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THE CIVIL AVIATION ACT

(*No.* 21 *of* 2013)

THE CIVIL AVIATION (AERONAUTICAL CHARTS) REGULATIONS, 2018

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THE CIVIL AVIATION ACT

(*No.* 21 *of* 2013)

IN EXERCISE of the powers conferred by section 82 of the Civil Aviation Act, 2013, the Cabinet Secretary for Transport and Infrastructure makes the following Regulations—

# THE CIVIL AVIATION (AERONAUTICAL CHARTS) REGULATIONS, 2018

## PART I—PRELIMINARY

Citation.

1. (1) These Regulations may be cited as the Civil Aviation (Aeronautical Charts) Regulations 2018.

Interpretation

2. In these Regulations, unless the context otherwise requires—

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

"Aerodrome elevation" means the elevation of the highest point of the landing area;

"Aerodrome operating minima" means the limits of usability of an aerodrome for–

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

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

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

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

"Aerodrome reference point" means the designated geographical location of an aerodrome;

"Aeronautical chart" means a representation of a portion of the Earth, its culture and relief, specifically designated to meet the requirements of air navigation;

"Aircraft stand" means a designated area on an apron intended to be used for parking an aircraft;

"Air defence identification zone" means a special designated airspace of defined dimensions within which aircraft are required to comply with special identification or reporting procedures additional to those related to the provision of air traffic services;

"Air traffic service" means a generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service);

"Air transit route" means a defined route for the air transiting of helicopters;

"Airway" means a control area or portion thereof established in the form of a corridor;

"Altitude" means the vertical distance of a level, a point or an object considered as a point, measured from mean sea level;

"Application" means manipulation and processing of data in support of user requirements (ISO 19104*);

"Apron" means a defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fueling, parking or maintenance.

"Area minimum altitude" means the minimum altitude to be used under instrument meteorological conditions, which provides a minimum obstacle clearance within a specified area, normally formed by parallels and meridians;

"Area navigation" means a method of navigation which permits aircraft operation on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these;

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

"air traffic services route" means a specified route designed for channeling the flow of traffic as necessary for the provision of air traffic services;

"air traffic services surveillance system" means a generic term meaning variously, 'ADS-B', 'PSR', 'SSR' or any comparable ground-based system that enables the identification of aircraft;

"Calendar" means discrete temporal reference system that provides the basis for defining temporal position to a resolution of one day (ISO 19108*);

"Change-over point" means the point at which an aircraft navigating on an air traffic services 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;

"Clearway" means a defined rectangular area on the ground or water under the control of the appropriate authority selected or prepared as a suitable area over which an aeroplane may make a portion of its initial climb to a specified height.

"Contour line" means a line on a map or chart connecting points of equal elevation.

"Culture" means all man-made features constructed on the surface of the Earth, such as cities, railways and canals;

"Cyclic redundancy check" means a mathematical algorithm applied to the digital expression of data that provides a level of assurance against loss or alteration of data;

"Danger area" means an airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times;

"Data product specification" means detailed description of a data set or data set series together with additional information that will enable it to be created, supplied to and used by another party (ISO 19131*);

"Data quality" means a degree or level of confidence that the data provided meets the requirements of the data user in terms of accuracy, resolution and integrity;

"Data set" means identifiable collection of data (ISO 19101*);

"Data set series" means collection of data sets sharing the same product specification (ISO 19115*);

"Datum" means any quantity or set of quantities that may serve as a reference or basis for the calculation of other quantities (ISO 19104*);

"Digital Elevation Model" means the representation of terrain surface by continuous elevation values at all intersections of a defined grid, referenced to common datum;

"Displaced threshold" means a threshold not located at the extremity of a runway;

"Electronic aeronautical chart display" means 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;

"Elevation" means the vertical distance of a point or a level, on or affixed to the surface of the earth, measured from mean sea level;

"Feature" means abstraction of real world phenomena (ISO 19101*);

"Feature attribute" means characteristic of a feature (ISO 19101*);

"Final approach" means that part of an instrument approach procedure which commences at the specified final approach fix or point, or where such a fix or point is not specified–

(a) at the end of the last procedure turn, base turn or inbound turn of a racetrack procedure, if specified; or

(b) at the point of interception of the last track specified in the approach procedure; and

(c) ends at a point in the vicinity of an aerodrome from which:
   (i) a landing can be made; or
   (ii) a missed approach procedure is initiated;

"Final approach and take-off area" means a defined area over which the final phase of the approach manoeuvre to hover or landing is completed and from which the take-off manoeuvre is commenced. Where the Final approach and take-off area is to be used by performance Class 1 helicopters, the defined area includes the rejected take-off area available;

"Final approach fix or point" means that fix or point of an instrument approach procedure where the final approach segment commences;

"Final approach segment" means that segment of an instrument approach procedure in which alignment and descent for landing are accomplished;

"Flight information region" means an airspace of defined dimensions within which flight information service and alerting service are provided;

"Flight level" means a surface of constant atmospheric pressure which is related to a specific pressure datum, 1 013.2 hectopascals, and is separated from other such surfaces by specific pressure intervals;

"Geodesic distance" means the shortest distance between any two points on a mathematically defined ellipsoidal surface;

"Geodetic datum" means a minimum set of parameters required to define location and orientation of the local reference system with respect to the global reference system/frame;

"Geoid" means the equipotential surface in the gravity field of the Earth which coincides with the undisturbed mean sea level extended continuously through the continents;

"Geoid undulation" means the distance of the geoid above (positive) or below (negative) the mathematical reference ellipsoid;

"Glide path" means a descent profile determined for vertical guidance during a final approach;

"Gregorian calendar" means calendar in general use; first introduced in 1582 to define a year that more closely approximates the tropical year than the Julian calendar (ISO 19108*);

"Height" means the vertical distance of a level, point or an object considered as a point, measured from a specific datum;

"Helicopter stand" means an aircraft stand which provides for parking a helicopter and where ground taxi operations are completed or where the helicopter touches down and lifts off for air taxi operations;

"Heliport" means an aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters;

"Holding procedure" means a predetermined manoeuvre which keeps an aircraft within a specified airspace while awaiting further clearance;

"Hot spot" means a location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary;

"Human Factors principles" means principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance;

"Hypsometric tints" means a succession of shades or colour gradations used to depict ranges of elevation;

"Initial approach segment" means that segment of an instrument approach procedure between the initial approach fix and the intermediate approach fix or, where applicable, the final approach fixes or point;

"Instrument approach procedure" means a series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles 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, to a position at which holding or en-route obstacle clearance criteria apply;

"Integrity classification (aeronautical data)" means classification based upon the potential risk resulting from the use of corrupted data. Aeronautical data is classified as–

(a) routine data: 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;

(b) essential data: 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;

(c) critical data: 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;

"Intermediate approach segment" means that segment of an instrument approach procedure 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;

"Intermediate holding position" means a designated position intended for traffic control at which taxiing aircraft and vehicles shall stop and hold until further cleared to proceed, when so instructed by the aerodrome control tower;

"Isogonal" means a line on a map or chart on which all points have the same magnetic variation for a specified epoch;

"Landing area" means that part of a movement area intended for the landing or take-off of aircraft;

"Landing direction indicator" means a device to indicate visually the direction currently designated for landing and for take-off;

" Level" means a generic term relating to the vertical position of an aircraft in flight and meaning variously, height, altitude or flight level;

"Logon address" means a specified code used for data link logon to an air traffic services unit;

"Magnetic variation" means the angular difference between True North and Magnetic North;

"Manoeuvring area" means that part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons;

"Marking" means a symbol or group of symbols displayed on the surface of the movement area in order to convey aeronautical information.

"Metadata" means data about data (ISO 19115*);

"Minimum en-route altitude" means the altitude for an en-route segment that provides adequate reception of relevant navigation facilities and air traffic services communications, complies with the airspace structure and provides the required obstacle clearance;

"Minimum obstacle clearance altitude" means the minimum altitude for a defined segment of flight that provides the required obstacle clearance;

"Minimum sector altitude" means the lowest altitude which may be used which will provide a minimum clearance of 300 m

(1 000 ft) above all objects located in an area contained within a sector of a circle of 46 km (25 NM) radius centred on significant point, the aerodrome reference point , or the heliport reference point;

"Missed approach point" means 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;

"Missed approach procedure" means the procedure to be followed if the approach cannot be continued;

"Movement area" means that part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s);

"Navigation specification" means a set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specifications–

(a) required navigation performance specification. A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH;

(b) area navigation specification. A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV;

"Obstacle" means all fixed (whether temporary or permanent) and mobile objects, or parts thereof, that–

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

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

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

"Obstacle clearance altitude or obstacle clearance height " means the lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable, used in establishing compliance with appropriate obstacle clearance criteria;

"Obstacle free zone" means the airspace above the inner approach surface, inner transitional surfaces, and balked landing surface and that portion of the strip bounded by these surfaces, which is not penetrated by any fixed obstacle other than a low-mass and frangibly mounted one required for air navigation purposes;

"Orthometric height" means height of a point related to the geoid, generally presented as a mean sea level elevation;

"performance-based navigation" means area navigation based on performance requirements for aircraft operating along an air traffic services route, on an instrument approach procedure or in a designated airspace;

"portrayal" means presentation of information to humans (ISO 19116*);

