Part 311

Aeronautical charts

TABLE OF CONTENTS

Subpart A
General

311.1 Applicability

(a) This part prescribes rules governing:
  (1) The certification and operation of organizations providing an aeronautical charts design and production in Egypt; and
  (2) The operating and technical standards for the provision of aeronautical charts design and production.

(b) These Rules were developed using:
  (1) ICAO Document 8168 (PANS– OPS) as the base document, ICAO DOC .9368
  (2) (Instrument flight procedures construction manual) and ICAO DOC. 9371
  (3) (Template manual for holding Reversal and Racetrack Procedures)
  (4) ANNEX 4 (Aeronautical charts) and ICAO DOC 8697 (Aeronautical Charts Manual)
  (5) ANNEX 11 (Air Traffic Services) and ICAO DOC. 9426 (Air Traffic Services Planning Manual)
  (6) ANNEX 14 (Aerodromes) and ICAO DOC. 9613

(c) All charts coming within the scope of this Part and bearing the aeronautical information date of 1 November 2001 or later shall conform to the Standards relevant to the particular chart.

(d) All charts produced under the standard of this Part shall be sent to ECAR Part 173 certificate holder after ECAA approval to be published in the AIP.

311.3 Definitions

When the following terms are used in the Standards and Recommended Practices for aeronautical charts, they have the following meanings:

Aeronautical chart. A representation of a portion of the earth, its culture and relief, specifically designated to meet the requirements of air navigation.

Airway. A control area or portion thereof established in the form of a corridor**.**

Area minimum altitude (AMA). The lowest altitude to be used under instrument meteorological conditions (IMC) that will provide a minimum vertical clearance of 300 m (1 000 ft) or in designated mountainous terrain 600 m (2 000 ft) above all obstacles located in the area specified, rounded up to the nearest (next higher) 30 m (100 ft).

Arrival routes. Routes identified in an instrument approach procedure by which aircraft may proceed from the en-route phase of flight to an initial approach fix.

Change-over point. The point at which an aircraft navigating on an ATS route segment defined by reference to very high frequency omni directional radio ranges is expected to transfer its primary navigational reference from the facility behind the aircraft to the next facility ahead of the aircraft**.**

Contour line. A line on a map or chart connecting points of equal elevation**.**

Electronic aeronautical chart display. An electronic device by which flight crews are enabled to execute, in a convenient and timely manner, route planning, route monitoring and navigation by displaying required information.

Final approach fix or point. That fix or point of an instrument approach procedure where the final approach segment commences**.**

Final approach segment. That segment of an instrument approach procedure in which alignment and descent for landing are accomplished**.**

Glide path. A descent profile determined for vertical guidance during a final approach**.**

Holding procedure. A predetermined maneuver which keeps an aircraft within a specified airspace while awaiting further clearance.

Hypsometric tints. A succession of shades or color gradations used to depict ranges of elevation.

Initial approach segment. That segment of an instrument approach procedure between the initial approach fix and the intermediate approach fix or, where applicable, the final approach fix or point. between either the intermediate approach fix and the final approach fix or point, or between the end of a reversal, racetrack or dead reckoning track procedure and the final approach fix or point, as appropriate.

Isogonal. A line on a map or chart on which all points have the same magnetic variation for a specified epoch.

Isogriv. A line on a map or chart which joins points of equal angular difference between the North of the navigation grid and Magnetic North.

Magnetic variation. The angular difference between True North and Magnetic North.

Metadata. Data about data (ISO 19115*).

Missed approach point (MAPt). That point in an instrument approach procedure at or before which the prescribed missed approach procedure must be initiated in order to ensure that the minimum obstacle clearance is not infringed.

Point light. A luminous signal appearing without perceptible length.

Precision approach procedure. An instrument approach procedure utilizing azimuth and glide path information provided by ILS or PAR.

Procedure altitude/height. A specified altitude/height flown operationally at or above the minimum altitude/height and established to accommodate a stabilized descent at a prescribed descent gradient/angle in the intermediate/final approach segment.

Procedure turn. A man oeuvre in which a turn is made away from a designated track followed by a turn in the opposite direction to permit the aircraft to intercept and proceed along the reciprocal of the designated track.

Radar vectoring. Provision of navigational guidance to aircraft in the form of specific headings, based on the use of radar.

Reversal procedure. A procedure designed to enable aircraft to reverse direction during the initial approach segment of an instrument approach procedure. The sequence may include procedure turns or base turns.

Terminal arrival altitude (TAA). The lowest altitude that will provide a minimum clearance of 300 m (1 000 ft) above all objects located in an arc of a circle defined by a 46-km (25 NM) radius centered on the initial approach fix (IAF), or where there is no IAF on the intermediate approach fix (IF), delimited by straight lines joining the extremity of the arc to the IF. The combined TAAs associated with an approach procedure shall account for an area of 360 degrees around the IF.

Visual approach procedure. A series of predetermined maneuvers by visual reference, from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, a go-around procedure can be carried-out.

311.5 Application for certification

(a) Each applicant for the grant of aeronautical charts design and production certificate shall:
  (1) Complete the ECAA aeronautical charts design and production certification form which requires the following information:
    (i) The applicant's name and address for service in Egypt;
    (ii) The specific aeronautical charts design and production or services to be provided and
    (iii) Such other particulars relating to the applicant and the intended service as may be required by the ECAA as indicated on the form.
  (2) Submit the completed form to the ECAA with payment of the appropriate application fee prescribed by ECAA
(b) Each applicant shall include with the application all the documents listed in the application form.

311.7 Issuance of certificate

An applicant is entitled to aeronautical charts design and production certificate if the ECAA is satisfied that:
(a) The applicant meets the requirements of this Part .
(b) The applicant, and the applicant's senior person or persons required by 311.51(a)(1) and (2) are fit and properly qualified persons; and
(c) The granting of the certificate is not contrary to the interests of aviation safety.

311.9 Privileges of certificate

(a) An aeronautical charts design and production certificate:
  (1) States the aerodrome landing area or designated airspace at, or within which, the flight operations procedures is provided; and
  (2) May include such conditions, as the ECAA considers appropriate related to this Part.
(b) An aeronautical charts design and production certificate shall specify which of the following flight operations procedures, approved training courses and assessment procedures for such flight operations procedures, the certificate holder is authorized to provide:
  (1) Flight data operation and Flight plans;
  (2) NOTAM;
  (3) Aeronautical chart design;
  (4) ENR and Instrument Approach chart;
  (5) Watch supervisor;

311.11 Duration of certificate

(a) An aeronautical charts design and production certificate may be issued or renewed for a maximum period up to 2-years;
(b) An aeronautical charts design and production certificate remains in force until it expires or withdrawn or suspended or revoked;
(c) The holder of an aeronautical charts design and production certificate that expires or is revoked shall forthwith surrender the certificate to the ECAA; and
(d) The holder of an aeronautical charts design and production certificate that is suspended shall forthwith produce the certificate to the ECAA for appropriate endorsement.

311.13 Renewal of certificate

(a) The renewal application shall be submitted to the ECAA not less than 30 days before the certificate expires.
(b) Where the certificate has been in force for the full 2-years period, the applicant will be subjected to a full entry-level assessment by the ECAA.

311.14 ECAA Inspection Authority

(a) Each person holds a certificate under this part (or applied for such certificate) shall grant unrestricted and unlimited access for ECAA inspectors to inspect his personnel, facilities, equipment, documents and records to determine:
(1) Eligibility to continue to hold his certificate.
(2) Compliance with this ECAR part
(b) Failure to comply with paragraph (a) above shall be a basis to suspend, withdraw or revoke any certificate issued under this part.

311.15 Enforcement issues

(a) Penalties:
(1) ECAA may impose a penalty (according to the Civil aviation Law NO 28), or reduce some privileges to the certificate holder if:
(i) It finds that the certificate holder does not comply with the requirements of this Part and such holder failed to remedy such non-compliance within 60-days after receiving notice in writing from ECAA to do so;
(ii) Such action is necessary in the interest of safety;
(iii) Its inspector is prevented by the provider from carrying out a safety inspection when his report recommends such action;
(iv) The certificate holder failed to provide the service in the required standard level, which is confirmed to ECAA by receiving reports from the users of the service and proved by a legal investigation; and
(2) When proposing a penalty, ECAA will state the reasons for such action and will furnish them to the certificate holder.
(b) Suspension of certificate this is a subsequent procedure to impose a penalty:
(1) ECAA may suspend for a defined period, an AIS certificate issued under this part if:
(i) Subject to item 173.25 Paragraph (B) 1, ECAA is satisfied that the certificate holder still unable to remedy any of these non-compliant areas with the specified time frame of 60-days;
(ii) The investigation, in case of an accident, proves that it was caused due to the faulty procedures and/or the malfunction or failure of AIS equipment or system;
(iii) The certificate holder failed to perform the action plan stated in the certificate in the exact period of time if so stated; and
(iv) Such actions still necessary in the interest of aviation safety.
(2) When proposing a suspension, the ECAA will state the reasons for such action and furnish them to the certificate holder;
(3) The certificate holder may appeal against such notice within 30-days of receipt;
(4) The applicant shall furnish to ECAA any documents, records, or other pertinent information supporting the appeal; and
(5) ECAA may confirm, modify, or set aside the proposed suspension based on the appeal.

(c) Revocation of certificate this is a subsequent procedure to suspension:
  (1) ECAA may permanently revoke an AIS certificates issue under this part if:
    (i) It is verified that the certificate holder will not be able to overcome non-compliant areas; and
    (ii) The certificate holder stops providing the service concerned without a convincing argument.
  (2) ECAA has decided for the interest of safety to terminate services provided at this aerodrome.
  (3) The Ministerial Order issued for the certificate holder is revoked.
  (4) The revoked certificate cannot be renewed, it has to be reissued not less than one year after the revocation date

311.17 Withdrawal or change in level of service

(a) Each holder of an aeronautical charts design and production certificate who wishes to permanently withdraw Aeronautical charts and Instrument Procedures shall give the ECAA at least 90 days notice of the proposal and include in that notice a summary of factors considered in arriving at the decision to withdrew the service.
(b) Each holder of an aeronautical charts design and production certificate that intends to permanently reduce the hours of operation of an aeronautical charts design and production shall provide to the ECAA an advance notice of, and the reasons for, the proposed reduction.
(c) Each holder of an aeronautical charts design and production certificate that is the outgoing provider of an aeronautical charts design and production shall not hinder the preparation and execution of transitional arrangements.

311.19 Provisional approval

The ECAA may, if it is considered in the interest of safety, grant an existing certificate holder a provisional approval to act as a substitute aeronautical charts design and production in respect to certificate that has been withdrawn, suspended or revoked.

311.21 Transfer of service

Each applicant for the grant of aeronautical charts design and production certificate intending to assume responsibility for providing any aeronautical charts design and production from an existing certificate holder, shall include with its application, full details of transitional arrangements endorsed by the air traffic managers of both organizations.

311.23 Display of certificate

Each aeronautical charts design and production certificate holder shall display the certificate in a prominent place, generally accessible to the public at the holders principal place of business and, if a copy of the approval is displayed, shall produce the original approval to an ECAA inspector if so requested by such inspector.

311.25 Register of certificates

(a) The ECAA will maintain a register of all aeronautical charts design and production certificate issued under this Part.
(b) The register contains:
  (1) The full name of the certificate holder;
  (2) The business address of the certificate holder;
  (3) The date on which the certificate was approved;
  (4) The type of aeronautical charts design and production for which the certificate was issued;
  (5) The date on which the certificate is revoke or suspend, if applicable; and
  (6) The date on which the certificate expires.

311.27 Availability

(a) Information. A certificate holder shall on request by ECAA provide all information relating to the Egyptian territory that is necessary to enable the Standards of this Part to be met.
(b) Charts. A certificate holder shall, when so specified, ensure the availability of charts in whichever of the appropriate ways prescribed in this Part for a particular chart or single sheet of a chart series.

311.29 Approval Criteria for PANS OPS

The requirment and approval will be adupted with ICAO Doc. 8168(Procedure for Air Navigation Suffices-PANS OPS)

311.31 Validation Of Instrument Flight Procedures

To obtain a qualitative assesment of the procedure design including obstcles, terrain, navigation data and provide an assesment of the fly ability of the procedure. Validation is the final quality assurance step in the procedure design process for instrument flight procedures (IFP) and is essencial before the procedure design documentation, refer to ICAO Doc. 9906

311.33 - 311.49 [Reserved]

Subpart B
Certification Requirements

311.51 Personnel requirements

Each applicant for the grant of an aeronautical charts design and production certificate shall employ or contract:

(a) A senior person acceptable to the ECAA, who has the authority within the applicant's organization to ensure that each activity listed in their exposition:
  (1) Can be financed and is provided to meet operational requirements; and
  (2) Is provided in accordance with the requirements prescribed by this Part.

(b) A senior person or group of senior persons who are responsible for assuring that the applicant's organization complies with the requirements of this Part. Such nominated person or persons shall be ultimately responsible to the ECAA;

(c) Sufficient personnel to collect, collate, check, coordinate, edit, and amend an aeronautical charts design and production for the flight operations procedures in the applicant's exposition; **,(for optimal qualifications see EAC 311-1)**

(d) Establish a procedure to initially assess the competence of those personnel authorized by the applicant to check, edit, and amend aeronautical charts for the flight operations procedures listed in their exposition;

(e) Establish a procedure to maintain the competence of those authorized personnel; and

(f) Provide those authorized personnel with written evidence of the scope of their authorization.

311.53 Collection of information

(a) Each applicant for the grant of an aeronautical charts design and production certificate shall establish procedures to collect and collate the information required for the activities listed in their exposition.

(b) The procedures shall ensure that:
  (1) Applicable information is obtained from organizations that provide services in support of the Egyptian air navigation system;
  (2) Applicable information is obtained from the other States relevant to the requirements of international aircraft operators operating on international air routes originating from Egypt;
  (3) Arrangements for the timely provision of information are made with the information originators prescribed in Paragraph (b)(1) and (2); and
  (4) Information received from the information originators prescribed in paragraph (b)(1) is certified as accurate by a person identified by the originator to be responsible for the accuracy of that information.

