a non-visual aid providing at least directional guidance adequate for a straight-in approach.</p> <p>b) <i>Precision approach runway, category I.</i> An instrument runway served by ILS and/or MLS and visual aids intended for operations with a decision height not lower than 60m (200 ft) and either a visibility not less than 800m or a runway visual range not less than 550m.</p> <p>c) <i>Precision approach runway, category II.</i> An instrument runway served by ILS and/or MLS and visual aids intended for operations with a decision height lower than 60m (200 ft) but not lower than 30m (100 ft) and a runway visual range not less than 350m.</p> <p>d) <i>Precision approach runway, category III.</i> An instrument runway served by ILS and/or MLS to and along the surface of the runway</p>

and:

A - intended for operations with a decision height lower than 30m (100ft), or no decision height and a runway visual range not less than 200m.

B - Intended for operations with a decision height lower than 15m (50 ft), or no decision height and a runway visual range less than 200m but not less than 50m.

C - Intended for operations with no decision height and no runway visual range limitations.

Note 1 – See ICAO Annex 10, Volume 1, Part 1, ILS and/or MLS specifications for related

Note 2 – Visual aids need not necessarily be matched to the scale of non-visual aids provided. The criterion for the selection of visual aids is the conditions in which operations are intended to be conducted.

Manoeuvring area	That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.
Marking	A symbol or group of symbols displayed on the surface of the movement area in order to convey aeronautical information.
Movement area	That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the aprons.
Non-instrument Runway	A runway intended for the operation of aircraft using visual approach procedures.
NOTAM or Notice to Airmen	Means a notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service or procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.
Obstacle	Any fixed (whether temporary or permanent) or mobile object or part thereof, which is located in an area intended for the surface movement of aircraft, or which extends above a defined surface intended to protect aircraft in flight.
Obstacle limitation Surfaces	Means a series of surfaces that define the volume of airspace at and around an aerodrome to be kept free of obstacles in order to permit

the intended aircraft operations to be conducted safely and to prevent the aerodrome from becoming unusable by the growth of obstacles around the aerodrome.

Pavement Classification Number (PCN)	A number expressing the bearing strength of a pavement for unrestricted operations.
Precision approach Runway	See 'Instrument runway'.
Primary runway(s)	Runway(s) used in preference to others whenever conditions permit.
Road	An established surface route on the movement area meant for the exclusive use of vehicles.
Road-holding position	A designated position at which vehicles may be required to hold.
Runway	A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.
Runway End Safety Area (RESA)	An area symmetrical about the extended runway centre line and adjacent to the end of the strip primarily intended to reduce the risk of damage to an aeroplane undershooting or overrunning the runway.
Runway-holding Position	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 authorized by the aerodrome control tower.
Runway strip	<p>A defined area, including the runway and stop way if provided, that is intended:</p> <ul style="list-style-type: none"> a) to reduce the risk of damage to aircraft running off a runway; and b) to protect aircraft flying over the area during take-off or landing operations.
Safety Management System (SMS)	A system for the management of safety at aerodromes, including the organizational structure, responsibilities, procedures, processes and provisions for the implementation of aerodrome safety policies by an aerodrome operator, which provides for control of safety at, and the safe use of, the aerodrome.
Shoulder	An area adjacent to the edge of a pavement so prepared as to provide a transition between the pavement and the adjacent surface.
Sign	a) <i>Fixed message sign</i> . A sign presenting only one message.

b) *Variable message sign*. A sign capable of presenting several pre-determined messages or no message, as applicable.

Stop-way

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

Take-off runway

A runway intended for take-off only.

Taxiway

A defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including:

a) *Aircraft stand taxi-lane*. A portion of an apron designated as a taxiway and intended to provide access to aircraft stands only.

b) *Apron taxiway*. A portion of a taxiway system located on an apron and intended to provide a through taxi route across the apron.

c) *Rapid exit taxiway*. A taxiway connected to a runway at an acute angle and designed to allow landing aeroplanes to turn off at higher speeds than are achieved on other exit taxiways thereby minimizing runway occupancy times.

Note: Terms and definitions that are shown in singular above shall also take on the same meaning when they are expressed in plural form in this Guideline and vice versa.

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CHAPTER 1.0

INTRODUCTION

13.2 GENERAL

13.2.1 Liberia Civil Aviation Law and Regulations

Part 13.2 of the Liberia Civil Aviation Regulation (LCAR) requires that all aerodromes open to public use and international operations be certified in accordance with the requirements of the regulations. The Liberia Civil Aviation Authority LCAA is setup and tasked authority to be responsible for the aerodrome certification process and for promulgating appropriate and clear requirements to be complied with by aerodrome operators.

13.2.2 Role/Status of the Aerodrome Manual in the Certification Process

- (a) The aerodrome manual is a fundamental requirement of the certification process. It shall contain all the relevant information about the aerodrome for processing the application before granting an aerodrome certificate. The information presented in the aerodrome manual shall demonstrate that the aerodrome conforms to the certification standards and safety directives put forth by the LCAA, and that there are no apparent shortcomings which would adversely affect the safety of aircraft operations. The manual shall be a reference document and provides a checklist of aerodrome certification standards to be maintained and the level of airside services at the aerodrome.
- (b) Information provided in the aerodrome manual will be the basis to assess the suitability of the aerodrome for the aircraft operations proposed and to judge an applicant's capability to be eligible to be granted a certificate. It is a basic reference guide for conducting site inspections for granting an aerodrome certificate and for subsequent continued surveillance/safety inspections. The aerodrome manual is a reference document agreed to between the aerodrome operator and the LCAA with respect to the standards, conditions and the level of service to be maintained at the aerodrome.
- (c) An application for an aerodrome certificate shall be accompanied by an aerodrome manual produced in accordance with the applicable regulation. Once granted a certificate, the aerodrome operator is required to maintain the aerodrome manual in conformity with the applicable regulation and enable all aerodrome operating staff to have access to the relevant parts of the manual.
- (d) Where the aerodrome operator may not be responsible for some of the subjects detailed in the scope of certification on paragraph 2.1. the aerodrome manual should clearly define, for each of these items, which coordination and procedures have been put into place in the case of multiple responsible stakeholders.

CHAPTER 2

13.2.3 PROCESS OF AERODROME ESTABLISHMENT AND CERTIFICATION

13.2.3.1 Scope of the Certification Process

- (a) The scope of certification covers all relevant specifications established through the State Civil Aviation Law and the (State Regulation) Part 13.2
- (b) The scope of certification includes at least the subjects below:
- 1) compliance of the aerodrome infrastructure with the applicable regulations for the operations the aerodrome is intended to serve;
 - 2) the operational procedures and their day-to-day application, when applicable, concerning:
 - (i.) aerodrome data and reporting
 - (ii.) access to the movement area;
 - (iii.) aerodrome emergency plan;
 - (iv.) rescue and fire fighting (RFF);
 - (v.) inspection of the movement area;
 - (vi.) maintenance of the movement area;
 - (vii.) snow and ice control, and other hazardous meteorological conditions;
 - (viii.) visual aids and aerodrome electrical systems;
 - (ix.) safety during aerodrome works;
 - (x.) apron management;
 - (xi.) apron safety;
 - (xii.) vehicles on the movement area;
 - (xiii.) wildlife hazard management

- (xiv.) obstacles;
 - (xv.) removal of a disabled aeroplane;
 - (xvi.) low visibility operations; and
- 3) compliance of the safety management system (SMS) with applicable regulations.
- (c) It is required that the aerodrome manual describes all the information, for each certified aerodrome, pertaining to the above scope of certification concerning the aerodrome site, facilities, services, equipment, operating procedures, organization and management, including its SMS.

13.2.3.2 The Process

- (a) Enabling Regulations. The requirements for the certification of aerodromes are given in Part 13.2 of Liberia Civil Aviation Regulations (LCAR).
- (b) The process have been subdivided into five major phases and applicants would be required to provide information and documents listed above in the order in which they would be requested during the certification process. The process is discussed in the paragraphs below. Aerodromes that are required to be certified under LCAR Part 13.2 must be in possession of an aerodrome certificate before commencing operations. Applicants wishing to construct and operate an aerodrome under LCAR Part 13.2 should note that the process for the construction of aerodrome is an integral part of the aerodrome certification process and would not terminate after the construction of the aerodrome. Such applicants are under obligation to complete the rest of the entire process before commencing operations.
- (c) When an aerodrome operator applies for initial certification, the Authority shall assess the compliance of that aerodrome with the applicable certification requirements. If the aerodrome is found to be compliant, a certificate is issued.
- (d) Compliance of the aerodrome is assessed through:
- 1) Technical inspections of the infrastructure of the aerodrome and its equipment, as related to the requirements associated with the intended operations;
 - 2) Review of the aerodrome manual and supporting documentation and acceptance of its relevant safety parts; and
- (a) The aerodrome certification process comprises the following phases:

- 1) LCAA dealing with the expression of interest by an intending applicant for an aerodrome certificate;
- 2) LCAA assessing the formal application;
- 3) LCAA assessing the aerodrome facilities and equipment;
- 4) LCAA issuing or refusing an aerodrome certificate; and
- 5) Promulgating the certified status of an aerodrome and the required details in the AIP.

13.2.3.3 Phase 1-Dealing with Expression of Interest

- (a) Director General receives an expression of interest letter and forwards it to the Head of ANS for processing;
- (b) The forms an Audit Team appropriate to the size, scope and complexity of the operations anticipated;
- (c) The Audit Team Leader opens a file (or work tracking systems) on the subject ;

13.2.3.4 Pre-application Meeting/Initial Site Assessment

- (a) The applicant is required to satisfactorily complete form **No** LCAA-CA02. A Pre-application meeting is held with the Applicant for the purpose of informing the applicant of the need to establish the suitability of the site for the development of an airport. Subsequently, the Audit Team will conduct an initial site assessment to ensure that the operation of an aerodrome at the location specified in the application will not endanger the safety of aircraft operations. Assistance from flight operations or other relevant authority may be required; some of the factors to be considered in the selection of site for the development of an airport are discussed in Appendix E section 1.1 of this Manual. Additional guidance on site selection for airport development can be found in ICAO Doc 9184 Part 1 – Airport Master Planning. The applicant is advised to engage a suitably qualified expert for the conduct of a site identification study prior to any site assessment by the LCAA.
- (b) The Audit Team leader forwards the assessment result to the **D**irector General;
- (c) If the assessment result is negative, the Director General , through the head of ANS advises the applicant accordingly by invoking **the relevant provision of LCAR;**

13.2.3.5 Referrals to Land Use and Environmental Authorities

- (a) If the assessment is successful, the Head of ANS informs the applicant to consult the relevant State entities to obtain their clearance with respect to environmental impact, land use and security issues. In this regard the applicant would be required to obtain and provide written approval from the appropriate authority in charge of land use in the area in which the airport is to be sited. The applicant will also be

required to obtain and furnish the Authority with a letter from the relevant environmental authority confirming that an environmental impact assessment has been satisfactorily conducted. He may be requested to provide a copy of the EIA report. Evidence of these approvals are to be submitted to the Authority along with completed copy of form No LCAA-CA02

- (b) Fulfilment of the requirements in paragraphs 2.2.1.2 (a) simply that the site is acknowledged as suitable and acceptable by all relevant Authorities.

13.2.3.6 LCAA assessing the formal application.

13.2.3.7 Formal Application Meeting

If the applicant satisfies the requirement of phase 1, Audit Team holds a certification meeting with the applicant's representatives in order to familiarise the applicant with the rest of the process. The applicant is advised on the required certification documents and these include Liberia Civil Aviation Regulations (LCAR) and other State Advisory Circulars. The applicant is advised to obtain other relevant publications issued by ICAO as necessary.

13.2.3.8 Airport Drawings and Project Monitoring

- (a) Upon payment of required certification fee, the Audit Team leader issues form No xxxx (Design compliance and construction form). See appendix xxx for sample form. LCAA. Aerodrome development activities will begin after the approval of the Airport Drawings and other related requisite report. The process for the approval of Airport drawings is given in subpart 6 of the Liberia Civil Aviation Regulation. Guidance on the planning and design of airport infrastructures is contained in ICAO Doc 9157 series. This process should be followed to obtain approval of the drawing set. After necessary approval has been obtained, The Authority will issue an airport development permit authorising the applicant to begin the provision of infrastructure and facilities in accordance with specifications in the approved drawings and the provisions of LCAR Part 13.2. Upon approval, LCAA shall monitor construction of the project and provide relevant professional advice where appropriate to ensure compliance with requirements until project completion.

13.2.3.9 Preparation of the Aerodrome Manual and Application for Exemption

- (a) Preparation of the Aerodrome Manual is expected to proceed while the development and installations of infrastructures and facilities is in progress at the aerodrome. The Aerodrome Manual is to be submitted with a completed copy of Form No LCAA-CA02 (Operational Compliance Form) and completed copies Aerodrome Manual Checklist and Compliance Statement.
- (b) If the applicant seeks a deviation from any of the requirements of LCAR Part 13.2, he is to submit his application for exemption along with the completed Form.

13.2.3.10 Initial Approval of the aerodrome manual

- (a) Prior to on-site verification of the aerodrome (including procedures and SMS), the aerodrome manual is reviewed by the Authority.

Note 1.— As compliance of all safety-relevant procedures of the aerodrome operator is assessed during the on-site verification, initial review consists of checking that all the information that should be contained in the aerodrome manual is provided.

Note 2.— The information required in the aerodrome manual is given in section 2.2.

Note 3.— The checklist given in Attachment C also shows the information required in the aerodrome manual and has been organized to follow the list of topics given in Attachment A.

- (b) The Authority may issue an initial approval of the aerodrome manual when all the conditions have been met. This may be preceded by a period of exchange of communication between the aerodrome operator and the Authority if needed – some information may be lacking at the beginning, thus preventing the Authority from accepting the manual at first.
- (c) Before the initial approval of the aerodrome manual is given, the CAA should verify that:
 - (i.) the operator has submitted an application;
 - (ii.) the aerodrome manual submitted by the aerodrome operator contains all the required information; and
 - (iii.) all the procedures related to aerodrome certification that will be assessed by the Audit team during the on-site verification are provided in the aerodrome manual.
- (d) The aerodrome operator should inform the Authority of any changes to the aerodrome manual for which initial approval has been given before the start of on-site verification.

13.2.3.11 Particulars of proposed non-compliance with or deviation from requirements

- (a) The particulars of proposed non-compliance or the application for exemption referred to in paragraph 2.2.2.3 (b)a shall be processed in line with the procedures discussed in Paragraph 2.2 of this Manual.
- (b) The Authority may accept a deviation on the basis of a safety assessment pursuant to Part 13.2 of (State Regulation)

Note 1.— A methodology for conducting safety assessments is available in (Name and Number of Advisory Circular)

Note 2.— Accepted deviations are listed in the aerodrome manual.

13.2.3.12 XCAA assessing the aerodrome facilities and equipment.

13.2.3.13 Aerodrome technical inspections

- (a) The technical inspections of the aerodrome should include, as a minimum:
 - 1) an inspection of the infrastructure, obstacle limitation surfaces (OLS), visual and non-visual aids and aerodrome equipment for the use of aeroplanes;
 - 2) an inspection of the RFF services; and

- 3) an inspection of wildlife hazard management.

Note 1.— Several options to carry out these inspections are presented below.

Note 2.— The methodology for technical inspections is proposed in [Appendix I](#) to this Manual.

13.2.3.14 On-site Verification

- (e) The scope of the on-site verification covers the subjects included in the aerodrome manual. The on-site verification confirms that the aerodrome operations are carried out effectively in accordance with the applicable regulation and procedures described in the manual.
- (f) The on-site verification of the SMS is normally included at this stage of initial certification, but depending on the implementation status of the SMS at the aerodrome, a specific verification of the SMS can be conducted separately.

Note.— Because the aerodrome operator's SMS may not yet be fully operational, its effectiveness will be assessed during continued oversight and will constitute an important factor in deciding the continued oversight that will be carried out.

- (g) On-site verification of the SMS focuses explicitly on the components required for granting the certificate and, when applicable, covers all other requirements for an SMS.

Note 1.— The minimal SMS components that are to be in operation before the certificate can be granted are described in [Appendix I](#).

Note 2.— SMS requirements also apply to the aerodrome operator's subcontractors in the domains within the scope of certification.

- (h) If the Audit team notices any deviations from the technical inspection reports, they are included in the team's report.
- (i) If the aerodrome operator is not directly responsible for some of the activities within the scope of Certification, the on-site verification ensures that there is appropriate coordination between the aerodrome operator and the other stakeholders.

Note 1.— The methodology used to conduct on-site verifications is available in [Appendix I](#).

Note 2.— Because the scope of certification is broad, a sampling method for verifying particular subjects may be used rather than the whole scope.

- (j) At the end of an on-site verification, a preliminary list of findings is given to the aerodrome operator.
- (k) An on-site verification report is also sent to the aerodrome operator after the classification of findings by the CAA.

13.2.3.15 Analysis of the findings and monitoring of the related corrective action plans

- (l) In case of findings, the Applicant is required the operator to develop a corrective action plan proposing ways to eliminate or mitigate the findings, with deadlines for each subsequent action.
- (m) The CAA may impose immediate appropriate measures on the aerodrome operator, if necessary, until actions have been taken to remove or mitigate the findings.

Insurance Cover

Before proceeding to the next stage, the applicant will be required to provide an insurance cover for protection against damage or injury or accident arising from any area of operations at the aerodrome.

13.2.3.16 LCAA issuing or refusing an aerodrome certificate

- (a) When no findings are reported or once the corrective action plans are accepted, and mitigation measures are agreed upon, the Authority grants the aerodrome certificate to the applicant. An appendix may be attached to the certificate describing the essential conditions prevailing at the aerodrome, which may include:
 - (1) the aerodrome reference code;
 - (1) critical aeroplane type;
 - (2) the operational conditions for the accommodation of critical aeroplanes for which the facility is provided;
 - (3) RFF category;
 - (4) the operational restrictions at the aerodrome; and
- (b) the authorized deviations related to aerodrome compatibility described in Chapter 4, their inherent operational conditions/restrictions and validity.

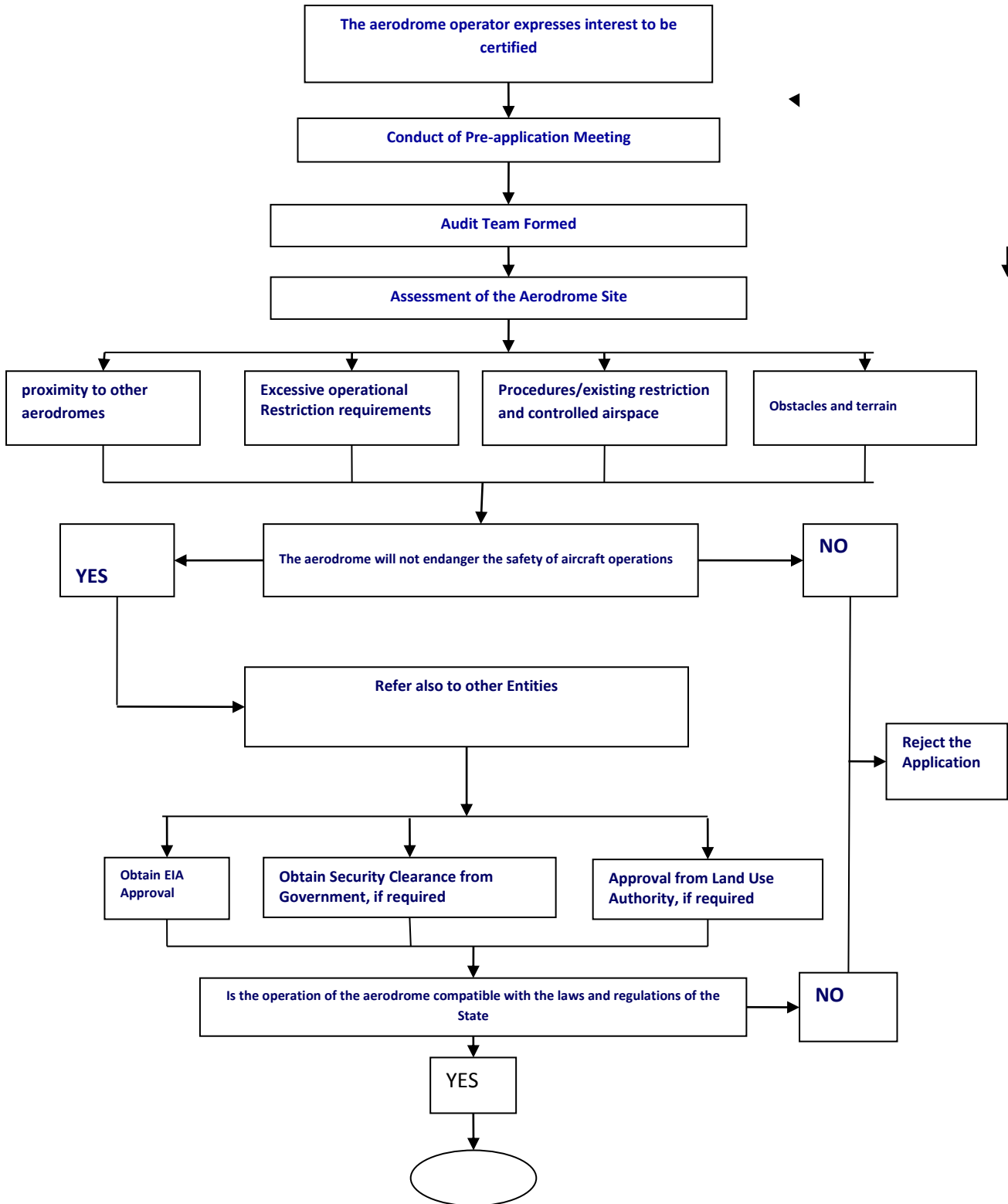
Note.— Unavailability or downgrading of an infrastructure, facility or service, of a temporary nature, may not necessarily invalidate the certificate of an aerodrome.

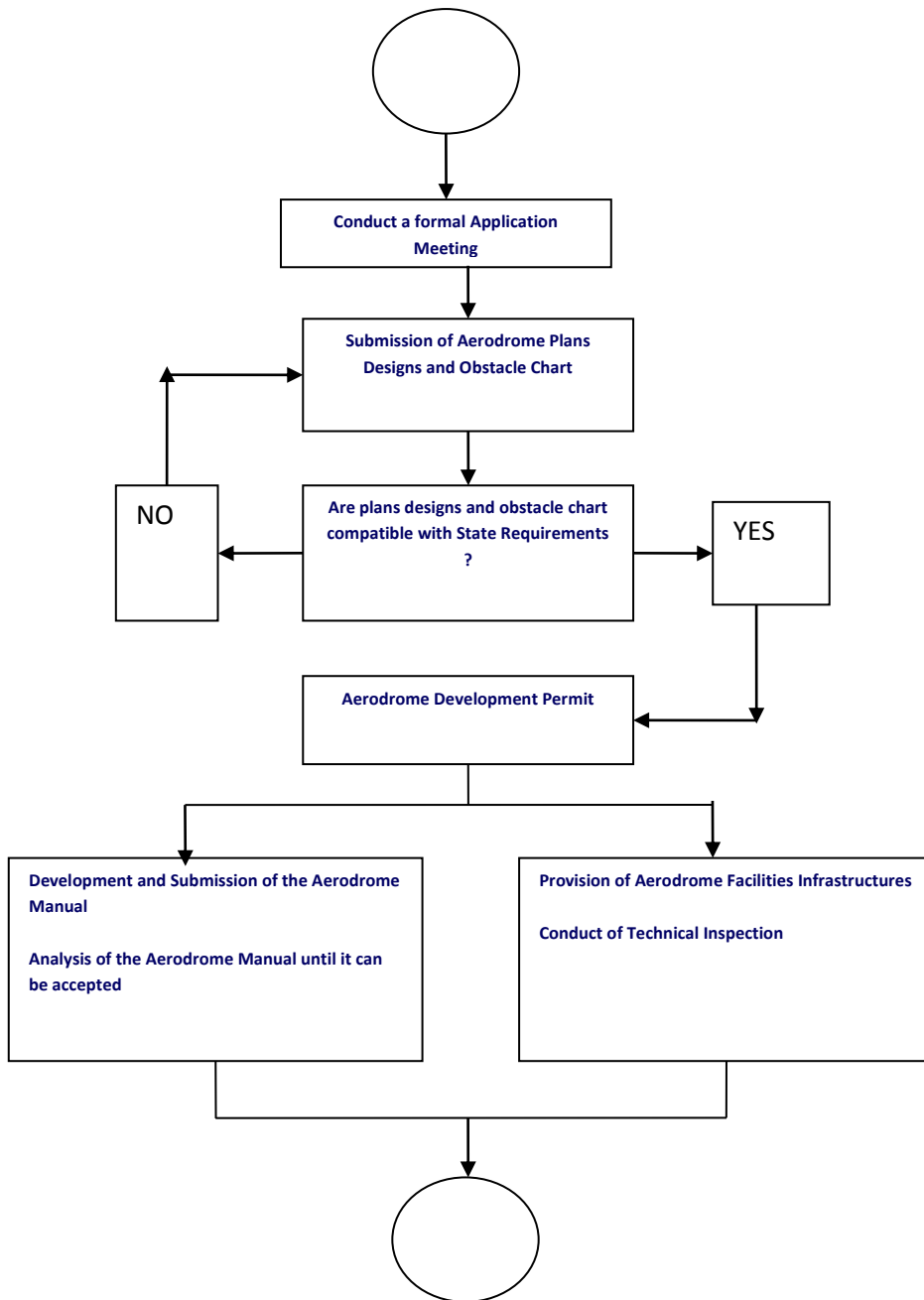
- (c) During the period of validity of the certificate, the CAA will monitor the timely implementation of the corrective action plans within the continued oversight developed in 2.5.
- (d) If after being advised of the additional steps that must be taken to rectify the deficiencies in the corrective plan of action, the applicant is still not able to satisfy the requirements of the regulations, the Authority may refuse to grant a certificate. The refusal may be based on one or more of the following determinations, for which details should be given:
 - (1) The inspection of aerodrome facilities and equipment revealed that they do not make satisfactory provision for the safety of aircraft operations;

- (2) The assessment of the aerodrome operating procedures revealed that they do not make satisfactory provision for the safety of aircraft operations;
- (3) The assessment of the aerodrome manual revealed that it does not contain the particulars set out in **LCAA** regulation and the associated schedule of the regulations; and
- (4) The assessment of the above facts and other factors (to be listed) revealed that the applicant will not be able to properly operate and maintain the aerodrome as required by the regulation.