"position (geographical)" means set of coordinates (latitude and longitude) referenced to the mathematical reference ellipsoid which define the position of a point on the surface of the Earth;*

"precision approach procedure" means an instrument approach procedure utilizing azimuth and glide path information provided by ILS or PAR;

"procedure altitude/height" means specified altitude/height flown operationally at or above the minimum altitude/height and established to accommodate a stabilized des cent at a prescribed descent gradient/angle in the intermediate/final approach segment;

"procedure turn" means manoeuvre 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;

"Prohibited area" means an airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited;

"relief" means the inequalities in elevation of the surface of the Earth represented on aeronautical charts by contours, hypsometric tints, shading or spot elevations;

"reporting point" means a specified (named) geographical location in relation to which the position of an aircraft can be reported;

"resolution" means a number of units or digits to which a measured or calculated value is expressed and used;

"restricted area" means an airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions;

"reversal procedure" means 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;

"runway" means a defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft;

"runway-holding position" means a designated position intended to protect a runway, an obstacle limitation surface, or an ILS/MLS critical/sensitive area at which taxiing aircraft and vehicles shall stop and hold, unless otherwise authorized by the aerodrome control tower;

"runway strip" means a defined area including the runway and stopway, if provided, intended:

(a) to reduce the risk of damage to aircraft running off a runway; and

(b) to protect aircraft flying over it during take-off or landing operations;

"runway visual range" means the range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line;

"shoulder" means an area adjacent to the edge of a pavement so prepared as to provide a transition between the pavement and the adjacent surface;

"significant point" means a specified geographical location used in defining an air traffic services route or the flight path of an aircraft and for other navigation and air traffic services purposes;

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

"taxiing" means movement of an aircraft on the surface of an aerodrome under its own power, excluding take-off and landing;

"taxi-route" means a defined path established for the movement of helicopters from one part of a heliport to another. A taxi-route includes a helicopter air or ground taxiway which is centred on the taxi-route;

"taxiway" means a defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including–

(a) aircraft stand taxilane. A portion of an apron designated as a taxiway and intended to provide access to aircraft stands only;

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

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

"terminal arrival altitude" means the lowest altitude that will provide a minimum clearance of 300 metres (1 000 feet) above all objects located in an arc of a circle defined by a 46 kilometre (25 nautical miles) radius centred on the Initial Approach Fix, or where there is no Initial Approach Fix on the Intermediate approach Fix, delimited by straight lines joining the extremity of the arc to the Intermediate Approach Fix. The combined Terminal Arrival Altitudes associated with an approach procedure shall account for an area of 360 degrees around the intermediate approach fix;

"terrain" means the surface of the Earth containing naturally occurring features such as mountains, hills, ridges, valleys, bodies of water, permanent ice and snow, and excluding obstacles;

"threshold" means the beginning of that portion of the runway usable for landing;

"touchdown and lift-off area " means a load bearing area on which a helicopter may touch down or lift off;

"touchdown zone" means the portion of a runway, beyond the threshold, where it is intended landing aeroplanes first contact the runway;

"track" means the projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from North (true, magnetic or grid);

"transition altitude" means the altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes;

"vectoring" means provision of navigational guidance to aircraft in the form of specific headings, based on the use of an air traffic services surveillance system;

"visual approach procedure" means a series of predetermined manoeuvres 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;

"waypoint" means a specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation. Waypoints are identified as either–

(a) fly-by waypoint. A waypoint which requires turn anticipation to allow tangential interception of the next segment of a route or procedure; or

(b) flyover waypoint. A waypoint at which a turn is initiated in order to join the next segment of a route or procedure.

Application.

3. (1) These Regulations shall apply to a person or entity providing an aeronautical cartographic service within designated airspaces and at aerodromes for civil aviation purposes in Kenya .

(2) No person or entity shall provide an aeronautical cartographic service unless such organization has been certificated to do so by the Authority in accordance with the Civil Aviation (Certifications of Air Navigation Service Providers) Regulations.

(3) A person or entity providing aeronautical cartographic services shall develop and avail charts to the entity coordinating search and rescue activities in the designated airspaces as prescribed by the Authority.

4. A certificated cartographic service provider shall ensure that— Availability.

(a) on the request of another State provide all information relating to the state of Kenya and the area of jurisdiction for the provision of air traffic services;

(b) the availability of charts is as provided in these regulations;

(c) for any chart or single sheet of a chart series entirely contained within the territory of the state, either–

(i) produce the chart or sheet itself; or

(ii) arrange for the production of the chart or sheet by another State or by an agency; or

(iii) provide another State prepared to accept an obligation to produce the chart or sheet with the data necessary for its production;

(d) for any chart or single sheet of a chart series which includes the territory of a Contracting State, in consultation with that state having jurisdiction over the territory concerned determine the manner in which the chart or sheet will be made available.

(e) take all reasonable measures to ensure that the information provided and the aeronautical charts made available are adequate and accurate and that aeronautical charts are maintained up to date by an adequate revision service.

PART II - GENERAL SPECIFICATIONS

5. (1) A certificated aeronautical cartographic service provider shall ensure that each type of chart provides information– Operational requirements for charts.

(a) relevant to the function of the chart and the design of the chart observes Human Factors principles to facilitate its optimum use;

(b) for the safe and expeditious operation of the aircraft appropriate to the phase of flight as listed below-

(i) Phase 1-Taxi from aircraft stand to take off;

(ii) Phase 2- Take off and climb to en-route air traffic services route structure;

(iii) Phase 3-Enroute air traffic services route structure;

(iv) Phase 4 - Descent to approach

(v) Phase 5 - Approach to land and missed approach

(vi) Phase 6 - Landing and taxi to aircraft stand.

(c) that is accurate, free from distortion and clutter, unambiguous, and readable under all normal operating conditions;

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

(e) in a form which enables the pilot to acquire information in a reasonable time consistent with workload and operating conditions.

(f) that permits smooth transition from chart to chart as appropriate to the phase of flight.

(2) The charts shall be True North orientated.

(3) The basic sheet size of the charts shall be 210 × 297 mm (8.27 x 11.69 inches) (A4).

Titles.

6. An aeronautical cartographic service provider shall ensure that the title of a chart or chart series prepared in accordance with these regulations intended to satisfy the function of the chart is that of the relevant part heading except that such title shall not include "ICAO" unless the chart conforms with all requirements specified in part II and any other specified for the particular chart.

Miscellaneous information.

7. An aeronautical cartographic service provider shall ensure that:

(a) the marginal note layout is as given in first schedule, except as otherwise specified for a particular chart.

(b) the following information is shown on the face of each chart unless otherwise stated in the specification of the chart concerned:

(i) designation or title of the chart series;

(ii) name and reference of the sheet;

(iii) on each margin an indication of the adjoining sheet where applicable.

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

(d) the name and adequate address of the producing agency is shown in the margin of the chart except that, where the chart is published as part of an aeronautical document, this information may be placed in the front of that document.

Symbols.

8. An aeronautical cartographic service provider shall ensure that–

(a) the symbols used conform to those specified in second schedule of these regulations, except that where it is desired to show on an aeronautical chart special features or items of importance to civil aviation for which no International Civil Aviation Organization symbol is at present provided, any appropriate symbol may be chosen for this purpose, provided that it does not cause confusion with any existing International Civil Aviation Organization chart symbol or impair the legibility of the chart;

(b) the same basic symbol is used on all charts on which it appears, regardless of chart purpose. to represent ground-based navigation aids, intersections and waypoints;

(c) the symbol used for significant points is based on a hierarchy of symbols and selected in the following order:

(i) ground-based navigation aid;

(ii) intersection; and

(iii) waypoint symbol.

(d) a waypoint symbol is used only when a particular significant point does not already exist as either a ground-based navigation aid or intersection; and

(e) the symbols are shown in the manner specified in sub regulation (2), (3) and (4) and in the second schedule - ICAO Chart Symbols, symbol number 121.

Units of measurement.

9. An aeronautical cartographic service provider shall ensure that the –

(a) distances are derived as geodesic distances;

(b) distances are expressed in either kilometres or nautical miles or both, provided the units are clearly differentiated;

(c) altitudes, elevations and heights are expressed in either metres or feet or both, provided the units are clearly differentiated;

(d) linear dimensions on aerodromes and short distances are expressed in metres;

(e) order of resolution of distances, dimensions, elevations and heights are as specified for a particular chart;

(f) units of measurement used to express distances, altitudes, elevations and heights are conspicuously stated on the face of each chart; and

(g) conversion scales are provided on each chart on which distances, elevations or altitudes are shown and shall be placed on the face of each chart.

Scale and projection.

10. An aeronautical cartographic service provider shall ensure that –

(a) the name and basic parameters and scale of the projection are indicated for charts of large areas; and

(b) for charts of small areas, a linear scale only is indicated.

Date of validity of aeronautical information.

11. An aeronautical cartographic service provider shall clearly indicate on the face of each chart the date of validity of aeronautical information.

Spelling of geographical names.

12. An aeronautical cartographic service provider shall ensure that –

(a) the symbols of the Roman alphabet are used for all writing;

(b) the word where a geographical term is abbreviated on any particular chart are spelt out in full; and

(c) the punctuation marks are not used in abbreviations within the body of a chart.