311.55 Preparation of aeronautical chart

(a) Each applicant for the grant of an aeronautical charts design and production certificate shall establish procedures to check, co-ordinate, edit, publish and disseminate aeronautical information for the services listed in their exposition.

(b) The procedures shall ensure that:
  (1) The information received under 311.29 is checked against available information to verify its accuracy prior to publication; and
  (2) The information received under 311.29 is edited, accurately.
    (i) In the format applicable to the operational significance of the information; and
    (ii) In a format that takes account of the circumstances under which the information will be used; and
  (3) Permanent publications and long-term temporary publications that related to an Aeronautical charts design and production are clearly identified as being published under the authority of the ECAA;
  (5) Any permanent change to published information is coordinated with other applicable information originators before the change is published;

(6) Temporary information that is published with - an estimated period is reviewed at an appropriate time to ensure that the originator takes the required action to cancel or reissue the information;
(7) The Aeronautical chart, airways, instrument procedures, control zone, and control area are published in the English and Arabic language;
(8) Units of measurement are consistent with those prescribed in Part 305;
(9) Abbreviations, consistent with those prescribed in Part 1, and are used in the published an aeronautical charts when:
(i) Their use is appropriate; and
(ii) Their use will facilitate the dissemination of the information; and
(11) Any of the aeronautical information related to an aeronautical charts is promptly made available to the other States, upon request by those States;
(12) The aeronautical information related to an aeronautical charts and instrument procedures is made available in a form under DOC 8697 and that is suitable for the operational requirements of flight operations personnel, including flight crew members.

(c) The procedures for aeronautical charts instrument procedures shall, in addition to Paragraph (b), ensure that:
(1) Aeronautical chart format is carried out in accordance with this Part;
(2) Airways format is carried out in accordance with this Part;
(3) Control zone and control area format is carried out in accordance with this Part;
(4) Instrument procedure format is carried out in accordance with this Part; and
(5) Obstacle evaluation format is carried out in accordance with this Part.

311.57 Correction in published information

(a) Each applicant for the grant of an aeronautical charts design and production certificate shall establish procedures to record, investigate, correct, and report any errors that are detected in the aeronautical chart published under the authority of their certificate.
(b) The procedures shall ensure that:
(1) The error is corrected by the most appropriate means relative to the operational significance of the error;
(2) The correction is clearly identified in the republished information; and
(3) The source of the error is identified and, where possible, eliminated.

311.59 Files

(a) The applicant for the grant of an aeronautical charts design and production certificate shall establish procedures to identify, collect, index, store, maintain and dispose of the files that are necessary and listed in their exposition.
(b) The procedures shall ensure that:
(1) There are files enabling all incoming and outgoing aeronautical data to be readily identified by serial number and date, and that supplementary data can be similarly verified and, where necessary, authenticated;
(2) There is a file of each person who is authorized by the applicant to check and edit aeronautical data;
(3) There is a file of each error correction;
(4) There is a file of each SQAMS review of the applicant's organization carried out under the procedures required by 311.61;
(5) All files are legible and of a permanent nature; and
(6) All electronic files are retained for at least 5-years after which complete update of the contents of those files is required.

311.61 Safety and quality management system

(a) Each certificate holder shall establish, implement, maintain and adhere to a safety and quality assurance management systems that are appropriate to the size, nature and complexity of all activities authorized to be conducted under the certificate and in accordance with EAC 00-11.
(b) The results of these systems and related audits and corrective actions shall be made available to the ECAA upon request.

311.63 Security

(a) Each applicant for the grant of an aeronautical charts design and production certificate shall prepare an aeronautical charts and instrument procedures security program, if applicable.
(b) Each an aeronautical charts and instrument procedures security program shall specify the physical security requirements, practices, and procedures to be followed for the purposes of minimizing the risk of, destruction of, damage to, or interference with the operation of, any an aeronautical charts design and production unit operated by the applicant where such destruction, damage, or interference is likely to endanger the safety of aircraft.
(c) Without limiting the generality of paragraph (b), the security program shall specify such physical security requirements, practices, and procedures as may be necessary:
  (1) To ensure that entrances to permanent an aeronautical charts design and production facilities operated by the applicant are subject to positive access control at all times, so as to prevent unauthorized entry;
  (2) To protect personnel on duty;
  (3) To be followed in the event of a bomb threat or other threat of violence against an Aeronautical charts design and production unit; and
  (4) To monitor unattended an aeronautical charts design and production unit facilities to ensure that any intrusion or interference is detected.

311.65 Coordination

(a) Each applicant for the grant of an aeronautical charts design and production certificate shall establish systems and procedures to ensure, where applicable, coordination between each unit listed in the applicant's exposition and the following agencies:
  (1) The holder of the Telecommunications and Radio Air Navigation Facilities Service certificate issued under Part 171;
  (2) Any holder of an aeronautical telecommunication service certificate issued under Part 174;
  (3) The Egyptian Meteorological Services organization;
  (4) The Egyptian Defense Force;
  (5) Aircraft operators;
  (6) Search and rescue authorities; and
  (7) Where the listed an aeronautical charts design and production unit is an aerodrome control or aerodrome AIS unit:
    (i) The aerodrome operator; and
    (ii) The apron management service, if the aerodrome control unit does not provide that service.
(b) The applicant shall provide systems and procedures to facilitate communications between the units having an operational requirement to communicate with each other.
(c) The applicant shall provide systems and procedures to ensure that units, aircraft operators, and aviation meteorological service providers, are provided with charts required.

311.67 Training

(a) Each applicant for the grant of an aeronautical charts design and production certificate shall establish procedures acceptable to the ECAA and follow the approved training programs for aeronautical information services officers as follows:
  (2) Basic introduction.
  (3) Initial training.
  (4) Recurrent training.

(5) Remedial training.
(6) On –job –training.
(7) Human factor initial and recurrent.

(b) Training provided must have, and put into effect a training plan for the training relating to aeronautical information services.

(c) Personnel giving instructions in an operational working position shall hold appropriate current instructor authorization by the ECAA.

Note: This authorization for personnel who are qualified and have received an instructional technique course and are selected for a specified appropriate in connection with training.

(d) The applicant shall nominate the qualified personnel carrying out assessment, examiners and trainers to be authorized by the ECAA.

(e) Each of training types mentioned in (a) shall fulfill the training standards requirements listed in Egyptian Civil Aviation Training Standards Handbook (ECATSH).

311.68 Training record

Each applicant for the grant of aeronautical MAP services certificate shall establish procedures acceptable to the ECAA for keeping training record for all technical staff and to be maintained up to date.

311.69 Operations manuals

Each holder of aeronautical information services certificate shall provide an operations manual, to be available for compliance by its personnel, to perform the services listed in its exposition.

311.71 Contingency plan

Each applicant for the grant of aeronautical information services certificate shall establish a contingency plan providing for the safe and orderly flow of information in the event of a disruption, and / or interruption.

311.73 RE – qualification requirements

Each aeronautical charts design and production services officer who has become unqualified due to not having satisfactorily completed recurrent training, competency or familiarization with the appropriate eligibility period shall comply with the re-qualification procedures accepted by the ECAA.

311.75 - 311.99 [Reserved]

Subpart C
Operating Requirements

311.101 Operational requirements for charts

(a) The total phase of flight can be sequenced into the following phases:
  (1) Phase 1 — Taxi from aircraft stand to take-off point
  (2) Phase 2 — Take-off and Note. — The total flight is divided into the following phases: Climb to en-route ATS route structure
  (3) Phase 3 — En route ATS route structure
  (4) Phase 4 — Descent to approach
  (5) Phase 5 — Approach to land and missed approach
  (6) Phase 6 — Landing and taxi to aircraft stand.

(b) Each type of chart shall provide information relevant to the function of the chart and its design shall observe Human Factors principles, which facilitate its optimum use.

(c) Each type of chart shall provide information appropriate to the phase of flight, to ensure the safe and expeditious operation of the aircraft.

(d) The presentation of information shall be accurate, free from distortion and clutter, unambiguous, and be readable under all normal operating conditions.

(e) Colors or tints and type size used shall be such that the chart can be easily read and interpreted by the pilot in varying conditions of natural and artificial light.

(f) The information shall be in a form, which enables the pilot to acquire it in a reasonable time consistent with workload and operating conditions.

(g) The presentation of information provided on each type of chart shall permit smooth transition from chart to chart as appropriate to the phase of flight.

(h) Each applicant for the grant of an aeronautical charts design and production certificate should make the charts to be True North orientated.

(i) The basic sheet size of the charts should be 210 x 148 mm (A5).

311.103 Titles

The title of a chart or chart series prepared in accordance with the requirements of this Part and intended to satisfy the function of the chart, shall be that of the relevant chapter heading as modified by application of any Standard contained therein, except that such title shall not include "ICAO" unless the chart conforms with all the requirements specified in this Part.

311.105 Miscellaneous information

Each applicant for the grant of an aeronautical charts design and production certificate shall:

(a) Make the marginal note layout in accordance to appendix 1 of this Part .

(b) Show the following information on the face of each chart unless otherwise stated in the specification of the chart concerned:
  (1) Designation or title of the chart series;
  (2) Name and reference of the sheet;
  (3) On each margin an indication of the adjoining sheet.

(c) Provide a legend to the symbols and abbreviations used. The legend shall be on the face or reverse of each chart except that, where it is impracticable for reasons of space, a legend may be published separately.

(d) Show the name and adequate address of the producing agency in the margin of the chart.

311.107 Symbols

Each applicant for the grant of an aeronautical charts design and production certificate shall conform the symbols used to those shown in Appendix 2 of this Part, except that where it is desired to show on an aeronautical chart special features or items of importance to civil aviation for which no ICAO symbol is at present provided, any appropriate symbol may be chosen for this purpose, provided that it does not cause confusion with any existing ICAO chart symbol or impair the legibility of the chart.

311.109 Units of measurement

Each applicant for the grant of an aeronautical charts design and production certificate shall:

(a) Derive distances as geodesic distances.
(b) Express the distances in nautical miles.
(c) Express altitudes, elevations and heights in feet.
(d) Express linear dimensions on aerodromes and short distances in meters.
(e) Specify the order of resolution of distances, dimensions, elevations and heights for a particular chart.
(f) State the units of measurement used to express distances, altitudes, elevations and heights on the face of each chart.
(g) Provide the conversion scales (kilometers/nautical miles, meters/feet) on each chart on which distances, elevations or altitudes are shown. The conversion scales shall be placed on the face of each chart.

311.111 Scale and projection

Each applicant for the grant of an aeronautical charts design and production certificate shall indicate:

(a) The name and basic parameters and scale of the projection for charts of large areas.
(b) A linear scale only for charts of small areas.

311.113 Date of validity of aeronautical information

Each applicant for the grant of an aeronautical charts design and production certificate shall indicate clearly the date of validity of aeronautical information on the face of each chart.

311.115 Spelling of geographical names

Each applicant for the grant of an aeronautical charts design and production certificate shall:

(a) Use the symbols of the Roman alphabet for all writing.
(b) Accept the names of places and of geographical features in countries which officially use varieties of the Roman alphabet in their official spelling, including the accents and diacritical marks used in the respective alphabets.
(c) Spell where a geographical term such as “cape”, “point”, “gulf”, “river”, is abbreviated on any particular chart, that word out in full in the language used by the publishing agency, in respect of the most important example of each type. Punctuation marks shall not be used in abbreviations within the body of a chart.

311.117 Abbreviations

Each applicant for the grant of an aeronautical charts design and production certificate:

(a) Shall use abbreviations on aeronautical charts whenever they are appropriate.
(b) Where applicable, should select abbreviations from the Procedures for Air Navigation Services — ICAO Abbreviations and Codes (Doc 8400).

311.119 Political boundaries

Each applicant for the grant of an aeronautical charts design and production certificate shall:

(a) Show International boundaries but may be interrupted if data more important to the use of the chart would be obscured.
(b) Where the territory of more than one State appears on a chart, shall indicate the names identifying the countries.

311.121 Relief

(a) Relief, where shown, each applicant for the grant of an aeronautical charts design and production certificate shall portray in a manner that will satisfy the chart users’ need for:
    (1) Orientation and identification;
    (2) Safe terrain clearance;

(3) Clarity of aeronautical information when shown;
(4) Planning.

(b) Each applicant for the grant of an aeronautical charts design and production certificate shall show the spot elevations for selected critical points.

(c) Each applicant for the grant of an aeronautical charts design and production certificate shall follow the value of spot elevations of doubtful accuracy by the sign±.

311.123 Prohibited, restricted and danger areas

When prohibited, restricted or danger areas are shown, each applicant for the grant of an aeronautical charts design and production certificate shall include the reference or other identification except that the nationality letters may be omitted.

311.125 Air traffic services airspaces

When ATS airspace is shown on a chart, each applicant for the grant of an aeronautical charts design and production certificate shall indicate the class of airspace, the type, name or call sign, the vertical limits and the radio frequency(ies) to be used and the horizontal limits depicted in accordance with Appendix 2 of this Part.

311.127 Magnetic variation

(a) Each applicant for the grant of an aeronautical charts design and production certificate shall indicate:
(1) True North and magnetic variation shall be indicated.
(2) The order of resolution of magnetic variation of magnetic variation as specified for particular chart.

(b) When magnetic variation is shown on a chart, the values shown should be those for the year nearest to the date of publication that is divisible by 5. In exceptional cases where the current value would be more than one degree different, after applying the calculation for annual change, an interim date and value should be quoted.