13.2.3.17 LCAA Promulgating the certified status of an aerodrome and the required details in the AIP.

- (a) LCAA shall promulgate the status of certification of aerodromes in the aeronautical information publication, including:
 - (1) aerodrome name and ICAO location indicator;
 - (2) date of certification and, if applicable, validity of certification; and
 - (3) remarks, if any.
- (b) Where safety concerns have been observed on the aerodrome, special conditions or operational restrictions may be attached to the certificate and published in the aeronautical information publication (AIP) or by NOTAM until completion of the corrective action plan. In this case, validity may be shortened to be consistent with the duration and content of the corrective action plan.





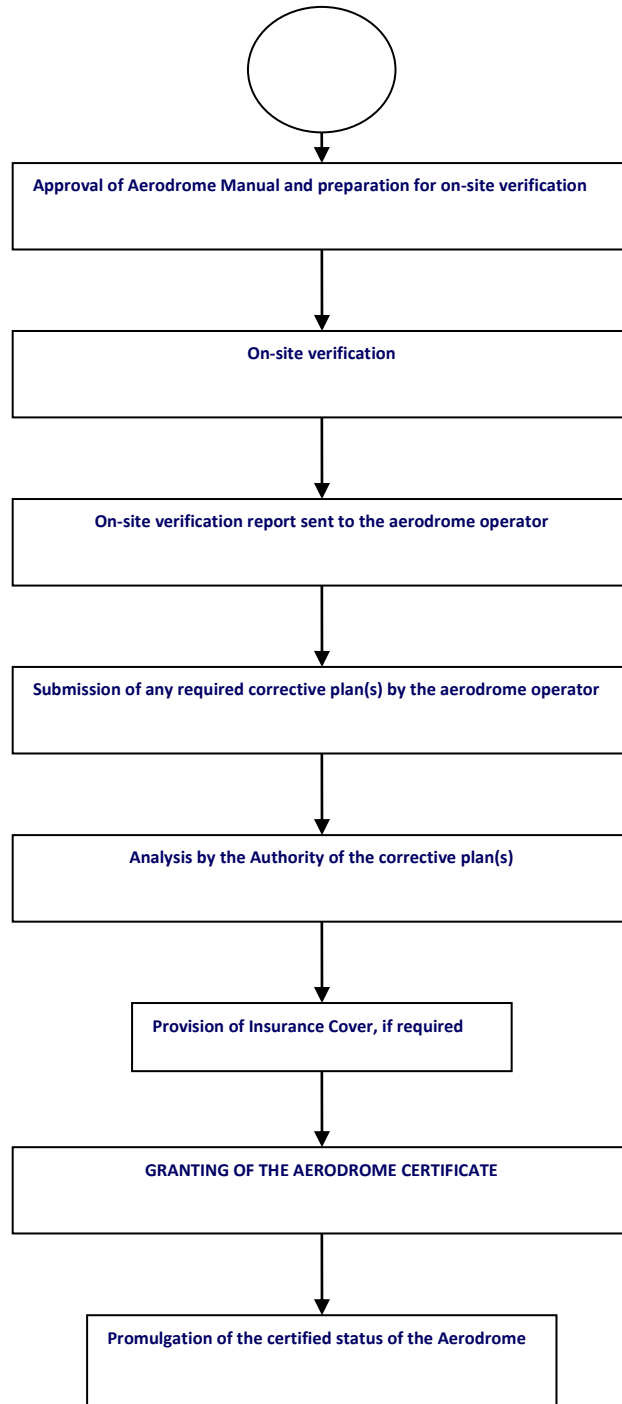


Figure : Flowchart of the certification Process for an Prospective Aerodrome

13.2.3.18 Summary of the Certification Process for Aerodrome Already Operational

- (a) The certification process for an aerodrome that is already operational can be summarized as follows:
 - (1) as soon as an aerodrome meets the legal criteria for certification, a meeting is held between the Authority and the Aerodrome Operator;
 - (2) during this meeting, the Authority presents the certification process and deadlines to the Aerodrome Operator. The Aerodrome Operator shall develop the aerodrome manual, so as to submit it no later than six months after the meeting;
 - (3) during this six-month period the Authority completes the technical inspections so that the results are available for the on-site verification; and

*Note.— The main items subject to technical inspections and the minimal checks to be performed are listed in **Appendix A6**.*

Option 1: full inspections by the Authority

- (b) At aerodromes where an SMS is not fully operational, full inspections will be conducted by the Authority. (see **Appendix A6** for critical areas to be inspected).
- (c) If technical inspections have previously been conducted, and depending on the changes that occurred at the aerodrome since the last inspection, the Authority may undertake a follow-up inspection instead of a full inspection, which may consist of:
 - (1) assessing that the conditions prevailing at the aerodrome that led to the conclusions of the previous technical inspections are still valid;
 - (2) reviewing any new applicable regulation; and
 - (3) reviewing the implementation of the previously accepted corrective action plan.
- (d) A report of the follow-up inspection would be produced, including any deviations or observations made during the follow-up inspection. Any immediate corrective action can be taken, if needed, during follow-up inspections.

Option 2: demonstration of compliance by the operator

- (e) At aerodromes where an SMS has been fully implemented, the aerodrome operator shall ensure that the requirements in the checklists provided by the Authority have been complied with.

Note.— According to the answers to the checklist, the aerodrome operator may need to undertake safety assessments and provide them, together with the completed checklists, to the Authority for acceptance.

- (f) The Authority would then analyse the documents completed by the applicant and conduct sample on-site checks according to this analysis.

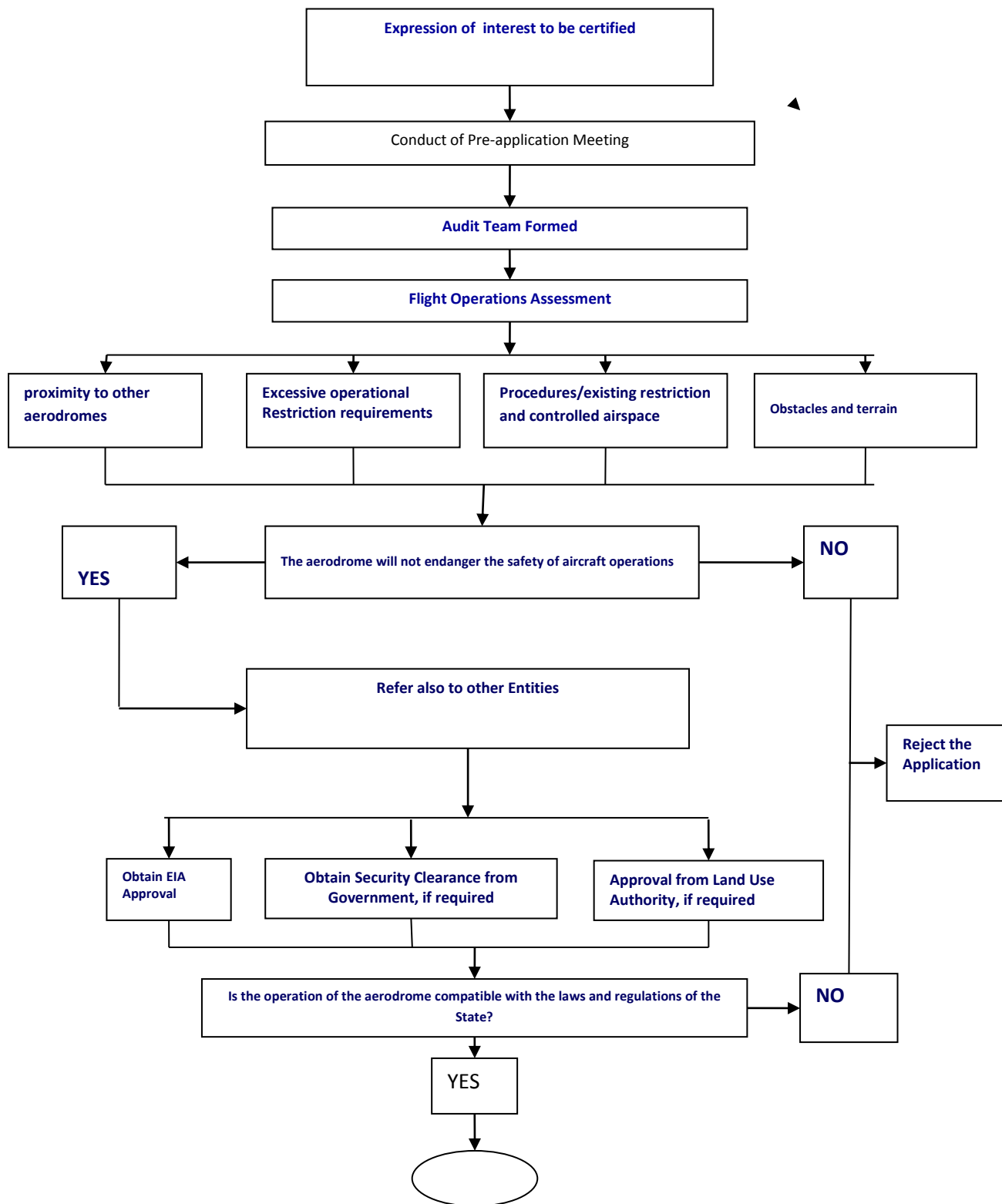
*Note.— The methodology for conducting on-site checks is described in **Appendix A6***

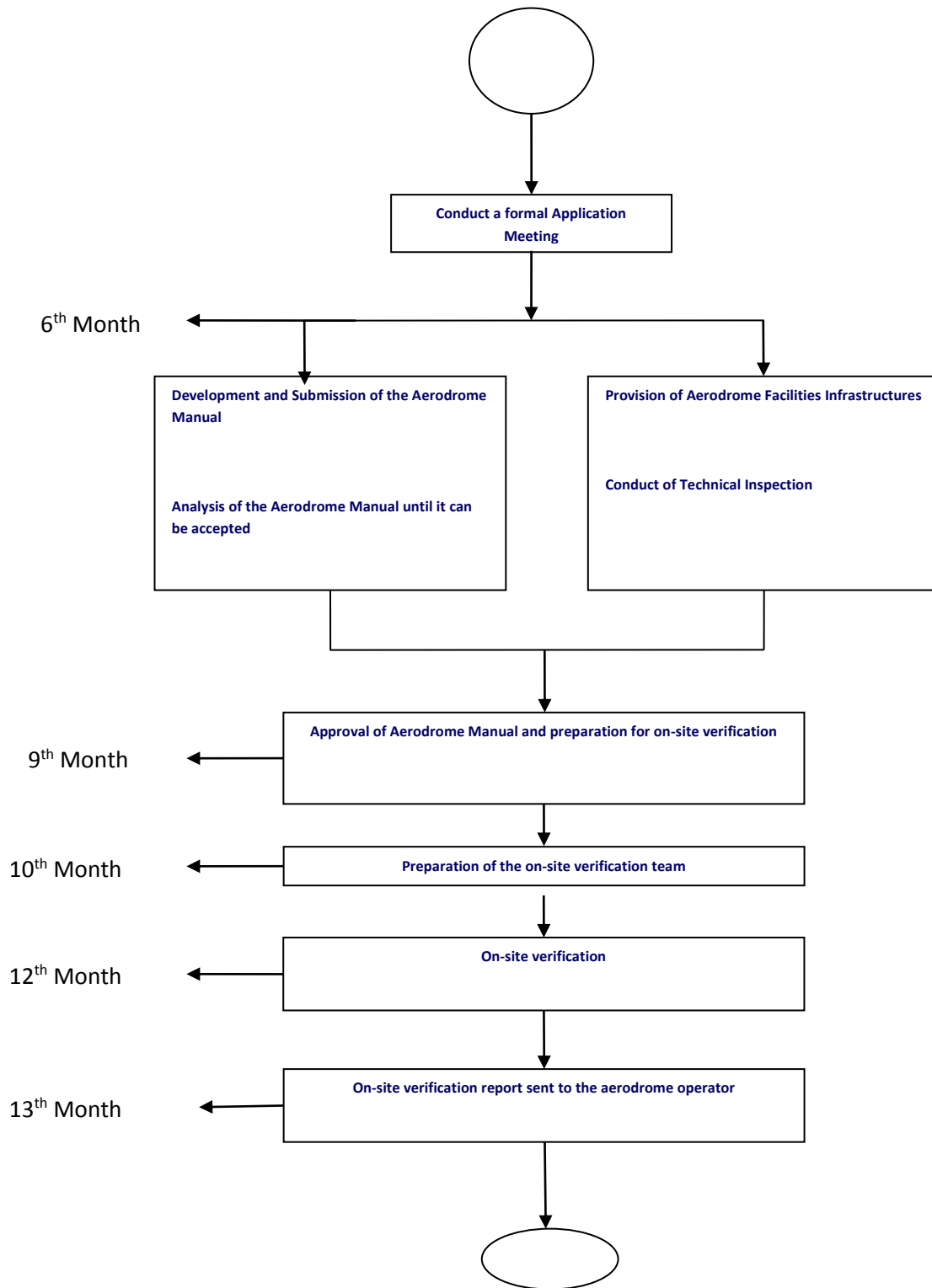
- (g) When all the conditions have been met, the aerodrome manual is approved no later than three months after it was first submitted. This period includes any exchange of communication between the aerodrome operator and the Authority if needed – some information may be lacking at the beginning, thus preventing the Authority from accepting the manual at first.
- (h) After the aerodrome manual is accepted, the on-site verification will be conducted. The date for the onsite verification will be selected with the objective of allowing the aerodrome operator a four month period to mitigate any deviations before the certification deadline.
- (i) The aerodrome operator shall submit to the Authority corrective action plans no later than two months after having received the certification/inspection reports.
- (j) For aerodromes already operating, the overall process, until delivery of the certificate, will not exceed 18 months.

Note.— The SMS on-site verification can be disconnected from the aerodrome operator's on-site verification in regard to compliance with its operational procedures and in this case:

- the deadline for the submission of the SMS part of the aerodrome manual can be longer, but will nevertheless not exceed six additional months;*
- the deadline for the SMS on-site verification can be longer, but the SMS on-site verification will nevertheless be conducted at least three months before the certification deadline to be in line with the required period of two months for the operator and the Authority to define an accepted corrective action plan.*

13.2.3.19 A flow chart on the certification process is given in Figure XXXX





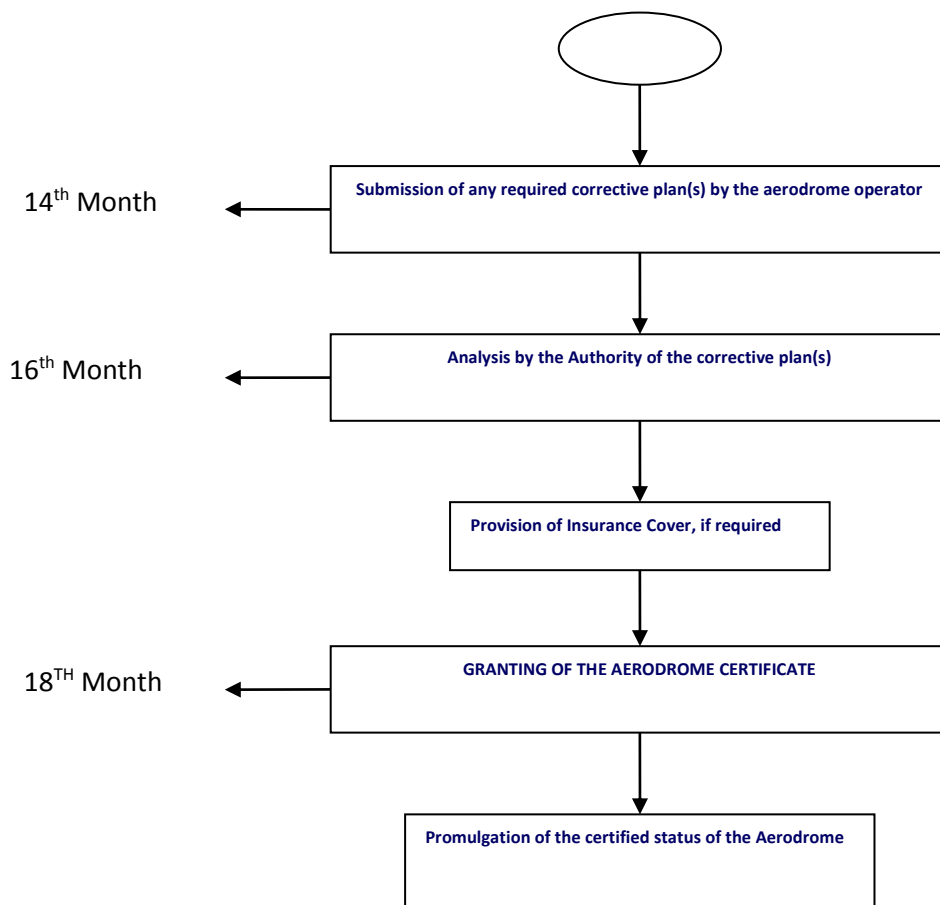


Figure XXXX :Flowchart of the Certification Process for Aerodrome already in Operat

13.2.3.20 Exemption Procedure for Non Compliance at Aerodrome

13.2.3.21 Introduction

- (a) An Aerodrome certificate holder is expected to comply with the LCAR Part XX. There may be some circumstances where compliance of requirement have not been followed at an existing aerodrome because of physical constraints and where the facility had been provided earlier as per old regulations and continued to be in operation. Similarly there may be situation where compliance is not possible also for a new aerodrome due to physical constraints. These situations make it imperative for the Authority to have procedures for accepting cases for non-compliance in respect of an aerodrome being issued with a certificate.

- (b) **The LCAR Part stipulates the procedures for application and grant of exemptions for non-compliance with Part XX requirements .**
- (c) When non-compliances are present, the effects on safety need to be analyzed and compensatory measures and/or limitations on its use to mitigate any non-compliance have to be established. The harmonization of this aspect of the certification process is therefore important for ensuring safety. Paragraph xxx, subpart 1 of Part 13.2 requires that an aeronautical study be conducted for granting exemptions from non-compliances with requirement.

13.2.3.22 NON COMPLIANCES

- (a) Non-compliances are primarily related to the following aspects at the aerodrome for which some examples are given below:
- (b) **Facilities and equipment**
 - Visual and non-visual aids.
 - Obstacles on the strip and the obstacle limitation surfaces i.e. approach, departure and transitional surfaces.
 - Strip areas - dimensions and quality. Inadequate runway strip with, inadequate taxiway width and lack of fillets
 - Runway end safety areas
 - Inadequate runway – taxiway separation distances.
 - Landing systems.
 - Rescue and fire-fighting vehicles and equipment.
 - Meteorological equipment.
- (c) **Services and operational procedures**
 - Rescue and fire-fighting services
 - Meteorological services
 - Low visibility procedures

13.2.3.23 Categories of Exemptions

Exemptions for non-compliance can be:

- i. **Temporary Exemptions:** where the non-compliance is expected to be removed and interoperability is the predominant aspect of the requirement, such as mandatory signs, availability of

runway strip etc.

- ii. **Permanent Exemptions:** where non-compliance cannot be removed and interoperability is not the predominant aspect of the requirement, such as the infringement of high ground into an obstacle limitation surface etc.

13.2.3.24 Procedures for Seeking Exemptions

- (a) Any application for exemption from any provision should be forwarded to the LCAA for consideration. The application should contain the following :
 - (i) the relevant provisions of Nigerian Civil Aviation Regulations for which the exemption is sought.
 - (ii) the period for which the exemption is required.
 - (iii) the category under which exemption sought (temporary/ permanent)
 - (iv) in case of exemption sought for non-compliance with specific regulation, compelling argument to support why the proposed exemption should be granted including any information and documentation/aeronautical study report to justify the exemption. (Note: Advisory Circular LCAA-AC-AATN016 contains guidance for the preparation of an aeronautical study report. Applicants are advised to study the guidance materials before submitting their application. It is imperative that the safety assessment methodology contained in the AC be applied in the conduct of the study)
 - (v) the action plan, short term within two months, medium term within one year and long term within three years, for rectification and review of non-compliance for temporary exemption, including the mitigation measures adopted for ensuring the safety during the exemption period.
 - (vi) a certificate holder's resolution that he shall annually review the conditions or mitigation measures and any other resultant non-compliance in particular when any significant changes in the activity or aerodrome development is proposed.
- (b) The applicant should provide adequate information in the prescribed **proforma** for consideration for granting exemptions with supporting documents. Failure to provide adequate information may delay processing / refusal of the application

13.2.3.25 Processing of Application for Exemptions

- (a) Upon receipt, the Authority will review the request to ensure that all necessary information has been provided. The Authority will forward a letter to the applicant acknowledging that his application has been received and request further documentation, if required.
- (b) The Authority will not commence processing of the application until all required information/documentation has been provided.

- (c) The application shall be processed in accordance with internal technical and administrative procedures established by the Authority

13.2.3.26 Grant or Denial of Exemption

- (a) Decision to Grant. The applicant is issued the letter granting the exemption if it is concluded that the applicant's arguments support a grant of exemption. The conditions and procedures under which the exemption is granted shall be outlined in the Exemption Letter.
- (b) A decision to deny the exemption is based on the determination that the exemption would not be in the public interest, would adversely affect safety, or, if applied, would not provide a level of safety required by the regulation. Under such circumstances, the reasons will be cited in the denial of the exemption letter.
- (c) Partial Grant of an Exemption. If the Authority determines that part of the applicant's request meets the criteria for granting the application, it may issue a partial grant of exemption. The letter must fully discuss those parts of the request that are being denied and those that are being granted.
- (d) LCAA will publish a report of its decision to grant or deny the application for exemption. The report shall specify the duration of the exemption and any conditions or limitations of the exemption. The means of publication shall include the AIP

13.2.3.27 Review, Removal and Extension of the Exemption

- (a) The exemption granted shall be reviewed during renewal of the certificate.
- (b) Upon expiration of the period of validity of an exemption, a new application may be filed with the authority if the operator seeks a further a renewal or extension of the termination date of the exemption.
- (c) At least 6 weeks' notice should be given to enable the Authority complete the processing of the request prior to the termination date.
- (d) The Authority may accept or reject the request for extension. The Authority will reject the request and issue a letter of disapproval if the basis or circumstances for which earlier exemption was granted have ceased to become applicable or if the reasons advanced in support of such exemption are no longer tenable.
- (e) If the Authority accepts to renew the exemption, a letter of extension of the termination date of the exemption will be issued.
- (f) A copy of the extension or denial shall be filed on the Aerodromes Register prior to the original exemption termination date.

Figure 2.3 - EXEMPTION APPLICATION FORM

(To be completed by the party making the request)

Name/Company	
Address	
Telephone, Fax	
Contact Person	
Date Request Made	
Regulatory Provisions Affected	
Details of Exemption Sought	
Background Information	
TEST	
<p><u>Aviation Safety</u></p> <p>What factors were considered to ensure aviation safety is not affected? Identify criteria and formulate as conditions of the exemption that provide an acceptable level of safety:</p> <p>a)</p> <p>b)</p> <p>c)</p>	
<p>Public Interest</p> <p>What factors were considered in the determination of Public Interest? Identify criteria:</p> <p>a)</p> <p>b)</p> <p>c)</p>	
<p>Are conditions related to Public Interest required?</p>	
<p>PROPOSED CONDITIONS BY THE APPLICANT</p>	
<p>What factors were considered to ensure aviation safety is not affected? Identify criteria and formulate as conditions of the exemption</p> <p>a)</p> <p>b)</p>	

PROPOSED PLAN OF ACTION BY THE APPLICANT (for temporary exemption)

FILE ATTACHMENTS

Letter of Request, All pertinent documents in support of the test

CERTIFICATION

I hereby certify that the forgoing information is correct in every respect and no relevant information has been withheld. I also undertake the responsibility for annually reviewing the conditions or mitigation measures and any other resultant non-compliance in particular when any significant changes in the aerodrome activity and development are proposed.