13. An aeronautical cartographic service provider shall ensure that abbreviations are – Abbreviations.

(a) used on aeronautical charts whenever they are appropriate; and

(b) selected from the Procedures for Air Navigation Services – ICAO document abbreviations and codes number 8400 where applicable.

14. An aeronautical cartographic service provider shall ensure that the - Political boundaries.

(a) international boundaries are shown, but may be interrupted if data more important to the use of the chart would be obscured; and

(b) names identifying the countries are indicated where the territory of more than one State appears on a chart.

15. An aeronautical cartographic service provider shall ensure that the colours used on charts conform to the Colour Guide in third Schedule of these Regulations. Colours.

16. A cartographic service provider shall ensure that- Relief.

(a) relief, where shown, is portrayed in a manner that will satisfy the chart users' need for–

(i) orientation and identification;

(ii) safe terrain clearance;

(iii) clarity of aeronautical cartographic when shown;

(iv) Planning.

(b) the tints used where relief is shown by hypsometric tints, are based on those shown in the Hypsometric Tint Guide in fourth Schedule of the Regulation;

(c) the spot elevations are shown for selected critical points where spot elevations are used; and

(d) the value of spot elevations of doubtful accuracy is followed by the sign.

17. An aeronautical cartographic service provider shall ensure that the reference or other identification are included when prohibited, restricted or danger areas are shown. Prohibited, restricted and danger areas.

Air traffic services airspaces.

18. An aeronautical cartographic service provider shall ensure that the class of airspace, the type, name or call sign, the vertical limits and the radio frequency to be used is indicated when air traffic services airspace is shown on a chart, and the horizontal limits specified in accordance to second schedule of these Regulations.

Magnetic variation.

19. An aeronautical cartographic service provider shall ensure that –

(a) the True North and magnetic variation are indicated and the order of resolution of magnetic variation is that as specified for a particular chart;

(b) when magnetic variation is shown on a chart, the values shown are those for the year nearest to the date of publication that is divisible by 5; and

(c) an interim date and value are quoted in exceptional cases where the current value would be more than one degree different, after applying the calculation for annual change.

Aeronautical data.

20. An aeronautical cartographic service provider shall ensure that –

(a) all necessary measures are taken to introduce a properly organized quality system containing procedures, processes and resources necessary to implement quality management at each function stage as specified in the Civil Aviation (Aeronautical Information Services) Regulations;

(b) the execution of such quality management is made demonstrable for each function stage, when required;

(c) the 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 and maintenance phases or in the operational use, to be corrected;

(d) the order of chart resolution of aeronautical data is as specified for a particular chart and as presented in a tabular form in the sixth schedule of these Regulations;

(e) the integrity of aeronautical data is maintained throughout the data process from survey or origin to the next intended user;

(f) based on the applicable integrity classification, the validation and verification procedures shall:

(i) for routine data: avoid corruption throughout the processing of the data;

(ii) for essential data: assure corruption does not occur at any stage of the entire process and include additional processes as needed to address potential risks in the overall system architecture to further assure data integrity at this level; and

(iii) critical data: assure corruption does not occur at any stage of the entire process and include additional integrity assurance processes to fully mitigate the effects of faults identified through analysis of the overall system architecture as potential data integrity risks.

(g) the Aeronautical data quality requirements related to the integrity and data classification is as provided in Tables 1-6 of the sixth schedule of these Regulations; and

(h) the electronic aeronautical data sets are protected by the inclusion in the data sets of a 32-bit cyclic redundancy check implemented by the application dealing with the data sets and applied to the protection of all integrity levels of data sets as specified in sub-regulation(f) .

Horizontal reference system.

21. An aeronautical cartographic service provider shall ensure that the -

(a) World Geodetic System — 1984 is used as the horizontal reference system;

(b) published aeronautical geographical coordinates indicating latitude and longitude are expressed in terms of the World Geodetic System-84 geodetic reference datum;

(c) geographical coordinates which have been transformed into World Geodetic System -84 coordinates but whose accuracy of original field work does not meet the requirements in the Civil Aviation (Air Traffic Services) Regulations and the Civil Aviation (Aerodrome) Regulations are identified by an asterisk; and

(d) order of chart resolution of geographical coordinates is as specified for a particular chart series and in accordance with Table 1 of the sixth schedule.

Vertical reference system.

22. An aeronautical cartographic service provider shall ensure that the –

(a) mean sea level datum is used as the vertical reference system;

(b) elevations referenced to mean sea level, for the specific surveyed ground positions, geoid undulation for the surveyed positions are published as specified for a particular chart; and

(c) order of chart resolution of elevation and geoid undulation is as specified for a particular chart series and in accordance with Table 2 of the sixth schedule in these regulations.

Temporal reference system

23. An aeronautical cartographic service provider shall ensure that –

(a) the Gregorian calendar and Coordinated Universal Time are used as the temporal reference system; and

(b) when a different temporal reference system is used for charting, this shall be indicated in the Aeronautical Information Publication.

Charts to be Published.

24. An aeronautical cartographic service provider shall publish the following charts, as applicable and in accordance to the requirements as prescribed by the Authority.

(a) Aerodrome Obstacle Chart;

(b) Precision Approach Terrain Chart;

(c) En-route Chart;

(d) Area Chart or, alternatively, Standard Departure Chart – Instrument and Standard Arrival Chart – Instrument;

(e) Instrument Approach Chart;

(f) Visual Approach Chart;

(g) Aerodrome/Heliport Chart;

(h) Aerodrome Ground Movement Chart;

(i) Aircraft Parking/Docking Chart;

(j) World Aeronautical Chart or, alternatively, Aeronautical Chart or Aeronautical Navigation Chart;

(k) Plotting Chart;

(l) Air Traffic Control Surveillance Minimum Altitude Chart;

Use of automation in aeronautical charting.

25. An aeronautical cartographic service provider shall ensure that an Aeronautical charting automated systems comply with the following requirements:

(a) provide for continuous and timely updating of the system database and monitoring of the validity and

(b) quality of the aeronautical information stored;

(c) integrate data from a wide variety of sources;

(d) temporally manage information and related products, to make sure that charts are always up to date;

(e) facilitate inspection of the aeronautical chart content, possibly through the synchronization of the graphical elements with the central database content via specific metadata;

(f) provide users with definable rules/templates to facilitate the assembling of the final chart product; and

(g) ensure products and services are equally available to humans and computer systems, through specific digital formats for capturing and processing the information.

## PART III - AERODROME OBSTACLE CHART - ICAO TYPE A

Function.

26. An aeronautical cartographic service provider shall ensure that the Aerodrome Obstacle chart as prescribed by the Authority, in combination with the relevant cartographic information published in the Aeronautical Information Publication, provides the data necessary to enable an operator to comply with the operating limitations of the Civil Aviation (Operations of Aircraft) Regulations.

Availability.

27. An aeronautical cartographic service provider shall ensure that–

(a) the Aerodrome Obstacle Chart as prescribed by the Authority is made available in the manner specified in

Regulation 4(b) for all aerodromes regularly used by international civil aviation, except for those aerodromes where there are no obstacles in the take-off flight path areas or where the Aerodrome Terrain and Obstacle Chart as prescribed by the Authority is provided in accordance with Part V of these regulations;

(b) a notification is published in the Aeronautical Information Publication where a chart is not required because no obstacles exist in the take-off flight path area.

Units of measurement.

28. An aeronautical cartographic service provider shall ensure that the –

(a) elevations are shown to the nearest to the nearest foot; and

(b) linear dimensions are shown to the nearest half-metre.

Coverage and scale.

29. A cartographic service provider shall ensure that the –

(a) extent or coverage of each chart is sufficient to cover all obstacles;

(b) horizontal scale is within the range of 1:10 000 to 1:15 000;

(c) vertical scale is ten times the horizontal scale; and

(d) horizontal and vertical linear scales showing both metres and feet are included in the charts.

Format.

30. An aeronautical cartographic service provider shall ensure that the –

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

(b) profile for each runway, stop way, clearway and the obstacles in the take-off flight path area are shown above its corresponding plan;

(c) profile of an alternative take-off flight path area comprises a linear projection of the full take-off flight path and is disposed above its corresponding plan in the manner most suited to the ready interpretation of the information;

(d) profile grid is ruled over the entire profile area exclusive of the runway;

(e) zero for vertical coordinates is mean sea level;

(f) zero for horizontal coordinates is at the end of the runway furthest from the take-off flight path area concerned;

(g) graduation marks indicating the sub-divisions of intervals is shown along the base of the grid and along the vertical margins;

(h) chart includes:

(i) a box for recording the operational data specified in Regulation 33

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

Identification.

31. An aeronautical cartographic service provider shall ensure that the chart is identified 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 of the runway.

Magnetic variation.

32. An aeronautical cartographic service provider shall ensure that the magnetic variation to the nearest degree and date of information is indicated.

*Aeronautical Data*

Obstacles.

33. An aeronautical cartographic service provider shall ensure that –

(a) objects 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 are regarded as obstacles, except that obstacles lying wholly below the shadow of other obstacles as defined in this regulation need not be shown;

(b) mobile objects such as boats, trains and trucks, which may project above the 1.2 per cent plane, are considered obstacles but are not considered as being capable of creating a shadow;

(c) plane surface originating at a horizontal line passing through the top of the obstacle at right angles to the centre line of the take-off flight path area is considered as the shadow of an obstacle; and

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

Take-off flight path area.