311.129 Aeronautical data

Each applicant for the grant of an aeronautical charts design and production certificate shall:

(a) Take all necessary measures to introduce a properly organized quality system containing procedures, processes and resources necessary to implement quality management at each function stage as outlined in ECAR Part 173.151. The execution of such quality management shall be made demonstrable for each function stage, when required. In addition, States shall ensure that established procedures exist in order that aeronautical data at any moment is traceable to its origin so to allow any data anomalies or errors, detected during the production/ maintenance phases or in the operational use, to be corrected.

(b) Ensure that the order of chart resolution of aeronautical data to be that as specified for a particular chart, and as presented in a tabular form in Appendix 6 of this Part.

(c) Ensure that integrity of aeronautical data is maintained throughout the data process survey/ from receiving to the next intended user. Aeronautical data integrity requirements shall be based upon the potential risk resulting from the corruption of data and upon the use to which the data item is put. Consequently, the following classification and data integrity level shall apply:
(1) Critical data, integrity level 1 x 10-8: there is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe;
(2) Essential data, integrity level 1 x 10-5: there is a low probability when using corrupted essential data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe; and
(3) Routine data, integrity level 1 x 10-3: there is a very low probability when using corrupted routine data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe.

(d) Aeronautical data quality requirements related to the integrity and data classification shall be as provided in Tables 1 to 5 in Appendix 6 of this Part. Protection of electronic aeronautical data while stored or in transit shall be totally monitored by the Cyclic Redundancy Check (CRC).
(e) To achieve protection of the integrity level of critical and essential aeronautical data, a 32- or 24-bit CRC algorithm shall apply respectively.
(f) To achieve protection of the integrity level of routine aeronautical data , a 16-bit CRC algorithm or a WX system software or any equivalent system.

311.131 World Geodetic System — 1984 (WGS-84)

Each applicant for the grant of an aeronautical charts design and production certificate shall make use of the following:
(a) Horizontal reference system. World Geodetic System - 1984 (WGS-84) shall be used as the horizontal (geodetic) reference system. Published aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS- 84 geodetic reference datum.
(b) Geographical coordinates which have been transformed into WGS-84 coordinates but whose accuracy of original field work does not meet the requirements in ECAR Part 173.71(h) & (k) and ECAR Part 139.307 shall be identified by an asterisk.
(c) The order of chart resolution of geographical coordinates shall be that specified for a particular chart series and in accordance with Appendix 6, Table 1 of this Part.
(d) Vertical reference system. Mean sea level (MSL) datum, which gives the relationship of gravity-related height (elevation) to a surface known as the geoid, shall be used as the vertical reference system.
(e) In addition to the elevation (referenced to mean sea level) for the specific surveyed ground positions, publish geoids undulation (referenced to the WGS-84 ellipsoid) for those positions as specified for a particular chart.
(f) The order of chart resolution of elevation and geoid undulation shall be that specified for a particular chart series and in accordance with Appendix 6, Table 2 of this Part.
(g) Temporal reference system. The Gregorian calendar and Coordinated Universal Time (UTC) shall be used as the temporal reference system.
(h) When a different temporal reference system is used for charting, this shall be indicated in GEN 2.1.2 of the Aeronautical Information Publication (AIP).

311.133 Aerodrome obstacle chart — ICAO type A (operating limitations)

Each applicant for the grant of an aeronautical charts design and production certificate shall fulfill the requirements listed under the following headings:
(a) Function: Make the aerodrome obstacle charts - ICAO Type A in combination with the relevant information published in the AIP, to provide the data necessary to enable an operator to comply with the operating limitations.
(b) Availability:
  (1) Make the aerodrome obstacle charts - ICAO Type A (operating limitations) for all aerodromes regularly used by international civil aviation, except for those aerodromes where there are no significant obstacles in the take-off flight path areas.
  (2) Where a chart is not required because no significant obstacles exist in the take-off flight path area, publish a notification to this effect.
(c) Units of measurement:
  (1) The elevations to the nearest half-meter or to the nearest foot.
  (2) The linear dimensions to the nearest half-meter.
(d) Coverage and scale:
  (1) Extent of each plan to be sufficient to cover all significant obstacles.
  (2) (2) Horizontal scale to be within the range of 1:10 000 to 1:15 000.
  (3) Horizontal scale should be 1:10 000.
  (4) Vertical scale to be ten times the horizontal scale.

(5) Horizontal and vertical linear scales to showing both meters and feet in the charts.

(e) Format:

(1) Make the charts to depict a plan and profile of each runway, any associated stop way or clearway, the take-off flight path area, and significant obstacles.

(2) The profile for each runway, stop way, clearway and the obstacles in the take-off flight path area shall be shown above its corresponding plan. The profile of an alternative take-off flight path area shall comprise a linear projection of the full take-off flight path and shall be disposed above its corresponding plan in the manner most suited to the ready interpretation of the information.

(3) The profile grid shall be ruled over the entire profile area exclusive of the runway. The zero for vertical coordinates shall be mean sea level. The zero for horizontal coordinates shall be the end of the runway furthest from the take-off flight path area concerned. Graduation marks indicating the subdivisions of intervals shall be shown along the base of the grid and along the vertical margins and should make

(4) The vertical grid to have intervals of 30 m (100 ft) and the horizontal grid to have intervals of 300 m (1 000 ft).

(5) make the chart to include:

(i) A box for recording the operational data

(ii) A box for recording amendments and dates thereof.

(e) Identification: Identify the chart by the name of the country in which the aerodrome is located, the name of the city or town, or area, which the aerodrome serves, the name of the aerodrome and the designator(s) of the runway(s).

(f) Magnetic variation: Indicate the magnetic variation to the nearest degree and date of information.

(g) Aeronautical data:

(1) Obstacles:

(i) Consider the obstacles in the take-off flight path area which project above a plane surface having a 1.2 per cent slope and having a common origin with the take-off flight path area, as significant obstacles, except that significant obstacles lying wholly below the shadow of other significant obstacles as defined in (3.8.1.2) need not be shown. Mobile obstacles such as boats, trains, trucks, etc., which may project above the 1.2 per cent plane shall be considered significant obstacles but shall not be considered as being capable of creating a shadow.

(ii) Consider the shadow of an obstacle to be a plane surface originating at a horizontal line passing through the top of the obstacle at right angles to the center line of the take-off flight path area. The plane covers the complete width of the take-off flight path area and extends to the plane defined at 3.8.1.1 or to the next higher significant obstacle if it occurs first. For the first 300 m (1 000 ft) of the take-off flight path area, the shadow planes are horizontal and beyond this point such planes have an upward slope of 1.2 per cent.

(iii) If the obstacle creating a shadow is likely to be removed, objects that would become obstacles by its removal shall be shown.

(2) Take-off flight path area:

(i) The take-off flight path area consists of a quadrilateral area on the surface of the earth lying directly below, and symmetrically disposed about, the take-off flight path. This area has the following characteristics:

(A) It commences at the end of the area declared suitable for take-off (i.e. at the end of the runway or clearway as appropriate);

(B) Its width at the point of origin is 180 m (600 ft) and this width increases at the rate of 0.25D to a maximum of 1 800 m (6 000 ft), where D is the distance from the point of origin;

(C) It extends to the point beyond which no significant obstacles exist or to a distance of 10.0 km (5.4 NM), whichever is the lesser.

(ii) For runways serving aircraft having operating limitations which do not preclude the use of a take-off flight path gradient of less than 1.2 per cent, the extent of the takeoff flight path area specified in.(3.8.2.1 c) shall be increased to not less than 12.0 km (6.5 NM) and the slope of the plane surface specified in 3.8.1.1 and 3.8.1.2 shall be reduced to 1.0 per cent or less.

(3) Declared distances:

(i) Enter the following information for each direction of each runway in the space provided:

(A) Take-off run available;

(B) Accelerate-stop distance available;

(C) Take-off distance available;

(D) Landing distance available.

(ii) Provide: Where a declared distance is not provided because a runway is usable in one direction only, that runway should be identified as "not usable for take-off, landing, or both".

(4) Plan and profile views:

(i) Make the plan view to show:

(A) The outline of the runways by a solid line, including the length and width, the magnetic bearing to the nearest degree, and the runway number;

(B) The outline of the clearways by a broken line, including the length and identification as such;

(C) Take-off flight path areas by a dashed line and the centerline by a fine line consisting of short and long dashes;

(D) Alternative take-off flight path areas. When alternative take-off flight path areas not centered on the extension of the runway centerline is shown, notes shall be provided explaining the significance of such areas;

(E) Obstacles, including:

(I) The exact location of each significant obstacle together with a symbol indicative of its type;

(II) The elevation and identification of each significant obstacle;

(III) The limits of penetration of significant obstacles of large extent in a distinctive manner identified in the legend.

(ii) The nature of the runway and stop way surfaces should be indicated.

(iii) Stop ways should be identified as such and should be shown by a broken line.

(iv) When stop ways are shown, the length of each stop way shall be indicated.

(v) make the profile view to show:

(A) The profile of the centerline of the runway by a solid line and the profile of the centerline of any associated stop ways and clearways by a broken line;

(B) The elevation of the runway center line at each end of the runway, at the stop way and at the origin of each takeoff flight path area, and at each significant change in slope of runway and stop way;

(C) Obstacles, including:

(I) Each significant obstacle by a solid vertical line extending from a convenient grid line over at least one other grid line to the elevation of the top of the obstacle;

(II) Identification of each significant obstacle;

(III) The limits of penetration of significant obstacles of large extent in a distinctive manner identified in the legend.

(i) Accuracy:

(1) Show on the chart the order of accuracy attained.
(2) Print on the chart the horizontal dimensions and the elevations of the runway, stop way and clearway determined to the nearest 0.5 m (1 ft).
(3) Take from the chart the order of accuracy of the field work and the precision of chart production such that measurements in the take-off flight path areas can be within the following maximum deviations:
(i) Horizontal distances: 5 m (15 ft) at a point of origin increasing at a rate of 1 per 500;
(ii) Vertical distances: 0.5 m (1.5 ft) in the first 300 m (1 000 ft) and increasing at a rate of 1 per 1 000.
(4) Where no accurate datum for vertical reference is available, the elevation of the datum used be stated and be identified as assumed.

311.135 En route chart — ICAO

Each applicant for the grant of an aeronautical charts design and production certificate shall fulfill the requirements listed under the following headings:

(a) Function: Make this chart to provide flight crews with information to facilitate navigation along ATS routes in compliance with air traffic services procedures.
(b) Availability:
(1) Make the en-route chart — ICAO available for all areas where flight information regions have been established.
(2) Provide separate charts, where different air traffic services routes, position reporting requirements or lateral limits of flight information regions or control areas exist in different layers of airspace and cannot be shown with sufficient clarity on one chart,.
(c) Coverage and scale:
(1) Should determine layout of sheet lines by the density and pattern of the ATS route structure.
(2) Shall avoid large variations of scale between adjacent charts showing a continuous route structure.
(3) Shall provide an adequate overlap of charts to ensure continuity of navigation.
(d) Projection:
(1) Should use a conformal projection on which a straight line approximates a great circle.
(2) Shall show parallels and meridians at suitable intervals
(3) Shall place graduation marks at consistent intervals along selected parallels and meridians.
(e) Identification: Identify each sheet by chart series and number.
(f) Culture and topography:
(1) Generalized shore lines of all open water areas, large lakes and rivers by except where they conflict with data more applicable to the function of the chart.
(2) Within each quadrilateral formed by the parallels and meridians the area minimum altitude shall be shown, except as provided for in 7.6.3..
(g) Magnetic variation: Isogonics should be indicated and the date of the isogonics information given by each applicant for the grant of an aeronautical charts design and production certificate in the chart.
(h) Bearings, tracks and radials:
(1) Make bearings, tracks and radials to be magnetic
(2) Identify, where bearings, tracks or radials are given with reference to True North or Grid North, this shall be clearly
(i) Aeronautical data:
(1) Aerodromes used by international civil aviation to which an instrument approach can be made.
(2) Depicted, prohibited, restricted and danger areas relevant to the layer of airspace with their identification and vertical limits.
(3) Air traffic services system: Where appropriate, the components of the established air traffic services system shall be shown.

(4) The components of the established air traffic services system and instrument procedures certificate in the chart, where appropriate:
(i) shall make the components include the following:
(A) The radio navigation aids associated with the air traffic services system together with their names, identifications, and frequencies and geographical coordinates in degrees, minutes and seconds;
(B) In respect of DME, additionally the elevation of the transmitting antenna of the DME to the nearest 30 m (100 ft);
(C) An indication of all designated airspace, including lateral and vertical limits and the appropriate class of airspace;
(D) All ATS routes for en-route flight including route designators, required navigation performance (RNP) types, the track to the nearest
(E) degree in both directions along each segment of the routes and, where applicable, the direction of traffic flow;
(F) All significant points which define the ATS routes and are not marked by the position of a radio navigation aid, together with their name-codes and geographical coordinates in degrees, minutes and seconds;
(G) In respect of waypoints defining VOR/DME area navigation routes, additionally,
(I) The station identification and radio frequency of the reference VOR/DME;
(II) The bearing to the nearest tenth of a degree and the distance to the nearest two-tenths of a kilometer (tenth of a nautical mile) from the reference VOR/ DME, if the waypoint is not collocated with it;
(H) An indication of all compulsory and "on-request" reporting points and ATS/MET reporting points;
(I) The distances to the nearest kilometer or nautical mile between significant points constituting turning points or reporting points;
(J) Change-over points on route segments defined by reference to very high frequency omni directional radio ranges, indicating the distances to the nearest kilometer or nautical mile to the navigation aids;
(K) Minimum flight altitudes on ATS routes to the nearest higher 50 meters or 100 feet (see Annex 11, 2.21);
(L) Radio communication facilities listed with their frequencies;
(M) Air defense identification zone (ADIZ) properly identified.