NAME.....(in capital letters)

SIGNATURE OF APPLICANT.....

POSITION HELD.....(with official seal)

DATE.....

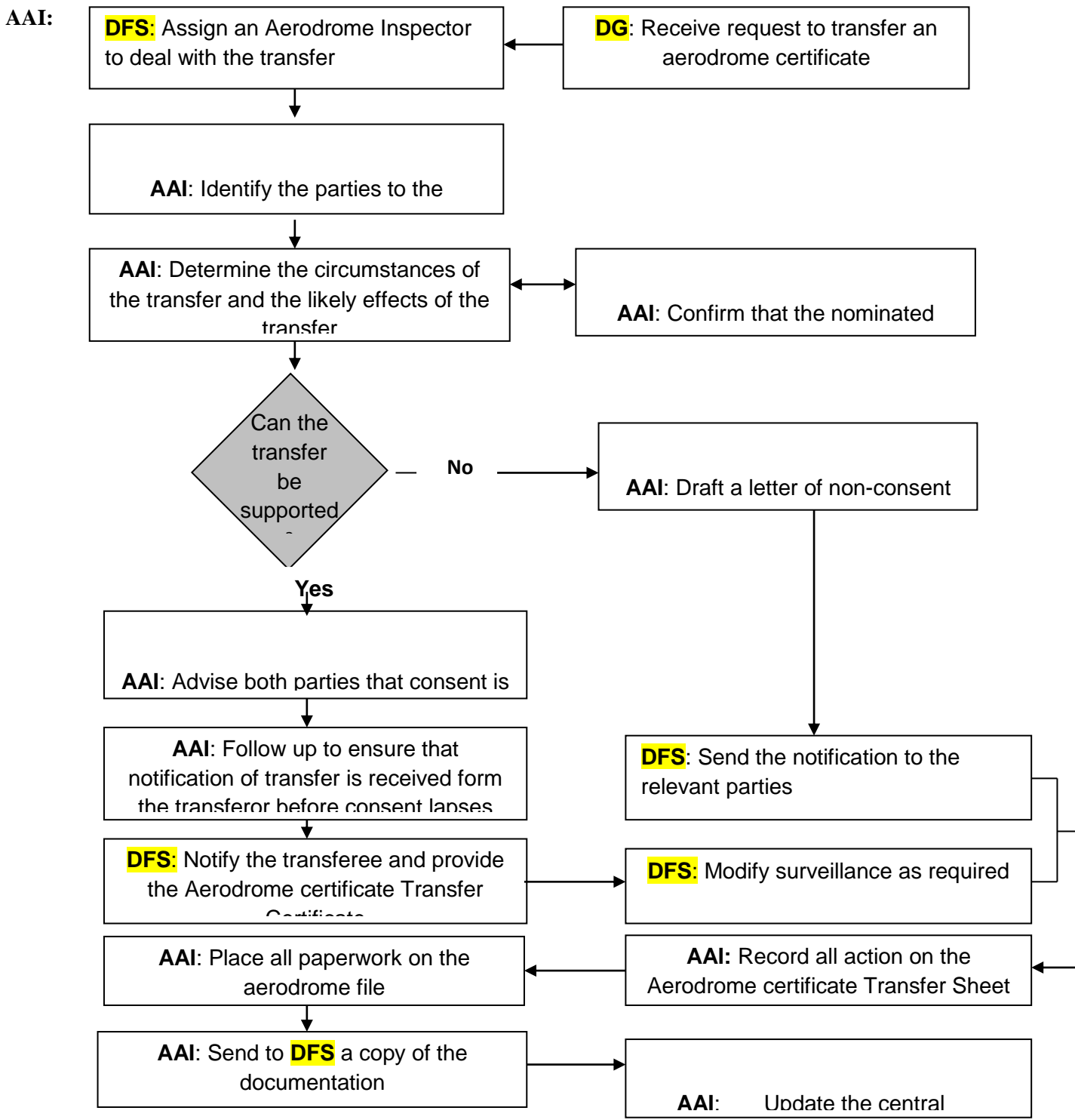
Note:

- i) It is an offence to make any false representation with the intent to deceive, for the purpose of procuring exemption
- ii) Application not completed in all respect and not accompanied with relevant enclosures is likely to be rejected.

Transfer of an Aerodrome Certificate

Part 14.3.9 of **LCAR** provides for the transfer of an Aerodrome Certificate

13.2.3.28 Certificate Transfer Process Flowchart



Key:
AAI Assigned Aerodrome Inspector

13.2.3.29 Processing Transfer of an Aerodrome Certificate

This section provides for the transfer of an aerodrome certificate at the request of an aerodrome operator as per (Insert regulation reference)

(a) Key Functions

The DFS is responsible for initiating the process for the transfer of the aerodrome certificate on the request of the Aerodrome Operators.

The application for the transfer of the aerodrome certificate submitted to Director shall be forwarded to the assigned aerodrome inspector through **DFS** for necessary action.

(b) Procedure

The assigned inspector shall:

(i) **Check whether the request for a transfer of aerodrome certificate is made by the aerodrome operator**

The aerodrome operator (transferor/transferee) must make requests in writing for (Insert CAA name) consent to transfer an airport certificate prior to 60 days of expiry of the airport certificate.

(ii) **Assess reasons for a transfer of an Aerodrome Certificate.**

An aerodrome operator may request **LCAA** consent to transfer of the certificate in following circumstances:

- (1) If a person having the Aerodrome Certificate gives a notice in writing to the DG, about the person or agency interested to obtain the said Certificate after having transferred the entitlement of the same,
- (2) If a person interested to obtain the Certificate from the person currently having Aerodrome Certificate by having transferred the entitlement of the same submits an application to the Director General, prior to 30 days of the date of expiry of the Certificate for permission to obtain the Certificate by having transferred the entitlement of same, and
- (3) If the process of transfer of the entitlement of the Aerodrome Certificate is completed pursuant to Part 14.3.9 of **LCAR**.

(iii) **Check the criteria for a transfer of an Airport Certificate.**

- (1) Consent to a transfer may be given **only** if **LCAA** is satisfied that the person to whom the certificate will be transferred is able to properly operate and maintain the aerodrome.

- (2) Requests for consent to transfer of an aerodrome certificate must be tested to determine whether:
 - (a) The change should be handled as a genuine transfer; or
 - (b) A situation exists which requires the certificate to be surrendered and a new certificate issued to a different entity.
 - (3) A transfer is appropriate when no significant variation will occur in the day-to-day operations of the aerodrome — that is, when:
 - (a) Aerodrome Manual procedures remain substantially unaltered (minor amendments — such as contact phone numbers etc — are acceptable)
 - (b) Aerodrome facilities remain substantially unaltered
 - (c) Key aerodrome operational personnel — such as Reporting Officers, Safety Manager/ Officers and the like — remain in their positions or are replaced with staff of equivalent qualification, experience or skill levels.
- (iv) **Check the criteria for non-consent to transfer An Aerodrome Certificate.**
- (1) Consent to transfer **must** be refused if **LCAA** is not satisfied that the person to whom the certificate is proposed to be transferred is able to properly operate and maintain the aerodrome.
 - (2) Generally, **LCAA** policy is that consent to transfer should be refused when significant changes to operational aspects of the aerodrome will be made — for example:
 - (a) If the certificate document is conditionally endorsed or the transfer would require conditions to be endorsed on the certificate document.
 - (b) Reduction of runway, taxiway or apron facilities
 - (c) If the aerodrome inspector believes:
 - (ii) Significant revision to the Aerodrome Manual will be necessary as a result of the transfer.
 - (iii) The proposed staffing arrangements are not adequate or appropriate

Note: *If consent is not granted,*

- *the DFS shall give the applicant written notice of the refusal, and the reasons for it no later than **within 14 days** after the DG refuses to transfer the certificate ; and*

- *the assigned aerodrome inspector should take steps to confirm that the current aerodrome operator can meet the obligations of the certificate. It is possible that a transfer of the certificate should be followed up by the LCAA surveillance.*

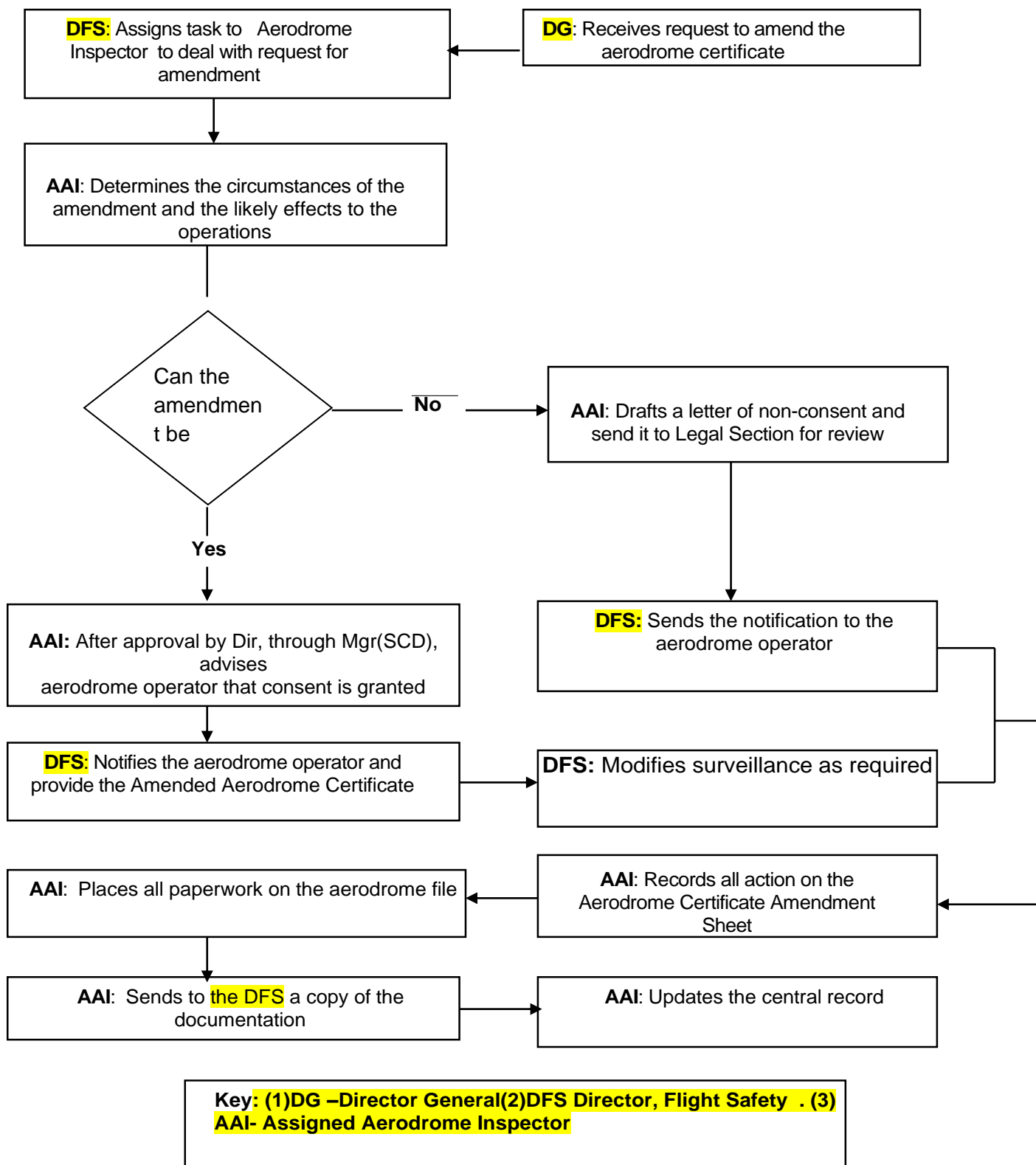
(d) Check for any reviewable Decision

- (i) A refusal to consent to a transfer may be reviewable.
- (ii) LCAA Legal Section should review any statement of reasons contained in a notice to the applicant before the notice is sent to the applicant.

After completion of the transfer, the *assigned aerodrome inspector* shall put copies of the documentation relating to the transfer in the aerodrome file. DFS shall notify AIS for issuing NOTAM and any changes to the details of the reporting officer and for amendment to publications and amend a surveillance plan. The assigned aerodrome inspector shall use the Aerodrome Certificate Transfer Checklist to monitor and record all actions to process the certificate transfer.

13.2.3.30 Amendment of an Aerodrome Certificate

13.2.3.31 Process Flowchart



13.2.3.32 Processing Amendments

Part 14.3.12 of **LCAR** permits an aerodrome certificate to be amended by the Authority, if the following circumstances occur:

- Change in the ownership or management of the aerodrome;
- Change in the use or operation of the aerodrome;
- Change in the boundary of the aerodrome; or
- The holder of the aerodrome certificate requests an amendment.

(a) Key Functions

The DFS is responsible for initiating the process for the amendment of the aerodrome certificate on the request of the Aerodrome Operators.

The application for the amendment of the aerodrome certificate submitted to DG shall be forwarded to the assigned aerodrome inspector through **DFS** for necessary action.

(b) Procedure

The assigned inspector shall:

(1) **Check whether the request for amendment of aerodrome certificate is made by the aerodrome operator**

The aerodrome operator must make requests in writing for the Authority's consent to amend an aerodrome certificate.

(3) **Check reasons for an amendment of an Aerodrome Certificate.**

An aerodrome operator may request Authority's consent to amend the certificate when:

- There is a change in the ownership or management of the aerodrome;
- There is a change in the use or operation of the aerodrome;
- There is a change in the boundary of the aerodrome; or
- The holder of the aerodrome certificate requests an amendment.

(3) **Check criteria for an amendment of an Aerodrome Certificate.**

- (a) Consent to an amendment may be given **only** if the Authority is satisfied with the reasons submitted by the aerodrome operator.

- (b) An amendment is appropriate when no significant variation will occur in the day-to-day operations of the Aerodrome, that is when:
- Aerodrome Manual procedures remain substantially unaltered (minor amendments — such as contact phone numbers etc — are acceptable)
 - Aerodrome facilities remain substantially unaltered
 - Key aerodrome operational personnel — such as Reporting Officers, Safety Officers and the like — remain in their positions or are replaced with staff of equivalent qualification, experience or skill levels.

(4) **Check criteria for non-consent to amend an Aerodrome Certificate**

- (a) Consent to amendment **must** be refused if the Authority is not satisfied with the reasons submitted by the aerodrome operator.
- (b) Generally, the Authority's policy is that consent to amendment should be refused — For example:
- If the certificate document is conditionally endorsed or the Amendment would require conditions to be endorsed on the certificate document;
 - Reduction of runway, taxiway or apron facilities;
 - If the *assigned aerodrome inspector* believes that:
 - A significant revision to the Aerodrome Manual will be necessary as a result of the amendment.
 - The proposed staffing arrangements are not adequate or appropriate.

Note: *If consent is not granted, the **assigned aerodrome inspector** should take steps to confirm that the aerodrome operator can meet the obligations of the certificate. It is possible that an amendment of the certificate should be followed up by the Authority's surveillance.*

(5) **Check for any reviewable decision**

- (a) A refusal to consent to an amendment may be reviewable
- (b) The Authority's Legal Section should review any statement of reasons contained in a notice to the applicant before the notice is sent to the applicant.
- (c) After completion of the amendment of the aerodrome certificate, the assigned aerodrome inspector shall put copies of the documentation relating to the amendment of the Aerodrome Certificate in the Aerodrome File
- (d) DFS shall notify AIS for issuing NOTAM and any changes to the details of the reporting officer and for amendment to publications;
- (e) DFS shall amend the Surveillance Plan

- (f) Assigned Aerodrome Inspector shall use the Aerodrome Certificate Amendment Checklist to monitor and record all actions to process amendment of the Aerodrome Certificate.

13.2.3.33 Aerodrome Certificate Amendment Checklist

- (a) **The aerodrome operator must provide the Authority with written notification of the request to amend the aerodrome certificate. The AAI who assesses the request may be required to investigate the application further to establish the relevant information.**
 - (1) Amendment date specified by the aerodrome operator.
 - (2) Authority verified — that is, the notification is from the certificate holder and signed.
 - (3) Are air transport operations being conducted at the aerodrome?
 - (4) Is the aerodrome to be closed?
 - (5) Is it necessary for the Authority to recommend any action to be taken by the aerodrome operator to ensure safety of future aircraft operations?

- (b) **The written notification is accepted by the Authority and the Authority consent to amend the certificate is not granted**
 - (1) Confirm that the details specified in section 1 of this checklist have been addressed.
 - (2) Reasons for not granting consent to amend the aerodrome certificate are enclosed.
 - (3) The Authority confirmation not to amend the aerodrome certificate issued.

- (c) **. The written notification is accepted by the Authority and the Authority consent to amend the certificate is granted**
 - (1) Confirm that the details specified in section 1 of this checklist have been addressed.
 - (2) The Authority confirmation to amend the aerodrome certificate issued.
 - (3) Endorse the original certificate document or a copy attached in the aerodrome file as “**Amended**”.
 - (4) Sign the amended certificate document.
 - (5) Place the copy of the amended certificate document in the appropriate aerodrome file.

(d) **Advise the following details of the amendment of aerodrome certificate**

- (1) Aerodrome Operator in writing the date of amendment of aerodrome certificate.
- (2) AIS for issuing NOTAM and any changes to the details of the reporting officer.
- (3) AIS for amendment to publications.
- (4) AAI, an amendment of the aerodrome certificate register.

(e) **Surveillance Update**

- (1) Aerodrome Profile Sheet update
- (2) Surveillance Plan amendment

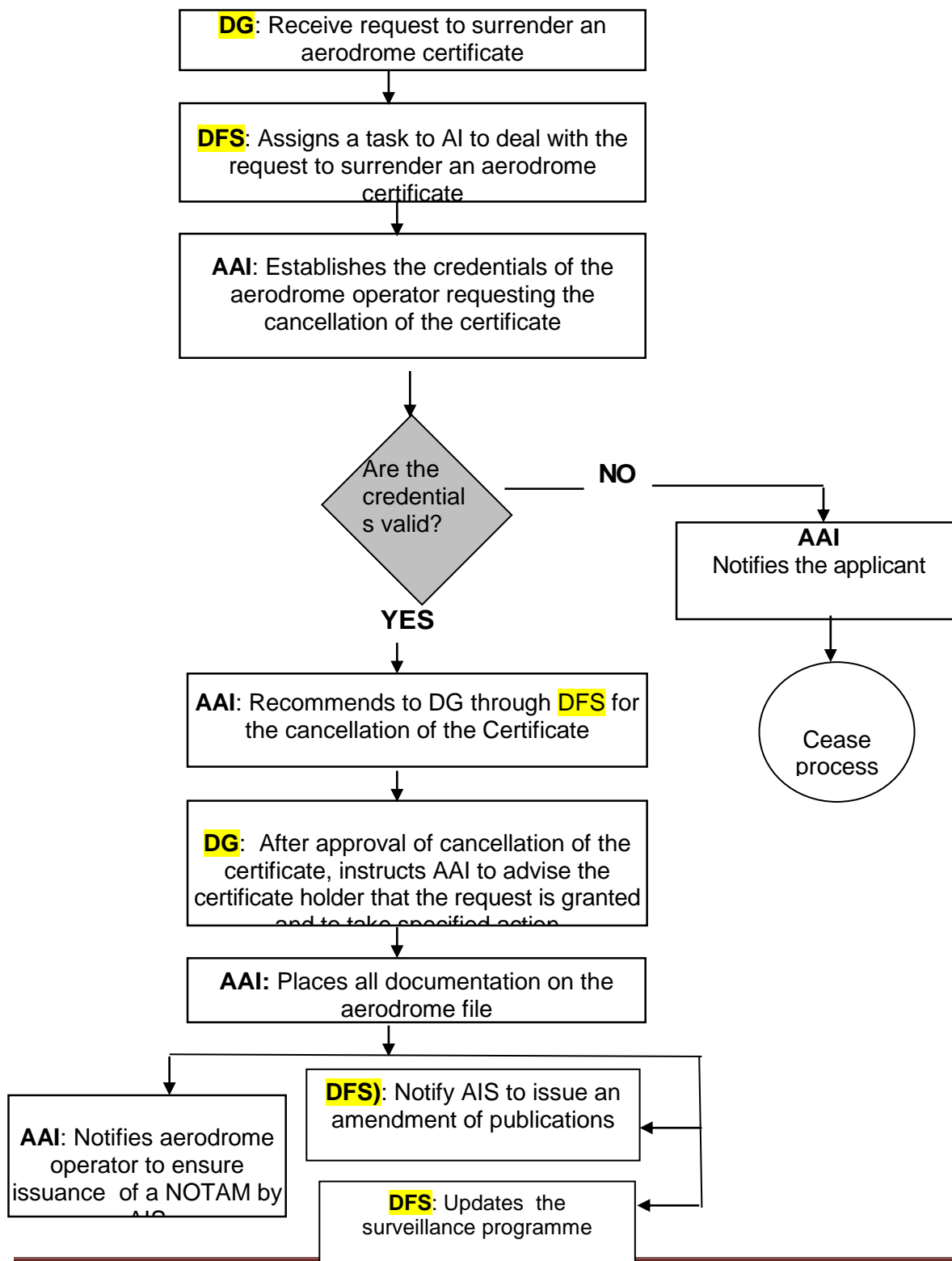
/ /

Aerodrome Inspector

Date:

13.2.3.34 Surrender of an Aerodrome Certificate

13.2.3.35 Certificate Surrender Process Flowchart



13.2.3.36 Processing Surrender of an Aerodrome Certificate

This section provides for the cancellation of an aerodrome certificate at the request of an aerodrome operator as per Part 14.3.10, **LCAR**

(a) Key Functions

The Director, Safety and Operations is responsible for initiating the process for the cancellation of the airport certificate on the request of the Aerodrome Operators

(b) Procedure

On receipt of the application, the *DFS* will notify the *Aerodrome Inspector* for action. On receipt of the application, the assigned aerodrome inspector shall:

- (1) Establish the credentials of the aerodrome operator requesting the cancellation as the certificate holder.
- (2) On the notification of the intention to surrender the airport certificate, check that the aerodrome operator has:
 - (a) Clearly stated making a request for the cancellation of certificate.
 - (b) Specified when cancellation should become effective. If no date is specified, the certificate cancellation date is the date 30 days from the date of notification.
- (3) If the aerodrome operator has not supplied the required information for a proper notification of intention to surrender the certificate, contact the operator and advise them to supply the necessary details in writing.
- (4) Determine whether the aerodrome is to continue to operate as an un-certificated aerodrome.

(c) Aerodrome Certificate Surrender Checklist

- (i) The *assigned aerodrome inspector* must complete the Airport Certificate Surrender Checklist as shown below, to ensure that each step of the aerodrome cancellation procedure is completed.
- (ii) Tick each box to indicate the satisfactory completion of the task. Note the date against each box.
- (iii) Sign and date this form and file it in the aerodrome file when the process is complete.
- (iv) Using the Aerodrome Certificate Surrender Checklist:
 - (1) Check that the aerodrome operator has given at least 30 days notice.
 - (2) Check that the operator has provided the following information:

- (a) Are there regular public transport (RPT) operations at the aerodrome?
- (b) Are there any changes to reporting officer details?
- (c) If the aerodrome is to be closed to all aircraft, have sufficient safety measures been taken? For example:
 - Will the windsock and boundary markers be removed?
 - Will un-serviceability markers be displayed for a period?
- (v) If the request is properly made, prepare a letter to the aerodrome operator:
 - (1) Notifying the cancellation of the certificate.
 - (2) Directing aerodrome operator to return the original certificate document to the Authority to enable cancellation of the certificate.
 - (3) Advising aerodrome operator to carry out any actions necessary in the interests of aviation safety.
- (vi) Prepare and forward the letter for **DG** signature through DFS and place a copy in the appropriate aerodrome file.
- (vii) Send the letter of notification to the aerodrome operator before the nominated surrender date (if specified)..
- (viii) When you have the original certificate:
 - (1) Mark it as cancelled by completing the following actions using ink:
 - (a) Draw a line through the certificate.
 - (b) Write “**Cancelled**” and the date of the cancellation on the certificate.
 - (c) Sign the certificate.
 - Ø Place the original cancelled certificate in the appropriate aerodrome file or a copy of the cancelled certificate.
- (ix) Notify the Aeronautical Information Service (AIS) through (Insert position(s)) to issue a NOTAM cancelling the certified status of the aerodrome and amend the AIP
- (x) Update the Airport Certificate Register.
- (xi) Amend the Aerodrome file and surveillance records.