34. An aeronautical cartographic service provider shall ensure that the -

(a) 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 and has the following characteristics–

(i) commences at the end of the area declared suitable for take-off ;

(ii) the 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;

(iii) extends to the point beyond which no obstacles exist or to a distance of 10.0 km (5.4 NM), whichever is the lesser; and

(b) 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 take-off flight path area specified in sub regulation 32 (a) (iii) shall be increased to not less than 12.0 km (6.5 NM) and the slope of the plane surface specified in sub regulation 32 (a) (i) and (ii) shall be reduced to 1.0 percent less.

Declared distances.

35. An aeronautical cartographic service provider shall ensure that –

(a) the following information for each direction of each runway is provided–

(i) take-off run available;

(ii) accelerate-stop distance available;

(iii) take-off distance available; and

(iv) landing distance available.

(b) a runway is identified as "not usable for take-off, landing or both" where a declared distance is not provided because a runway is usable in one direction only.

Plan and profile views.

36. (1) An aeronautical cartographic service provider shall ensure that the plan view shows –

(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 centre line by a fine line consisting of short and long dashes;

(d) alternative take-off flight path areas and where alternative take-off flight path areas not centered on the extension of the runway centre line are shown, notes are provided explaining the significance of such areas;

(e) obstacles, including:

(i) the exact location of each obstacle together with a symbol indicative of its type;

(ii) the elevation and identification of each obstacle;

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

(2) An aeronautical cartographic service provider shall ensure that –

(a) the nature of the runway and stop way surfaces are indicated;

(b) stop ways are identified as such and are shown by a broken line;

(c) the length of each stop way is indicated.

(3) An aeronautical cartographic service provider shall ensure that the profile view shows –

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

(b) the elevation of the runway centre line at each end of the runway, at the stop way and at the origin of each take- off;

(c) obstacles, including:

(i) each 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 obstacle;

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

Accuracy.

37. An aeronautical cartographic service provider shall ensure that the –

(a) order of accuracy attained is shown on the chart;

(b) horizontal dimensions and the elevations of the runway, stop way and clearway to be printed on the chart are determined to the nearest 0.5 m (1 ft);

(c) order of accuracy of the field work and the precision of chart production are such that measurements in the take-off flight path areas can be taken from the chart 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 000ft) and increasing at a rate of 1 per 1 000; and

(d) elevation of the datum used is stated and is identified as assumed where no accurate datum for vertical reference is available.

PART IV - AERODROME OBSTACLE CHART – ICAO TYPE B

Function.

38. An aeronautical cartographic service provider shall ensure that the Aerodrome Obstacle Chart – Type B provides information to satisfy the following functions–

(a) the determination of minimum safe altitudes/heights including those for circling procedures;

(b) the determination of procedures for use in the event of an emergency during take-off or landing;

(c) the application of obstacle clearing and marking criteria; and

(d) the provision of source material for aeronautical charts.

Availability.

39. An aeronautical cartographic service provider shall ensure that the –

(a) Aerodrome Obstacle Charts as prescribed by the Authority is made available, in the manner prescribed in Regulation 4(b) for all aerodromes regularly used by international civil aviation except for those aerodromes where the Aerodrome Terrain and Obstacle Chart as prescribed by the Authority is provided in accordance with part V

(b) Aerodrome Obstacle Chart as prescribed by the Authority is called the Aerodrome Obstacle Chart when a chart combining the specifications of part III and Part IV of this Regulation is made available.

Units of measurement.

40. An aeronautical cartographic service provider shall ensure that the –

(a) elevations are shown to the nearest foot; and

(b) linear dimensions are shown to the nearest half-metre.

Coverage and scale.

41. An aeronautical cartographic service provider shall ensure that –

(a) the extent or coverage of each chart is sufficient to cover all obstacles

(b) the horizontal scale is within the range of 1:10 000 to 1:20 000; and

(c) a horizontal linear scale showing both metres and feet is included in the chart and when necessary, a linear scale for kilometres and a linear scale for nautical miles is also shown.

Format.

42. An aeronautical cartographic service provider shall ensure that the charts include –

(a) any necessary explanation of the projection used;

(b) any necessary identification of the grid used;

(c) a notation indicating that obstacles are those which penetrate the surfaces specified in Civil Aviation (Aerodromes) Regulations);

(d) a box for recording amendments and dates thereof; and

(e) outside the neat line, every minute of latitude and longitude marked in degrees and minutes.

Identification.

43. An aeronautical cartographic service provider shall ensure that the chart is identified 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, and the name of the aerodrome.

Culture and topography.

44. An aeronautical cartographic service provider shall ensure that the –

(a) drainage and hydrographic details are kept to a minimum;

(b) buildings and other salient features associated with the aerodrome are shown and wherever possible, to scale;

(c) all objects, either cultural or natural, that project above the take-off and approach surfaces specified in regulation 45 or the clearing and marking surfaces specified in Civil Aviation (Aerodrome) Regulations are shown; and

(d) roads and railroads within the take-off and approach area, and less than 600 m (2 000 ft) from the end of the runway or runway extensions, are shown.

Magnetic variation.

45. An aeronautical cartographic service provider shall ensure that the chart shows a compass rose orientated to the True North, or a North point, showing the magnetic variation to the nearest degree with the date of magnetic cartographic and annual change.

Aeronautical data.

46. An aeronautical cartographic service provider shall ensure that the chart shows –

(a) the aerodrome reference point and its geographical coordinates in degrees, minutes and seconds;

(b) the outline of the runways by a solid line;

(c) the length and width of the runway;

(d) the magnetic bearing to the nearest degree of the runway and the runway number;

(e) the elevation of the runway centre line at each end of the runway, at the stop way, at the origin of each take-off and approach area, and at each significant change of slope of runway and stop way;

(f) taxiways, aprons and parking areas identified as such, and the outlines by a solid line;

(g) stop ways identified as such and depicted by a broken line;

(h) the length of each stop way;

(i) clearways identified as such and depicted by a broken line;

(j) the length of each clearway;

(k) take-off and approach surfaces identified as such and depicted by a broken line;

(l) take-off and approach areas;

(m) obstacles at their exact location, including:

(i) a symbol indicative of their type;

(ii) elevation;

(iii) identification;

(iv) limits of penetration of large extent in a distinctive manner identified in the legend;

(n) any additional obstacles, as determined by regulation 31 (a) including the obstacles in the shadow of an obstacle, which would otherwise be exempted.

(i) The nature of the runway and stopway surfaces shall be given.

(ii) The highest object or obstacle between adjacent approach areas within a radius of 5 000 m (15 000 ft) from the aerodrome reference point shall be indicated in a prominent manner, wherever practicable.

(iii) The extent of tree areas and relief features, part of which constitute obstacles, shall be shown.

Accuracy.

47. An aeronautical cartographic service provider shall ensure that the –

(a) order of accuracy attained is shown on the chart;

(b) horizontal dimensions and the elevations of the movement area, stop ways and clearways to be printed on the chart is determined to the nearest 0.5 m (1 ft);

(c) order of accuracy of the field work and the precision of chart production is such that the resulting data will be within the maximum deviations indicated herein:

(d) take-off and approach areas:

(i) horizontal distances: 5 m (15 ft) at 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;

(e) other areas:

(i) horizontal distances: 5 m (15 ft) within 5 000 m (15 000 ft) of the aerodrome reference point and 12 m (40 ft) beyond that area;

(ii) vertical distances: 1 m (3 ft) within 1 500 m (5 000 ft) of the aerodrome reference point increasing at a rate of 1 per 1 000;

(f) elevation of the datum used is stated and identified as assumed, where no accurate datum for vertical reference is available.

PART V - AERODROME TERRAIN AND OBSTACLE CHART – ICAO (ELECTRONIC)

Function.

48. An aeronautical cartographic service provider shall ensure that the Aerodrome Terrain and Obstacle Chart electronic portrays the terrain and obstacle data in combination with aeronautical data, as appropriate, necessary to–

(a) enable an operator to comply with the operating limitations of the Civil Aviation (operation of aircraft) Regulations, by developing contingency procedures for use in the event of an emergency during a missed approach or take-off, and by performing aircraft operating limitations analysis; and

(b) support the following air navigation applications:

(i) instrument procedure design (including circling procedure);

(ii) aerodrome obstacle restriction and removal; and

(iii) provision of source data for the production of other aeronautical charts.

Availability.

49. An aeronautical cartographic service provider shall ensure that the–

(a) aerodrome Terrain and Obstacle Charts as prescribed by the Authority are made available in the manner specified in regulation 4(b) for aerodromes regularly used by international civil aviation;

(b) aerodrome Terrain and Obstacle Chart as prescribed by the Authority shall be made available in hard copy format upon request; and

(c) ISO 19100 series of standards for geographic cartographic are used as a general data modelling framework.

Identification.

50. An aeronautical cartographic service provider shall ensure that electronic charts are identified by the name of the country in which the aerodrome is located, the name of the city or town which the aerodrome serves, and the name of the aerodrome.

51. An aeronautical cartographic service provider shall ensure that the extent of each chart is sufficient to cover Area 2 as specified in the Civil Aviation (Aeronautical Information Services) Regulations. Chart Coverage.