(5) Supplementary information:
(i) Show details of departure and arrival routes and associated holding patterns in terminal areas unless they are shown on an area chart, a standard departure chart — instrument (SID) — ICAO or a standard arrival chart — instrument (STAR) — ICAO.
(ii) Show where established, altimeter-setting regions and identified in the chart

311.137 Standard departure chart — instrument (SID) — ICAO

Each applicant for the grant of an aeronautical charts design and production certificate shall fulfill the requirements listed under the following headings:

(a) Function: Make this chart to provide the flight crew with information to enable it to comply with the designated standard departure route — instrument from take-off phase to the en route phase.
(b) Availability: Make the standard departure chart — instrument (SID) — ICAO available wherever a standard departure route — instrument has been established and cannot be shown with sufficient clarity on the area chart — ICAO.
(c) Coverage and scale:
(1) Shall make the coverage of the chart to be sufficient to indicate the point where the departure route begins and the specified significant point at which the en-route phase of flight along a designated air traffic services route can be commenced.
(2) Should make the chart to be drawn to scale.
(3) Shall show a scale-bar ,If the chart is drawn to scale.

(4) Shall show, when the chart is not drawn to scale, the annotation "NOT TO SCALE" and the symbol for scale break shall be used on tracks and other aspects of the chart which are too large to be drawn to scale.

(d) Projection:
(1) Should use a conformal projection on which a straight line approximates a great circle.
(2) Should show, when the chart is drawn to scale, parallels and meridians at suitable intervals.
(3) Shall place graduation marks at consistent intervals along the neat lines, as appropriate.

(e) Identification: Be identified by the name of the city or town, or area, which the aerodrome serves, the name of the aerodrome and the identification of the standard departure route(s) - instrument as established in accordance with the procedures for air navigation services - aircraft operations (PANS-OPS, Doc 8168), Volume II, Part II, Chapter 5.

(f) Culture and topography:
(1) Shall, where the chart is drawn to scale, show generalized shore lines of all open water areas, large lakes and rivers except where they conflict with data more applicable to the function of the chart.
(2) Should, to improve situational awareness in areas where significant relief exists, draw the chart to scale and all relief exceeding 300 m (1 000 ft) above the aerodrome elevation should be shown by smoothed contour lines, contour values and layer tints printed in brown. Appropriate spot elevations, including the highest elevation within each top contour line, should be shown printed in black. Significant obstacles should also be shown.

(g) Magnetic variation: Show magnetic variation used in determining the magnetic bearings, tracks and radials to the nearest degree.

(h) Bearings, tracks and radials: Make the bearings, tracks and radials to be magnetic.

(i) Aeronautical data:
(1) Aerodromes
(i) Show the aerodrome of departure by the runway pattern.
(ii) Show and identify all aerodromes which affect the designated standard departure route instrument. Where appropriate the aerodrome runway patterns shall be shown.
(2) Show prohibited, restricted and danger areas Prohibited, restricted and danger areas which may affect the execution of the procedures with their identification and vertical limits.
(3) Minimum sector altitude:
(i) Show the established minimum sector altitude, based on a navigation aid associated with the procedure with a clear indication of the sector to which it applies.
(ii) Draw, where the minimum sector altitude has not been established, the chart to scale and area minimum altitudes shall be shown within quadrilaterals formed by the parallels and meridians. Area minimum altitudes shall also be shown in those parts of the chart not
(4) Air traffic services system:
(i) Show the components of the relevant air traffic services system: Make the components to comprise the following a graphic portrayal of each standard departure route — instrument, including:
(A) Route designator;
(B) Significant points defining the route;
(C) Track or radial to the nearest degree along each segment of the route(s);
(D) Distances to the nearest kilometer or nautical mile between significant points;
(E) Minimum flight altitudes to the nearest higher 50 m or 100 ft along the route or route segments;
(F) Altitude to the nearest higher 50 m or 100 ft/flight level restrictions, where established;
(ii) The radio navigation aid(s) associated with the route(s) including:
(1) when the radio navigation aid is used for conventional navigation:
(A) Plain language name;
(B) Identification;
(C) Morse code;

(D) Frequency;
(E) Geographical coordinates in degrees, minutes and seconds;
(F) For DME, the channel and the elevation of the transmitting antenna of the DME to the nearest 30 m (100 ft);
(2) when the radio navigation aid is used as a significant point for area navigation:
(A) plain language name; and
(B) identification;
(iii) significant points not marked by the position of a radio navigation aid including:
(1) when the significant point is used for conventional navigation:
(A) name-code;
(B) geographical coordinates in degrees, minutes an seconds;
(C) bearing to the nearest tenth of a degree from the reference radio navigation aid;
(D) distance to the nearest two-tenths of a kilometre (tenth of a nautical mile) from the reference radio navigation aid; and
(E) identification of the reference radio navigation aid;
(2)when the significant point is used for area navigation:
(A) name-code;

(iv) Applicable holding patterns;
(v) Transition altitude/height to the nearest higher 300 m or 1 000 ft;
(vi) The position and height of close-in obstacles which penetrate the obstacle identification surface (OIS). A note shall be included whenever close-in obstacles Penetrating the OIS exists but which were not considered for the published procedure design gradient.
(vii) Area speed restrictions, where established;
(viii) All compulsory and "on-request" reporting points;
(ix) Radio communication procedures, including:
(A) Call sign(s) of ATS unit(s);
(B) Frequency;
(C) Transponder setting, where appropriate.

(5) A textual description of standard departure route(s) - instrument(SID) and communication failure procedures in relation to radar control should be provided and should, whenever feasible, be shown on the chart or on the same page which contains the chart.

311.139 Standard arrival chart — instrument (STAR) — ICAO

Each applicant for the grant of an aeronautical charts design and production certificate shall fulfill the requirements listed under the following headings:

(a) Function: Make this chart to provide the flight crew with information to enable it to comply with the designated standard arrival route — instrument from the en-route phase to the approach phase.
(b) Availability: Make the standard arrival chart — instrument (STAR) — ICAO available wherever a standard arrival route - instrument has been established and cannot be shown with sufficient clarity on the Area Chart.
(c) Coverage and scale
(1) Shall make the coverage of the chart to be sufficient to indicate the points where the en-route phase ends and the approach phase begins.
(2) Should draw the chart to scale.
(3) Shall show a scale, If the chart is drawn to scale.
(4) Shall, when the chart is not drawn to scale, show the annotation "NOT TO SCALE" and the symbol for scale break shall be used on tracks and other aspects of the chart which are too large to be drawn to scale.
(d) Projection
(1) Should use a conformal projection on which a straight line approximates a great circle.

(2) Should show parallels and meridians at suitable intervals ,when the chart is drawn to scale.
(3) Shall place graduation marks at consistent intervals along the neat lines, as appropriate.

(e) Identification: Identify the chart by the name of the city or town, or area, which the aerodrome serves, the name of the aerodrome, and the identification of the standard arrival route(s) C instrument as established in accordance with the Procedures for Air Navigation Services - Aircraft Operations (PANSOPS, Doc 8168), Volume II, Part III, Chapter 3.

(f) Culture and topography:
(1) Where the chart is drawn to scale, shall show generalized shore lines of all open water areas, large lakes and rivers shown except where they conflict with data more applicable to the function of the chart.
(2) To improve situational awareness in areas where significant relief exists, should draw the chart to scale and all relief exceeding 300 m (1 000 ft) above the aerodrome elevation should be shown by smoothed contour lines, contour values and layer tints printed in brown. Appropriate spot elevations, including the highest elevation within each top contour line, should be shown printed in black. Significant obstacles should also be shown.

(g) Magnetic variation: Show the magnetic variation used in determining the magnetic bearings, tracks and radials to the nearest degree.

(h) Bearings, tracks and radials: Make bearings, tracks and radials to be magnetic,

(i) Aeronautical data:
(1) Aerodromes:
(i) Show the aerodrome of landing by the runway pattern.
(ii) Show and identify all aerodromes which affect the designated standard arrival route instrument. Where appropriate the aerodrome runway patterns shall be shown.
(2) Show prohibited, restricted and danger areas Prohibited, restricted and danger areas which may affect the execution of the procedures with their identification and vertical limits.
(3) Minimum sector altitude:
(i) Show the established minimum sector altitude with a clear indication of the sector to which it applies.
(ii) Be shown, where the minimum sector altitude has not been established, draw the chart to scale and area minimum altitudes within quadrilaterals Formed by the parallels and meridians. Area minimum altitudes shall also be shown in those parts of the chart not covered by the minimum sector altitude.
(4) Air traffic services system
(i) Show the components of the relevant air traffic services system
(A) Make the components to comprise the following:
(I) A graphic portrayal of each standard arrival route — instrument, including:

- Route designator;
- Significant points defining the route;
- Track or radial to the nearest degree along each segment of the route;
- Distances to the nearest kilometer or nautical mile between significant points;
- Minimum flight altitudes to the nearest higher 50 m or 100 ft along the route or route segments; and
- Altitude to the nearest higher 50 m or 100 ft/flight level restrictions, where established.

(II) The radio navigation aid(s) associated with the route(s) including:
(A) when the radio navigation aid is used for conventional navigation:

- Plain language name;
- Identification;
- Morse code
- Frequency;

- Geographical coordinates in degrees, minutes and seconds; and
- For DME, the channel and the elevation of the transmitting antenna of the DME to the nearest 30 m (100 ft).

(B) when the radio navigation aid is used for conventional navigation:

- Plain language name;
- Identification

(III) significant points not marked by the position of a radio navigation aid including:

(A) when the significant point is used for conventional navigation:

- name-code;
- geographical coordinates in degrees, minutes an seconds;
- bearing to the nearest tenth of a degree from the reference radio navigation aid;
- distance to the nearest two-tenths of a kilometre (tenth of a nautical mile) from the reference radio navigation aid;
- identification of the reference radio navigation aid;

(B) when the significant point is used for area navigation:

- name-code;

(IV) Applicable holding patterns;
(V) Transition altitude/height to the nearest higher 300 m or 1 000 ft;
(VI) Area speed restrictions, where established;
(VII) All compulsory and "on-request" reporting points;
(VIII) Radio communication procedures, including:

- Call sign(s) of ATS unit(s);
- Frequency;
- Transponder setting, where appropriate.

(ii) A textual description of standard arrival route(s): Instrument (STAR) and communication failure procedures in relation to radar control be provided and should whenever feasible, be shown on the chart or on the same page which contains the chart

311.141 Instrument approach chart — ICAO

Each applicant for the grant of an aeronautical charts design and production certificate shall fulfill the requirements listed under the following headings:

(a) Function: Make this chart to provide flight crews with information which will enable them to perform an approved instrument approach procedure to the runway of intended landing including the missed approach procedure and where applicable, associated holding patterns.

(b) Availability:

(1) Make instrument approach charts — ICAO available for all aerodromes used by international civil aviation where instrument approach procedures have been established by the ECAA.

(2) Provide a separate instrument approach chart — ICAO, for each precision approach procedure established by the ECAA.

(3) Provide, a separate instrument approach chart - ICAO for each non-precision approach procedure established by the ECAA.

(4) Provide more than one chart, when the values for track, time or altitude differ between categories of aircraft on other than the final approach segment of the instrument approach procedures and the listing of these differences on a single chart could cause clutter or confusion.

(5) Revise instrument approach charts — ICAO whenever information essential to safe operation becomes out of date.

(c) Coverage and scale
  (1) Make the coverage of the chart sufficient to include all segments of the instrument approach procedure and such additional areas as may be necessary for the type of approach intended.
  (2) Select the scale to ensure optimum legibility consistent with:
    (i) The procedure shown on the chart;
    (ii) Sheet size.
  (3) Give a scale indication: Except where this is not practicable, Each applicant for the grant of an aeronautical charts design and production certificate shall show a distance circle with a radius of 20 km (10 NM) centered on a DME located on or close to the aerodrome, or on the aerodrome reference point where no suitable DME is available; its radius shall be indicated on the circumference.
  (4) A distance scale should be shown directly below the profile.
  (5) The basic sheet size of the charts should be 210 x 148 mm (A5).

(d) Projection:
  (1) Shall use a conformal projection on which a straight line approximates a great circle.
  (2) Should place graduation marks at consistent intervals along the neat lines.

(e) Identification: Be identified the chart by the name of the city or town, or area, which the aerodrome serves, the name of the aerodrome and the identification of the instrument approach procedure as established in accordance with the procedures for air navigation services - aircraft operations (PANS-OPS, Doc 8168), Volume II, Part III, Chapter 1.

(f) Culture and topography:
  (1) Show culture and topographic information pertinent to the safe execution of the instrument approach procedure, including the missed approach procedure, associated holding procedures and visual maneuvering (circling) procedure when established, and only when necessary, to facilitate the understanding of such name Topographic information, and the minimum shall be a delineation of land masses and significant lakes and rivers.
  (2) Show relief in a manner best suited to the particular elevation characteristics of the area. In areas where relief exceeds 1200 m (4000 ft) above the aerodrome elevation within the coverage of the chart or 600 m (2000 ft) within 11 km (6 NM) of the aerodrome reference point or when final approach or missed approach procedure gradient is steeper than optimal due to terrain, all relief exceeding 150 m (500 ft) above the aerodrome elevation shall be shown in the chart by an applicant by smoothed contour lines, contour values and layer tints printed in brown. Appropriate spot elevations, including the highest elevation within each top contour line shall also be shown printed in black.

(g) Magnetic variation:
  (1) The magnetic variation should be shown in the chart by an applicant.
  (2) When shown, the value of the variation, indicated to the nearest degree, shall agree with that used in determining magnetic bearings, tracks and radials.

(h) Bearings, tracks and radials: Put bearings, tracks and radials in magnetic

(i) Aeronautical data:
  (1) Aerodromes:
    (i) All aerodromes which show a distinctive pattern from the air shall be shown by the appropriate symbol. Abandoned aerodromes shall be identified as abandoned.
    (ii) Show the runway pattern, at a scale sufficiently large to show it clearly, for:
      (A) The aerodrome on which the procedure is based;
      (B) Aerodromes affecting the traffic pattern or so situated as to be likely, under adverse weather conditions, to be mistaken for the aerodrome of intended landing.
    (iii) Show the aerodrome elevation to the nearest meter or foot in a prominent position on the chart.
    (iv) Show the threshold elevation or, where applicable, the highest elevation of the touchdown zone to the nearest meter or foot.
  (2) Obstacles:
    (i) Show significant obstacles on the plan view of the chart.