13.2.3.37 Aerodrome Certificate Surrender Checklist

- (a) The aerodrome operator must provide the Authority with written notification of the request to surrender the aerodrome certificate. The *aerodrome inspector* who assesses the request may be required to investigate the application further to establish the relevant information.
 - (i) The cancellation date specified by the aerodrome operator.
 - (ii) The Authority verified that, the notification is from the certificate holder and signed.
 - (iii) Are air transport operations being conducted at the aerodrome?
 - (iv) Is the aerodrome to be closed?
 - (v) Is it necessary for the Authority to recommend any action to be taken by the aerodrome operator to ensure safety of future aircraft operations?
- (b) The written notification is accepted by the Authority and the certificate is cancelled
 - (i) Confirm that the details specified in section 1 of this checklist have been addressed.
 - (ii) Endorse the original certificate document or a copy attached in the aerodrome file as “**Cancelled**”.
 - (iii) Sign the endorsed original certificate document or a copy.
 - (iv) Place endorsed original certificate document or copy on the appropriate aerodrome file.
- (c) Advise the following of the details of the cancellation
 - (i) Aerodrome Operator in writing the date of cancellation.
 - (ii) AIS for issuing NOTAM and any changes to the details of the reporting officer.
 - (iii) AIS for amendment to publications.
 - (iv) Amendment of the aerodrome certificate register
- (d) Surveillance Update
 - (i) Aerodrome Certificate Register update
 - (ii) Surveillance Plan amendment

/ /

(Assigned Aerodrome Inspector)

Date

CHAPTER 3.0

13.2.4 AERODROME SAFETY COORDINATION

13.2.4.1 Introduction

- (a) This chapter specifies the role of **LCAA** in the coordination process and the interaction between the aerodrome operator and other stakeholders which is necessary for the safety of operations at the aerodrome.

13.2.4.2 Coordination affecting aerodrome safety

- (a) **LCAA** verifies that coordination exists between the aerodrome operator, aeroplane operators, air navigation service providers and all other relevant stakeholders to ensure the safety of operations.
- (b) The aerodrome operator should ensure that all users of the aerodrome, including ground-handling agencies and other organizations that perform activities independently at the aerodrome in relation to flight or aircraft handling, comply with the safety requirements of the aerodrome operator. The aerodrome operator monitors such compliance.

13.2.4.3 Feedback on occurrences

- (a) Aerodrome operators are required to report safety occurrences at their aerodromes to **LCAA** in accordance with the **LCAR Part XX**.
- (b) Aerodrome operators shall report accidents and serious incidents, including:
 - (1) runway excursions;
 - (2) undershoots;
 - (3) runway incursions;
 - (4) landing or take-off on a taxiway; and
 - (5) wildlife strike-related events.
- (c) In addition to accidents and serious incidents, aerodrome operators shall report safety occurrences of the following types:
 - (1) foreign object debris/damage- (FOD) related event;
 - (2) undershoots;
 - (3) other excursions (i.e. from a taxiway or apron);
 - (4) other incursions (i.e. on taxiway or apron); and

- (5) ground collisions.

LCAR Part 14 details the list of safety occurrences types and related critical data which must be reported at an aerodrome. The related tasks for reporting these occurrences and to feed the data when required are shared and coordinated between the various aerodrome stakeholders.

- (d) Aerodrome operators should ensure that analysis of safety occurrences at the aerodrome is performed by competent personnel who have been trained to perform these tasks.
- (e) Aerodrome operators should coordinate with all users of the aerodrome, including aircraft operators, ground-handling agencies, air navigation service providers and other stakeholders to improve the completeness and accuracy of the collection of safety occurrences and their related critical data.
- (f) LCAA will review and analyse the information provided by the operator in the occurrences reports to ensure that:
- (1) all occurrences in (b) and (c) are adequately analysed by the aerodrome operator;
 - (2) significant trends are identified (either on a specific aerodrome or at a national level). Further in-depth analysis on the subject should be carried out if required so that the appropriate actions can be taken; and
 - (3) the most serious/significant occurrences are identified for follow – up action by the LCAA
- (g) The output of these analyses can be used as input for the planning of continued oversight.

Note.— Variations in the frequency of occurrences reports on a specific aerodrome, other than those occurring as a result of seasonal variations in the types and/or levels of operations, could be considered to be an indicator of a potential problem in the reporting culture on the aerodrome or a specific danger that should have been studied by the aerodrome operator. This may warrant the reinforcement of continued oversight of the reporting process or subjects with a high frequency of occurrence.

13.2.4.4 Oversight of Third Parties

Compliance of third parties with the safety provisions established by the aerodrome operator as specified **in c should** be monitored using the appropriate means.

CHAPTER 4.0

CONTINUED AERODROME SAFETY OVERSIGHT

13.2.5 General

- (a) The scope of initial certification is described in 2.3. This section describes the procedures for continued aerodrome safety oversight. Continued oversight actions may not need to be as exhaustive but should be based on principles ensuring that compliance is maintained throughout the planning of adequate oversight actions
- (b) Specific and targeted actions, in addition to the planned activities, may be carried out by the State, for example, in relation to changes, analysis of occurrences, safety of aerodrome works, monitoring of corrective action plans, or those related to the State safety plan. States may also have to address other issues regarding aerodrome safety depending on the aerodrome organization, such as obstacle control or oversight of ground handlers.

Note.— In order to have a complete perspective on aerodrome compliance, the results of those technical inspections undertaken during initial certification should be available for the team verifying the aerodrome operational procedures on site.

13.2.5.1 Continued oversight principles

- (a) The State should plan continued oversight actions in such a way as to ensure that each subject covered by the scope of certification is subject to oversight (see 2.1.2).

Note.— The planning of continued oversight actions by the State may take into account the aerodrome safety performance and risk exposure (see 2.5.4).

- (b) The development and operation of an aerodrome's SMS should ensure that the aerodrome operator takes appropriate actions regarding the safety on the aerodrome.

Note.— When an aerodrome has a fully developed and operational SMS, the continued oversight of the aerodrome does not have to be as exhaustive as for one with a developing SMS. Oversight activities in this case should focus on the SMS itself in order to ensure that the aerodrome SMS is operating continuously and adequately.

- (c) Sample checks of the aerodrome's compliance with certification requirements and specifications should be carried out in order to ensure the SMS has identified all deviations, if any, and adequately managed them. This also provides an indication on the level of maturity of the SMS. Consequently, a periodic audit cycle should be developed which consists of:
 - (1) at least one audit of the SMS; and
 - (2) sample checks on specific subjects.
- (d) If the SMS of the aerodrome operator is not fully implemented, specific oversight actions should target the SMS to ensure it is developing adequately and at a normal pace. In this case, the SMS should be audited as appropriate until it is considered to be sufficiently mature.

*Note.— The maturity of the SMS is determined by the results of the oversight actions, according to the criteria developed in **Appendix 1**.*

13.2.5.2 Audit of selected items

- (a) After initial certification has taken place, continued oversight actions of a subject may not require complete audit of all subject items and may instead be on the basis of sample assessment of selected items based on risk profile.

Note.— An aerodrome can be assessed through an analysis of the safety occurrences at the aerodrome, including any significant development, change or other known information that may highlight subjects of concern.

- (b) The audit of the selected items should consist of:
- (1) a desk-based review of the appropriate documents, and
 - (2) an on-site verification.
- (c) The same checklists as those used for initial certification of the subject items should be used, but if a sampling item selection is made, only the selected checklist items should be audited.

13.2.5.3 Influence of aerodrome safety performance and risk exposure

- (a) The number of audits of the SMS during the period should be determined taking into account the following criteria:
- (1) the regulator's confidence in the operator's SMS. This confidence is evaluated using the results of the SMS audits or other oversight actions. For example, feedback on the operator's occurrence reporting and management system might indicate that the analyses of the safety occurrences are not carried out as adequately as desired, or that a significant number of incidents have arisen on the aerodrome; and
 - (2) other factors contributing to the level of risk at the aerodrome, for example, the complexity of the aerodrome, the aerodrome's infrastructure or organization, the density of traffic, type of operations and other specific conditions.

Note.— The content of an SMS audit may be developed using the criteria in Appendix 1.

- (b) For aerodromes with a fully implemented SMS, in addition to the audit of the SMS, some sample subjects should be checked to ensure that the SMS has identified all safety-critical issues. This also helps to ensure that the SMS is operating adequately. The selection of these subjects should be determined taking into account:
- (1) an analysis of the safety occurrences on the aerodrome;
 - (2) known information related to safety at the aerodrome that may highlight subjects of concern;
 - (3) specific subjects most significant for safety;
 - (4) the complexity of the aerodrome;
 - (5) any significant development or change to aerodrome infrastructure; and

- (6) the subjects previously selected in order to cover all within a certain number of oversight cycles

13.2.5.4 Continued oversight plans and programmes

- (a) Following the above principles, an oversight plan should be determined by the State, for each certified aerodrome and communicated to the aerodrome operator. This plan should ensure that:
 - (1) for aerodromes where an SMS is not fully functional:
 - i. each subject within the scope of certification appears at least once and is subject to specified oversight actions; and
 - ii. the SMS is audited as appropriate;

Note 1.— The development of an SMS may be phased. During a phased implementation, only the elements under development within a specific phase will be assessed and reviewed.

Note 2.— It may be appropriate to audit an immature SMS at least once a year.

- (b) for the aerodromes with a fully functional SMS:
 - (1) the SMS is audited at least once; and
 - (2) other oversight actions on selected subjects are conducted as appropriate.
- (c) The plan and programme should be updated annually to show the oversight actions that have actually been carried out, including observations on certain actions that have not been undertaken as planned.

13.2.5.5 Unannounced inspections

- (a) Planning of the aerodrome audit is intended to assist the regulator and aerodrome in planning resources and manpower and in ensuring a consistent and adequate level of oversight. However, it does not prevent the State from carrying out unannounced inspections, if deemed necessary.
- (b) These inspections follow the same methodology as the scheduled audit or technical inspection as appropriate and may be carried out using the same checklists or could be aimed at a specific subject of concern.

13.2.5.6 Monitoring of corrective actions plans

- (a) Corrective actions plans resulting either from initial certification or from continued oversight audits or technical inspections should be monitored by the State until all items are closed to ensure that mitigating actions are carried out to the standard and timescale agreed.
- (b) The State should regularly review the status of each pending action.

- (c) When a deadline has been reached, the State should verify that the related corrective actions have been adequately implemented.
- (d) Where a corrective action plan does not result in appropriate action being taken within acceptable timelines, increased oversight can be taken by the State.

13.2.5.7 Increased oversight

- (a) When an aerodrome's corrective action plan does not ensure that appropriate corrective action has been taken within acceptable timelines, and after coordination between the State and the operator, the State may decide that increased oversight of this operator is necessary. The scope of increased oversight may cover specific subjects or be all-encompassing.
- (b) The State should notify the aerodrome operator in writing:
 - (1) that it is being placed under increased oversight and outline the subjects concerned and from which date;
 - (2) the reasons for the increased oversight and what it consists of; and
 - (3) what actions are required by the aerodrome.
- (c) When an aerodrome is placed under increased oversight, the State should:
 - (1) carry out appropriate oversight actions on the subjects concerned;
 - (2) follow very carefully the implementation of the corrective actions plan; and
 - (3) allocate sufficient time/resources to the oversight of the concerned aerodrome.
- (d) The oversight actions carried out under increased oversight are the same as those carried out normally, but are more exhaustive and address all the subjects concerned.
- (e) When increased oversight is concluded on an aerodrome for a specific subject, the State should advise the aerodrome operator in writing, stating the end of the procedure and the reason.
- (f) The aerodrome certificate can be amended, suspended or revoked according to the outcome of the increased oversight.

CHAPTER 5.0

13.2.6 AERODROME COMPARTIBILITY

13.2.6.1 Introduction

This chapter outlines a methodology and procedure to assess the compatibility between aeroplane operations and aerodrome infrastructure and operations when an aerodrome accommodates an aeroplane that exceeds the certificated characteristics of the aerodrome.

A compatibility study should be performed collaboratively between affected stakeholders which includes the aerodrome operator, the aeroplane operator, ground handling agencies as well as the various air navigation service providers (ANSPs).

The following steps describe the arrangement, to be appropriately documented, between the aeroplane operator and aerodrome operator for the introduction of an aeroplane type/subtype new to the aerodrome:

- (a) the aeroplane operator submits a request to the aerodrome operator to operate an aeroplane type/subtype new to the aerodrome;
- (b) the aerodrome operator identifies possible means of accommodating the aeroplane type/subtype including access to movement areas and, if necessary, considers the feasibility and economic viability of upgrading the aerodrome infrastructure; and
- (c) the aerodrome operator and aircraft operator discuss the aerodrome operator's assessment, and whether operations of the aeroplane type/subtype can be accommodated and, if permitted, under what conditions.
 - (1) identifies safety hazards;
 - (2) ensures that remedial action necessary to maintain safety is implemented;
 - (3) provides for continuous monitoring and regular assessment of the achieved safety; and
 - (4) aims to make continuous improvement to the overall safety of the aerodrome.

The following procedures should be included in the aerodrome compatibility study:

- (a) identify the aeroplane's physical and operational characteristics (see Attachments C, and D);
- (b) identify the applicable regulatory requirements;
- (c) establish the adequacy of the aerodrome infrastructure and facilities vis-à-vis the requirements of the new aeroplane (see the appendix to this chapter);
- (d) identify the changes required to the aerodrome;
- (e) document the compatibility study; and
- (f) perform the required safety assessments identified during the compatibility study (see Chapter 2 on safety assessment).

Note 1.— A compatibility study may require a review of the obstacle limitation surfaces at an aerodrome as specified in Chapter 4, Annex 14, Volume I. Further guidance on the function of these surfaces is given in Doc 9137, Part 6 — Control of Obstacles. Where required, reporting of obstacles is prescribed in Annex 4 — Aeronautical Charts and Annex 15 — Aeronautical Information Services. 4-2 Procedures — Aerodromes

Note 2.— For aerodrome operations in low visibility conditions, additional procedures may be implemented in order to safeguard the operation of aeroplanes. Further guidance on operations in low visibility conditions are available in Doc 9137 — Airport Services Manual, Part 8 — Airport Operational Services, Doc 9476 — Manual of Surface Movement Guidance and Control Systems (SMGCS); and Doc 9830 — Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual.

Note 3.— Additional processes that ensure suitable measures are in place to protect the signal produced by the ground-based radio navigation equipment may be necessary at aerodromes with precision instrument approaches.

The result of the compatibility study **should** enable decisions to be made and should provide:

- (a) the aerodrome operator with the necessary information in order to make a decision on allowing the operation of the specific aeroplane at the given aerodrome;
- (b) the aerodrome operator with the necessary information in order to make a decision on the changes required to the aerodrome infrastructure and facilities to ensure safe operations at the aerodrome with due consideration to the harmonious future development of the aerodrome; and
- (c) the **LCAA** with the information which is necessary for its safety oversight and the continued monitoring of the conditions specified in the aerodrome certification.

Note 1.— Each compatibility study is specific to a particular operational context and to a particular type of aeroplane.

Note 2.— See Annex 6 — Operation of Aircraft, Part I — International Commercial Air Transport — Aeroplanes, Chapter 4, regarding the obligation of the aeroplane operator.

Note 3.— Information resulting from the compatibility study that is considered to be of operational significance is published in accordance with Annex 14, Volume I, 2.13.1, and Annex 15.

13.2.6.2 Impact of Aeroplane Characteristics on the Aerodrome Infrastructure

13.2.6.3 General

Introducing new types of aeroplanes into existing aerodromes may have an impact on the aerodrome facilities and services, in particular, when the aeroplane characteristics exceed the parameters that were used for planning the aerodrome.

The parameters used in aerodrome planning are defined in Annex 14, Volume I, which specifies the use of the aerodrome reference code determined in accordance with the characteristics of the aeroplane for which an aerodrome facility is intended. The aerodrome reference code provides a starting point for the compatibility

study and may not be the sole means used to conduct the analysis and to substantiate the aerodrome operator's decisions and the State's safety oversight actions.

Note: The individual facilities required at an aerodrome are interrelated by the aerodrome reference code. The design of these facilities, including a description of the aerodrome reference code, can be found in Annex 14, Volume I, and are transposed by States into national regulations.

13.2.6.4 Consideration of the Aeroplane physical characteristics

The aeroplane's physical characteristics may influence the aerodrome dimensions, facilities and services in the movement area. These characteristics are detailed in Attachment A to this chapter.

13.2.6.5 Consideration of the aeroplane's operational characteristics

In order to adequately assess aerodrome compatibility, aeroplane operational characteristics should be included in the evaluation process. The operational characteristics can include the infrastructure requirements of the aeroplane as well as ground servicing requirements. These characteristics are detailed in Attachment B to this chapter.

13.2.6.6 Physical Characteristics of Aerodromes

In order to adequately assess the aeroplane's compatibility, aerodrome physical characteristics should be included in the evaluation process. These characteristics are detailed in the Appendix to Chapter 4.

CHAPTER 6.0

13.2.7 THE AERODROME MANUAL

13.2.7.1 Introduction

The aerodrome manual is a fundamental requirement of the certification process. It shall contain all the relevant information about the aerodrome as stipulated in the Manual of Aerodrome Standards for processing the application before granting an aerodrome certificate.

13.2.7.2 Information to be included in the Aerodrome Manual

- a. Information provided in the aerodrome manual will be the basis to assess the suitability of the aerodrome for the aircraft operations proposed and to judge an applicant's capability to be eligible to be granted a certificate
- b. The following sets out the items which should be included in the manual, though it is recognised that the need to include additional items will vary between aerodromes dependent upon the nature and scale of operations.

- c. Before the first part, there should be a table of content, a list of corrigenda//amendments, a distribution list. The content of the other parts are as follows

13.2.7.3 General

General information, including the following:

- a) Purpose and scope of the Aerodrome Manual;
- b) The legal requirement for an Aerodrome Certificate and an Aerodrome Manual as prescribed in the national regulations
- c) conditions for use of the aerodrome – a statement to indicate that the aerodrome shall at all times when it is available for the take-off and landing of aircraft, be so available to all persons on equal terms and conditions;
- d) The available aeronautical information services and procedures for timely and accurate effecting promulgation of AIP Amendment, AIP Supplement or NOTAM
- e) The system for recording aircraft movements;
- f) Obligations of the aerodrome operator; and
- g) A table presented in the format shown below to indicate the aerodrome and aerodrome operator's compliance status with EACH clause of this Manual of Aerodrome Standards.
- h) Coordination policy or letters of agreement between ATS and Aerodrome operator on areas of coordination such as Aerodrome Emergency planning, Aerodrome condition reporting, Aerodrome Vehicle Operations etc.
- i) **A list of all deviations from the regulatory provisions authorized by the Authority together with their validity and references to the related documents (including any safety assessments**

13.2.7.4 Particulars of the aerodrome site

General information, including the following:

- a) A description of the intended operations, including:
 - (1) the critical aeroplanes the aerodrome is intended to serve;
 - (2) the category of runway(s) provided (non-instrument, instrument including non-precision and precision);
 - (3) the different runways and their associated levels of service;

- (4) the nature of aviation activities (commercial, passenger, air transport, cargo, aerial work, general aviation);
 - (5) the type of traffic permitted to use the aerodrome (international/national, IFR/VFR, scheduled/nonscheduled);and
 - (6) the minimum RVR that aerodrome operations can be permitted;
- b) A plan of the aerodrome showing the main aerodrome facilities for the operation of the aerodrome including, particularly, the location of each wind direction indicator;
 - c) A plan of the aerodrome showing the aerodrome boundaries;
 - d) A plan showing the distance of the aerodrome from the city or other populous area, and the location of any aerodrome facilities and equipment outside the boundaries of the aerodrome; and
 - e) Particulars of the title of the aerodrome site. If the boundaries of the aerodrome are not defined in the title documents particulars of the title to, or interest in, the property on which the aerodrome is located and a plan showing the boundaries and position of the aerodrome.

13.2.7.5 Particulars of the aerodrome required to be reported to the Aeronautical Information Service (AIS)

13.2.7.6 General Information

- a) The name of the aerodrome;
- b) The location of the aerodrome;
- c) The geographical coordinates of the aerodrome reference point determine in terms of the World Geodetic System – 1984 (WGS-84) reference datum;
- d) The aerodrome elevation and geoid undulation;
- e) The elevation of each threshold and geoid undulation, the elevation of the runway end and any significant high and low points along the runway, and the highest elevation of the touchdown zone of a precision approach runway;
- f) The aerodrome reference temperature;
- g) Details of the aerodrome beacon; and
- h) The name of the aerodrome operator and the address and telephone number at which the aerodrome operator may be contacted at all times.

13.2.7.7 Aerodrome dimensions and related information

General information, including the following:

- a) Runway – true bearing, designation number, length, width, displaced threshold location, slope, surface type, type of runway and, for a precision approach runway, the existence of an obstacle free zone;
- b) Length, width and surface type of strip, runway end safety areas stop-ways;
- c) Length, width and surface type of taxiways;
- d) Apron surface type and aircraft stands;
- e) Clearway length and ground profile;
- f) visual aids for approach procedures, *via*, approach lighting type and visual approach slope indicator system (PAPI/APAPI and T-VASIS/AT-VASIS); marking and lighting of runways, taxiways, and aprons; other visual guidance and control aids on taxiways (including runway holding positions, intermediate holding positions and stop bars) and aprons, location and type of visual docking guidance system; availability of standby power for lighting.
- g) The location and radio frequency of VOR aerodrome checkpoints;
- h) The location and designation of standard taxi routes;
- i) The geographical coordinates of each threshold;
- j) The geographical coordinates of appropriate taxiway centre line points;
- k) The geographical coordinates of each aircraft stand;
- l) The geographical coordinates and the top elevation of significant obstacles in the approach and take-off areas, in the circling area and in the vicinity of the aerodrome. (This information may best be shown in the form of charts such as those required for the preparation of aeronautical information publications, as specified in Annexes 4 and 15 to the Convention);
- m) Pavement surface type and bearing strength using the Aircraft Classification Number – Pavement Classification Number (ACN-PCN) method;
- n) One or more pre-flight altimeter check locations established on and apron and their elevation;
- o) Declared distances: take-off run available (TORA), take-off distance available (TODA), accelerate-stop distance available (ASDA), landing distance available (LDA);
- p) disabled aircraft removal plan: the telephone/telex/facsimile numbers and email address of the aerodrome coordinator for the removal of a disabled aircraft on or adjacent to the movement area, information on the capability to remove a disabled aircraft, expressed in terms of the largest type of aircraft which the aerodrome is equipped to remove; and
- q) rescue and fire-fighting: the level of protection provided, expressed in terms of the category of the rescue and fire-fighting services, which should be in accordance with the longest aeroplane normally using the aerodrome and the type and amounts of extinguishing agents normally available at the aerodrome.

Note – The accuracy of the information in Part 3 is critical to aircraft safety. Information requiring engineering survey and assessment should be gathered or verified by qualified technical persons.

13.2.7.8 Particulars of the aerodrome operating procedures and safety measures

The aerodrome operating procedures and safety measures as set out below. For each procedure

- (1) the responsibilities of the aerodrome operator are clearly described;
- (2) the tasks that are to be achieved by the aerodrome operator or its subcontractors are listed; and
- (3) the means and procedures required to complete these tasks are described or appended, together with the necessary details such as the frequency of application and operating modes.

13.2.7.9 Aerodrome reporting

Particulars of the procedures for reporting any changes to the aerodrome information set out in the AIP and procedures for requesting the issue of NOTAMS, including the following:

- a) Arrangement for reporting any changes to the Authority and recording the reporting of changes during and outside the normal hours of aerodrome operations;
- b) The names and roles of persons responsible for notifying the changes, and their telephone numbers during and outside the normal hours of aerodrome operations; and
- c) The address and telephone numbers, as provided by the **LCAA**, of the office where changes are to be reported to the **LCAA**.

13.2.7.10 Access to the aerodrome movement area

Particulars of the procedures that have been developed and are to be followed in coordination with the agency responsible for preventing unlawful interferences in civil aviation at the aerodrome and for preventing unauthorized entry of persons, vehicles, equipment, animals or other things into the movement area, including the following:

- a) the role of the aerodrome operator, the aircraft operator, aerodrome fixed base operators, the aerodrome security entity, the **LCAA** and other government departments, as applicable; and
- b) The names and roles of the personnel responsible for controlling access to the aerodrome, and the telephone numbers for contacting them during and after working hours.

13.2.7.11 Aerodrome Emergency Plan

Particulars of the aerodrome emergency plan, including the following:

- a) plans for dealing with emergencies occurring at the aerodrome or in its vicinity, including the malfunction of aircraft in flight; structural fires; sabotage, including bomb threats (aircraft or structure); unlawful seizure of aircraft; and incidents on the airport covering “during the emergency” and “after the emergency” considerations;

- b) Details of test for aerodrome facilities and equipment to be used in emergencies, including the frequency of those tests;
- c) Details of exercises to test emergency plans, including the frequency of those exercises;
- d) Details regarding the observance of human factor principles in developing the plan
- e) Where the aerodrome is close to water, swampy areas or difficult terrain, availability and coordination with specialist rescue services.
- f) Details regarding the establishment and manning of Emergency Operations Centre, Command Post and for communication between them.
- g) a list of organizations, agencies and persons of authority, both on- and off airport, for site roles; their telephone and facsimile numbers, e-mail and SITA addresses and the radio frequencies of their offices;
- h) The establishment of an aerodrome emergency committee to organize training and other preparations for dealing with emergencies; and
- i) The appointment of an on-scene commander for the overall emergency operation.