52. An aeronautical cartographic service provider shall ensure that the – General Specifications.

(a) relationships between features, feature attributes, and the underlying spatial geometry and associated topological relationships are specified by an application schema when developing computer graphic applications that are used to portray features on the chart;

(b) portrayed information is provided on the basis of portrayal specifications applied according to defined portrayal rules whereby portrayal specifications and portrayal rules are not part of the data set;

(c) portrayal rules are stored in a portrayal catalogue which making reference to separately stored portrayal specifications; and

(d) symbols used to portray features are in accordance with regulation 8 and the International Civil Aviation Organization Chart Symbols in second schedule.

53. An aeronautical cartographic service provider shall ensure that – Terrain feature.

(a) the terrain feature, and associated attributes, to be portrayed and database-linked to the chart are based on the electronic terrain data sets which satisfy the requirements the Civil Aviation (Aeronautical Information Services) Regulations;

(b) the terrain feature are portrayed in a manner that provides an effective general impression of a terrain which is too be a representation of terrain surface by continuous elevation values at all intersections of the defined grid, also known as the Digital Elevation Model;

(c) an ortho-rectified image which matches the features on the digital elevation model with features on the overlying image is to be used to enhance the digital elevation model;

(d) the portrayed terrain feature is linked to the following associated attributes in the database(s):

(i) horizontal positions of grid points in geographic coordinates and elevations of the points;

(ii) surface type;

(iii) contour line values, if provided; and

(iv) names of cities, towns and other prominent topographic features.

(e) other terrain attributes specified in the Civil Aviation (Aeronautical Information Services) Regulations Table A8-3 in the eighth schedule, and provided in the database(s) is linked to the portrayed terrain feature.

Obstacle features.

54. An aeronautical cartographic service provider shall ensure that the –

(a) obstacle features, and associated attributes, portrayed or database -linked to the chart is based on electronic obstacle data sets which satisfy the requirements of the Civil Aviation (Aeronautical Information Services) Regulations;

(b) each obstacle is portrayed by an appropriate symbol and obstacle identifier;

(c) the portrayed obstacle feature is linked to the following associated attributes in the database(s):

(i) horizontal position in geographic coordinates and associated elevation;

(ii) obstacle type; and

(iii) obstacle extent, if appropriate;

(d) other obstacle attributes are as specified in Civil Aviation (Aeronautical Information Services) Regulations table A8-4 in the eighth schedule, and provided in the database linked to the portrayed obstacle feature.

Aerodrome features.

55. An aeronautical cartographic service provider shall ensure that the –

(a) aerodrome features, and associated attributes, portrayed and database -linked to the chart is used on aerodrome data which satisfy the requirements of the Civil Aviation (Aerodrome) Regulations and the Civil Aviation (Aeronautical Information Services) Regulations;

(b) following aerodrome features are portrayed by an appropriate symbol:
   (i) aerodrome reference point;

   (ii) runway(s), with designation numbers, and if available, stop way(s) and clearway(s); and

   (iii) taxiways, aprons, large buildings and other prominent aerodrome features.

(c) portrayed aerodrome feature is linked to the following associated attributes in the database:-
   (i) geographical coordinates of the aerodrome reference point;

   (ii) aerodrome magnetic variation, year of cartographic and annual change;

   (iii) length and width of runway(s), stop way(s) and clearway(s);

   (iv) type of surface of runway(s) and stop way(s);

   (v) magnetic bearings of the runway(s) to the nearest degree;

   (vi) elevations at each end of runway(s), stop way(s) and clearway(s), and at each significant change in slope of runway(s) and stop way(s);
   (vii) declared distances for each runway direction, or the abbreviation "NU" where a runway direction cannot be used for take-off or landing or both.

Radio Navigation and features.

56. An aeronautical cartographic service provider shall ensure that the each radio navigation aid feature located within the chart coverage is portrayed by an appropriate symbol.

Accuracy and resolution.

57. An aeronautical cartographic service provider shall ensure that the –
(a) order of accuracy of aeronautical data is as specified in the Civil Aviation (Air Traffic Services), Regulations and the Civil Aviation (Aerodrome) Regulations;
(b) order of accuracy of terrain and obstacle data is as specified in the Civil Aviation (Aeronautical Information Services) Regulations eighth schedule;

(c) Aeronautical data resolution is as specified in the Civil Aviation (Aeronautical Information Services) Regulations seventh schedule, and the resolution for

terrain and obstacle data is as specified in Civil Aviation (Aeronautical Information Services) Regulations eighth schedule.

Electronic functionality.

58. An aeronautical cartographic service provider shall ensure that the –

(a) symbols and text size varies with chart scale to enhance readability;

(b) information on the chart is geo-referenced, and it is possible to determine cursor position to at least the nearest second;

(c) chart is compatible with widely available desktop computer hardware, software and media;

(d) chart includes a reader software;

(e) it is not possible to remove information from the chart without an authorized update;

(f) selectable information layers are provided to allow for the customized combination of information when due to congestion of information, the details necessary to support the function of the chart cannot be shown with sufficient clarity on a single comprehensive chart view; and

(g) chart can be printed in hard copy format according to the content specifications and scale determined by the user.

Chart data product specifications.

59. An aeronautical cartographic service provider shall ensure that –

(a) a comprehensive statement of the data sets comprising the chart is provided in the form of data product specifications on which basis air navigation users will be able to evaluate the chart data product and determine whether it fulfils the requirements for its intended use;

(b) the chart data product specifications includes an overview, a specification scope, a data product identification, data content information, the reference systems used, the data quality requirements, and information on data on data capture, data maintenance, data portrayal, data product delivery, as well as any additional information available, and metadata;

(c) the overview of the chart data product specifications provides an informal description of the product and

contains the general information about the data product and specification scope of the chart data product specifications contains the spatial extent of the chart coverage;

(d) the chart data product identification includes the title of the product, a brief narrative summary of the content and purpose, and a description of the geographic area covered by the chart;

(e) the data content of the chart data product specifications clearly identify the type of coverage and imagery and provide a narrative description of each;

(f) the chart data product specifications includes information that defines the reference systems used including:-
   (i) the spatial reference system (horizontal and vertical) and, if appropriate;

   (ii) temporal reference system.

(g) the chart data product specifications identifies the data quality requirements including –
   (i) a statement on acceptable conformance quality levels, and;

   (ii) corresponding data quality measures.

(h) statement in paragraph (g) covers all the data quality elements and data quality sub-elements; even if only to state that a specific data quality element or sub-element is not applicable.

(i) The chart data product specifications includes:
   (i) a data capture statement which is a general description of the sources and processes applied for the capture of chart data;
   (ii) The principles and criteria applied in the maintenance of the chart;

   (iii) the frequency with which the chart product is updated;

   (iv) the maintenance cartographic of obstacle data sets included on the chart, and;

   (v) an indication of the principles, methods and criteria applied for obstacle data maintenance.

(j) chart data product specifications contains:

(i) information on how data are portrayed on the chart, as detailed in regulation 50;

(ii) the chart data product delivery information which include delivery formats and delivery medium information; and

(k) core chart metadata elements is included in the chart data product specifications and any additional metadata items required to be supplied is stated in the product specifications together with the format and encoding of the metadata.

PART VI - PRECISION APPROACH TERRAIN CHART — ICAO

Function.

60. An aeronautical cartographic service provider shall ensure that the precision approach terrain chart provides detailed terrain profile information within a defined portion of the final approach so as to enable aircraft operating agencies to assess the effect of the terrain on decision height determination by the use of radio altimeters.

Availability.

61. An aeronautical cartographic service provider shall ensure that the –

(a) precision approach terrain chart is 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 as prescribed by the Authority in accordance with part V of these regulations;

(b) precision approach terrain chart is revised whenever any significant change occurs.

Scale.

62. An aeronautical cartographic service provider shall ensure that –

(a) the horizontal scale is 1:2500, and the vertical scale 1:500;

(b) when the chart includes a profile of the terrain to a distance greater than 900 m (3 000 ft) from the runway threshold, the horizontal scale is 1:5000.

Identification.

63. An aeronautical cartographic service provider shall ensure that the chart is identified 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 of the runway.

64. An aeronautical cartographic service provider shall ensure that the – Plan and profile information.

(a) chart includes:

(i) a plan showing contours at 1m (3 ft) intervals in the area 60m (200 ft) on either side of the extended centre line of the runway, to the same distance as the profile, the contours to be related to the runway threshold;

(ii) an indication where the terrain or any object thereon, within the plan defined in (i), differs by ±3 m (10 ft) in height from the centre line profile and is likely to affect a radio altimeter;

(iii) a profile of the terrain to a distance of 900 m (3 000 ft) from the threshold along the extended centre line of the runway;

(b) where the terrain at a distance greater than 900 m (3 000 ft) from the runway threshold is mountainous or otherwise significant to users of the chart, the profile of the terrain is shown to a distance not exceeding 2000m (6500ft) from the runway threshold;

(c) ILS reference datum height is shown to the nearest foot.

PART VII - ENROUTE CHART — ICAO

65. An aeronautical cartographic service provider shall ensure that the En-route chart provides flight crews with information to facilitate navigation along Air Traffic Service routes in compliance with air traffic services procedures. Function

66. An aeronautical cartographic service provider shall ensure that – Availability

(a) the enroute chart is made available in the manner prescribed in regulation 4(b) for all areas where flight information regions have been established in (state);

(b) separate charts are provided 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.