(ii) Determine If one or more obstacles are the determining factor of an obstacle clearance altitude/height, those obstacles should be identified.

(iii) Show The elevation of the top of obstacles shall be shown to the nearest (next higher) meter or foot.

(iv) Show the heights of obstacles above a datum other than the mean sea level, when shown, they should be given in parentheses on the chart.

(v) when the heights of obstacles above a datum other than mean sea level are shown, to be the datum define the aerodrome elevation except that, at aerodromes having an instrument runway (or runways) with a threshold elevation more than 2 m (7 ft) below the aerodrome elevation, the chart datum shall be the threshold elevation of the runway to which the instrument approach is related.

(vi) Where a datum other than means sea level is used, each applicant state it in a prominent position on the chart.

(vii) Where an obstacle free zone has been established for a precision approach runway Category I, this shall be indicated.

(3) Prohibited, restricted and danger areas: Prohibited areas, restricted areas, and danger areas, which may affect the execution of the procedures, shall be shown by an applicant with their identification and vertical limits.

(4) Radio communication facilities and navigation aids

(i) Show radio navigation aids required for the procedures together with their frequencies, identifications and track-defining characteristics, if any. In the case of a procedure in which more than one station is located on the final approach track, clearly identify the facility to be used for track guidance for final approach.

- When a radio navigation aid is used as a significant point for area navigation, only its plain language name and identification shall be shown.

(ii) Show and identify when the final approach fix is used for conventional navigation (or final approach point for an ILS approach procedure), it should be identified with its geographical coordinates in degrees, minutes and seconds.

(iii) The final approach fix (or final approach point for an ILS approach procedure) should be identified with its geographical coordinates in degrees, minutes and seconds.

(iv) Show or indicate radio navigation aids that might be used in diversionary procedures together with their track-defining characteristics, if any, on the chart.

(v) Radio communication frequencies, including call signs, that are required for the execution of the procedures shall be shown by an applicant.

(vi) When required by the procedures, show the distance to the aerodrome from each radio navigation aid concerned with the final approach to the nearest kilometer or nautical mile. When no track-defining aid indicates the bearing of the aerodrome, show the bearing to the nearest degree.

(5) Minimum sector altitude: show The minimum sector altitude established by the competent authority, with a clear indication of the sector to which it applies.

(6) Portrayal of procedure tracks:

(i) Make the plan view to show the following information in the manner indicated:

(A) The approach procedure track by an arrowed continuous line indicating the direction of flight;

(B) The missed approach procedure track by an arrowed broken line;

(C) Any additional procedure track, other than those specified in A) and B), by an arrowed dotted line;

(D) Bearings, tracks, radials to the nearest degree and distances to the nearest two-tenths of a kilometer or tenth of a nautical mile or times required for the procedure;

(E) Where no track-defining aid is available, the magnetic bearing to the nearest degree to the aerodrome from the radio navigation aids concerned with the final approach;

(F) The boundaries of any sector in which visual maneuvering (circling) is prohibited;

(G) Where specified the holding pattern and minimum holding altitude/height associated with the approach and missed approach;

(H) Caution notes where required, prominently displayed on the face of the chart.

(ii) The plan view should show the distance to the aerodrome from each radio navigation aid concerned with the final approach.

(iii) Make a profile to provide normally below the plan view showing the following data:

(A) The aerodrome by a solid block at aerodrome elevation;

(B) The profile of the approach procedure segments by an arrowed continuous line indicating the direction of flight;

(C) The profile of the missed approach procedure segment by an arrowed broken line and a description of the procedure;

(D) The profile of any additional procedure segment, other than those specified in b) and c), by an arrowed dotted line;

(E) Bearings, tracks, radials to the nearest degree and distances to the nearest two-tenths of a kilometer or tenth of a nautical mile or times required for the procedure;

(F) Altitude/heights required by the procedures, including transition altitude, where established;

(G) Limiting distance to the nearest kilometer or nautical mile on procedure turn, when specified;

(H) The intermediate approach fix or point, on procedures where no course reversal is authorized.

(I) A line representing the aerodrome elevation or threshold elevation, as appropriate, extended across the width of the chart including a distance scale with its origin at the runway threshold.

(iv) Heights required by procedures be shown in parentheses, using the height datum selected .

(v) A ground profile shown by a solid line depicting the highest elevations of the relief occurring within the primary area of the final approach segment. The highest elevations of the relief occurring in the secondary areas of the final approach segment shown by a dashed line or minimum altitudes/heights in the intermediate and final approach segments indicated within bounded shaded blocks

(7) Aerodrome operating minima:

AOM are defined as: (ICAO annex 6 part 1)

"the limits of usability of an aerodrome for:

a) Take-off, expressed in terms of RVR and/or visibility and , if necessary, cloud conditions;

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

c) Landing in precision approach and landing operations, expressed in terms of visibility and/or RVR and DA/H; and

d) Landing in Non-precision approach and landing operations, expressed in terms of visibility and/or RVR, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions"

show the aerodrome operating minima in the chart when established by the ECAA The obstacle clearance altitudes/heights for the aircraft categories for which the procedure is designed shall be shown; for precision approach procedures, additional OCA/H for Cat DL aircraft (wing span between 65 m and 80 m and/or vertical distance between the flight path of the wheels and the glide path antenna between 7 m and 8 m) shall be published, when necessary.

In establishing the aerodrome operating minima which will apply to any particular operation, an operator must take full account of:

a) The type , performance and handling characteristics of the aeroplane;
b) The composition of the flight crew, their competence and experience;
c) The dimensions and charateristics of the runways which may be selected For use;
d) The adequacy and performance of the avilable visual and non-visual ground aids;
e) The equipment available on the aeroplane for the purpose of navigation and/or control of the flight path, as appropriate, during the take-off, the approach, the flare, the landing, roll-out and the missed approach;
f) The obstacles in the approach, missed approach and the climb-out areas required for the execution of contingency procedures and necessary clearance,
g) The obstacle clearance altitude/height of the instrument approach procedures;
h) The means to determine and report meteorological conditions; and
i) The flight technique to be used during the final approach.

(8) Supplementary information

(i) Show when the missed approach point is defined by:

(A) A distance from the final approach fix, or

(B) A facility or a fix and the corresponding distance from the final approach fix, the distance to the nearest two-tenths of a kilometer or tenth of a nautical mile and a table showing ground speeds and times from the final approach fix to the missed approach point.

(ii) Show when DME is required for use in the final approach segment, a table showing altitudes/heights for each 2 km or 1 NM, as appropriate. The table shall not include distances, which would correspond to altitudes/ heights below the OCA/H.

(iii) For procedures in which DME is not required for use in the final approach segment but where a suitably located DME is available to provide advisory descent profile information, a table showing the altitudes/heights should be included.

(iv) A rate of descent table should be shown.

(v) Show the final approach descent gradient and, in parenthesis, descent angle to the nearest one tenth of a degree for non-precision procedures with a final approach fix.

(vi) Show on charts depicting ILS/MLS and LNAV/VNAV approach procedures, the height of the ILS/MLS and LNAV/VNAV reference datum to the nearest half meter or foot and the glide path/elevation/vertical path angle. If the ILS/MLS glide path/elevation angle exceeds 3.5°, a note shall be included referring to appropriate aircraft and flight crew qualification requirements for such a procedure.

(vii) Final approach descent angle be shown to the nearest one tenth of a degree for instrument procedures with vertical guidance

(viii) The chart indicating the approach procedures that are authorized for simultaneous independent or dependent operations.

(9) Aeronautical data base requirements: publish the following data in tabular form on the verso of the chart or as a separate, properly referenced sheet:

(i) Final approach fixes/points and other essential fixes/ points comprising the instrument approach procedure identified with their geographical coordinates in degrees, minutes, seconds and tenths of seconds;

(ii) Instrument approach procedure fix formation bearings to the nearest hundredth of a degree; and

(iii) Instrument approach procedure fix formations distance to the nearest one hundredth of a nautical mile; and

(iv) For non-precision approaches, the final approach descent angle to the nearest one hundredth of a degree

311.143 Aerodrome /heliport chart — ICAO

Each applicant for the grant of an aeronautical charts design and production certificate shall fulfill the requirements listed under the following headings:

(a) Function: Provide this chart flight crews with information which will facilitate the ground movement of aircraft:
  (1) From the aircraft stand to the runway; and
  (2) From the runway to the aircraft stand; it shall also provide essential operational information at the aerodrome.
  (3) Helicopter movement:
    (i) From the helicopter stand to the touchdown and lift-off area and to the final approach and take-off area;
    (ii) From the final approach and take-off area to the touchdown and lift-off area and to the helicopter stand;
    (iii) Along helicopter ground and air taxiways; and
    (iv) Along air transit routes;
    It shall also provide essential operational information at the aerodrome/heliport.

(b) Availability:
  (1) make available the Aerodrome/Heliport Chart — ICAO for all aerodromes regularly used by international civil aviation.
  (2) the aerodrome/heliport chart - ICAO be made available also, for all other aerodromes/heliports available for use by international civil aviation

(c) Coverage and scale:
  (1) Make the coverage and scale to be sufficiently large to show clearly all the elements listed in 311.93(f)(1).
  (2) Show a linear scale.

(d) Identification: Identify the chart by the name of the city or town, or area, which the aerodrome/heliport serves and the name of the aerodrome.

(e) Magnetic variation: Show true and Magnetic North arrows and magnetic variation to the nearest degree and annual change of the magnetic variation.

(f) Aerodrome/heliport data:
  (1) Geographical coordinates in degrees, minutes and seconds for the aerodrome/heliport reference point;
  (2) Elevations to the nearest meter or foot of the aerodrome, of non-precision approach runway thresholds and apron (altimeter checkpoint locations) where applicable;
  (3) Elevations and geoids undulations to the nearest half meter or foot of runway thresholds, geometric center of touchdown and lift-off area and the highest elevation of the touchdown zone of a precision approach runway;
  (4) All runways including those under construction with designation number, length and width to the nearest meter, bearing strength, displaced thresholds, stop ways, clearways, runway directions to the nearest degree magnetic, type of surface, and runway markings;
  (5) All aprons, with aircraft stands, lighting, markings and other visual guidance and control aids, where applicable, including location and type of visual docking guidance systems, and bearing strengths or aircraft type restrictions where the bearing strength is less than that of the associated runways;
  (6) Geographical coordinates in degrees, minutes and seconds for thresholds, geometric center of touchdown and lift-off area and/or thresholds of the final approach and take-off area (where appropriate);
  (7) All taxiways, with designations, width, lighting, markings, including runway-holding positions and stop bars, other visual guidance and control aids, and bearing strength or aircraft type restrictions where the bearing strength is less than that of the associated runways;
  (8) Geographical coordinates in degrees, minutes, seconds and hundredths of seconds for appropriate taxiway center line points and aircraft stands;
  (9) Where established, standard routes for taxiing aircraft with their designators;
  (10) The boundaries of the air traffic control service;

(11) Position of runway visual range (RVR) observation sites;
(12) Approach and runway lighting;
(13) Location and type of the visual approach slope indicator systems with their nominal approach slope angle(s), minimum eye height(s) over the threshold of the on-slope signal(s), and where the axis of the system is not parallel to the runway center line, the angle and direction of the displacement, i.e. left or right;
(14) Radio communication facilities;
(15) Significant obstacles to taxiing;
(16) Aircraft servicing areas and buildings of operational significance;
(17) VOR checkpoint and radio frequency of the aid concerned;
(18) Any part of the depicted movement area permanently unsuitable for aircraft, clearly identified as such.
(19) Aerodromes accommodating aeroplanes with folding wing tips, the location where the wing tips may be safely extended should be shown on the chart.

(g) In addition, relating to heliports, the chart shall show:
(1) Heliport type;
(2) Touchdown and lift-off area including dimensions to the nearest meter, slope, type of surface and bearing strength in tones;
(3) Final approach and take-off area including type, true bearing to the nearest degree, designation number (where appropriate), length and width to the nearest meter, slop and type of surface;
(4) Safety area including length, width and type of surface;
(5) Helicopter clearway including length and ground profile;
(6) Obstacles including type and elevation of the top of the obstacles to the nearest (next higher) meter or foot;
(7) Visual aids for approach procedures, marking and lighting of final approach and take-off area, and of touchdown and lift-off area;
(8) Declared distances to the nearest meter for heliports, where relevant, including:
(i) Take-off distance available;
(ii) Rejected take-off distance available;
(iii) Landing distance available.

311.145 Aircraft parking/docking chart — ICAO

Each applicant for the grant of an aeronautical charts design and production certificate shall fulfill the requirements listed under the following headings:

(a) Function: Provide this supplementary chart flight crews with detailed information to facilitate the ground movement of aircraft between the taxiways and the aircraft stands and the parking/docking of aircraft.
(b) Availability: Make available the aircraft parking/ docking chart — ICAO where, due to the complexity of the terminal facilities, the information cannot be shown with sufficient clarity on the aerodrome/heliport chart — ICAO or on the aerodrome ground movement chart — ICAO.
(c) Coverage and scale:
(1) Make the coverage and scale to be sufficiently large to show clearly all the elements listed in 311.95(f).
(2) A linear scale be shown.
(d) Identification: Identify the chart by the name of the city or town, or area, which the aerodrome serves and the name of the aerodrome.
(e) Magnetic variation:
(1) A true north arrow.
(2) Magnetic variation to the nearest degree and its annual change be shown.
(f) Aerodrome data: Show this chart in a similar manner all the information on the aerodrome/heliport chart — ICAO and the aerodrome ground movement chart — ICAO relevant to the area depicted, including:
(1) Apron elevation to the nearest meter or foot;

(2) Aprons with aircraft stands, bearing strengths or aircraft type restrictions, lighting, marking and other visual guidance and control aids, where applicable, including location and type of visual docking guidance systems;
(3) Geographical coordinates in degrees, minutes, seconds and hundredths of seconds for aircraft stands;
(4) Taxiway entries with designations, including runway holding positions and stop bars;
(5) Geographical coordinates in degrees, minutes, seconds and hundredths of seconds for appropriate taxiway center line points;
(6) The boundaries of the air traffic control service;
(7) Relevant radio communication facilities listed with their frequencies;
(8) Significant obstacles to taxiing;
(9) Aircraft servicing areas and buildings of operational significance;
(10) VOR checkpoint and radio frequency of the aid concerned;
(11) Any part of the depicted movement area permanently unsuitable for aircraft clearly identified as such.