13.2.7.12 Rescue and Fire-Fighting

Particulars of the facilities, equipment, personnel and procedures for meeting the rescue and fire-fighting requirements, including the names and roles of the persons responsible for dealing with the rescue and fire-fighting services at the aerodrome

Note – This subject should also be covered in appropriate detail in the aerodrome emergency plan.

13.2.7.13 Inspection of the aerodrome movement area and obstacle limitation surface by the Aerodrome Operator

Particulars of the procedures for the inspection of the aerodrome movement area and obstacle limitation surfaces, including the following:

- a) Arrangement for carrying out inspections, including runway friction and water-depth measurements on runways and taxiways, during and outside the normal hours of aerodrome operations;
- b) Arrangement and means of communicating with the aerodrome air traffic control unit during an inspection;
- c) Arrangements for keeping an inspection logbook, and the location of the logbook;
- d) Details of inspection intervals and times;
- e) Inspection checklist;
- f) Arrangement for reporting the results of inspections and for taking prompt follow-up actions to ensure correction of unsafe conditions; and

- g) The names and roles of persons responsible for carrying out inspections, and their telephone number during and after working hours.
- h) Procedure to monitor and report the condition of movement areas.
- i) Procedures to report the presence of water on runway.
- j) Procedures to report slippery runway condition

13.2.7.14 Visual Aids and Aerodrome Electrical Systems

Particulars of the procedures for the inspection and maintenance of aeronautical lights (including obstacle lighting), signs, markers and aerodrome electrical systems, including the following:

- a) Description of electrical system and power supply
- b) Description of Aerodrome Ground Lighting, including visual docking guidance system
- c) Arrangement for carrying out inspections during and outside the normal hours of aerodrome operation, and the checklist for such inspection;
- d) Arrangements for recording the results of inspections and for taking follow up action to correct deficiencies;
- e) Arrangements for carrying out routine maintenance and emergency maintenance, including description of inspection schedule, types of inspection and maintenance performance level requirements;
- f) Arrangements for secondary power supplies, if any, and, if applicable, the particulars of any other method of dealing with partial or total system failure and of monitoring lighting systems reliability; and
- g) The names and roles of the persons responsible for the inspection and maintenance of the electrical system, airfield lighting, markings and airfield signs, and the telephone numbers for contacting those persons during and after working hours.
- h) Submission of marking, signage, lighting and SMGCS plan.
- i) Procedure to prevent aircraft from entering permanently closed runways and taxiways.

Procedure to monitor or control non-aeronautical ground lights which could present a hazard to aircraft safety

13.2.7.15 Maintenance of the Movement Area

Particulars of the facilities and procedures for the maintenance of the movement area (names telephone numbers and roles of persons responsible for maintenance of movement area pavement and drainage), including the following :

- a) Arrangements for maintaining the paved areas , including FOD management, rubber removal programme and friction management programme for runways ;

- b) Arrangements for maintaining the unpaved runways and taxiways;
- c) Arrangements for maintaining the runway and taxiway strips; and
- d) Arrangements for the maintenance of aerodrome drainage.

13.2.7.16 Aerodrome work safety

Particulars of the procedures for planning and carrying out construction and maintenance work safely (including work that may have to be carried out at short notice) on or in the vicinity of the movement area which may extend above an obstacle limitation surface, including the following:

- a) Arrangements for communicating with the aerodrome air traffic control unit and other related parties during the progress of such work;
- b) Procedure for closing and reopening work areas
- c) Work notification and work permit process
- d) the names, telephone numbers and roles of the persons and organizations responsible for planning and carrying out the work, and arrangements for contacting those persons and organizations at all times;
- e) The names and telephone numbers, during and after working hours, of the aerodrome fixed-based operators, ground handling agents and aircraft operators who are to be notified of the work.
- f) A distribution list for work plans, if required.
- g) Procedure to return a runway to operational status after pavement overlay

13.2.7.17 Apron Management

Particulars of the apron management procedures, including the following:

- a) Arrangements between air traffic control and the apron management units, including procedures for transfer of control for arriving and departing aircraft;
- b) Arrangements for allocating aircraft parking positions, including arrangement for ensuring stand and equipment availability prior to aircraft arrival;
- c) Arrangements for initiating engine start and ensuring clearance of aircraft push-back; and
- d) Marshalling service.

13.2.7.18 Apron Safety Management

Procedures to ensure apron safety, including:

- a) Protection from jet blasts;
- b) Enforcement of safety precautions during aircraft refuelling operations;
- c) Apron sweeping;

- d) Apron cleaning;
- e) Arrangements for reporting incidents/accidents on an apron; and
- f) Arrangements for auditing the safety compliance of all personnel working on the apron.

13.2.7.19 Airside Vehicle Control

Particulars of the procedure for the control of surface vehicles on or in the vicinity of the movement area, including the following:

- a) Details of the application of traffic rules (including speed limits and the means of enforcing the rules); and
- b) The method of issuing driving permits for operating vehicles in the movement area.

13.2.7.20 Wildlife Hazard Management

Particulars of the procedures to deal with the danger posed to aircraft operations by the presence of bird or mammals in the aerodrome flight pattern or movement area, including the following:

- a) Arrangements for assessing wildlife hazards;
- b) Arrangements for implementing wildlife control programmes; and
- c) The names and roles of the persons responsible for dealing with wildlife hazards, and their telephone numbers during and after working hours.

13.2.7.21 Obstacle Control

Particulars setting out the procedures for:

- a) Monitoring the obstacle limitation surfaces and Type A Chart for obstacle in the take-off surface;
- b) Controlling obstacles within the authority of the operator;
- c) Monitoring the height of buildings or structures within the boundaries of the obstacle limitation surfaces;
- d) Controlling new developments in the vicinity of aerodromes; and
- e) Notifying the Authority of the nature and location of obstacles and any subsequent addition or removal of obstacles for action as necessary, including amendment of the AIS publications.

13.2.7.22 Removal of Disabled Aircraft

Particulars of the procedures for removing a disabled aircraft on or adjacent to the movement area, including the following:

- a) The roles of the aerodrome operator and the holder of the aircraft certificate of registration;
- b) Arrangements for notifying the holder of the certificate of registration;

- c) Arrangements for liaising with the aerodrome air traffic control unit;
- d) Arrangements for obtaining equipment and personnel to remove the disabled aircraft; and
- e) The names, role and telephone numbers of persons responsible for arranging for the removal of disabled aircraft

13.2.7.23 Handling of Hazardous Materials

Particulars of the procedures for the safe handling and storage of hazardous material on the aerodrome, including the following:

- a) arrangements for special areas on the aerodrome to be set up for the storage of inflammable liquids (including aviation fuels) and any other hazardous materials; and
- b) The method to be followed for the delivery, storage, dispensing and handling of hazardous materials,

Note – Hazardous materials include inflammable liquids and solid, corrosive liquids, compressed gases and magnetized or radioactive materials. Arrangements for dealing with the accidental spillage of hazardous materials should be included in the aerodrome emergency plan.

13.2.7.24 Low-visibility operations

Particulars of procedures to be introduced for low-visibility operations, including the measurement and reporting of runway visual range as and when required, and the names and telephone numbers, during and after working hours, of the persons responsible for measuring the runway visual range.

13.2.7.26 Protection of sites for Radar and Navigational Aids

Particulars of the procedures for the protection of sites for radar and radio navigational aids located on the aerodrome to ensure that their performance will not be degraded, including the following:

- a) Arrangements for the control of activities in the vicinity of radar and navaid installations;
- b) Arrangements for ground maintenance in the vicinity of these installations; and
- c) Arrangements for the supply and installation of signs warning hazardous microwave radiation.

Note 1 – In writing the procedures for each category, clear and precise information should be included on:

- When, or in what circumstances, an operating procedure is to be activated
- How an operating procedure is to be activated;
- Actions to be taken;
- The persons who are to carry out the actions; and
- The equipment necessary for carrying out the actions, and access to such equipment.

Note 2 – If any of the procedures specified above are not relevant or applicable, the reason should be given.

13.2.7.27 Details of the Aerodrome Administration and Safety Management System

13.2.7.28 Aerodrome Administration

Particulars of the aerodrome administration, including the following:

- a) an aerodrome organizational chart showing the names and positions of key personnel, including their responsibilities;
- b) The name, position and telephone number of the person who has overall responsibility for aerodrome safety;
- c) Airport committees; and
- d) particulars of staff training and competency, including the specifications of staff qualifications and experience, training and programme for upgrading of skills provided to staff on safety-related duties, and where necessary, the certification system for testing their competency.

13.2.7.29 Safety Management System (SMS)

Particulars of the safety management system established for ensuring compliance with all safety requirements and achieving continuous improvement in safety performance, the essential features being:

- a) The safety policy, insofar as applicable, on the safety management process and its relation to the operational and maintenance process;
- b) The structure or organization of the SMS, including staffing and the assignment of individual and group responsibilities for safety issues;
- c) SMS strategy and planning, such as setting safety performance target, allocating priorities for implementing safety initiatives and providing a framework for controlling the risks to as low a level as is reasonably practicable keeping always in view the requirements of the Standards and Recommended Practices in Volume I of Annex 14 to the Convention on International Civil Aviation, and the national regulations, standards, rules or orders.
- d) SMS implementation, including facilities, methods and procedures for the effective communication of safety messages and the enforcement of safety requirements;
- e) a system for the implementation of, and action on, critical safety areas which require a higher level of safety management integrity (safety measures programmes);
- f) measures for safety promotion and accident prevention and a system for risk control involving analysis and handling of accidents, incidents, complaints, defects, faults, discrepancies and failures, and continuing safety monitoring;
- g) The internal safety audit and review system detailing the systems and programmes for quality control of safety;

- h) The system for documenting all safety-related airport facilities as well as airport operational and maintenance records, including information on the design and construction of aircraft pavements and aerodrome lighting. The system should enable easy retrieval of record including charts; and
- i) The incorporation and enforcement of safety-related clauses in the contracts for construction work at the aerodrome.

13.2.7.30 Letter of Agreement between the Applicant and Designated Service Providers

To ensure safety of aeroplane operations at the aerodrome and in the associated airspace, the applicant will be required to coordinate with designated service providers and arrange for the provision of aeronautical information, air traffic control and aviation security services.

The applicant is therefore required to enter into a technical agreement with the entities or agencies responsible for providing air traffic control, aeronautical information and aviation security services as may be applicable at the aerodrome

In this connection, the applicant should submit to Authority:

- a. A copy of the Letter of Agreement signed between the applicant and the prospective aviation security service provider at the aerodrome, and a copy of the approved airport security programme detailing the arrangement in place at the airport to ensure optimum implementation of aviation security measures.
- b. A copy of Letter of Agreement signed between the applicant and prospective air traffic service provider at the aerodrome setting out the technical terms under which the services are to be provided.
- c. A copy of Letter of Agreement signed between the applicant and prospective communication, navigation and surveillance service provider at the aerodrome setting out the technical terms under which the services are to be provided.
- d. A copy of the Letter of Agreement signed between the applicant and the prospective aeronautical information service provider at the aerodrome to ensure accurate, up-to-date and timely information of aerodrome related safety condition is provided to aviation service users.
- e. A copy of the letter of approval or authorization of the prospective air traffic and communication, navigation and surveillance service provider(s), issued by the Authority following its assessment of the facilities equipment procedures personnel structure and organization of the service provider, and attesting to the competence and capability of the service providers to provide safe air traffic and communication and navigation services at the airport.

APPENDIX 1 : LCAA CERTIFICATION APPLICATION (EXPRESSION OF INTEREST) FORM: LCAA-CA-02

1. PARTICULARS OF THE APPLICANT												
a) FULL NAME												
b) ADDRESS												
c) POSTAL CODE				d) POSITION								
e) PHONE			f) FAX			g) E MAIL						
2. PARTICULARS OF THE AERODROME												
<i>Note: This application must be accompanied by map extract showing the exact Aerodrome Boundary by means of a red line</i>												
a) Proposed Aerodrome Name												
b) Real Property Description												
c) Geographical Coordinates of the Site (in degrees, minutes and seconds)												
i) Longitude				ii) Latitude								
d) Bearing and Distance from the nearest Town or Populous Are												
3. AERODROME ACTIVITIES												
a) Public Use	Yes	No	b) Private Use	Yes	No	c) Day/Night Use	Yes	No	d) Day Use only	Yes	No	
e) Proposed Operating Hrs	Yes	No	f) International Operations	Yes	No	g) Domestic Operations	Yes	No				
h) Passenger Service Air	Yes	No	i) Freight or Mail	Yes	No	j) Maintenance	Yes	No				
k) Royalty/State/Executive	Yes	No	l) Hospital	Yes	No	m) Flying Trg	Yes	No				
n) Aerial Works	Yes	No	o) Ballooning	Yes	No	p) Parachuting	Yes	No				
q) Light Sport Aircraft	Yes	No										
3. AERODROME OPERATIONAL SPECIFICATION												
a) Largest type of Airplane intended for the Aerodrome :												
b) Largest type of helicopter intended to use the helipads												
c) Approach Category				d) Aerodromes				e) Helipads				
i) Non Instrument				i) Aerodrome Reference Code				i) Heliport "D" Value				
ii) Instrument				ii) Overall Aircraft Length (m)				ii) Largest overall dimension (m):				
iii) Precision				iii) Maximum fuselage width (m)				iii) Performance Class				
1) Category 1				iv) Outer main gear wheel span (m)								
2) Category 2				v) Wing span (m)								
3) Category 3												
iv) Non Precision												
4. DETAILS TO BE HOWN ON THE AERODROME CERTIFICATE												
a) Aerodrome Name												
b) Aerodrome Operator												
c) Address												

5. AIR TRAFFIC SERVICES		
<i>Note: You should apply separately to the relevant national telecommunication authority for frequency allocation</i>		
Which of the following will be provided:		
a) Air Traffic Control Service with licensed air traffic controllers?	Yes :	No :
b) Aerodrome Flight Information Service?	Yes :	No :
c) Air/Ground or FISO Service?	Yes :	No :
4. COMMENTS		
5. DECLARATION		
<p>I hereby certify that the foregoing information is correct in every respect and no relevant information has been withheld. I undertake to pay the Liberia Civil Aviation Authority's Service Fee in respect of this application and agree to abide by the terms and conditions of holding an Aerodrome Certificate as outlined in national civil aviation regulation.</p> <p><i>Note: It is an offence to make any false representation with intent to deceive, for the purpose of procuring the grant, issue, renewal or variation of an Aerodrome Certificate. A person found guilty of such an offence is liable to a fine on summary conviction and to a fine, imprisonment or both on conviction on indictment.</i></p> <p>Name:</p> <p>Title:</p> <p>Signature:</p> <p>Date:</p>		
<p>If you have any difficulty completing this application form then please do not hesitate to contact the National Authority. Send with this application form and the required supporting documentation to the National Authority by one of the following:</p>		
Post:	Courier	E-mail
Liberia CAA: Attn: Name, Title Address City, State, Country	Building Address Attn: Name, Title City , State, Country Phone: xxx	authority@domain.gov

APPENDIX 2 : LCAA CERTIFICATION APPLICATION (EXTERNAL CLEARANCE/APPROVAL)
FORM LCAA-CA-02

1. REQUIRED DOCUMENTATION		
<i>Note: Before submitting this application, the relevant authorities as indicated in BLOCK 1 , should be consulted and if appropriate, their approvals obtained. There may also be other bodies that applicants should inform in their own interests; it is the responsibility of the applicant to obtain the appropriate approvals.</i>		
a) Have the following being attached :		
b) Environmental Impact Assessment Approval?	Yes :	No :
c) Federal Government Security Clearance?	Yes :	No :
d) Details of right held in relation to the site; and		
e) Name and address of the owner of the site and written evidence that permission has been obtained for the site to be used by the applicant as an aerodrome	Yes :	No :
f) Business Continuity Plan, if required	Yes :	No :
g) Survey Plan of the Area	Yes :	No :
2. COMMENTS		
a) Have any of the relevant authorities in Block 1 above raised any objections to the proposed use of the site as an aerodrome or the proponents status as an aerodrome operator:	Yes :	No :
b) If yes, please State the Authority concerned and the nature of the objection:		
3. DECLARATION		
<p>I hereby certify that the foregoing information is correct in every respect and no relevant information has been withheld. I undertake to pay the Liberia Civil Aviation Authority's Service Fee in respect of this application and agree to abide by the terms and conditions of holding an Aerodrome Certificate as outlined in national civil aviation regulation.</p> <p><i>Note: It is an offence to make any false representation with intent to deceive, for the purpose of procuring the grant, issue, renewal or variation of an Aerodrome Certificate. A person found guilty of such an offence is liable to a fine on summary conviction and to a fine, imprisonment or both on conviction on indictment.</i></p> <p>Name:</p> <p>Title:</p> <p>Signature:</p> <p>Date:</p>		
If you have any difficulty completing this application form then please do not hesitate to contact the National Authority. Send with this application form and the required supporting documentation to the National Authority by one of the following:		
Post:	Courier	E-mail
Liberia CAA: Attn: Name, Title Address City, State, Country	Building Address Attn: Name, Title City , State, Country Phone: xxx	authority@domain.gov

APPENDIX 3 : CERTIFICATION APPLICATION (DESIGN COMPLIANCE AND CONSTRUCTION) FORM: LCAA-CA-03

1. GENERAL DETAILS			
a) Aerodrome Name			
b) Aerodrome ICAO Designator :			
c) Proposed Aerodrome Certificate Holder :			
Application Point of Contact			
d) Name		e) Title	
f) Organization			
g) Phone Number		h) E-mail	
2. SUPPORTING DOCUMENTS			
<i>Please indicate which of the following document are included as part of this application. If a required document is not included please include a comment in Section 3 explaining why.</i>			
b) Airport Drawing Checklist (Completed)?		Yes :	No :
c) Airport Drawings?		Yes :	No :
d) Airport Drawing Narrative Report		Yes	
e) Receipt for Payment of Service Fee		Yes :	No :
f) Other Documents			
3. COMMENTS			
4. DECLARATION			
<p>I hereby certify that the foregoing information is correct in every respect and no relevant information has been withheld. I undertake to pay the Liberia Civil Aviation Authority's Service Fee in respect of this application and agree to abide by the terms and conditions of holding an Aerodrome Certificate as outlined in national civil aviation regulation.</p> <p><i>Note: It is an offence to make any false representation with intent to deceive, for the purpose of procuring the grant, issue, renewal or variation of an Aerodrome Certificate. A person found guilty of such an offence is liable to a fine on summary conviction and to a fine, imprisonment or both on conviction on indictment.</i></p> <p>Name:</p> <p>Title:</p> <p>Signature:</p> <p>Date:</p>			

APPENDIX 4 : CERTIFICATION APPLICATION (OPERATIONAL COMPLIANCE FORM: LCAA-AC-04)

1. GENERAL DETAILS			
a) Aerodrome Name			
b) Aerodrome ICAO Designator :			
c) Proposed Aerodrome Certificate Holder :			
Application Point of Contact			
d) Name			e) Title
f) Organization			
g) Phone Number		h) E-mail	
2. SUPPORTING DOCUMENTS			
<i>Please indicate which of the following document are included as part of this application. If a required document is not included please include a comment in Section 3 explaining why. It is recognised that some of the documents could be annexes to the Aerodrome Manual. These could be listed under f) – other documents</i>			
b) Compliance Statement (Completed)?	Yes :	No :	N/A:
c) Aerodrome Manual?	Yes :	No :	N/A:
f) Other Documents			
3. SUPPORTING AGREEMENTS/APPROVALS			
<i>Please indicate which of the following agreements/approvals are included as part of this application.</i>			
a) Agreement between the aerodrome operator and the organisation that will be responsible for provision of air navigation services in respect of the terms under which such services are to be provided	Yes :	No :	N/A:
b) Agreement between the aerodrome operator and the organisation intending to provide aviation security respecting the terms under which such service will be provided	Yes :	No :	N/A:
c) Aviation Security Programme Approval, if required	Yes :	No :	N/A:
d) Air Traffic Service Provider Approval, if required	Yes :	No :	N/A:

3. COMMENTS			
4. KEY MANAGEMENT PERSONNEL			
Accountable Manager			
a) Name		e) Title	
b) Phone Number		h) E-mail	
c) Post Holder		Yes :	No :
Key Person Responsible for Aerodrome Safety			
a) Name		e) Title	
b) Phone Number		h) E-mail	
c) Post Holder		Yes :	No :
Key Person Responsible for Aerodrome Operations			
a) Name		e) Title	
b) Phone Number		h) E-mail	
c) Post Holder		Yes :	No :
Key Person Responsible for Rescue and Fire Fighting Services			
a) Name		e) Title	
b) Phone Number		h) E-mail	
c) Post Holder		Yes :	No :
Key Person Responsible for Aerodrome Maintenance			
a) Name		e) Title	
b) Phone Number		h) E-mail	
c) Post Holder		Yes :	No :
Key Person Responsible for Air Traffic Services			
a) Name		e) Title	
b) Phone Number		h) E-mail	
c) Post Holder		Yes :	No :
5. DECLARATION			
<p>I hereby certify that the foregoing information is correct in every respect and no relevant information has been withheld. I undertake to pay the Liberia Civil Aviation Authority's Service Fee in respect of this application and agree to abide by the terms and conditions of holding an Aerodrome Certificate as outlined in national civil aviation regulation.</p> <p><i>Note: It is an offence to make any false representation with intent to deceive, for the purpose of procuring the grant, issue, renewal or variation of an Aerodrome Certificate. A person found guilty of such an offence is liable to a fine on summary conviction and to a fine, imprisonment or both on conviction on indictment.</i></p> <p>Name:</p> <p>Title:</p> <p>Signature:</p> <p>Date:</p>			

APPENDIX 5: ADDITIONAL INFORMATION FOR DEVELOPMENT OF AERODROME

Site Selection Survey

The applicant is required to carry out a site selection survey of the site(s) under consideration. The survey is to ensure that the operation of an aerodrome at the specified location will not endanger the safety of aircraft operations.

Relevant data upon which the survey should be based include: Reliable wind distribution statistics that extend over as long a period as possible, preferably not less than five years. The observation should be made at least eight times daily and spaced at equal intervals of time; Noise contour/exposure map indicating the areas around aerodrome vicinities likely to be exposed to significant or unacceptable levels of noise, based on projected aircraft operations; and Soil investigation report.

The survey should take into consideration the proximity of the aerodrome to other aerodromes and landing sites; any excessive operational restriction requirements; any existing restrictions and controlled airspace; and any existing instrument procedures.

An applicant is advised to employ the services of a consultant with proven track record, experience and expertise in the conduct of site selection studies.

The applicant is also required to carry out an Environmental Impact Assessment (EIA) of the site. The primary purpose of the EIA report is to ensure that due cognisance is given to the policies and goals defined in Environment Protection Act and that they are integrated into the proposed aerodrome project. The report shall provide fair, full and explicit discussion of significant environmental impact and shall inform decision makers and the public of the reasonable alternatives which would avoid or minimise adverse impacts or enhance the quality of the environment.

APPENDIX 6 : TECHNICAL INSPECTIONS AND ON-SITE VERIFICATIONS

INTRODUCTION

The aim of this section is to list the main items to be reviewed during the initial certification.

The following list may be expanded in accordance with LCAA certification requirements.

By following these lists, the Authority will base its checks on the same items while adapting its checklists to the LCAR Part XX regulation, thus harmonizing its inspections.

The oversight audit checklist may be based on the same lists.