67. An aeronautical cartographic service provider shall ensure that – Coverage and scale.

(a) the layout of sheet lines is determined by the density and pattern of the air traffic service route structure;

(b) large variations of scale between adjacent charts showing a continuous route structure are be avoided; and

(c) an adequate overlap of charts is provided to ensure continuity of navigation.

Projection.

68. An aeronautical cartographic service provider shall ensure that the –

(a) parallels and meridians are shown at suitable intervals; and

(b) graduation marks are placed at consistent intervals along selected parallels and meridians.

Identification.

69. An aeronautical cartographic service provider shall ensure that the each sheet of the chart is identified by chart series and number.

Culture and topography.

70. An aeronautical cartographic service provider shall ensure that –

(a) generalized shore lines of all open water areas, large lakes and rivers are shown except where they conflict with data more applicable to the function of the chart;

(b) area minimum altitude are shown within each quadrilateral formed by the parallels and meridians;

(c) selected orientation used is clearly indicated, where charts are not True North orientated.

Magnetic variation.

71. An aeronautical cartographic service provider shall ensure that the isogonal are indicated and the date of the isogonic information given.

Bearing, tracks and radials.

72. An aeronautical cartographic service provider shall ensure that the –

(a) bearings, tracks and radials are:

(i) magnetic, except as provided for in sub paragraph (ii);

(ii) shown in parentheses to the nearest tenth of a degree where bearings and tracks are additionally provided as true values for area navigation segments;

(iii) clearly indicated where bearings, tracks or radials are given with reference to True North or Grid North;

(b) reference grid meridian is identified when Grid North is used.

*Aeronautical data*

73. An aeronautical cartographic service provider shall ensure that all aerodromes used by international civil aviation to which an instrument approach can be made are shown. Aerodromes.

74. An aeronautical cartographic service provider shall ensure that the prohibited, restricted and danger areas relevant to the layer of airspace are depicted with their identification and vertical limits. Prohibited, restricted and danger areas.

75. An aeronautical cartographic service provider shall ensure that the – Air traffic services system.

(a) components of the established air traffic services system are shown where appropriate;

(b) components include the following:

(i) the radio navigation aids associated with the air traffic services system together with their names, identifications, frequencies and geographical coordinates in degrees, minutes and seconds;

(ii) in respect of distance measuring equipment, additionally the elevation of the transmitting antenna of the distance measuring equipment to the nearest 30 m (100 ft);

(iii) an indication of all designated airspace, including lateral and vertical limits and the appropriate class of airspace;

(iv) all air traffic services routes for en-route flight including route designators, the track to the nearest degree in both directions along each segment of the routes and, where established, the designation of the navigation specification(s) including any limitations and the direction of traffic flow;

(v) all significant points which define the air traffic services 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;

(vi) in respect of waypoints defining VOR/distance measuring equipment area navigation routes, additionally,

(vii) the station identification and radio frequency of the reference VOR/distance measuring

equipment;

(viii) the bearing to the nearest tenth of a degree and the distance to the nearest two-tenths of a kilometre (tenth of a nautical mile) from the reference VOR/ distance measuring equipment, if the waypoint is not collocated with it;

(ix) an indication of all compulsory and "on-request" reporting points and air transport services/MET reporting points;

(x) the distances to the nearest kilometre or nautical mile between significant points constituting turning points or reporting points;

(xi) change-over points on route segments defined by reference to very high frequency omnidirectional radio ranges, indicating the distances to the nearest kilometre or nautical mile to the navigation aids;

(xii) minimum en-route altitudes and minimum obstacle clearance altitudes, on air transport services routes to the nearest higher 50 metres or 100 feet (the Civil Aviation (Air Traffic Service Regulations) ;

(xiii) communication facilities listed with their channels and, if applicable, logon address and satellite voice communications number; and

(xiv) air defense identification zone properly identified.

Supplementary information.

76. An aeronautical cartographic service provider shall ensure that the –

(a) details of departure and arrival routes and associated holding patterns in terminal areas are shown unless they are shown on an Area Chart, a Standard Departure Chart — Instrument or a Standard Arrival Chart — Instrument; and

(b) altimeter setting regions are shown and identified where established.

PART VIII—AREA CHART

Function.

77. An aeronautical cartographic service provider shall ensure that the area chart provides the flight crew with information to facilitate the following phases of instrument

flight–

(a) the transition between the en-route phase and approach to an aerodrome;

(b) the transition between take-off/missed approach and en-route phase of flight; and

(c) flights through areas of complex air traffic services routes or airspace structure.

Availability.

78. An aeronautical cartographic service provider shall ensure that –

(a) the area chart is made available in the manner specified in regulation 4(b) where the air traffic services routes or position reporting requirements are complex and cannot be adequately shown on an Enroute Chart;

(b) separate charts are provided where air traffic services routes or position reporting requirements are different for arrivals and for departures, and cannot be shown with sufficient clarity on one chart.

Coverage and scale.

79. An aeronautical cartographic service provider shall ensure that the:

(a) coverage of each chart extends to points that effectively show departure and arrival routes;

(b) chart is drawn to scale and a scale-bar shown.

Projection.

80. An aeronautical cartographic service provider shall ensure that –

(a) a conformal projection on which a straight line approximates a great circle is used;

(b) the parallels and meridians are shown at suitable intervals; and

(c) graduation marks are placed at consistent intervals along the neat lines, as appropriate.

Identification.

81. A chart shall be identified by a name associated with the airspace portrayed.

Culture and topography.

82. An aeronautical cartographic service provider shall ensure that –

(a) generalized shorelines of all open water areas, large lakes and rivers are shown except where they conflict with data more applicable to the function of the charts;

(b) all relief exceeding 300 m (1 000 ft) above the elevation of the primary aerodrome is shown by smoothed contour lines, contour values and layer tints printed in brown, in areas where significant relief exists;

(c) appropriate spot elevations, including the highest elevation within each top contour line, are shown printed in black and obstacles shown.

Magnetic variation.

83. An aeronautical cartographic service provider shall ensure that the average magnetic variation of the area covered by the chart is shown to the nearest degree.

Bearings, tracks and radials.

84. An aeronautical cartographic service provider shall ensure that–

(a) bearings, tracks and radials are:

(i) magnetic;

(ii) shown in parentheses to the nearest tenth of a degree where bearings and tracks are additionally provided as true values for area navigation segments;

(b) where bearings, tracks or radials are given with reference to True North or Grid North, this shall be clearly indicated;

(c) when Grid North is used, its reference grid meridian shall be identified.

Aerodromes.

85. An aeronautical cartographic service provider shall ensure that the all aerodromes which affect the terminal routings are shown and where appropriate, a runway pattern symbol is used.

Prohibited, restricted and danger areas.

86. An aeronautical cartographic service provider shall ensure that prohibited, restricted and danger areas are depicted with their identification and vertical limits.

Area minimum altitudes.

87. An aeronautical cartographic service provider shall ensure that the area minimum altitudes are shown within quadrilaterals formed by the parallels and meridians.

Air traffic services system.

88. An aeronautical cartographic service provider shall ensure that the –

(a) components of the established relevant air traffic services system are shown;

(b) components referred to in sub regulation (a) include the following–

(i) the radio navigation aids associated with the air traffic services system, together with their names, identifications, frequencies and geographical coordinates in degrees, minutes and seconds;

(ii) the elevation of the transmitting antenna of the distance measuring equipment to the nearest 30 m (100 ft);

(iii) terminal radio aids which are required for outbound and inbound traffic and for holding patterns;

(iv) the lateral and vertical limits of all designated airspace and the appropriate class of airspace;

(v) the designation of the navigation specification(s) including any limitations, where established;

(vi) holding patterns and terminal routings, together with the route designators, and the track to the nearest degree along each segment of the prescribed airways and terminal routings;

(vii) all significant points which define the terminal routings 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;

(viii) in respect of waypoints defining VOR/distance measuring equipment area navigation routes, additionally,

(ix) the station identification and radio frequency of the reference VOR/distance measuring equipment;

(x) the bearing to the nearest tenth of a degree and the distance to the nearest two-tenths of a kilometre (tenth of a nautical mile) from the reference VOR/distance measuring equipment, if the waypoint is not collocated with it;

(xi) an indication of all compulsory and "on-request" reporting points;

(xii) the distances to the nearest kilometre or nautical mile between significant points constituting turning points or reporting points;

(xiii) change-over points on route segments defined by reference to very high frequency omnidirectional radio ranges, indicating the distances to the nearest kilometre or nautical mile to the radio navigation aids;

(xiv) minimum en-route altitudes and minimum obstacle clearance altitudes, on air traffic services routes to the nearest higher 50 metres or 100 feet ;

(xv) established minimum vectoring altitudes to the nearest higher 50 m or 100 ft, clearly identified;

(xvi) area speed and level/altitude restrictions where established;

(xvii) communication facilities listed with their channels and, if applicable, logon address and satellite voice communications number; and

(xviii) an indication of "flyover" significant points.

PART IX—STANDARD DEPARTURE CHART—INSTRUMENT (SID)

Function.

89. An aeronautical cartographic service provider shall ensure that the standard departure chart - instrument provides 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.

Availability.

90. An aeronautical cartographic service provider shall ensure that the standard departure Chart — instrument is made available wherever standard departure route — instrument has been established and cannot be shown with sufficient clarity on the Area Chart.

Coverage and scale.