311.147 Operational requirements for aerodrome data

The declared distances to the nearest meter for a runway intended for use by international commercial air transport:

(1) Take-off run available;
(2) Landing distance available.
(3) Take-off distance available;
(4) Accelerate-stop distance available; and
(5) Calculation of declared distances Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall:
(i) Calculate the declared distances for each runway direction comprise: the take-off run available (TORA), take-off distance available (TODA) accelerate-stop distance available (ASDA), and landing distance available (LDA).
(ii) Where a runway is not provided with a stop way or clearway and the threshold is located at the extremity of the runway, the four declared distances should normally be equal to the length of the runway,
(iii) Where a runway is provided with a clearway (CWY), then the TODA will include the length of clearway,
(iv) Where a runway is provided with a stop way (SWY), then the ASDA will include the Length of stop way,
(v) Where a runway has a displaced threshold, then the LDA will be reduced by the distance the threshold is displaced, a displaced threshold affects only the LDA for approaches made to that threshold; all declared distances operations in the reciprocal direction are unaffected.
(vi)(vi) If a runway direction cannot be used for take-off or landing, or both, because it is operationally forbidden, then this should be declared and the words" not usable" or the abbreviation "NU" entered.

311.149 Obstacle restriction and removal

Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall determine the Obstacle limitation surfaces as follow:

(a) Conical surface:
(1) Description. Keep description as the following: Conical surface. A surface sloping upwards and outwards from the periphery of the inner horizontal surface.
(2) Characteristics: - The limits of the conical surface shall comprise:
(i) A lower edge coincident with the periphery of the inner horizontal surface; and
(ii) An upper edge located at a specified height above the inner horizontal surface.

(iii) Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall measure the slope of the conical surface in a vertical plane perpendicular to the periphery of the inner horizontal surface.

(b) Inner horizontal surface

(1) Description: keep description as follows Inner horizontal surface. A surface located in a horizontal plane above an aerodrome and its environs.

(2) Characteristics: keep characteristics as follows: the radius or outer limits of the inner horizontal surface shall be measured from a reference point or points established for such purpose.

(3) Measure the height of the inner horizontal surface above an elevation datum established for such purpose.

(c) Approach surface:

(1) Description: keep description as follows:
Approach surface: An inclined plane or combination of planes preceding the threshold.

(2) Characteristics: keep characteristics as follows: The limits of the approach surface shall comprise:

(i) An inner edge of specified length, horizontal and perpendicular to the extended centerline of the runway and located at a specified distance before the threshold;

(ii) Two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the extended center line of the runway; and

(iii) An outer edge parallel to the inner edge. The above surfaces shall be varied when lateral offset, offset or curved approaches are utilized, specifically, two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the extended centerline of rate from the extended centerline of the lateral offset, offset or curved ground track.

(3) The elevation of the inner edge be equal to the elevation of the mid-point of the threshold.

(4) Measure the slope(s) of the approach surface in the vertical plane containing the centerline of the runway and shall continue containing the centerline of any lateral offset or curved ground track.

(d) Inner approach surface:

(1) Description: Keep description as follows: Inner approach surface. A rectangular portion of the approach surface immediately preceding the threshold.

(2) Characteristics: Keep characteristics as follows: The limits of the inner approach surface shall comprise:

(i) An inner edge coincident with the location of the inner edge of the approach surface but of its own specified length;

(ii) Two sides originating at the ends of the inner edge and extending parallel to the vertical plane containing the center line of the runway; and

(iii) An outer edge parallel to the inner edge.

(e) Transitional surface

(1) Description: Keep description as follows: Transitional surface. A complex surface along the side of the strip and part of the side of the approach surface, that slopes upwards and outwards to the inner horizontal surface

(2) Characteristics: Keep characteristics as follows: The limits of a transitional surface shall comprise.

(i) A lower edge beginning at the intersection of the side of the approach surface with the inner horizontal surface and

(ii) An upper edge located in the plane of the inner horizontal surface.

(3) The elevation of a point on the lower edge shall be:

(i) Along the side of the approach surface — equal to the elevation of the approach surface at that point; and

(ii) Along the strip — equal to the elevation of the nearest point on the centerline of the runway or its extension.

(4) The slope of the transitional surface be measured in a vertical plane at right angles to the centerline of the runway.

(f) Inner transitional surface

(1) Description: Keep description as follows: Inner transitional surface. a surface similar to the transitional surface but closer to the runway.

(2) Characteristics: Keep characteristics as follows: The limits of an inner transitional surface shall comprise:

(i) A lower edge beginning at the end of the inner approach surface and extending down the side of the inner approach surface to the inner edge of that surface, from they're along the strip parallel to the runway centerline to the inner edge of the balked landing surface and from they're up the side of the balked landing surface to the point where the side intersects the inner horizontal surface; and

(ii) An upper edge located in the plane of the inner horizontal surface.

(3) The elevation of a point on the lower edge shall be:

(i) Along the side of the inner approach surface and balked landing surface — equal to the elevation of the particular surface at that point; and

(ii) Along the strip — equal to the elevation of the nearest point on the center line of the runway or its extension

(4) The slope of the inner transitional surface shall be measured in a vertical plane at right angles to the centerline of the runway.

(g) Balked landing surface:

(1) Description: keep description as follows: Balked landing surface. An inclined plane located at a specified distance after the threshold, extending between the inner transitional surfaces

(2) Characteristics: Keep characteristics as follows: The limits of the balked landing surface shall comprise:

(i) An inner edge horizontal and perpendicular to the centerline of the runway and located at a specified distance after the threshold;

(ii) Two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the vertical plane containing the center line of the runway; and plane containing the center line of the runway; and

(iii) An outer edge parallel to the inner edge and located in the plane of the inner horizontal surface

(3) The elevation of the inner edge shall be equal to the elevation of the runway centerline at the location of the inner edge.

(4) The slope of the balked landing surface shall be measured in the vertical plane containing the centerline of the runway.

(h) Take-off climb surface

(1) Description: Keep description as follows: Take-off climb surface. An inclined plane or other specified surface beyond the end of a runway or clearway.

(2) Characteristics: Keep description as follows*:* The limits of the take-off climb surface shall comprise:

(i) An inner edge horizontal and perpendicular to the center line of the runway and located either at a specified distance beyond the end of the runway or at the end of the clearway when such is provided and its length exceed the specified distance.

(ii) Two sides originating at the ends of the inner edge, diverging uniformly at a specified rate from the take-off-track to a specified final width and continuing thereafter at that width for the remainder of the length of the takeoff climb surface; and

(iii)An outer edge horizontal and perpendicular to the specified take-off track.

(3) The elevation of the inner edge shall be equal to the highest point on the extended runway center line between the end of the runway and the inner edge, except that when a clearway is provided the elevation shall be equal to the highest point on the ground on the centerline of the clearway

(4) In the case of a straight take-off flight path, the slope of the take-off climb surface shall be measured in the vertical plane containing the centerline of the runway.
(5) Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall in the case of a take-off flight path involving a turn, the take-off climb surface be a complex surface containing the horizontal normal to its center line, and the slope of the center line shall be the same as that for a straight take-off flight path.

311.151 Obstacle limitation requirements

(a) Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall establish the obstacle limitation surfaces for a non-instrument runway:
(1) Conical surface;
(2) Inner horizontal surface;
(3) Approach surface; and
(4) Transitional surfaces.
(b) Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall not make the heights and slopes of the surfaces be greater than, and their other dimensions not less than,
(c) Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall not make new objects or extensions of existing objects be permitted above an approach or transitional surface except when, in the opinion of the appropriate authority, the new object or extension would be shielded by an existing immovable object
(d) Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall not be new objects or extensions of existing objects permitted above the conical surface or inner horizontal surface except when, in the opinion of the appropriate authority, the object would be shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aero planes.
(e) Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall as far as practicable remove existing objects above any of the surfaces except when, in the opinion of the appropriate authority, the object is shielded by an existing immovable object, or after aeronautical study it is determined that the object would not adversely affect the safety or significantly.

311.153 Non-precision approach runways

(a) Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall determine the obstacle limitation surfaces for a non-precision approach runway
(1) Conical surface;
(2) Inner horizontal surface;
(3) Approach surface; and
(4) Transitional surfaces.
(b) Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall not the heights and slopes of the surfaces be greater than, and their other dimensions not less than, those specified in Table below, except in the case of the horizontal section of the approach surface.
(c) Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall be the approach surface horizontal beyond the point at which the 2.5 percent slope intersects:
(1) A horizontal plane 150 m above the threshold elevation; or
(2) The horizontal plane passing through the top of any object that governs the obstacle that governs the obstacle clearance altitude/height (OCA/H); which ever is the higher?

311.155 Dimensions and slopes of obstacle limitation surfaces —Approach runways

Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall determined dimensions and slopes of obstacle limitation surfaces —Approach runways as follows:-

(a) Approach runways

RUNWAY CLASSIFICATION

Surface and dimensions	Non-instrument Code number				Non-precision approach Code number			Precision approach category I , II or III Code number		
	1	2	3	4	1.2	3	4	1.2	3.4	3.4
CONICL										
Slope	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Height	35 m	55 m	75 m	100 m	60 m	75 m	100 m	60 m	100 m	100 m
INNER HORIZONTAL										
Height	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m
slope	2000m	2500m	4000m	4000m	3500m	4000m	4000m	3500m	4000m	4000m
INNER APPRAOCH										
Width	—	—	—	—	—	—	—	90 m	120 m	120 m
Distance form threshold	—	—	—	—	—	—	—	60 m	60 m	60 m
Length	—	—	—	—	—	—	—	900 m	900 m	900 m
Slope								2.5%	2%	2%
APPRAOCH										
Length of inner edge	60 m	80 m	150 m	150 m	300 m	300 m	300 m	150 m	300 m	300 m
Distance form threshold	30 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m
Divergence (each side)	10%	10%	10%	10%	15%	15%	15%	15%	15%	15 %
First section										
Length	1600m	2500m	3000m	3000m	2500m	3000m	3000m	3000m	3000m	3000m
Slope	5%	4%	3.33%	2.5%	3.33%	2%	2%	2.5%	2%	2%
Second section										
Length	—	—	—	—	—	3600mb	3600mb	12000m	3600mb	3600mb
Slope	—	—	—	—	—	2.5%	2.5%	3%	2.5%	2.5%
Horizontal section										
Length	—	—	—	—	—	84oo mb	84oo mb	—	84oo mb	84oo mb
Total length	—	—	—	—	—	15000m	15000m	15000m	15000m	15000m
TRANSITIONAL										
Slope	20%	20%	14.3%	14.3%	20%	14.3%	14.3%	14.3%	14.3%	14.3%
INNER TRANSITIONAL Slope	—	—	—	—	—	—	—	40%	33.3%	33.3%
BALKED LANDING SURFACE	—	—	—	—	—	—	—	90m	120 m	120 m
Length of inner edge	—	—	—	—	—	—	—	c	1800 mb	1800 mb
Distance form threshold	—	—	—	—	—	—	—	10%	10%	10%
Divergence (each side)	—	—	—	—	—	—	—	4%	3.33%	3.33%
Slope										

(1) All dimensions are measured horizontally unless specified otherwise.
(2) Variable length
(3) Distance to the end of strip.
(4) Or end of runway whichever is less.

311.157 Precision approach terrain chart – ICAO

Availability The Precision Approach Terrain Chart — ICAO shall be made available for all precision approach runways Categories II and III at aerodromes used by international civil aviation, except where the requisite information is provided in the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) in accordance with Chapter 5.

311.159 Establishing instrument approach procedures (conventional)

Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall certificate shall establish an appropriate Instrument APCH procedures (conventional) approved by the ECAA (according to the acceptable level of safety and safety objectives applicable to the provision of establishing an Instrument APCH procedures (conventional) in the EAC 311/1) to ensure that safety is maintained in the provision of ATS with in its airspace and at its aerodrome.

311.161 Establishing RNAV procedures

Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall certificate shall establish an appropriate RNAV procedures approved by the ECAA (according to the acceptable level of safety and safety objectives applicable to the provision of establishing an RNAV procedures in the EAC 311/2) to ensure that safety is maintained in the provision of ATS with in its airspace and at its aerodrome.

311.163 Control zones

(a) Each applicant for the grant of an aeronautical charts and Instrument Procedures certificate shall make The lateral limits of control zones to encompass at least those portions of the airspace, which are not within control areas, containing the paths of IFR flights arriving at and departing from aerodromes to be used under instrument meteorological conditions.

(b) Each applicant for the grant of an aeronautical charts and Instrument Procedures certificate shall make the lateral limits of a control zone to extend to at least 9.3 km (5 NM) from the center of the aerodrome or aerodromes concerned in the directions from which approaches may be made.

(c) (c) If a control zone is located within the lateral limits of a control area, each applicant for the grant of an aeronautical charts and Instrument Procedures certificate shall make it to extend upwards from the surface of the earth to at least the lower limit of the control area.

311.165 Establishing VOR and NDB routes

Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall certificate shall establish an appropriate VOR and NDB route approved by the ECAA (according to the acceptable level of safety and safety objectives applicable to the provision of establishing an VOR and NDB route in the EAC 311/3) to ensure that safety is maintained in the provision of ATS with in its airspace and at its aerodrome.