TECHNICAL INSPECTIONS

Infrastructure and ground aids

Initial certification of the infrastructure and ground aids includes:

- (a) Obstacle restrictions:
 - (1) OLS:
 - i. the surfaces are defined;
 - ii. as few objects as possible penetrate the OLS;
 - iii. any obstacles that do penetrate the OLS are appropriately marked and lit. Operational restrictions may apply as appropriate;
 - (2) obstacle free zone (OFZ):
 - i. these surfaces are defined when required;
 - ii. no object penetrates the OFZ unless essential for the safety of air navigation and is frangible;
 - (3) objects on the areas near the runway or the taxiways (runway strips, clearway, stop way, runway end safety area, taxiway strips, radio altimeter operating area, pre-threshold area) comply with the requirements;
- (b) Physical characteristics:
 - (1) in order to facilitate the verification of compliance of the physical characteristics of the aerodrome, LCAA may use the reference code method developed in LCAR Part 13.2. The reference code provides a simple method for interrelating the numerous specifications concerning the characteristics of aerodromes so as to provide a series of aerodrome facilities that are suitable for the aeroplanes that are intended to operate at the aerodrome;

- (2) the aerodrome operator may indicate in its aerodrome manual the reference code chosen for each element of the movement area so that the **LCAA** can check compliance of the runways and taxiways and their associated characteristics against the requirements of the reference code as well as other specifications (bearing strength, surface characteristics, slopes);
- (3) runways:
 - i. the physical characteristics:
 - are compliant with the applicable regulation and the reference code;
 - characteristics are adequately and regularly measured;
 - ii. the published declared distances are in accordance with the situation on site;
 - iii. the areas near the runway (runway shoulders, runway strips, clearway, stopway, runway end safety area, radio altimeter operating area, pre-threshold area) are compliant with the applicable regulation and the reference code in terms of width, length, type of surface, resistance, slopes, grading and objects on them;
 - iv. the relevant separation distances are compliant with the **LCAR Part** 13.2 and the reference code;
- (4) taxiways:
 - i. the physical characteristics (width, curve radius, extra taxiway width, longitudinal and transverse slopes, radius of turn-off curve for rapid exit taxiways, surface type, bearing strength) are compliant with the published reference code for each taxiway;
 - ii. the taxiway shoulders and strips are compliant with their reference code in terms of width, type of surface, slopes and objects on them;
 - iii. the taxiways on bridges are compliant with their reference code in terms of width;
 - iv. the relevant separation distances are compliant with **LCAR Part** 13.2 and the reference code;
- (5) service roads:
 - i. road-holding positions are established at the intersection of a road and a runway at a distance compliant with the reference code;
- (6) holding bays, runway-holding positions and intermediate holding positions:
 - i. road-holding positions are established at the intersection of a road and a runway at a distance compliant with the reference code;
 - ii. the holding bays, runway-holding positions and intermediate holding positions are located in accordance with the applicable reference code;
- (c) Electrical systems:

- (1) adequate primary power supply is available;
 - (2) the switch-over time meets the requirements;
 - (3) when required, a secondary power supply is available;
 - (4) the air traffic service (ATS) has feedback on the status of ground aids when required;
- (d) Visual aids:
- (1) markings:
 - i. all the markings:
 - are in place where required;
 - are located as required and in the required number;
 - have the dimensions and colours required;
 - ii. this includes, when required:
 - the runway markings (runway designation marking, threshold marking, runway centre line marking, runway side stripe marking, aiming point marking, touchdown zone marking, runway turn pad marking);
 - the taxiway markings (taxiway centre line and enhanced taxiway centre line marking, taxiway side stripe marking, runway-holding position marking, intermediate holding position marking);
 - the apron markings;
 - the mandatory instruction markings;
 - the information markings (that do not have to be displayed but are to be compliant when displayed);
 - a road-holding position marking (that is compliant with **LCAR Part 13.2**);
 - a VOR aerodrome checkpoint marking;
 - a non-load bearing surface marking;
 - (2) signs:
 - i. all the signs:
 - are in place where required;
 - are located as required;

- have the dimensions and colours required;
 - have an adequate lighting system when required;
 - are frangible when required;
 - ii. this includes when required:
 - mandatory instruction signs (runway designation signs, runway-holding position signs, Category I, II and III holding position signs, no entry signs);
 - information signs (direction signs, location signs, runway vacated signs, runway exit signs, intersection take-off signs, destination signs, road-holding position signs, VOR checkpoint signs aerodrome identification sign);
- (3) lights:
- i. there should not be any non-aeronautical lights that might endanger the safety of an aeroplane;
 - ii. all the aeronautical lights:
 - are displayed when required;
 - located as required and in the required number;
 - have the required colours and intensity levels;
 - comply with their serviceability levels or maintenance objectives;
 - are frangible when elevated as required;
 - iii. this includes, when required:
 - the approach lighting system;
 - the runway lead-in lighting systems;
 - the visual approach slope indicator system (VASIS or PAPI);
 - the runway lights (runway centre line lights, runway edge lights, runway threshold identification lights, runway end lights, runway threshold and wing bar lights, runway touchdown zone lights, stopway lights, runway turn pad lights);
 - the taxiway lights (taxiway centre line lights, taxiway edge lights, stop bars, no-entry bars, intermediate holding position lights, rapid exit taxiway indicator lights);

- de-icing/anti-icing facility exit lights;
- runway guard lights;
- road-holding position lights;
- unserviceability lights;
- aeronautical beacons;
- obstacle lights;

(4) markers:

i. tall the markers:

- are in place where required;
- are located as required and in the required number;
- have the required colours;
- are frangible;

ii. this includes, when required:

- the taxiway markers (taxiway edge markers, taxiway centre line markers);
- the unpaved runway edge markers;
- the boundary markers;
- the stopway edge markers;
- the edge markers for snow-covered runways;
- unserviceability markers;

(5) indicators:

i. a wind direction indicator:

- is provided in the correct location;
- complies with the location and characteristics requirements;
- is illuminated at an aerodrome intended for use at night.

RFF services

Initial certification of RFF services includes:

(a) Level of protection:

- (1) the level of protection is promulgated in the AIP;
- (2) the aerodrome operator has a procedure to regularly reassess the traffic and update the level of protection including unavailability;
- (3) the aerodrome operator has made arrangements with the aeronautical information services, including ATS, to provide up-to-date information in case of any change in the level of protection;

(b) RFF personnel:

- (1) the number of RFF personnel is consistent with the level of protection appropriate to the aerodrome RFF category;

Note.— Guidance on the use of a task resource analysis in determining the minimum number of RFF personnel required can be found in the Airport Services Manual (Doc 9137), Part 1 — Rescue and Fire Fighting.

- (2) the training of all RFF personnel is adequate and monitored;
- (3) the training facilities, which may include simulation equipment for training on aeroplane fires, are available;
- (4) the procedures that RFF personnel follow are kept up to date;

(c) Response:

- (1) the RFF service is provided with an up-to-date map of its response area, including the access roads;
- (2) the response time complies with the applicable regulation and is regularly tested. This check should be formalized in the RFF procedures;
- (3) the RFF service has procedures that describe this response and ensure that in case of an incident/accident a report is written and filed;
- (4) a communication and alerting system is provided between the fire station, the control tower and the RFF vehicles;

(d) Rescue equipment:

- (1) the number of RFF vehicles is consistent with **LCAR Part 13.2**;
- (2) the RFF service has a procedure describing the maintenance of the RFF vehicles and ensuring that this maintenance is formally monitored;

- (3) the types and quantities of the extinguishing agents, including the reserve supply, are consistent with the **LCAR Part 13.2**;
- (4) the protective clothing and respiratory equipment provided are consistent in quality and quantity in accordance with the **LCAR Part 13.2**, and the respiratory equipment is properly checked and their quantities formally monitored;
- (5) specific rescue equipment is provided in adequate number and type when the area to be covered by the RFF service includes water;
- (6) any other equipment required by the applicable regulation is provided in sufficient number.

Wildlife hazard management

The following checks on wildlife hazard management can either be a technical inspection or included in the audit of the aerodrome operator's procedures:

- (a) The required equipment is provided;
- (b) Fences are provided as required;
- (c) The aerodrome operator has a procedure describing the actions taken for discouraging the presence of wildlife, including:
 - (1) who is in charge of those actions and what their training is;
 - (2) how and when these actions are carried out, including reporting and filing of these actions;
 - (3) what equipment is used to conduct these actions;
 - (4) analyses of the aerodrome vicinity and the preventive actions to be taken subsequently to discourage wildlife;
 - (5) monitoring of these actions, including, where applicable, the conduct of appropriate wildlife assessments;
 - (6) coordination with ATS;
- (d) The aerodrome operator has a procedure to:
 - (1) record and analyse the incidents involving wildlife;

- (2) collect the wildlife's remains;
- (3) monitor the corrective actions to be taken subsequently; and
- (4) report to the State incidents involving wildlife.

ON-SITE VERIFICATION OF THE OPERATOR'S PROCEDURES AND SMS

On-site verification of the operator's procedures

On-site verification of the aerodrome operator's procedures should include the following:

- (a) Aerodrome data and reporting:
 - (1) completeness, correctness and integrity of the data reported in accordance with the AIP including:
 - i. data collection, including the status of the movement area and its facilities;
 - ii. data validity checks;
 - iii. data transmission;
 - iv. changes to published data, whether permanent or not;
 - v. checks of the information once published;
 - vi. information update after construction works;
 - (2) formal coordination with ATS;
 - (3) formal coordination with the aeronautical information services;
 - (4) publication of the required information in the aeronautical publication;
 - (5) information published in accordance with the situation on site;
- (b) Access to the movement area:
 - (1) an up-to-date plan clearly showing all the access points to the movement area;
 - (2) a procedure describing the inspection of access points and fences;

Note.— Procedures for access to the manoeuvring areas are often markedly different from those for the apron areas.

- (c) Aerodrome emergency plan:

- (1) an up-to-date aerodrome emergency plan;
 - (2) regular exercises in relation to the emergency plan;
 - (3) a procedure describing the tasks in the emergency plan;

 - (4) the aerodrome operator regularly verifies the information in the emergency plan, including keeping an up-to-date list of the persons and contact details in the emergency plan;
 - (5) a procedure describing its roles and responsibilities during emergencies;
 - (6) a procedure describing the involvement of, and coordination with, other agencies during emergencies;
 - (7) the required minimum emergency equipment is available, including an adequately equipped emergency operation centre and mobile command post;
- (d) RFF:
- (1) a technical inspection of the various elements of the RFF services in 2.2 b) is held prior to the audit;
 - (2) the checks that are to be done during the aerodrome operator's on-site verification consist only of verifying the timely implementation of the corrective action plan subsequent to the technical inspection;
 - (3) if on-site verification reveals new deviations, they should be included in the on-site verification report;
- (e) Inspection of the movement area:
- (1) a procedure to ensure there is coordination with ATS for the inspection of the movement area;
 - (2) describe the inspections, if performed by the aerodrome operator, including:
 - i. frequency and scope;
 - ii. reporting, transmission and filing;
 - iii. actions to be taken and their monitoring;
 - (3) assess, measure and report runway surface characteristics when the runway is wet or contaminated and their subsequent promulgation to ATS;
- (f) Maintenance of the movement area:

- (1) a procedure to periodically measure the runway surface friction characteristics, assessing their adequacy and any action required;
 - (2) ensure there is a long-term maintenance plan, including the management of the runway surface friction characteristics, pavement, visual aids, fencing, drainage systems and electrical systems and buildings;
- (g) Hazardous meteorological conditions:
- (1) for hazardous meteorological situations that may occur at the aerodrome (such as thunderstorms, strong surface winds and gusts, sandstorms), the aerodrome operator should have procedures describing the actions that have to be taken and defining the responsibilities and criteria for suspension of operations on the runway;
 - (2) the aerodrome operator has formal coordination with the meteorological service provider in order to be advised of any significant meteorological conditions;
- (h) Visual aids and aerodrome electrical systems:
- (1) if the aerodrome operator is responsible for the maintenance of visual aids and electrical systems, procedures exist describing:
 - i. the tasks — routine and emergency ones, including inspections of luminous and non-luminous aids and their frequency and power supply maintenance;
 - ii. reporting, transmission and filing of reports;
 - iii. monitoring of subsequent actions;
 - iv. coordination with ATS;
 - (2) if the aerodrome operator is not in charge of maintenance of visual aids and electrical systems, the organization in charge needs to be clearly identified, ensuring there are formal coordination procedures with the aerodrome operator, including agreed objectives;
 - (3) obstacle marking is taken into account;
- (i) Operational safety during aerodrome work:
- (1) when executing work on the aerodrome:

- i. a procedure describing the necessary notification to the different stakeholders;
 - ii. risk assessment of the aerodrome work;
 - iii. roles and responsibilities of the various parties, including their relationship and the enforcement of safety measures;
 - iv. safety monitoring during the work;
 - v. reopening of facilities, where relevant;
 - vi. necessary coordination with ATS;
- (j) Apron management. When an apron management service is provided:
 - (1) a procedure to ensure coordination with ATS;
 - (2) the use of acceptable aeroplanes for each parking stand formally identified;
 - (3) a compliant apron safety line is provided;
 - (4) general safety instructions for all the agents on the apron area;
 - (5) the placement and pushback of the aeroplane;
- (k) Apron safety management:
 - (1) a procedure for the inspection of the apron area (see j));
 - (2) there is coordination with other parties accessing the apron, such as fuelling companies, de-icing companies and other ground handling agencies;
- (l) Vehicles on the movement area:
 - (1) a procedure to ensure the vehicles on the movement area are adequately equipped;
 - (2) the drivers have followed the appropriate training;
 - (3) if the aerodrome operator is responsible for the training of vehicular drivers on the manoeuvring area, an appropriate training plan, including recurrent training and awareness actions, is available;
 - (4) if the aerodrome operator is not in charge of this training or some of this training, the service provider is clearly identified and there is formal coordination between them;

Note.— Guidance on the knowledge required by operators of vehicles can be found in Annex 14, Volume I, Attachment A, section 19.

- (m) **Wildlife hazard management.** Checks on wildlife hazard management can either be a technical inspection or included in the on-site verification of the operator's procedures:
 - (1) if the domain has not been inspected during the technical inspections, the on-site verification team should check the points listed in 2.3 c) above;
 - (2) if a technical inspection has been carried out prior to the on-site verification, the latter consists in checking the timely implementation of the corrective action plan subsequent to the technical inspection;
 - (3) if the on-site verification reveals new deviations, these have to be included in the on-site verification report;

- (n) **Obstacles:**
 - (1) a procedure to ensure that there is an obstacle chart;
 - (2) a procedure for obstacle monitoring describing the checks, their frequency, filing and follow-up actions;
 - (3) a procedure to ensure that the obstacles do not represent a danger for safety and that appropriate action is taken when required;

- (o) **Removal of a disabled aeroplane:**
 - (1) there is a plan for the removal of a disabled aeroplane describing the role and responsibility of the aerodrome operator, including the necessary coordination with other agencies and the means available or that can be made available;

- (p) **Low visibility operations:**
 - (1) there is coordination between the aerodrome operator and ATS, including awareness of the status of both low visibility procedures (LVP) and the deterioration of visual aids;
 - (2) a procedure describing the actions to be taken when LVP is in process (vehicle control, visual range measurement if necessary);

On-site verification of the SMS

- (a) **As a minimum, the items to be in place when granting the initial certification are:**
 - (1) **safety policy:** a safety policy has been endorsed by the accountable executive to reflect the organization's commitments regarding safety;
 - (2) **operator's organizational structure:** the aerodrome operator has appointed an accountable executive and a safety manager;

- (b) The safety manager should be independent from any operational task regarding aerodrome safety. The criteria for assessing the operator's SMS structure might be tailored to the size of the operator, notably concerning the independence of the safety manager;
- (c) The capability and competence of the aerodrome operator should be assessed so as to ensure sufficient management commitment to and responsibility for safety at the aerodrome. This is usually achieved through the competence of the accountable executive;
 - (1) responsibilities and assignments: the aerodrome operator has formally defined the responsibilities of each staff member regarding safety as well as the lines of responsibility;
 - (2) training: the aerodrome operator formally monitors the staff's and subcontractors' training, ensuring that it is adequate, and takes action when necessary;
 - (3) accident and incident reporting: the aerodrome operator has a procedure ensuring that:
 - i. incidents are reported by staff and subcontractors, including a description of the actions in place in order to be able to report them;
 - ii. incidents are promptly analysed and the actions to be subsequently taken are monitored;
 - iii. the reports and analyses of the incidents are filed;
 - iv. incidents are reported to the State;
 - v. coordination is in place with other stakeholders;
 - (4) existing hazards at the aerodrome: a procedure in order to identify, analyse and assess hazards to the safe operation of aeroplanes and to put in place suitable mitigating measures;
 - (5) risk assessment and mitigation of changes: a procedure ensuring that for any change at the aerodrome, its impact on safety is analysed, listing the subsequent hazards that could be generated. This procedure describes who conducts the analysis, when and how the hazards are monitored, what actions are subsequently taken, and the criteria leading to the analysis. These assessments are filed;
 - (6) safety indicators: the aerodrome operator sets and monitors its own safety indicators that illustrate its safety criteria, in order to be able to analyse the potential deficiencies;

Note.— Ensure coordination with previous safety indicators as set by the State.

- (7) safety audits: the aerodrome operator has a safety audit programme in place which includes a training programme for those involved;

- (8) safety promotion: the aerodrome operator should have a process to promote safety-related information.

APPENDIX 7 : CHECKLIST OF THE COMPONENTS OF AN AERODROME MANUAL

1.	Introduction	YES	NO
a)	Purpose of the aerodrome manual.		
b)	Legal position regarding aerodrome certification as contained in the applicable regulation.		
c)	Distribution of the aerodrome manual.		
d)	Procedures for distributing and amending the aerodrome manual and the circumstances in which amendments may be needed.		
e)	Checklist of pages.		
f)	Preface by licence holder.		
g)	Table of contents.		
h)	Glossary of terms.		
	<i>Note.— This section will contain a short explanation of the general terms used in the aerodrome manual including job titles and abbreviations.</i>		
2.	Technical administration		
a)	Name and address of the aerodrome.		
b)	Name and address of the aerodrome operator.		
c)	The name of the accountable executive.		
3.	Description of the aerodrome (aerodrome characteristics)		
a)	Details of the following:		
1)	latitude and longitude of the aerodrome reference point in World Geodetic System — 1984 (WGS-84) format;		
2)	elevations of: <input type="checkbox"/> aerodrome <input type="checkbox"/> apron		
b)	Plans showing the position of the aerodrome reference point, layout of the runways, taxiways and aprons; the aerodrome markings and lighting (including the precision approach path indicator (PAPI), the visual approach slope indicator system (VASIS) and obstruction lighting); and the siting of navigation aids within the runway strips. It will not be necessary for these plans or the information called for in subparagraphs c) to f) below to accompany all copies of the aerodrome manual, but they are to be appended to the licence holder's master copy and to the copy kept with the State regulator. Operating staff are to be provided with scaled-down copies or extracts of plans relevant to their duties.		
c)	Description, height and location of obstacles that infringe upon the standard protection surfaces, whether they are lighted and if they are noted in the aeronautical publications		
d)	Procedures for ensuring that the plans are up to date and accurate.		
e)	Data for, and the method used to calculate, declared distances and elevations at the beginning and end of each declared distance.		

f)	Details of the surfaces, dimensions and classification or bearing strengths of runways, taxiways and aprons.		
4.	List of authorized deviations, if any.		
5.	Operational procedures for:		
5.1	Promulgation of aeronautical information		
	The system of aeronautical information service available and the system that the certificate holder uses to promulgate AIP requirements.		
5.2	Control of access		
	Control of access to the aerodrome and its operational areas, including the location of notice boards, and the control of vehicles in the operational areas.		
5.3	Emergency planning		
a)	The aerodrome operator's arrangements in response to an emergency. These arrangements should take account of the complexity and size of the aeroplane operations.		
b)	Control of access to the aerodrome and its operational areas, including the location of notice boards, and the control of vehicles in the operational areas. Description of actions to be taken by the aerodrome operator as part of plans for dealing with different emergencies occurring at the aerodrome or in its vicinity.		
c)	Contact list of organizations, agencies and persons of authority.		
d)	Procedures for the appointment of an on-scene commander for the overall emergency operation and description of responsibilities for each type of emergency.		
e)	Reporting mechanism in the event of emergency.		
f)	Details of tests of aerodrome facilities and equipment to be used in emergencies, including the frequency of those tests		
g)	Details of the exercises to test emergency plans, including the frequency of those exercises.		
h)	Arrangements for personnel training and preparation for dealing with emergencies.		
5.4	Rescue and fire fighting (RFF) services		
a)	Policy statement on the RFF categories to be provided.		
b)	Where the senior aerodrome fire officer or designated fire watch officers have specific safety accountabilities, these should be included in the relevant chapter of the aerodrome manual.		
c)	Policy and procedures indicating how depletion of the RFF service is to be managed. This should include the extent to which operations are to be restricted, how pilots are to be notified and the maximum duration of any depletion.		
d)	At aerodromes where a higher category of RFF is available by prior arrangement, the aerodrome manual should clearly state the actions necessary to upgrade the facility. Where necessary, this should include actions to be taken by other departments.		

e)	The aerodrome operator's objectives for each RFF category provided should be defined, including a brief description of:		
1)	amounts of extinguishing agents provided;		
2)	discharge rates;		
3)	number of foam-producing appliances;		
4)	manning levels;		
5)	levels of supervision.		
f)	Procedures for:		
1)	monitoring the aeroplane movement areas for the purpose of alerting RFF personnel;		
2)	indicating how the adequacy of the response time capability of the RFF services throughout their functions and locations is monitored and maintained;		
3)	indicating how RFF personnel engaged in extraneous duties are managed to ensure that response capability is not affected.		
g)	Where the aerodrome provides specialist equipment such as rescue craft, emergency tenders, hose layers, and appliances with aerial capability, details should be included in the aerodrome manual. Procedures to be followed if these facilities are temporarily unavailable should also be included.		
h)	Where the aerodrome is reliant upon other organizations to provide equipment which is essential for ensuring the safe operation of the aerodrome (perhaps water rescue), policies or letters of agreement should be included in the aerodrome manual. Where necessary, contingency plans in the event of nonavailability should be described.		
i)	A statement describing the process by which aerodrome operators ensure the initial and continued competence of their RFF personnel, including the following:		
1)	realistic fuel fire training;		
2)	breathing apparatus training in heat and smoke;		
3)	first aid;		
4)	low visibility procedures (LVP);		
5)	any legal requirements;		
6)	health and safety policy with regard to training of personnel in the use of respiratory protection equipment and personal protection equipment.		

j)	Procedures indicating how accidents in the immediate vicinity of the aerodrome are to be accessed. Where difficult environs exist, the aerodrome manual should indicate how these are to be accessed.		
k)	Where local authorities or the aerodrome operator expects the RFF facility to respond to domestic fires or special services, procedures for managing their impact upon normal aeroplane RFF responses should be included.		
l)	Where the aerodrome operator expects the RFF facility to respond to aeroplane accidents landside, the policy should be clearly described, including procedures to manage the effects on continued aeroplane operations.		
m)	The availability of additional water supplies should be described.		
n)	Aerodrome operator's arrangements for ensuring the adequacy of responses in abnormal conditions, i.e. LVP.		
5.5	Inspections of the movement area		
a)	Routine aerodrome inspections, including lighting inspections, and reporting, including the nature and frequency of these inspections.		
b)	Inspecting the apron, runways and taxiways following a report of debris on the movement area, an abandoned take-off due to engine, tire or wheel failure, or any incident likely to result in debris being left in a hazardous position.		
c)	Sweeping of runways, taxiways and aprons.		
d)	Measurement and promulgation of water, slush and other contaminants including depths on runways and taxiways.		
e)	Assessment and promulgation of runway surface conditions:		
1)	details of inspection intervals and times;		
2)	completion and effective use of an inspection checklist;		
3)	arrangements and methods for carrying out inspections on FOD, lighting, pavement surface, grassing;		
4)	arrangements for reporting the results of inspections and for follow-up;		
5)	arrangements and means of communication with air traffic control during an inspection;		
6)	arrangements for keeping an inspection logbook and the location of the logbook		
5.6	Maintenance of the movement area		
a)	Promulgation of information on the aerodrome operational state, temporary withdrawals of facilities, runway closures, etc.:		
1)	arrangements for maintaining the paved areas, including the runway friction assessments;		

2)	arrangements for maintaining the unpaved runways and taxiways;		
3)	arrangements for maintaining the runway and taxiway strips;		
4)	arrangements for maintaining aerodrome drainage;		
5)	arrangements for maintaining the visual aids, including the measurement of intensity, beam spread and orientation of lights;		
6)	arrangements for maintaining the obstacle lighting;		
7)	arrangements for reporting and action taken in the event of failure or unsafe occurrence.		
5.7	Snow and ice control, and other hazardous meteorological conditions		
	Description of the procedures.		
5.8	Visual aids		
a)	Responsibilities with respect to the aerodrome ground lighting system.		
b)	A full description of all visual aids available on each approach, runway, taxiway and apron, including signs, markings and signals.		
c)	Procedures for operational use and brilliancy settings of the lighting system.		
d)	Standby and emergency power arrangements, including operating procedures both in LVP and during main power failure situations.		
e)	Procedures for routine inspection and photometric testing of approach lights, runway lights, VASIS and PAPIs.		
f)	The location of and responsibility for obstacle lighting on and off the aerodrome.		
g)	Procedures for recording inspection and maintenance of visual aids and actions to be taken in the event of failures.		
h)	The control of work, including trenching and agricultural activity, which may affect the safety of the aeroplane.		
5.9	Apron management		
a)	Arrangements between air traffic control, the aerodrome operator and the apron management unit.		
b)	Arrangements for allocating aeroplane stands.		
c)	Arrangements for initiating engine start and ensuring clearance of aeroplane pushback.		