91. An aeronautical cartographic service provider shall ensure that –

(a) the coverage of the chart is 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;

(b) if the chart is drawn to scale a scale-bar is shown; and

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

Projection.

92. An aeronautical cartographic service provider shall ensure that graduation marks are placed at consistent intervals along the neat lines.

Identification.

93. An aeronautical cartographic service provider shall ensure that the chart is 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 Volume II, Part I, Section 3, Chapter 5.

Culture and topography.

94. An aeronautical cartographic service provider shall ensure that the generalized shore lines of all open water areas, large lakes and rivers are shown where the chart is drawn to scale except where they conflict with data more applicable to the function of the chart;

Magnetic variation.

95. An aeronautical cartographic service provider shall ensure that the magnetic variation used in determining the magnetic bearings, tracks and radials is shown to the nearest degree.

Bearings, tracks and radials.

96. An aeronautical cartographic service provider shall ensure that –

(a) bearings, tracks and radials are:

(i) magnetic and the bearings and tracks are shown in parentheses to the nearest tenth of a degree where bearings and tracks are additionally provided as true values for area navigation segments;

(ii) clearly indicated where bearings, tracks or radials are given with reference to True North or Grid North; and

(b) the reference grid meridian is identified when Grid North is used.

Aerodromes.

97. An aeronautical cartographic service provider shall ensure that –

(a) the aerodrome of departure is shown by the runway pattern; and

(b) all aerodromes which affect the designated standard departure route — instrument are shown and identified

and where appropriate, the aerodrome runway patterns are shown.

Prohibited, restricted and danger areas.

98. An aeronautical cartographic service provider shall ensure that the prohibited, restricted and danger areas which may affect the execution of the procedures are shown with their identification and vertical limits.

Minimum sector altituede.

99. An aeronautical cartographic service provider shall ensure that the –

(a) established minimum sector altitude is shown with a clear indication of the sector to which minimum sector altitude applies;

(b) chart is drawn to scale and area minimum altitudes are shown within quadrilaterals formed by the parallels and meridians; and

(c) area minimum altitudes are shown in those parts of the chart not covered by the minimum sector altitude where the minimum sector altitude has not been established.

Air traffic services systems.

100. An aeronautical cartographic service provider shall ensure that the –

(a) components of the established relevant air traffic services system are shown; and

(b) components shall comprise of a graphic portrayal of each standard departure route — instrument, including:

(i) for departure procedures designed specifically for helicopters the term "CAT H" shall be depicted in the departure chart plan view;

(ii) route designator;

(iii) significant points defining the route;

(iv) track or radial to the nearest degree along each segment of the route;

(v) distances to the nearest kilometre or nautical mile between significant points;

(vi) minimum obstacle clearance altitudes, along the route or route segments and altitudes required by the procedure to the nearest higher 50 m or 100 feet and flight level restrictions where established;

(vii) where the chart is drawn to scale and vectoring on departure is provided, established minimum

vectoring altitudes to the nearest higher 50 m or 100 ft, clearly identified;

(c) components shall comprise of a the radio navigation aid(s) associated with the route(s) including–

(i) plain language name;

(ii) identification;

(iii) frequency;

(iv) geographical coordinates in degrees, minutes and seconds;

(v) for distance measuring equipment, the channel and the elevation of the transmitting antenna of the distance measuring equipment to the nearest 30 m (100 ft);

(d) the name-codes of the significant points not marked by the position of a radio navigation aid, their geographical coordinates in degrees, minutes and seconds and the bearing to the nearest tenth of a degree and distance to the nearest two-tenths of a kilometre (tenth of a nautical mile) from the reference radio navigation aid;

(e) applicable holding patterns;

(f) transition altitude/height to the nearest higher 300 m or 1 000 ft;

(g) the position and height of close-in obstacles which penetrate the obstacle identification surface . A note shall be included whenever close-in obstacles penetrating the obstacle identification surface exist but which were not considered for the published procedure design gradient;

(h) area speed restrictions, where established;

(i) the designation of the navigation specification(s) including any limitations, where established;

(j) all compulsory and "on-request" reporting points;

(k) radio communication procedures, including:

(i) call sign(s) of air traffic services unit(s);

(ii) frequency and if applicable, satellite voice communications number;

(iii) transponder setting, where appropriate;

(l) an indication of "flyover" significant points.

Aeronautical database requirements.

101. An aeronautical cartographic service provider shall ensure that the Appropriate data to support navigation database coding is published in accordance with the procedures for Air Navigation Services — Aircraft Operations Document 8168, Volume II, Part III, Section 5, Chapter 2, 2.1, on the reverse of the chart or as a separate, properly referenced sheet.

PART X - STANDARD ARRIVAL CHART — INSTRUMENT (STAR) — ICAO

Function.

102. An aeronautical cartographic service provider shall ensure that the chart provides the flight crew with information to enable the flight crew to comply with the designated standard arrival route instrument from the en-route phase to the approach phase.

Availability.

103. An aeronautical cartographic service provider shall ensure that the Standard Arrival Chart — Instrument is made available wherever a standard arrival route — instrument has been established and cannot be shown with sufficient clarity on the Area Chart.

Coverage and scale.

104. An aeronautical cartographic service provider shall ensure that –

(a) the coverage of the chart is sufficient to indicate the points where the en-route phase ends and the approach phase begins;

(b) if the chart is drawn to scale a scale-bar is shown; and

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

Projection.

105. An aeronautical cartographic service provider shall ensure that the graduation marks are placed at consistent intervals along the neat lines.

Identification.

106. An aeronautical cartographic service provider shall ensure that the chart is 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 arrival route(s) —

instrument as established in accordance with the Procedures for Air Navigation Services — Aircraft Operations Document 8168, Volume II, Part I, Section 4, Chapter 2.

Culture and topography.

107. An aeronautical cartographic service provider shall ensure that the generalized shore lines of all open water areas, large lakes and rivers are shown where the chart is drawn to scale, except where they conflict with data more applicable to the function of the chart.

Magnetic variation.

108. The Magnetic variation used in determining the magnetic bearings, tracks and radials shall be shown to the nearest degree.

Bearing, tracks and radials.

109. An aeronautical cartographic service provider shall ensure that the –

(a) bearings, tracks and radials are magnetic;

(b) bearings and tracks are shown in parentheses to the nearest tenth of a degree where bearings and tracks are additionally provided as true values for area navigation segments;

(c) bearings, tracks or radials are clearly indicated where bearings, tracks or radials are given with reference to True North or Grid North; and

(d) reference grid meridian is identified when Grid North is used.

*Aeronautical data*

Aerodromes.

110. An aeronautical cartographic service provider shall ensure that –

(a) the aerodrome of landing is shown by the runway pattern;

(b) all aerodromes which affect the designated standard arrival route — instrument are shown and identified and where appropriate, the aerodrome runway patterns are shown.

Prohibited, restricted and danger areas.

111. An aeronautical cartographic service provider shall ensure that the prohibited, restricted and danger areas which may affect the execution of the procedures are shown with their identification and vertical limits.

Minimum sector altitude.

112. An aeronautical cartographic service provider shall ensure that the –

(a) established minimum sector altitude is shown with a clear indication of the sector to which the minimum sector altitude applies;

(b) chart is drawn to scale and area minimum altitudes are shown within quadrilaterals formed by the parallels and meridians where the minimum sector altitude has not been established; and

(c) area minimum altitudes are shown in those parts of the chart not covered by the minimum sector altitude.

Air traffic services system.

113. An aeronautical cartographic service provider shall ensure that the –

(a) components of the established relevant air traffic services system shall be shown.

(b) components shall comprise of graphic portrayal of each standard arrival route — instrument, including–

(i) route designator;

(ii) significant points defining the route;

(iii) track or radial to the nearest degree along each segment of the route;

(iv) distances to the nearest kilometre or nautical mile between significant points;

(v) minimum obstacle clearance altitudes, along the route or route segments and altitudes required by the procedure to the nearest higher 50 m or 100 feetand flight level restrictions where established;

(vi) where the chart is drawn to scale and vectoring on arrival is provided, established minimum vectoring altitudes to the nearest higher 50 m or 100 ft, clearly identified;

(c) the components shall comprise of the radio navigation aid(s) associated with the route(s) including–

(i) plain language name;

(ii) identification;

(iii) frequency;

(iv) geographical coordinates in degrees, minutes and seconds;

(v) for distance measuring equipment, the channel and the elevation of the transmitting antenna of the distance measuring equipment to the nearest 30 m (100 ft);

(d) the name-codes of the significant points not marked by the position of a radio navigation aid, their geographical coordinates in degrees, minutes and seconds and the bearing to the nearest tenth of a degree and distance to the nearest two-tenths of a kilometre (tenth of a nautical mile) from the reference radio navigation aid;

(e) applicable holding patterns;

(f) transition altitude/height to the nearest higher 300 m or 1 000 ft;

(g) area speed restrictions, where established;

(h) the designation of the navigation specification(s) including any limitations, where established;

(i) all compulsory and "on-request" reporting points;

(j) radio communication procedures, including–
   (i) call sign(s) of air traffic services unit(s);
   (ii) frequency and if applicable, satellite voice communications number;
   (iii) transponder setting, where appropriate;

(k) an indication of "flyover" significant waypoints; and

(l) for arrival procedures to an instrument approach designed specifically for helicopters the term "CAT H" shall be depicted in the arrival chart plan view.