311.167 Establishing RNAV /RNP routes

Each applicant for the grant of an aeronautical charts and instrument procedures certificate shall certificate shall establish an appropriate RNAV /RNP route approved by the ECAA (according to the acceptable level of safety and safety objectives applicable to the provision of establishing an RNAV /RNP route in the EAC 311/4) to ensure that safety is maintained in the provision of ATS with in its airspace and at its aerodrome.

311.169 WORLD AERONAUTICAL CHART — ICAO 1:1 000 000

Function this chart shall provide information to satisfy the requirements of visual air navigation.

Note. — This chart may also serve:

(a) As a basic aeronautical chart:

(1) When highly specialized charts lacking visual information do not provide essential data;

(2) To provide complete world coverage at a constant scale with a uniform presentation of plan metric data;

(3) In the production of other charts required by international civil aviation;

(b) As a pre-flight planning chart.

Availability The World Aeronautical Chart — ICAO 1:1 000 000 shall be made available in the manner prescribed in 1.3.2 for all areas delineated in Appendix 5. Note.— When operational or chart production considerations indicate that operational requirements can be effectively satisfied by Aeronautical Charts — ICAO 1:500 000 or Aeronautical Navigation Charts — ICAO Small Scale, either of these charts may be made available instead of the basic 1:1 000 000 chart.

Projection the projections shall be as follows:

(a) Between the Equator and 80° latitude: the Lambert conformal conic projection, in separate bands for each tier of charts. The standard parallels for each 4° band shall be 40' south of the northern parallel and 40' north of the southern parallel;

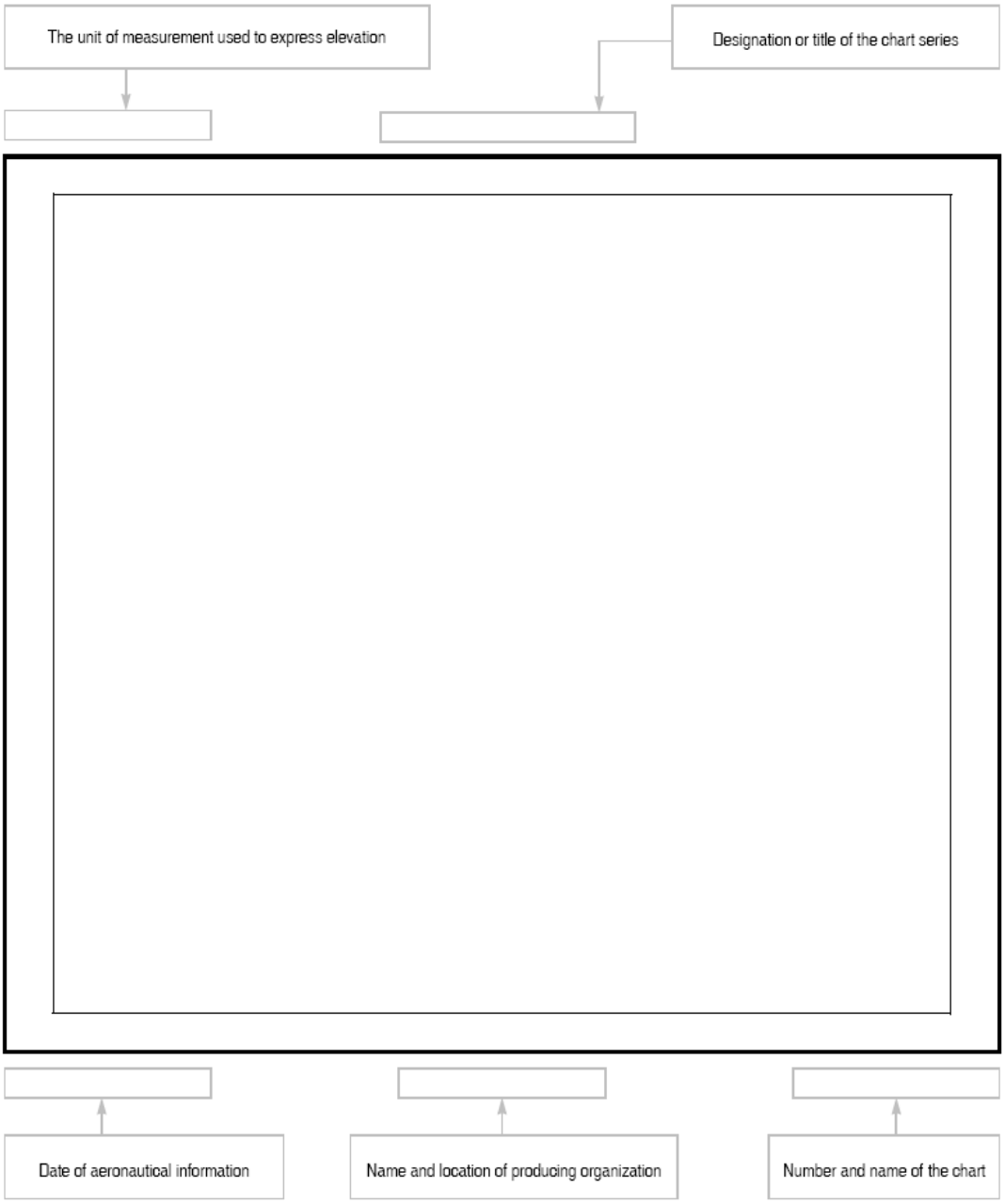
(b) between 80° and 90° latitude: the Polar stereographic projection with scale matching that of the Lambert conformal conic projection at latitude 80°, except that in the northern hemisphere the Lambert conformal conic projection may be used between 80° and 84° latitude and the Polar stereographic projection between 84° and 90° with the scales matching at 84° North.

Culture and topography

Built-up areas Cities, towns and villages shall be selected and shown according to their relative importance to visual air navigation.

Boundaries International boundaries shall be shown. UN demarcated and undefined boundaries shall be distinguished by descriptive notes.

APPENDIX 1. MARGINAL NOTE LAYOUT



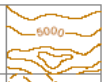
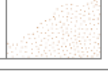
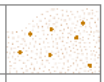
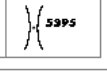
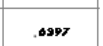
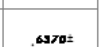
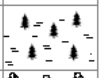
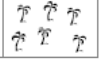
APPENDIX 2. ICAO CHART SYMBOLS

Annex 4 — Aeronautical Charts *Appendix 2*

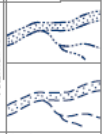
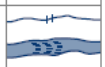
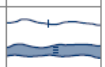
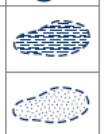
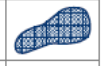
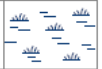
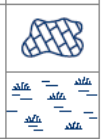
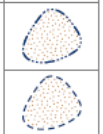
Appendix 2 *Annex 4 — Aeronautical Charts*

Appendix 2 *Annex 4 - Aeronautical Charts*

TOPOGRAPHY

1	Contours	
2	Approximate contours	
3	Relief shown by hachures	
4	Bluff, cliff or escarpment	
5	Lava flow	
6	Sand dunes	
7	Sand area	
8	Gravel	
9	Levee or esker	Alternative 
10	Unusual land features appropriately labelled	
	Active volcano	
11	Mountain pass	
12	Highest elevation on chart	Alternative 
13	Spot elevation	
14	Spot elevation (of doubtful accuracy)	
15	Coniferous trees	
16	Other trees	
17	Palms	
18	Areas not surveyed for contour information or relief data incomplete	Caution

HYDROGRAPHY

19	Shore line (reliable)	
20	Shore line (unreliable)	
21	Tidal flats	
22	Coral reefs and ledges	
23	Large river (perennial)	
24	Small river (perennial)	
25	Rivers and streams (non-perennial)	Alternative 
26	Rivers and streams (unsurveyed)	
27	Rapids	
28	Falls	
29	Canal	
30	Abandoned canal *Note.— Dry canal having landmark value.*	
31	Lakes (perennial)	
32	Lakes (non-perennial)	Alternative 
33	Salt lake	
34	Salt pans (evaporator)	
35	Swamp	
36	Rice field	Alternative 
37	Spring, well or water hole	perennial  intermittent 
38	Reservoir	
39	Dry lake bed	Alternative 
40	Wash	Alternative
41	Shoals	
42	Glaciers and ice caps	
43	Danger line (2 m or one fathom line)	
44	Charted isolated rock	
45	Rock awash	
46	Unusual water features appropriately labelled	

Annex 4 - Aeronautical Charts *Appendix 2*

CULTURE

BUILT-UP AREAS

47	City or large town	
48	Town	
49	Village	
50	Buildings	

HIGHWAYS AND ROADS

57	Dual highway	
58	Primary road	
59	Secondary road	
60	Trail	
61	Road bridge	
62	Road tunnel	

MISCELLANEOUS (Cont.)

69	Pipeline	Pipeline
70	Oil or gas field	
71	Tank farms	
72	Nuclear power station	
73	Coast guard station	
74	Lookout tower	
75	Mine	
76	Forest ranger station	
77	Race track or stadium	
78	Ruins	
79	Fort	
80	Church	
81	Mosque	
82	Pagoda	
83	Temple	

RAILROADS

51	Railroad (single track)	
52	Railroad (two or more tracks)	
53	Railroad (under construction)	
54	Railroad bridge	
55	Railroad tunnel	
56	Railroad station	

MISCELLANEOUS

63	Boundaries (international)	
64	Outer boundaries	
65	Fence	X—X—X
66	Telegraph or telephone line (when a landmark)	—T—T—
67	Dam	
68	Ferry	

AERODROMES

84	Civil	Land	
85	Civil	Water	
86	Military	Land	
87	Military	Water	

88	Joint civil and military	Land	
89	Joint civil and military	Water	
90	Emergency aerodrome or aerodrome with no facilities		
91	Abandoned or closed aerodrome		

92	Sheltered anchorage	
93	Aerodrome for use on charts on which aerodrome classification is not required e.g. Enroute Charts	
94	Heliport *Note.— Aerodrome for the exclusive use of helicopters*	H

95	*Note.— Where required by the function of the chart, the runway pattern of the aerodrome may be shown in lieu of the aerodrome symbol, for example:*	

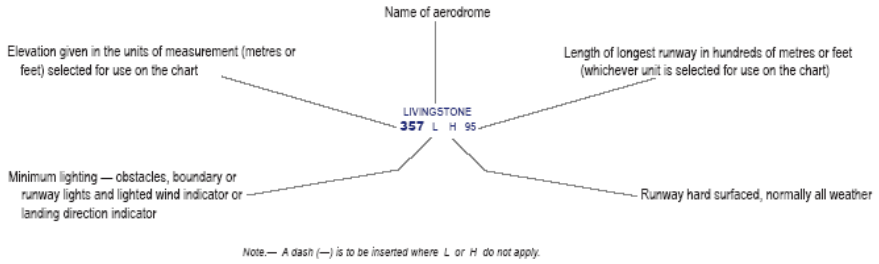
Appendix 2 *Annex 4 — Aeronautical Charts*

AERODROMES *(Cont.)*

AERODROME DATA IN ABBREVIATED FORM WHICH MAY BE IN ASSOCIATION WITH AERODROME SYMBOLS

(Reference: 16.9.2.2 and 17.9.2.2)

96



Note.— A dash (—) is to be inserted where L or H do not apply.

AERODROME SYMBOLS FOR APPROACH CHARTS

97	Aerodromes affecting the traffic pattern on the aerodrome on which the procedure is based	
98	The aerodrome on which the procedure is based	

RADIO NAVIGATION AIDS*

99	Basic radio navigation aid symbol *Note.— This symbol may be used with or without a box to enclose the data.*			
100	Non-directional radio beacon	NDB		Electronic 
101	VHF omnidirectional radio range	VOR		
102	Distance measuring equipment	DME		
103	Collocated VOR and DME radio navigation aids	VOR/DME		
104	DME distance	Distance in kilometres (nautical miles) to DME → 15 km Identification of radio navigation aid → KAV		
105	VOR radial	Radial bearing from, and identification of, VOR	R 090 KAV	
106	UHF tactical air navigation aid	TACAN		

107	Collocated VOR and TACAN radio navigation aids	VORTAC		Electronic 
108	Instrument landing system	ILS	PLAN VIEW  B Y Electronic  FRONT COURSE  BACK COURSE PROFILE  Electronic  GLIDE PATH	
109	Radio marker beacon	Elliptical		
		Bone Shape		

Note.— Marker beacon may be shown by outline, or stipple, or both.

110

Compass rose
To be orientated on the chart in accordance with the alignment of the station (normally Magnetic North)

Note.— Additional points of compass may be added as required.