5.10	Apron safety management		
a)	Means and procedures for jet blast protection.		
b)	Arrangements of safety precautions during aeroplane refuelling operations.		
c)	Arrangements for apron sweeping and cleaning.		
d)	Arrangements for reporting incidents and accidents on an apron.		
e)	Arrangements for assessing the safety compliance of all personnel working on the apron.		
f)	Arrangements for the use of advanced visual docking systems, if provided.		
5.11	Vehicles on the movement area		
a)	Details of the applicable traffic rules (including speed limits and the means of enforcing the rules).		
b)	Method and criteria for allowing drivers to operate vehicles on the movement area.		
c)	Arrangements and means of communicating with air traffic control.		
d)	Details of the equipment needed in vehicles that operate on the movement area.		
5.12	Wildlife hazard management		
a)	Arrangements and method for dispersal of bird and other wildlife.		
b)	Measure to discourage birds and other wildlife.		
c)	Arrangements for assessing wildlife hazards.		
d)	Arrangements for implementing wildlife control programmes.		
5.13	Obstacles		
a)	Arrangements for monitoring the height of buildings or structures within the boundaries of the obstacle limitation surfaces (OLS).		
b)	Arrangements for controlling new developments in the vicinity of aerodromes.		
c)	The reporting procedure and actions to be taken in the event of the appearance of unauthorized obstacles.		
d)	Arrangements for removal of an obstacle.		
5.14	The removal of a disabled aeroplane		
a)	Details of the capability for removal of a disabled aeroplane.		

b)	Arrangements for removing a disabled aeroplane, including the reporting and notifying procedures and liaison with ATC.		
5.15	Dangerous goods		
	Arrangements for special areas on the aerodrome to be set up for the storage of dangerous goods.		
5.16	Low visibility operations		
a)	Obtaining and disseminating meteorological information, including runway visual range (RVR) and surface visibility.		
b)	Protection of runways during LVP if such operations are permitted.		
c)	The arrangement and rules before, during and after low visibility operations, including applicable rules for vehicles and personnel operating in the movement area.		
5.17	Protection of sites for radar, navigation aids and meteorological equipment		
a)	Description of the areas to be protected and procedures for their protection.		
6.	Safety management system (SMS)		
a)	Safety policy.		
b)	Operator's structure and responsibility. This should include:		
1)	the name, status and responsibilities of the accountable executive;		
2)	the name, status and responsibilities of the safety manager;		
3)	the name, status and responsibilities of other senior operating staff;		
4)	the name, status and responsibilities of the official in charge of day-to-day operations;		
5)	instructions as to the order and circumstances in which the above-named staff may act as the official in charge or accountable executive;		
6)	an organizational chart supporting the commitment to the safe operation of the aerodrome as well as one simply showing the hierarchy of responsibility for safety management. an organizational chart supporting the commitment to the safe operation of the aerodrome as well as one simply showing the hierarchy of responsibility for safety management.		
c)	Training.		
d)	Complying with regulatory requirements relating to accidents, incidents and Mandatory occurrence reporting.		

e)	Hazard analysis and risk assessment.		
f)	The management of change.		
g)	Safety criteria and indicators.		
h)	Safety audits.		
i)	Documentation.		
j)	Safety-related committees.		
k)	Safety promotion.		
l)	Responsibility for monitoring the contractors and third parties operating on the aerodrome.		

APPENDIX 8 : PHYSICAL CHARACTERISTICS OF AERODROMES

1. Introduction

Each paragraph within this section is structured as follows:

Introduction

This section provides the rationale, including the basis and objectives for the various elements of the physical infrastructure required in Annex 14, Volume I, Chapter 3. References are made, where necessary, to other ICAO documents.

Challenges

This section identifies possible challenges based on experience, operational judgement and analysis of hazards linked to an infrastructure item in relation to ICAO provisions. Each compatibility study should determine the challenges relevant for the accommodation of the planned aeroplane at the existing aerodrome.

Potential solutions

This section presents possible solutions related to the identified problems. Where it is impracticable to adapt the existing aerodrome infrastructure or operations in accordance with the applicable regulation, the compatibility study or, where necessary, safety assessment, determines the appropriate solutions or possible risk mitigation measures to be implemented.

Note 1.— Where possible solutions have been developed, these should be reviewed periodically to assess their continued validity. These possible solutions do not substitute or circumvent the provisions contained in Annex 14, Volume I.

Note 2.— Procedures on the conduct of a safety assessment can be found in Chapter 3.

2. Runways

Runway length

Note 1.— Runway length is a limiting factor on aeroplane operations and should be assessed in collaboration with the aeroplane operator. Information on aeroplane reference field length can be found in Attachment D to this chapter.

Note 2.— Longitudinal slopes can have an effect on aeroplane performance.

Runway width

Introduction

For a given runway width, factors affecting aeroplane operations include the characteristics, handling qualities and performance demonstrated by the aeroplane. It may be advisable to consider other factors of operational significance in order to have a safety margin for factors such as wet or contaminated runway pavement, crosswind conditions, crab angle approaches to landing, aeroplane controllability during aborted take-off, and engine failure procedures.

Note.— Guidance is given in Doc 9157, Part 1 — Runways.

Challenges

The main issue associated with available runway width is the risk of aeroplane damage and fatalities associated with an aeroplane veering off the runway during take-off, rejected take-off or during the landing.

The main causes and accident factors are:

- (a) for take-off/rejected take-off:
 - (1) aeroplane (asymmetric spin-up and/or reverse thrust, malfunctioning of control surfaces, hydraulic system, tires, brakes, nose-gear steering, centre of gravity and powerplant (engine failure, foreign object ingestion));
 - (2) temporary surface conditions (standing water, snow, dust, residuals (rubber), FOD, damage to the pavement and runway friction coefficient);
 - (3) permanent surface conditions (horizontal and vertical slopes and runway friction characteristics);
 - (4) meteorological conditions (e.g. heavy rain, crosswind, strong/gusty winds, reduced visibility, snow); and

(5) Human Factors (crew, maintenance, balance, payload security);

(b) for landing:

(1) aeroplane/airframe (malfunction of the landing gear, control surfaces, hydraulic system, brakes, tires, nose- gear steering and powerplant (reverse and thrust lever linkage));

(2) temporary surface conditions (standing water, snow, dust, residuals (e.g. rubber), FOD, damage to the pavement and applying runway friction coefficient);

(3) permanent surface conditions (horizontal and vertical slopes and runway friction characteristics);

(4) prevailing meteorological conditions (heavy rain, crosswind, strong/gusty winds, thunderstorms/wind shear, reduced visibility);

(5) Human Factors (i.e. hard landings, crew, maintenance);

(6) ILS localizer signal quality/interference, where autoland procedures are used;

(7) any other localizer signal quality/interference of approach aid equipment;

(8) lack of approach path guidance such as VASIS or PAPI; and

(9) approach type and speed.

Note.— An analysis of lateral runway excursion reports shows that the causal factor in aeroplane accidents/incidents is not the same for take-off and landing. Mechanical failure is, for instance, a frequent accident factor for runway excursions during take-off, while hazardous meteorological conditions such as thunderstorms are more often associated with landing accidents/incidents. Engine reverse thrust system malfunction and/or contaminated runway surfaces have also been a factor in a significant number of veer-offs during landing (other subjects are relevant to the aeroplane such as brake failures and high crosswinds).

Potential solutions

The lateral runway excursion is linked to specific aeroplane characteristics, performance/handling qualities, controllability in response to such events as aeroplane mechanical failures, pavement contamination, winter operations and crosswind conditions. Runway width is not a required specific certification limitation. However, indirectly related is the determination of minimum control speed on the ground (V_{mcg}) and the maximum

demonstrated crosswind. These additional factors should be considered as key factors in order to ensure that this kind of hazard is adequately addressed.

For a specific aeroplane, it may be permissible to operate on a runway with a narrower width if approved by the appropriate authorities for such operations.

Note.— The maximum demonstrated crosswind is included in the aircraft flight manual.

Potential solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) paved inner shoulders of adequate bearing strength to provide an overall width of the runway and its (inner) shoulders of the recommended runway width according to the reference code;
- (b) paved/unpaved outer shoulders with adequate bearing strength to provide an overall width of the runway and its shoulder according to the reference code;
- (c) additional runway centre line guidance and runway edge markings; and
- (d) increased full runway length FOD inspection, when required or requested.

Aerodrome operators should also take into account the possibility that certain aeroplanes are not able to make a 180-degree turn on narrower runways. When there is no proper taxiway at the end of the runway, providing a suitable runway turn pad is recommended.

Note.— Particular care should be given while manoeuvring on runways having a width less than recommended to prevent the wheels of the aeroplane from leaving the pavement, while avoiding the use of large amounts of thrust that could damage runway lights and signs and cause erosion of the runway strip. For affected runways a close inspection, as appropriate, is generally considered to detect the presence of debris that may be deposited during 180-degree turns on the runway after landing.

Snow removal should be provided at least up to the position of the outboard engine's intake section area to avoid snow ingestion unless specific aeroplane characteristics/procedures exist to avoid snow ingestion (significant ground clearance of the engines preventing snow ingestion, specific take-off procedure).

Note.— Guidance is given in Doc 9137, Part 2 — Pavement Surface Conditions.

Aerodromes which use embedded (inset) runway edge lights should take into account additional consequences such as:

- (a) more frequent cleaning intervals for the embedded lights, as dirt will affect the function more quickly compared to elevated runway edge lights;

- (b) earlier execution of snow removal operations, as the inset lights are likely to be affected by snow more quickly; and
- (c) in addition, bi-directional inset lights can facilitate snow removal procedures on a wider range.

Location and specifications for runway signs should be considered due to the increased size of the aeroplane's wingspan (engine location) as well as the increased thrust rating from the aeroplane's engines.

3. Runway shoulders

Introduction

The shoulders of a runway should be capable of minimizing any damage to an aeroplane veering off the runway. In some cases, the bearing strength of the natural ground may be sufficient without additional preparation to meet the requirements for shoulders. The prevention of ingestion of objects from jet engines should always be taken into account particularly for the design and construction of the shoulders. In case of specific preparation of the shoulders, visual contrast, such as the use of runway side-stripe markings, between runway and runway shoulders, may be required.

Note.— Guidance is given in Doc 9157, Part 1.

Challenges

Runway shoulders have three main functions:

- (a) to minimize any damage to an aeroplane running off the runway ;
- (b) to provide jet blast protection and to prevent engine FOD ingestion; and
- (c) to support ground vehicle traffic, RFF vehicles and maintenance vehicles.

Note.— Inadequate width of existing runway bridges is a special topic that needs careful evaluation.

Potential issues associated with runway shoulder characteristics (width, soil type, bearing strength) are:

- (a) aeroplane damage that could occur after excursion onto the runway shoulder due to inadequate bearing capacity;
- (b) shoulder erosion causing ingestion of foreign objects by jet engines due to unsealed surfaces; consideration should be given to the impact of FOD on aeroplane tires and engines as a potentially major hazard; and

- (c) Difficulties for RFF services to access a damaged aeroplane on the runway due to inadequate bearing strength.

Factors to be considered are:

- (a) runway center line deviations;
- (b) power plant characteristics (engine height, location and power); and
- (c) soil type and bearing strength (aeroplane mass, tire pressure, gear design).

Potential solutions

Possible solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) Excursion onto the runway shoulder. Provide the suitable shoulder as detailed in section 2.3;
- (b) Jet blast. Information about outer engine position, jet blast velocity contour and jet blast directions at take-off is needed to calculate the required width of shoulders that has to be enhanced for protection against jet blast. Lateral deviation from the runway centre line should also be taken into account;

Note 1.— Jet blast velocity data may be available from the aircraft manufacturers.

Note 2.— Relevant information is typically available in the aircraft characteristics for airport planning manual of aircraft manufacturers.

- (c) RFF vehicles. Operational experience with aeroplanes currently operated on existing runways suggests that an overall width of the runway and its shoulders which is compliant with the requirements is adequate to permit intervention on aeroplanes by occasional RFF vehicle traffic. However, longer upper-deck escape chutes may reduce the margin between the shoulder edge and the extension of escape slides and reduce the supporting surface available to rescue vehicles; and
- (d) Additional surface inspections. It may be necessary to adapt the inspection programme for FOD detection.

4. Runway turn pads

Introduction

Turn pads are generally provided when an exit taxiway is not available at the runway end. A turn pad allows an aeroplane to turn back after landing and before take-off and to position itself correctly on the runway.

Note.— Guidance on typical turn pads is given in Doc 9157, Part 1, Appendix 4. In particular, the design of the total width of the turn pad should be such that the nose-wheel steering angle of the aeroplane for which the turn pad is intended will not exceed 45 degrees.

Challenges

For minimizing the risk of a turn pad excursion, the turn pad should be designed sufficiently wide to permit the 180-degree turn of the most demanding aeroplane that will be operated. The design of the turn pad generally assumes a maximum nose landing gear steering angle of 45 degrees, which should be used unless some other condition applies for the particular type of aeroplane, and considers clearances between the gears and the turn pad edge, as for a taxiway.

The main causes and accident factors of the aeroplane veering off the turn pad pavement are:

- (a) aeroplane characteristics that are not adequate and aeroplane failure (ground manoeuvring capabilities, especially long aeroplanes, malfunctioning of nose-gear steering, engine, brakes);
- (b) adverse surface conditions (standing water, loss of control on ice-covered surfaces, friction coefficient);
- (c) loss of the turn pad visual guidance (markings and lights covered by snow or inadequately maintained); and
- (d) Human Factors, including incorrect application of the 180-degree procedure (nose-wheel steering, asymmetric thrust, differential braking).

Note.— No turn pad excursions with passenger injuries have so far been reported. Nevertheless, an aeroplane disabled on a turn pad can have an impact on runway closure.

Potential solutions

The ground maneuvering capabilities available from aircraft manufacturers are one of the key factors to be considered in order to determine whether an existing turn pad is suitable for a particular aeroplane. The speed of the manoeuvring aeroplane is also a factor.

Note.— Relevant information is typically available in the aircraft characteristics for airport planning manual of aircraft manufacturers.

For a specific aeroplane, it may be permissible to operate on a runway turn pad not provided in accordance with Annex 14, Volume I, specifications, considering:

- (a) the specific ground manoeuvring capability of the specific aeroplane (notably the maximum effective steering angle of the nose landing gear);

- (b) the provision for adequate clearances;
- (c) the provision for appropriate marking and lighting;
- (d) the provision of shoulders;
- (e) the protection from jet blast; and
- (f) and if relevant, protection of the ILS. In this case, the turn pad can have a different shape. The objective is to enable the aeroplane to align on the runway while losing the least runway length as possible. The aeroplane is supposed to taxi at slow speed.

Note.— Further advisory material on turn pads may be available from the aircraft manufacturers.

Runway Strips

5. Runway Strip dimensions

Introduction

A runway strip is an area enclosing a runway and any associated stopway. Its purpose is to:

- (a) reduce the risk of damage to an aeroplane running off the runway by providing a cleared and graded area which meets specific longitudinal and transverse slopes, and bearing strength requirements; and
- (b) protect an aeroplane flying over it during landing, balked landing or take-off by providing an area which is cleared of obstacles, except for permitted aids to air navigation.

Particularly, the graded portion of the runway strip is provided to minimize the damage to an aeroplane in the event of a veer-off during a landing or take-off operation. It is for this reason that objects should be located away from this portion of the runway strip unless they are needed for air navigation purposes and are frangibly mounted.

Note.— The dimensions and characteristics of the runway strip are detailed in Annex 14, Volume I, Chapter 3, 3.4, and Attachment A.

Challenges

Where the requirements on runway strips cannot be achieved, the available distances, the nature and location of any hazard beyond the available runway strip, the type of aeroplane and the level of traffic at the aerodrome should be reviewed. Operational restrictions may be

applied to the type of approach and low visibility operations that fit the available ground dimensions, while also taking into account:

- (a) runway excursion history;
- (b) friction and drainage characteristics of the runway;
- (c) runway width, length and transverse slopes;
- (d) navigation and visual aids available;
- (e) relevance in respect of take-off or aborted take-off and landing;
- (f) scope for procedural mitigation measures; and
- (g) accident report.

An analysis of lateral runway excursion reports shows that the causal factor in aeroplane accidents/incidents is not the same for take-off and for landing. Therefore, take-off and landing events may need to be considered separately.

Note.— Mechanical failure is a frequent accident factor in runway excursions during take-off, while hazardous meteorological conditions such as thunderstorms are more often present with landing accident/incidents. Brake failures or engine reverse thrust system malfunctions have also been factors in a significant number of landing veer-offs.

Lateral deviation from the runway centre line during a bailed landing with the use of the digital autopilot as well as manual flight with a flight director for guidance have shown that the risk associated with the deviation of specific aeroplanes is contained within the OFZ.

Note.— Provisions on OFZ are given in Annex 14, Volume I, and in Cir 301, New Larger Aeroplanes — Infringement of the Obstacle Free Zone: Operational Measures and Aeronautical Study.

The lateral runway excursion hazard is clearly linked to specific aeroplane characteristics, performance/ handling qualities and controllability in response to such events as aeroplane mechanical failures, pavement contamination and crosswind conditions. This type of hazard comes under the category for which risk assessment is mainly based on flight crew/aeroplane performance and handling qualities. Certified limitations of the specific aeroplane is one of the key factors to be considered in order to ensure that this hazard is under control.

Potential solutions

Potential solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) improving runway surface conditions and/or the means of recording and indicating rectification action, particularly for contaminated runways, having knowledge of runways and their condition and characteristics in precipitation;
- (b) ensuring that accurate and up-to-date meteorological information is available and that information on runway conditions and characteristics is passed to flight crews in a timely manner, particularly when flight crews need to make operational adjustments;
- (c) improving the aerodrome operator's knowledge of recording, prediction and dissemination of wind data, including wind shear, and any other relevant meteorological information, particularly when it is a significant feature of an aerodrome's climatology;
- (d) upgrading the visual and instrument landing aids to improve the accuracy of aeroplane delivery at the correct landing position on runways; and
- (e) in consultation with aeroplane operators, formulating any other relevant aerodrome operating procedures or restrictions and promulgating such information appropriately.

6. Obstacles on runway strips

Introduction

An object located on a runway strip which may endanger aeroplanes is regarded as an obstacle, according to the definition of "obstacle" and should be removed, as far as practicable. Obstacles may be either naturally occurring or deliberately provided for the purpose of air navigation.

Challenges

An obstacle on the runway strip may represent either:

- (a) a collision risk for an aeroplane in flight or for an aeroplane on the ground that has veered off the runway; and
- (b) a source of interference to navigation aids.

Note 1.— Mobile objects that are beyond the OFZ (inner transitional surface) but still within the runway strip, such as vehicles and holding aeroplanes at runway-holding positions, or wing tips of aeroplanes taxiing on a parallel taxiway to the runway, should be considered.

Note 2.— Provisions on OFZ are given in Annex 14, Volume I, and in Circular 301.

Potential solutions

Potential solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) a natural obstacle should be removed or reduced in size wherever possible; alternatively, grading of the area allows reduction of the severity of damage to the aeroplane;
- (b) other fixed obstacles should be removed unless they are necessary for air navigation, in which case they should be frangible and should be so constructed as to minimize the severity of damage to the aeroplane;
- (c) an aeroplane considered to be a moving obstacle within the runway strip should respect the requirement on the sensitive areas installed to protect the integrity of the ILS and should be subject to a separate safety assessment; and

Note.— Provisions on ILS critical and sensitive areas are given in Annex 10 — Aeronautical Telecommunications, Volume I — Radio Navigation Aids.

- (d) visual and instrument landing aids may be upgraded to improve the accuracy of aeroplane delivery at the correct landing position on runways, and in consultation with aeroplane operators, any other relevant aerodrome operating procedures or restrictions may be formulated and such information promulgated appropriately.

7. Runways End Safety Area (RESA)

Introduction

A RESA is primarily intended to reduce the risk of damage to an aeroplane undershooting or overrunning the runway. Consequently, a RESA will enable an aeroplane overrunning to decelerate, and an aeroplane undershooting to continue its landing.

Challenges

Identification of specific issues related to runway overruns and undershoots is complex. There are a number of variables that have to be taken into account, such as prevailing meteorological conditions, the type of aeroplane, the load factor, the available landing aids, runway characteristics, the overall environment, as well as Human Factors.

When reviewing the RESA, the following aspects have to be taken into account:

- (a) the nature and location of any hazard beyond the runway end;
- (b) the topography and obstruction environment beyond the RESA;

- (c) the type of aeroplanes and level of traffic at the aerodrome and actual or proposed changes to either;
- (d) overrun/undershoot causal factors;
- (e) friction and drainage characteristics of the runway which have an impact on runway susceptibility to surface contamination and aeroplane braking action;
- (f) navigation and visual aids available;
- (g) type of approach;
- (h) runway length and slope, in particular, the general operating length required for take-off and landing versus the runway distances available, including the excess of available length over that required;
- (i) the location of the taxiways and runways;
- (j) aerodrome climatology, including predominant wind speed and direction and likelihood of wind shear; and
- (k) aerodrome overrun/undershoot and veer-off history.

Potential solutions

Potential solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) restricting the operations during adverse hazardous meteorological conditions (such as thunderstorms);
- (b) defining, in cooperation with aeroplane operators, hazardous meteorological conditions and other factors relevant to aerodrome operating procedures and publishing such information appropriately;
- (c) improving an aerodrome's database of operational data, detection of wind data, including wind shear and other relevant meteorological information, particularly when it is a significant change from an aerodrome's climatology;
- (d) ensuring that accurate and up-to-date meteorological information, current runway conditions and other characteristics are detected and notified to flight crews in time, particularly when flight crews need to make operational adjustments;

- (e) improving runway surfaces in a timely manner and/or the means of recording and indicating necessary action for runway improvement and maintenance (e.g. friction measurement and drainage system), particularly when the runway is contaminated;
- (f) removing rubber build-up on runways according to a scheduled time frame;
- (g) repainting faded runway markings and replacing inoperative runway surface lighting identified during daily runway inspections;
- (h) upgrading visual and instrument landing aids to improve the accuracy of aeroplane delivery at the correct landing position on runways (including the provision of ILSs);
- (i) reducing declared runway distances in order to provide the necessary RESA;
- (j) installing suitably positioned and designed arresting systems as a supplement or as an alternative to standard RESA dimensions when necessary (see Note 1);
- (k) increasing the length of a RESA and/or minimizing the potential obstruction in the area beyond the RESA; and l) publishing provisions, including the provision of an arresting system, in the AIP.

Note 1.— Further guidance on arresting systems can be found in Annex 14, Volume I, Attachment A.

Note 2.— In addition to the AIP entry, information/instructions may be disseminated to local runway safety teams and others to promote awareness in the community.

8. Taxiway

Potential solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

Introduction

Taxiways are provided to permit the safe and expeditious surface movement of aeroplanes.

A sufficiently wide taxiway permits smooth traffic flow while facilitating aeroplane ground steering.

Note 1.— Guidance material is given in Doc 9157, Part 2 — Taxiways, Aprons and Holding Bays; Section 1.2 and Table 1-1 provide the formula for determining the width of a taxiway.

Note 2.— Particular care should be taken while manoeuvring on taxiways having a width less than that specified in Annex 14, Volume I, to prevent the wheels of the aeroplane from leaving the pavement, while avoiding the use of large amounts of thrust that could damage taxiway

lights and signs and cause erosion of the taxiway strip. Affected taxiways should be closely inspected, as appropriate, for the presence of debris that may be deposited while taxiing into position for take-off.

Challenges

The issue arises from a lateral taxiway excursion.

Causes and accident factors can include:

- (a) mechanical failure (hydraulic system, brakes, nose-gear steering);
- (b) adverse surface conditions (standing water, loss of control on ice-covered surfaces, friction coefficient);
- (c) loss of the taxiway centre line visual guidance (markings and lights covered by snow or inadequately maintained);
- (d) Human Factors (including directional control, orientation error, pre-departure workload); and e) aeroplane taxi speed.

Note.— The consequences of a taxiway excursion are potentially disruptive. However, consideration should be given to the greater potential impact of deviation of a larger aeroplane in terms of blocked taxiways or disabled aeroplane removal.

Pilot precision and attention are key issues since they are heavily related to the margin between the outer main gear wheel and the taxiway edge

Compatibility studies related to taxiway width and potential deviations can include:

- (a) the use of taxiway deviation statistics to calculate the taxiway excursion probability of an aeroplane depending on taxiway width. The impact of taxiway guidance systems and meteorological and surface conditions on taxiway excursion probability should be assessed whenever possible;
- (b) view of the taxiway from the cockpit, taking into account the visual reference cockpit cut-off angle and pilot eye height; and
- (c) the aeroplane outer main gear wheel span.

Potential solutions

Potential solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) the provision of taxiway centre line lights;

- (b) conspicuous centre line marking;
- (c) the provision of on-board taxi camera systems to assist taxi guidance;
- (d) reduced taxi speed;
- (e) the provision of taxi side-stripe markings;
- (f) taxiway edge lights (inset or elevated);
- (g) reduced wheel-to-edge clearance, using taxiway deviation data;
- (h) enhanced snow bank clearance (engine positions);
- (i) snow and ice control surface measures implemented on taxiway entrances to the runway, especially high-speed taxiway exits;
- (j) the use of alternative taxi routes; and
- (k) the use of marshaller services (follow-me guidance).

Note 1.— Taxi cameras are designed to ease the taxi and can assist the flight crew in preventing the wheels of the aeroplane from leaving the full-strength pavement during normal ground manoeuvring.

Note 2.— Taxiways that are not provided with suitable shoulders may be restricted in operation.

Special attention should be given to the offset of centre line lights in relation to centre line markings, especially during winter conditions when distinguishing between markings and offset lights can be difficult.

Location and specifications for taxiway signs should be considered due to the engine location as well as the increased thrust in the aeroplane engines.

9. Taxiway Curves

Introduction

Annex 14, Volume I, 3.9.6, contains provisions on taxiway curves. Additional guidance is included in Doc 9157, Part 2.

Challenges

Any hazard will be the result of a lateral taxiway excursion on a curved section.

The main causes and accident factors are the same as for a taxiway excursion on a straight taxiway section. The use of the cockpit-over-centreline steering technique on a curved taxiway will result in track-in of the main landing gear from the centre line. The amount of track-in depends on the radius of the curved taxiway and the distance from the cockpit to the main landing gear.

The consequences are the same as for lateral taxiway excursions on straight sections.

The required width of the curved portions of taxiways is related to the clearance between the outer main wheel and the taxiway edge on the inner curve. The hazard is related to the combination of the outer main gear wheel span and the distance between the nose gear/cockpit and the main gear. Consideration should be given to the effect on airfield signs and other objects nearby of jet blast from a turning aeroplane.

Certain aeroplanes may require wider fillets on curved sections or taxiway junctions.

Potential solutions

Potential solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) the widening of existing fillets or the provision of new fillets;
- (b) reduced taxi speed;
- (c) the provision of taxiway centre line lights and taxi side-stripe markings (and inset taxiway edge lights);
- (d) reduced wheel-to-edge clearance, using taxiway deviation data;
- (e) pilot judgemental oversteering; and
- (f) publication of provisions in the appropriate aeronautical documentation.

Note 1.— Taxi cameras are designed to ease the taxi and can assist the flight crew in preventing the wheels of the aeroplane from leaving the full-strength pavement during normal ground manoeuvring.

Note 2.— Operations on taxiway curves that are not provided with suitable taxiway fillets should be restricted.

Special attention should be given to the offset of centre line lights in relation to centre line markings.

Location and specifications for taxiway signs should be considered due to the increase in the size of aeroplanes as well as the increased thrust in aeroplane engines.

10. Runway and Taxiway Minimum Separation Distances

Introduction

A minimum distance is provided between the centre line of a runway and the centre line of the associated parallel taxiway for instrument runways and non-instrument runways.

Note 1.— Doc 9157, Part 2, section 1.2, and Table 1-5, clarify that the runway/taxiway separation is based on the principle that the wing tip of an aeroplane taxiing on a parallel taxiway should be clear of the runway strip.

Note 2.— It is permissible to operate with lower separation distances at an existing aerodrome if a safety assessment indicates that such lower separation distances would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes. See Note 2 to Table 3-1, and Notes 2, 3 and 4 to 3.9.8 of Annex 14, Volume I.

Note 3.— Doc 9157, Part 2, has related guidance in 1.2.46 to 1.2.49. Furthermore, attention is drawn to the need to provide adequate clearance at an existing aerodrome in order to operate an aeroplane with the minimum possible risk.

Challenges

The potential issues associated with runway/parallel taxiway separation distances are:

- (a) the possible collision between an aeroplane running off a taxiway and an object (fixed or mobile) on the aerodrome;
- (b) the possible collision between an aeroplane leaving the runway and an object (fixed or mobile) on the aerodrome or the risk of a collision of an aeroplane on the taxiway that infringes on the runway strip; and
- (c) possible ILS signal interference due to a taxiing or stopped aeroplane.

Causes and accident factors can include:

- (a) Human Factors (crew, ATS);
- (b) hazardous meteorological conditions (such as thunderstorms and wind shear);

- (c) aeroplane mechanical failure (such as engine, hydraulic system, flight instruments, control surfaces and autopilot);
- (d) surface conditions (standing water, loss of control on ice-covered surfaces, friction coefficient);
- (e) lateral veer-off distance;
- (f) aeroplane position relative to navigation aids, especially ILS; and g) aeroplane size and characteristics (especially wingspan).

Note.— Common accident/incident databases deal with lateral runway excursions but do not include accident reports relative to in-flight collisions and ILS signal interference. Therefore, the causes and accident factors specific to the local environment and identified above for runway separation issues are mainly supported by local aerodrome experience. The huge variety and complexity of accident factors for collision risk should be emphasized.

Potential solutions

Potential solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) place a restriction on the wingspan of aeroplanes using the parallel taxiway or on the runway, if continued unrestricted taxiway or runway operation is desired;
- (b) consider the most demanding length of aeroplane that can have an impact on runway/taxiway separation and the location of holding positions (ILS);
- (c) change taxiway routing so that the required runway airspace is free of taxiing aeroplanes; and d) employ tactical control of aerodrome movements.

Note.— When A-SMGCS is available, it can be utilized as a supporting means to the proposed solutions especially in low visibility conditions.

11. Taxiway and Taxilane Separation Distances

Introduction

Taxiway to object separation

Three taxiway minimum separation distances provide an area clear of objects that may endanger an aeroplane.

Note 1.— See Annex 14, Volume I, 3.9.

Note 2.— Additional guidance material on minimum separation distances is included in Doc 9157, Part 2.

Parallel taxiway separation

The minimum separation distance is equal to the wingspan plus maximum lateral deviation plus increment.

Note 1.— Information is given in Doc 9157, Part 2.

Note 2.— If the minimum required distance between the centre lines of two parallel taxiways is not provided, it is permissible to operate with lower separation distances at an existing aerodrome if a compatibility study, which may include a safety assessment, indicates that such lower separation distances would not adversely affect the safety or significantly affect the regularity of aeroplane operations.

Challenges

Taxiway to object separation

The separation distances during taxiing are intended to minimize the risk of a collision between an aeroplane and an object (taxiway/object separation, taxilane/object separation).

Note.— Taxiway deviation statistics can be used to assess the risk of a collision between two aeroplanes or between an aeroplane and an object.

The causes and accident factors can include:

- (a) mechanical failure (hydraulic system, brakes, nose-gear steering);
- (b) conditions (standing water, loss of control on ice-covered surfaces, friction coefficient);
- (c) loss of the visual taxiway guidance system (markings and lights covered by snow); and
- (d) Human Factors (directional control, temporary loss of orientation resulting in aeroplanes being incorrectly positioned, etc.).

Parallel taxiway separation

The potential issues associated with parallel taxiway separation distances are:

- (a) the probable collision between an aeroplane running off a taxiway and an object (aeroplane on parallel taxiway); and
- (b) an aeroplane running off the taxiway and infringing the opposite taxiway strip.

Causes and accident factors can include:

- (a) Human Factors (crew, ATS);
- (b) hazardous meteorological conditions (such as reduced visibility);
- (c) aeroplane mechanical failure (such as engine, hydraulic system, flight instruments, control surfaces, autopilot);
- (d) surface conditions (standing water, loss of control on ice-covered surfaces, friction coefficient);
- (e) lateral veer-off distance; and
- (f) aeroplane size and characteristics (especially wingspan).

Potential solutions

Taxiway to object separation

Potential solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) the use of reduced taxiing speed;
- (b) the provision of taxiway centre line lights;
- (c) the provision of taxi side-stripe markings (and inset taxiway edge lights);
- (d) the provision of special taxi routing for larger aeroplanes;
- (e) restrictions on aeroplanes (wingspan) allowed to use parallel taxiways during the operation of a specific aeroplane;
- (f) restrictions on vehicles using service roads adjacent to a designated aeroplane taxi route;
- (g) the use of “follow-me” guidance;

- (h) the provision of reduced spacing between taxiway centre line lights; and
- (i) the provision of straightforward taxiway naming and ground routings with respect to the hazard of taxiway veer-offs.

Note.— Special attention should be given to the offset of centre line lights in relation to centre line markings. Especially during winter conditions, distinguishing between markings and offset lights can be difficult.

12. Parallel taxiway separation

Potential solutions can be developed by providing the following facilities, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) place a restriction on the wingspan of aeroplanes using the parallel taxiway if continued unrestricted taxiway operation is desired;
- (b) consider the most demanding length of aeroplane that can have an impact on a curved taxiway section;
- (c) change taxiway routing;
- (d) employ tactical control of aerodrome movements;
- (e) use of reduced taxiing speed;
- (f) provision of taxiway centre line lights;
- (g) provision of taxi side-stripe markings (and inset taxiway edge lights);
- (h) use of “follow-me” guidance;
- (i) provision of reduced spacing between taxiway centre line lights; and
- (j) provision of straightforward taxiway naming and ground routings with respect to the hazard of taxiway veer- offs.

Note.— When A-SMGCS is available, it can be utilized as a supporting means to the proposed solutions especially in low visibility conditions.

13. Taxiway on Bridges

Introduction

The width of that portion of a taxiway bridge capable of supporting aeroplanes, as measured perpendicularly to the taxiway centre line, is normally not less than the width of the graded area of the strip provided for that taxiway, unless a proven method of lateral restraint is provided which is not hazardous for aeroplanes for which the taxiway is intended.

Note.— Annex 14, Volume I, section 3.9, and Doc 9157, Part 2, provide information on taxiways on bridges.

Access is to be provided for RFF vehicles to intervene, in both directions within the specified response time, with the largest aeroplane for which the taxiway is intended.

If aeroplane engines overhang the bridge structure, it may be necessary to protect the adjacent areas, below the bridge, from engine blast.

Challenges

The following hazards are related to the width of taxiway bridges

- (a) landing gear leaving the load-bearing surface;
- (b) deployment of an escape slide beyond the bridge, in case of an emergency evacuation;
- (c) lack of manoeuvring space for RFF vehicles around the aeroplane;
- (d) jet blast to vehicles, objects or personnel below the bridge;
- (e) structural damage to the bridge due to the aeroplane mass exceeding the bridge design load; and
- (f) damage to the aeroplane due to insufficient clearance of engines, wings or fuselage from bridge rails, lights or signs.

The causes and accident factors can include:

- (a) mechanical failure (hydraulic system, brakes, nose-gear steering);
- (b) surface conditions (standing water, loss of control on ice-covered surfaces, friction coefficient);
- (c) loss of the visual taxiway guidance system (markings and lights covered by snow);
- (d) Human Factors (directional control, disorientation, pilot's workload);

- (e) the position of the extremity of the escape slides; and
- (f) undercarriage design.

The main causes of and accident factors for jet blast effect below the bridge are:

- (a) powerplant characteristics (engine height, location and power);
- (b) bridge blast protection width; and
- (c) taxiway centre line deviation factors (see taxiway excursion hazard in 4.1.4).

In addition to the specifications of Chapter 3, Safety Assessments for Aerodromes, hazard prevention mechanisms should be based on the critical dimensions of the aeroplane in relation to the bridge width.

Potential solutions

Potential solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) where feasible, strengthen existing bridges;
- (b) provide a proven method of lateral restraint to prevent the aeroplane from veering off the full bearing strength of the taxiway bridge;
- (c) provide an alternative path/bridge for RFF vehicles or implement emergency procedures to taxi the aeroplane away from such taxi bridges;
- (d) implement jet blast procedures to reduce the effects of jet blast on the undercroft; and
- e) use the vertical clearance provided by high wings.

The RFF vehicles need to have access to both sides of the aeroplane to fight any fire from the best position, allowing for wind direction as necessary. In case the wingspan of the considered aeroplane exceeds the width of the bridge, another bridge nearby can be used for access to the “other” side of an aeroplane rather than an increased bridge width; in this case the surface of the bypass routes are at least stabilized where it is unpaved.

Note.— The use of another bridge as mentioned in 7.9 is practicable only where bridges are paired (parallel taxiways) or when there is a service road in the surrounding area. In any case, the bridge strength is to be checked, depending on the aeroplane planning to use it.

The protection from jet blast of vehicular traffic under/near the bridge is to be studied, consistent with the overall width of the taxiway and its shoulders.

The bridge width should be compatible with the deployment of escape slides. If this is not the case, a safe and quick escape route should be ensured.

Note.— Curved centre lines should be avoided leading up to, on and when leaving the bridge.

14. Taxiway Shoulders

Introduction

Taxiway shoulders are intended to protect an aeroplane operating on the taxiway from FOD ingestion and to reduce the risk of damage to an aeroplane running off the taxiway.

The taxiway shoulder dimensions are based on current information regarding the width of the outer engine exhaust plume for breakaway thrust. Furthermore, the surface of taxiway shoulders is prepared so as to resist erosion and ingestion of the surface material by aeroplane engines.

Note.— Guidance material is contained in Doc 9157, Part 2.

Challenges

The factors leading to reported issues are:

- (a) powerplant characteristics (engine height, location and power);
- (b) taxiway shoulder width, the nature of the surface and its treatment; and
- (c) taxiway centre line deviation factors, both from the expected minor wander from tracking error and the effect of main gear track-in in the turn area while using the cockpit-over-centre line-steering technique.

Potential solutions

Potential solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) Excursion on the taxiway shoulder. The thickness and composition of shoulder pavements should be such as to withstand the occasional passage of the aeroplane operating at the aerodrome that has the most demanding impact on pavement loading, as well as the full load of the most demanding aerodrome emergency vehicle. The impact of an aeroplane on pavements should be assessed and, if required, existing

taxiway shoulders (if allowed to be used by these heavier aeroplanes) may need to be strengthened by providing a suitable overlay.

Note.— Surface materials of an asphalt paved shoulder of 10 to 12.5 cm thick (the higher thickness where widebodied aircraft jet blast exposure is likely) and firmly adhering to the underlying pavement layers (by way of a tack coat or other means that assures a well-bonded interface between the surface layer and the underlying strata) is generally a suitable solution.

- (b) Jet blast. Information on engine position and jet blast velocity contour at breakaway thrust mode is used to assess jet blast protection requirements during taxiing operations. A lateral deviation from the taxiway centre line should be taken into account, particularly in the case of a curved taxiway and the use of the cockpit-over-centre-line steering technique. The effect of jet blast can also be managed by the use of thrust management of the engines (in particular for four-engine aircraft).

Note.— Further information concerning aeroplane characteristics including the margins between the outer engine axis and the edge of the shoulder, and the distance from the outer engine to the ground can be found in the manufacturer's aircraft characteristics for airport planning manual.

- (d) RFF vehicles. Operational experience with current aeroplanes on existing taxiways suggests that a compliant overall width of the taxiway and its shoulders permits the intervention of aeroplanes by occasional RFF vehicle traffic.

Note 1.— For NLA, the longer upper-deck escape chutes may reduce the margin between the shoulder edge and the extremity of these escape slides and reduce the supporting surface available to rescue vehicles.

Note 2.— In some cases, the bearing strength of the natural ground may be sufficient, without special preparation, to meet the requirements for shoulders. (Doc 9157, Part 1, provides further design criteria).

15. Clearance Distance on Aircraft stands

Introduction

Annex 14, Volume I, 3.13.6, recommends the minimum distance between an aeroplane using the stand and an obstacle.

Note.— Doc 9157, Part 2, provides additional guidance on this subject.

Challenges

The possible reasons for collision between an aeroplane and an obstacle on the apron or holding bay can be listed as:

- (a) mechanical failure (e.g. hydraulic system, brakes, nose-gear steering);
- (b) surface conditions (e.g. standing water, ice-covered surfaces, friction coefficient);

- (c) loss of the visual taxi guidance system (docking system out of service); and d) Human Factors (directional control, orientation error).

The probability of a collision during taxiing depends more on Human Factors than on aeroplane performance. Unless technical failure occurs, aeroplanes will respond reliably to directional inputs from the pilot when taxiing at the usual ground speed. Nevertheless, caution should be exercised with regard to the impact of aeroplanes with larger wingspans.

Potential solutions

Potential solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) appropriate condition of marking and signage;
- (b) apron stand lead-in lights;
- (c) azimuth guidance as a visual docking system;
- (d) appropriate training of operating and ground personnel should be ensured by an aerodrome operator;
- (e) operational restrictions (e.g. adequate clearances before and behind parked or holding aeroplanes due to the increased length of aeroplanes);
- (f) temporarily downgraded adjacent aircraft stands;
- (g) towing the aeroplane on/from the stand;
- (h) use of remote/cargo stands or “roll-through” parking positions for handling the aeroplane;
- (i) publication of procedures in the appropriate aeronautical documentation (i.e. closing or rerouting of taxiways behind parked aeroplanes);
- (j) advanced visual guidance system;
- (k) marshaller guidance;
- (l) enhancing apron lighting levels in low visibility conditions; and m) use of the vertical clearances provided by high wings.

16. Left Blank Intentionally

17. Pavement Design

Introduction

To facilitate flight planning, various aerodrome data are required to be published, such as data concerning the strength of pavements, which is one of the factors required to assess whether the aerodrome can be used by an aeroplane of a specific all-up mass.

Note.— The aircraft classification number/pavement classification number (ACN/PCN) method is used for reporting pavement strength. Requirements are given in Annex 14, Volume I, section 2.6, and Attachment A, section 20. Doc 9157, Part 3 — Pavements, contains guidance on reporting pavement strength using the ACN/PCN method.

The increased mass and/or gear load of the aeroplanes may require additional pavement support. Existing pavements and their maintenance will need to be evaluated for adequacy due to differences in wheel loading, tire pressure, and undercarriage design. Bridge, tunnel and culvert load-bearing capacities are a limiting factor, requiring some operational procedures.

Potential solutions

Potential solutions can be developed by applying the following measures, alone or in combination with other measures. The following list is not in any particular order and is not exhaustive:

- (a) restrictions on aeroplanes with higher ACNs on specific taxiways, runway bridges or aprons; or b) adoption of adequate pavement maintenance programmes.

ATTACHMENT A: AEROPLANE PHYSICAL CHARACTERISTICS

This **attachment** lists aeroplane characteristics that may have an impact on the relevant aerodrome characteristics, facilities and services in the movement area.

1. Fuselage Length

The fuselage length may have an impact on:

- (a) the dimensions of the movement area (taxiway, holding bays and aprons), passenger gates and terminal areas;
- (b) the aerodrome category for RFF;
- (c) ground movement and control (e.g. reduced clearance behind a longer aeroplane holding at an apron or a runway/intermediate holding position to permit the passing of another aeroplane);
- (d) de-icing facilities; and
- (e) clearances at the aircraft stand.

2. Fuselage Width

The fuselage width is used to determine the aerodrome category for RFF.

3. Door Sill Height

The door sill height may have an impact on:

- (a) the operational limits of the air bridges;
- (b) mobile steps;
- (c) catering trucks;
- (d) persons with reduced mobility; and
- (e) dimensions of the apron.

4. Aeroplane Nose Characteristics

The aeroplane nose characteristics may have an impact on the location of the runway-holding position of the aeroplane which should not infringe the OFZ.

5. Tail Height

The tail height may have an impact on:

- (a) the location of the runway-holding position;
- (b) ILS critical and sensitive areas: In addition to the tail height of the critical aeroplane, tail composition, tail position, fuselage height and length can have an effect on ILS critical and sensitive areas;
- (c) the dimensions of aeroplane maintenance services;
- (d) de-icing/anti-icing facilities;
- (e) aeroplane parking position (in relation to aerodrome OLS);
- (f) runway/parallel taxiway separation distances; and
- (g) the clearance of any aerodrome infrastructure or facilities built over stationary or moving aeroplanes.

6. Wingspan

The wingspan may have an impact on:

- (a) taxiway/taxilane separation distances (including runway/taxiway separation distances);
- (b) the dimensions of the OFZ;
- (c) the location of the runway-holding position (due to the impact of the wingspan on OFZ dimensions);
- (d) the dimensions of aprons and holding bays;
- (e) wake turbulence;
- (f) gate selection;
- (g) aerodrome maintenance services around the aeroplane;

- (h) equipment for disabled aeroplane removal; and i) de-icing.

7. Wingtip Vertical Clearance

The wing tip vertical clearance may have an impact on:

- (a) taxiway separation distances with height-limited objects;
- (b) apron and holding bay clearances with height-limited objects;
- (c) aerodrome maintenance services (e.g. snow removal);
- (d) airfield signage clearances; and
- (e) service road locations.

8. Cockpit View

The relevant geometric parameters to assess the cockpit view are cockpit height, cockpit cut-off angle and the corresponding obscured segment. The cockpit view may have an impact on:

- (a) runway visual references (aiming point);
- (b) runway sight distance;
- (c) taxiing operations on straight and curved sections;
- (d) markings and signs on runways, turn pads, taxiways, aprons and holding bays;
- (e) lights: in low visibility conditions, the number and spacing of visible lights when taxiing may depend on the cockpit view; and
- (f) calibration of PAPI/VASIS (pilot eye height above wheel height on approach).

Note.— Cockpit view with reference to the obscured segment is also affected by the attitude of the aeroplane on approach.

9. Distance from the Pilot's Eye Position to the Nose Landing Gear

The design of taxiway curves is based on the cockpit-over-centre-line concept. The distance from the pilot's eye position to the nose landing gear is relevant for:

- (a) taxiway fillets (wheel track);
- (b) the dimensions of aprons and holding bays; and c) the dimensions of turn pads.

10. Landing Gear Design

The aeroplane landing gear design is such that the overall mass of the aeroplane is distributed so that the stresses transferred to the soil through a well-designed pavement are within the bearing capacity of the soil. The landing gear layout also has an effect on the manoeuvrability of the aeroplane and the aerodrome pavement system.

11. Outer Main Gear Wheel Span

The outer main gear wheel span may have an impact on:

- (c) runway width;
- (d) the dimensions of turn pads;
- (e) taxiway width;
- (f) taxiway fillets;
- (g) the dimensions of aprons and holding bays; and f) the dimension of the OFZ.

12. Wheel Base

The wheelbase may have an impact on:

- (h) the dimensions of turn pads;
- (i) taxiway fillets;
- (j) the dimensions of aprons and holding bays; and
- (k) terminal areas and aeroplane stands.

13. Gear Steering System

The gear steering system may have an impact on the dimensions of turn pads and the dimensions of aprons and holding bays.

14. Maximum Aeroplane Mass

The maximum mass may have an impact on:

- (l) the mass limitation on existing bridges, tunnels, culverts and other structures under runways and taxiways;
- (m) disabled aeroplane removal;
- (n) wake turbulence; and
- (o) arresting systems when provided as an element of kinetic energy.

15. Landing Gear geometry, Tire Pressure and Aircraft Classification Number (ACN) Values

Landing gear geometry, tire pressure and ACN values may have an impact on the airfield pavement and associated shoulders.

16. Engine Characteristics

The engine characteristics include engine geometry and engine airflow characteristics, which may affect aerodrome infrastructure as well as ground handling of the aeroplane and operations in adjacent areas which are likely to become affected by jet blast.

The engine geometry aspects are:

- (a) the number of engines;
- (b) the location of engines (span and length);
- (c) the vertical clearance of engines; and
- (d) the vertical and horizontal extent of possible jet blast or propeller wash.

The engine airflow characteristics are:

- (a) idle, breakaway and take-off thrust exhaust velocities;
- (b) thrust reverser fitment and flow patterns; and c) inlet suction effects at ground level.

The engine characteristics may be relevant for the following aerodrome infrastructure and operational aspects:

- (a) runway shoulder width and composition (jet blast and ingestion issues during take-off and landing);
- (b) shoulder width and composition of runway turn pads;
- (c) taxiway shoulder width and composition (jet blast and ingestion issues during taxiing);
- (d) bridge width (jet blast under the bridge);
- (e) the dimensions and location of blast protection fences;
- (f) the location and structural strength of signs;
- (g) the characteristics of runway and taxiway edge lights;
- (h) the separation between aeroplanes and adjacent ground service personnel, vehicles or passengers;
- (i) snow removal procedures;
- (j) the design of engine run-up areas and holding bays;
- (k) the design and use of functional areas adjacent to the manoeuvring area;
- (l) the design of air bridges; and
- (m) the location of refuelling pits on the aircraft stand.

17. Maximum Passenger and Fuel Carrying Capacity

Maximum passenger- and fuel-carrying capacity may have an impact on:

- (a) terminal facilities;
- (b) fuel storage and distribution;
- (c) aerodrome emergency planning;
- (d) aerodrome rescue and fire fighting; and

- (e) air bridge loading configuration.

18. Flight Performance

Flight performance may have an impact on:

- (a) runway width;
- (b) runway length;
- (c) the OFZ;
- (d) runway/taxiway separation;
- (e) wake turbulence;
- (f) noise; and
- (g) aiming point marking.

ATTACHMENT B : AERODROME GROUND SERVICING REQUIREMENTS

The following list of aeroplane ground servicing characteristics and requirements may affect the available aerodrome infrastructure. This list is not exhaustive; additional items may be identified by the stakeholders involved in the compatibility assessment process:

- (a) ground power;
- (b) passengers embarking and disembarking;
- (c) cargo loading and unloading;
- (d) fuelling;
- (e) pushback and towing;
- (f) de-icing;
- (g) taxiing and marshalling;
- (h) aeroplane maintenance;
- (i) RFF;
- (j) equipment areas;
- (k) stand allocation; and
- (l) disabled aircraft removal.