Compass rose to be used as appropriate in combination with the following symbols:

VOR	
VOR/DME	
TACAN	
VORTAC	

** Note.— Guidance material on the presentation of radio navigation aid data is given in the* Aeronautical Chart Manual *(Doc 8697).*

Annex 4 — Aeronautical Charts *Appendix 2*

AIR TRAFFIC SERVICES

111	Flight information region	FIR	
112	Aerodrome traffic zone	ATZ	
113	Control area Airway Controlled route	CTA AWY	Alternative
114	Uncontrolled route		
115	Advisory airspace	ADA	
116	Control zone	CTR	
117	Air defence identification zone	ADIZ	ADIZ
118	Advisory route	ADR	Alternative

119	Visual flight path	compulsory with radio communication requirement	R
		compulsory, without radio communication requirement	R
		recommended	
120	Scale-break (on ATS route)		Alternative
121	Reporting point	REP	Compulsory / On request
122	Change-over point To be superimposed on the appropriate route symbol at right angles to the route	COP	26 / 36
123	ATS/MET reporting point	MRP	Compulsory / On request
124	Way-point WPT	Flyover WPT (also used for start point and end point of a controlled turn) Fly-by WPT	

AIRSPACE CLASSIFICATIONS

125	Airspace classifications	A, B, C, D, E, F, G
126	Alternative	Aeronautical data in abbreviated form to be used in association with airspace classification symbols: TMA DONLON 119.1 C 200m AGL – FL 245 Type / Name or call sign / Radio frequency(ies) / Airspace classification / Vertical limits TMA DONLON C FL 245 200m AGL 119.1

AIRSPACE RESTRICTIONS

127	Restricted airspace (prohibited, restricted or danger area)	Common boundary of two areas
	Note.— The angle and density of rulings may be varied according to scale and the size, shape and orientation of the area.	
128	International boundary closed to passage of aircraft except through air corridor	

Appendix 2 *Annex 4 — Aeronautical Charts*

OBSTACLES

129	Obstacle		133	Exceptionally high obstacle (optional symbol)	
130	Lighted obstacle		134	Exceptionally high obstacle — lighted (optional symbol) *Note.— For obstacles having a height of the order of 300 m (1 000 ft) above terrain*	
131	Group obstacles		135	Elevation of top (italics) 52 / (15) Height above specified datum (upright type in parentheses)	
132	Lighted group obstacles				

MISCELLANEOUS

136	Prominent transmission line		137	Isogonic line or isogonal	3° E	138	Ocean station vessel (normal position)

VISUAL AIDS

139	Marine light *Note 2.— Characteristics are to be indicated as follows:*	F	Alt Alternating B Blue F Fixed	*Note 1.— Marine alternating lights are red and white unless otherwise indicated. Marine lights are white unless colours are stated.*	Fl Flashing G Green Gp Group	Occ Occulting R Red SEC Sector	sec Second (U) Unwatched W White
140	Aeronautical ground light		Electronic	141	Lightship		

SYMBOLS FOR AERODROME/HELIPORT CHARTS

142	Hard surface runway		150	Pierced steel plank or steel mesh runway	
143	Unpaved runway		151	Point light	
144	Stopway SWY				
145	Taxiways and parking areas		152	Obstacle light	
146	Helicopter alighting area on an aerodrome		153	Landing direction indicator (lighted)	
147	Aerodrome reference point		154	Landing direction indicator (unlighted)	
148	VOR check-point		155	Stop bar	
149	Runway visual range (RVR) observation site		156	Runway-holding position — Pattern A / Pattern B *Note.— For application, see Annex 14, Volume I, paragraph 5.2.9*	

SYMBOLS FOR AERODROME OBSTACLE CHARTS — TYPE A, B AND C

		Plan	Profile
157	Tree or shrub		Identification number
158	Pole, tower, spire, antenna, etc.		
159	Building or large structure		
160	Railroad		
161	Transmission line or overhead cable		

		Plan	Profile
162	Terrain penetrating obstacle plane		
163	Escarpment		
164	Stopway SWY		
165	Clearway CWY		

Annex 4 — Aeronautical Charts *Appendix 2*

ADDITIONAL SYMBOLS FOR USE ON ELECTRONIC CHARTS

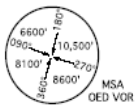
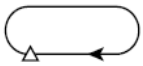
	PLAN VIEW	Electronic
166	Minimum sector altitude *Note.— This symbol may be modified to reflect particular sector shapes* MSA	
167	Holding pattern	
168	Missed approach track	
	PROFILE	Electronic
169	Runway	
170	Radio navigation aid (type of aid and its use in the procedure to be annotated on top of the symbol)	
171	Radio marker beacon (type of beacon to be annotated on top of the symbol)	
172	Collocated radio navigation aid and marker beacon (type of aid to be annotated on top of the symbol)	
173	DME fix (distance from DME and the fix use in the procedure to be annotated on top of the symbol)	
174	Collocated DME fix and marker beacon (distance from DME and the type of beacon to be annotated on top of the symbol)	

CHART SYMBOLS *(Cont.)*

Woods		GREEN	
Areas which have not been surveyed for contour information or relief data are incomplete	Optional colours	GOLDEN BUFF	
		WHITE	

HYPSOMETRIC TINTS

	WHITE	Tint for extreme elevations		SEPIA	
	VIOLET				
	ORANGE or BUFF	Tint for higher range elevations		BROWN	
	YELLOW	Tint for middle range elevations		BUFF	
	GREEN	Tint for lower range elevations	Optional colours	GREEN	
				WHITE	
	BLUE-GREEN	Tint for areas below sea level	Optional colours	BLUE-GREEN	
				LIGHT GREY	

Note — Basic tints are identical to those specified for the International Map of the World

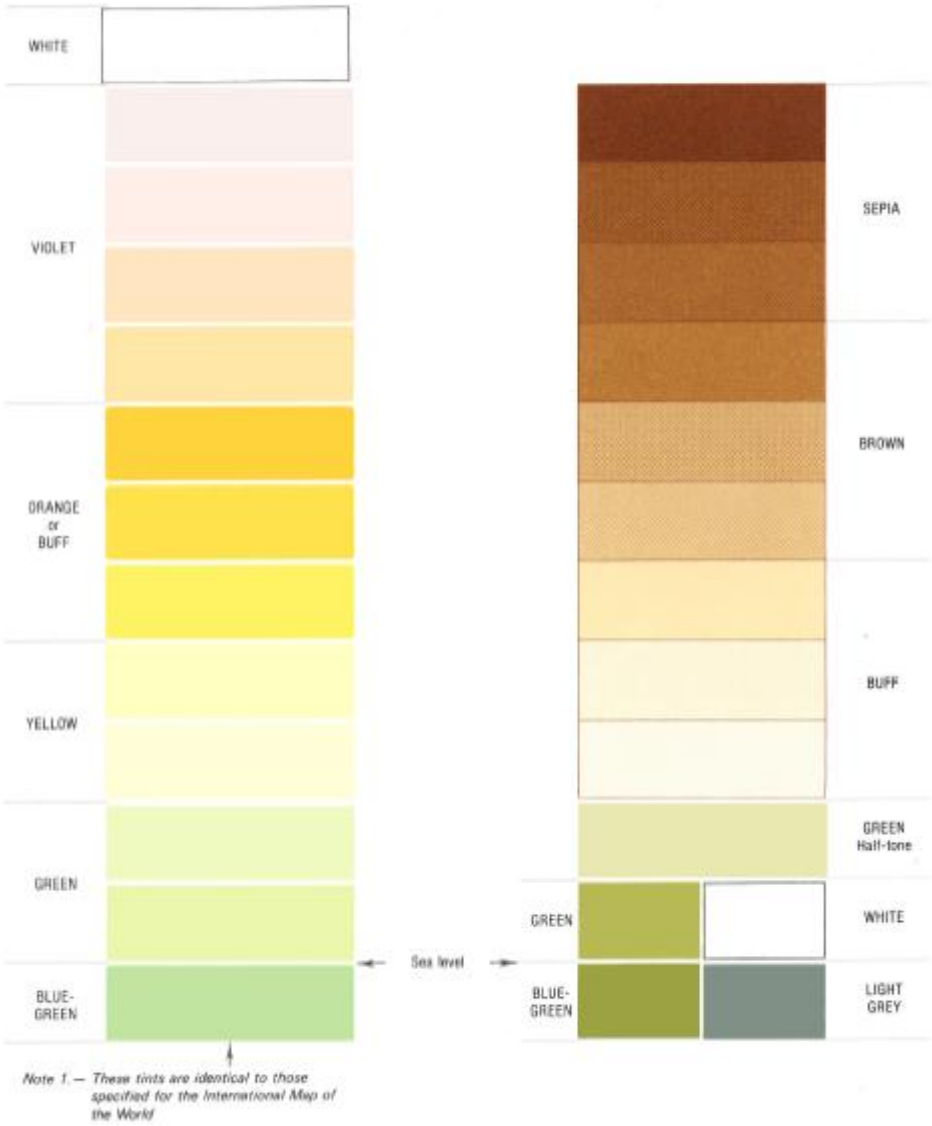
APPENDIX

C

Culture, except highways and roads; outlines of large cities, gri spot elevations; danger lines and off-shore rocks; names and aeronautical and hydrographic features	
Built-up areas of cities	
Highways and roads	
Built-up areas for cities (alternative to black stipple)	
Contours and topographic features: Items 1 through 10 of Appe Hydrographic features: Items 39 through 41 of Appendix 2	
Shore lines, drainage, rivers, lakes, bathymetric contours and ot including their names or description	
Open water areas	
Salt lakes and salt pans	
Large non-perennial rivers and non-perennial lakes	
Aeronautical data, except for Enroute and Area Charts - ICAO, w colours may be required. Both colours may be used on the sa but, where only one colour is used, dark blue is preferred	

APPENDIX 4. HYPSOMETRIC TINT GUIDE

(Alternative systems, reference 2.12.2)



Note 1.— These tints are identical to those specified for the International Map of the World

Note 2.— Elevations have not been associated with tints of either system in order to allow for flexibility in their selection.

APPENDIX (5)

APPENDIX 6. AERONAUTICAL DATA QUALITY REQUIREMENTS

Table 1. Latitude and longitude

Latitude and longitude	Chart Resolution	Integrity Classification
Flight information region boundary points	as plotted	1×10^{-3} routine
P, R, D areas boundary points (outside CTA/CTZ boundaries)	as plotted	1×10^{-3} routine
P, R, D areas boundary points (inside CTA/CTZ boundary)	as plotted	1×10^{-5} essential
CTA/CTZ boundary points	as plotted	1×10^{-5} essential
En-route navaids and fixes, holding, STAR/SID points	1 sec	1×10^{-5} essential
Obstacles en-route	as plotted	1×10^{-3} routine
Aerodrome/heliport reference point	1 sec	1×10^{-3} routine
Navaids located at the aerodrome/heliport	as plotted	1×10^{-5} essential
Obstacles in the circling area and at the aerodrome/heliport	1/10 sec (AOC Type C)	1×10^{-5} essential
Significant obstacles in the approach and take-off area	1/10 sec (AOC Type C)	1×10^{-5} essential
Final approach fixes/points and other essential fixes/points comprising instrument approach procedure	1 sec	1×10^{-5} essential
Runway thresholds	1 sec	1×10^{-8} critical
Taxiway centre line points	1/100 sec	1×10^{-5} essential
Aircraft stand points/INS checkpoints	1/100 sec	1×10^{-3} routine
Geometric centre of TLOF or FATO thresholds, heliports	1 sec	1×10^{-8} critical

Table 2. Elevation/altitude/height

Elevation/altitude/height	Chart Resolution	Integrity Classification
Aerodrome/heliport elevation	1 m or 1 ft	1×10^{-5} essential
WGS-84 geoid undulation at aerodrome/heliport elevation position	1 m or 1 ft	1×10^{-5} essential
Runway or FATO threshold, non-precision approaches	1 m or 1 ft	1×10^{-5} essential
WGS-84 geoid undulation at runway or FATO threshold, TLOF geometric centre, non-precision approaches	1 m or 1 ft	1×10^{-5} essential
Runway or FATO threshold, precision approaches	0.5 m or 1 ft	1×10^{-8} critical
WGS-84 geoid undulation at runway or FATO threshold, TLOF geometric centre, precision approaches	0.5 m or 1 ft	1×10^{-8} critical
Threshold crossing height, precision approaches	0.5 m or 1 ft	1×10^{-8} critical
Obstacle Clearance Altitude/Height (OCA/H)	as specified in PANS-OPS (Doc 8168)	1×10^{-5} essential
Obstacles en-route	3 m (10 ft)	1×10^{-3} routine
Obstacles in the approach and take-off areas	1 m or 1 ft	1×10^{-5} essential
Obstacles in the circling areas and at the aerodrome/heliport	1 m or 1 ft	1×10^{-5} essential
Distance measuring equipment (DME)	30 m (100 ft)	1×10^{-5} essential
Instrument approach procedures altitude	as specified in PANS-OPS (Doc 8168)	1×10^{-5} essential
Minimum altitudes	50 m or 100 ft	1×10^{-3} routine

Table 3. Magnetic variation

Magnetic variation	Chart Resolution	Integrity Classification
Aerodrome/heliport magnetic variation	1 degree	1×10^{-5} essential

Table 4. Bearing

Bearing	Chart Resolution	Integrity Classification
Airway segments	1 degree	1×10^{-3} routine
En-route and terminal fix formations	1/10 degree	1×10^{-3} routine
Terminal arrival/departure route segments	1 degree	1×10^{-3} routine
Instrument approach procedure fix formations	1/10 degree	1×10^{-5} essential
ILS localizer alignment	1 degree	1×10^{-5} essential
MLS zero azimuth alignment	1 degree	1×10^{-5} essential
Runway and FATO bearing	1 degree	1×10^{-3} routine

Table 5. Length/distance/dimension

Length/distance/dimension	Chart Resolution	Integrity Classification
Airway segments length	1 km or 1 NM	1×10^{-3} routine
En-route fix formations distance	2/10 km (1/10 NM)	1×10^{-3} routine
Terminal arrival/departure route segments length	1 km or 1 NM	1×10^{-5} essential
Terminal and instrument approach procedure fix formations distance	2/10 km (1/10 NM)	1×10^{-5} essential
Runway and FATO length, TLOF dimensions	1 m (AD chart) 0.5 m (AOC chart)	1×10^{-8} critical
Stopway length	0.5 m (AOC chart)	1×10^{-8} critical
Landing distance available	1 m (AD chart) 0.5 m (AOC chart)	1×10^{-8} critical
ILS localizer antenna-runway end, distance	as plotted	1×10^{-3} routine
ILS glide slope antenna-threshold, distance along centre line	as plotted	1×10^{-3} routine
ILS markers-threshold distance	2/10 km (1/10 NM)	1×10^{-5} essential
ILS DME antenna-threshold, distance along centre line	as plotted	1×10^{-5} essential
MLS azimuth antenna-runway end, distance	as plotted	1×10^{-3} routine
MLS elevation antenna-threshold, distance along centre line	as plotted	1×10^{-3} routine
MLS DME/P antenna-threshold, distance along centre line	as plotted	1×10^{-5} essential

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