Aeronautical database requirements.

114. An aeronautical cartographic service provider shall ensure that appropriate data to support navigation database coding is published in accordance with the Procedures for Air Navigation Services — Aircraft Operations Document 8168, Volume II, Part III, on the reverse of the chart or as a separate, properly referenced sheet.

PART XI—INSTRUMENT APPROACH CHART—ICAO

Function

115. An aeronautical cartographic service provider shall ensure that the Instrument Approach chart provides flight crews with information which will enable the flight crew to perform an approved instrument approach procedure to the runway of intended landing including the missed approach procedure and, where applicable, associated holding patterns.

Availability.

116. An aeronautical cartographic service provider shall ensure that –

(a) the instrument Approach Charts are made available for all aerodromes used by international civil aviation where instrument approach procedures have been established by the Authority;

(b) a separate Instrument Approach Chart is provided for each precision approach procedure established by the Authority;

(c) a separate Instrument Approach Chart is provided for each non-precision approach procedure established by the Authority;

(d) more than one chart is provided 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; and

(e) the instrument Approach Charts are revised whenever information essential to safe operation becomes out of date.

Coverage and scale.

117. An aeronautical cartographic service provider shall ensure that –

(a) the coverage of the chart is sufficient to include all segments of the instrument approach procedure and such additional areas as may be necessary for the type of approach intended;

(b) the scale selected ensures optimum legibility consistent with-

(i) the procedure shown on the chart;

(ii) Sheet size.

(c) a scale indication is given;

(d) a distance circle with a radius of 20 kilometres (10 nautical miles) centered on a distance measuring equipment located on or close to the aerodrome, or on the aerodrome reference point where no suitable distance measuring equipment is available, is shown and the radius of the distance measuring equipment indicated on the circumference, except where this is not practicable; and

(e) a distance scale is shown directly below the profile.

118. An aeronautical cartographic service provider shall ensure that the sheet size is 210 × 297 mm (8.27 x 11.69 inches) (A4). Format.

119. An aeronautical cartographic service provider shall ensure that a conformal projection on which a straight line approximates a great circle is used. Projection.

120. An aeronautical cartographic service provider shall ensure that the chart is 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 instrument approach procedure as established in accordance with the Procedures for Air Navigation Services — Aircraft Operations Document 8168, Volume II, Part I, Section 4, Chapter 9. Identification.

121. An aeronautical cartographic service provider shall ensure that– Culture and topography.

(a) 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 procedure when established, is shown;

(b) topographic information is named, only when necessary, to facilitate the understanding of such information, and the minimum is delineation of land masses and significant lakes and rivers;

(c) relief is shown in a manner best suited to the particular elevation characteristics of the area;

(d) In areas where relief exceeds 1 200 m (4 000 ft) above the aerodrome elevation within the coverage of the chart or 600 m (2 000 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 by smoothed contour lines, contour values and layer tints printed in brown.

(e) appropriate spot elevations, including the highest elevation within each top contour line, is shown printed in black.

122. An aeronautical cartographic service provider shall ensure that the – Magnetic variation.

(a) magnetic variation is shown; and

(b) value of the variation, indicated to the nearest degree, agrees with that used in determining magnetic bearings, tracks and radials, when shown.

Bearings, tracks and radials.

123. An aeronautical cartographic service provider shall ensure that the –

(a) bearings, tracks and radials are magnetic;

(b) bearings and tracks are shown in parentheses to the nearest tenth of a degree where bearings and tracks are additionally provided as true values for area navigation segments;

(c) bearings, tracks or radials are clearly indicated where bearings, tracks or radials are given with reference to True North or Grid North; and

(d) reference grid meridian is identified when Grid North is used.

*Aeronautical data*

Aerodromes.

124. An aeronautical cartographic service provider shall ensure that –

(a) all aerodromes which show a distinctive pattern from the air are shown by the appropriate symbol and abandoned aerodromes are identified as abandoned;

(b) the runway pattern, at a scale sufficiently large to show it clearly is shown for-

(i) the aerodrome on which the procedure is based;

(ii) 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;

(c) the aerodrome elevation is shown to the nearest foot in a prominent position on the chart; and

(d) the threshold elevation or, where applicable, the highest elevation of the touchdown zone is shown to the nearest meter or foot.

Obstacles.

125. An aeronautical cartographic service provider shall ensure that the –

(a) obstacles are shown on the plan view of the chart;

(b) obstacles are identified if one or more obstacles are the determining factor of an obstacle clearance altitude or height;

(c) the elevation of the top of obstacles are shown to the nearest metre or foot;

(d) the heights of obstacles above a datum other than mean sea level are shown and, are given in parentheses on the chart when shown;

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

(f) the datum is stated in a prominent position on the chart, where a datum other than mean sea level is used;

(g) the obstacle free zone is indicated, where an obstacle free zone has not been established for a precision approach runway Category I; and

(h) Obstacles that penetrate the visual segment surface shall be identified on the chart.

Prohibited, restricted and danger areas.

126. An aeronautical cartographic service provider shall ensure that prohibited areas, restricted areas, and danger areas which may affect the execution of the procedures are shown with their identification and vertical limits.

Radio communication facilities and navigation aids.

127. An aeronautical cartographic service provider shall ensure that the –

(a) radio navigation aids required for the procedures together with their frequencies, identifications and track-defining characteristics, if any, are shown;

(b) the facility to be used for track guidance for final approach is clearly identified in the case of a procedure in which more than one station is located on the final approach track;

(c) consideration is given to the elimination from the approach chart of those facilities that are not used by the procedure;

(d) the initial approach fix, the intermediate approach fix, the final approach fix or final approach point for an ILS approach procedure, the missed approach point, where established, and other essential fixes or points comprising the procedure are shown and identified;

(e) the final approach fix or final approach point for an ILS approach procedure are identified with its geographical coordinates in degrees, minutes and seconds;

(f) radio navigation aids that might be used in diversionary procedures together with their track-defining characteristics, if any, are shown or indicated on the chart;

(g) radio communication frequencies, including call signs that are required for the execution of the procedures are shown;

(h) the distance to the aerodrome from each radio navigation aid concerned with the final approach is shown to the nearest kilometre or nautical mile when required by the procedures; and

(i) the bearing is also be shown to the nearest degree when no track-defining aid indicates the bearing of the aerodrome.

Minimum sector altitude or terminal arrival altitude.

128. An aeronautical cartographic service provider shall ensure that the minimum sector altitude or terminal arrival altitude established is shown, with a clear indication of the sector to which the minimum sector altitude or terminal arrival altitude applies.

Portrayal of procedure tracks.

129. An aeronautical cartographic service provider shall ensure that the –

(a) plan view shows the following information in the manner indicated –

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

(ii) the missed approach procedure track by an arrowed broken line;

(iii) any additional procedure track, other than those specified in i) and ii), by an arrowed dotted line;

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

(v) 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;

(vi) the boundaries of any sector in which visual maneuvering is prohibited;

(vii) where specified, the holding pattern and minimum holding altitude/height associated with the approach and missed approach;

(viii) caution notes where required, prominently displayed on the face of the chart; and

(ix) an indication of "flyover" significant points;

(b) plan view shows the distance to the aerodrome from each radio navigation aid concerned with the final approach;

(c) a profile is provided normally below the plan view showing the following data:

(i) the aerodrome by a solid block at aerodrome elevation;

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

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

(iv) the profile of any additional procedure segment, other than those specified in ii) and iii), by an arrowed dotted line;

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

(vi) altitudes/heights required by the procedures, including transition altitude and procedure altitudes/heights,- and heliport crossing height where established;

(vii) limiting distance to the nearest kilometre or nautical mile on procedure turn, when specified;

(viii) the intermediate approach fix or point, on procedures where no course reversal is authorized;

(ix) 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.

(d) heights required by procedures are shown in parentheses, using the height datum selected in accordance with regulation 123;

(e) profile view includes a ground profile or a minimum altitude or height portrayal as follows–

(i) 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

(ii) minimum altitudes or heights in the intermediate and final approach segments indicated within bounded shaded blocks.

Aerodrome operating minima.

130. An aeronautical cartographic service provider shall ensure that the –

(a) aerodrome operating minima when established by the Authority is shown.

(b) obstacle clearance altitudes or heights for the aircraft categories for which the procedure is designed are shown;

(c) for precision approach procedures, the obstacle clearance altitudes or heights for Cat DL aircraft of wing span between 65 m and 80 m and vertical distance between the flight path of the wheels and the glide path antenna between 7 m and 8 m is published, when necessary.

Supplementary cartographic.

131. An aeronautical cartographic service provider shall ensure that –

(a) where the missed approach point is defined by:

(i) a distance from the final approach fix is shown or

(ii) a facility or a fix and the corresponding distance from the final approach fix;

(b) the distance to the nearest two-tenths of a kilometre or tenth of a nautical mile and a table showing ground speeds and times from the final approach fix to the missed approach point is shown.

(c) a table showing altitudes or heights for each 2 km or 1 NM is shown as appropriate when distance measuring equipment is required for use in the final approach segment;

(d) the table is not include distances which would correspond to altitudes/heights below the obstacle clearance altitudes or heights;

(e) a table showing the altitudes or heights is included for procedures in which distance measuring equipment is not required for use in the final approach segment but where a suitably located distance measuring equipment is available to provide advisory descent profile cartographic;

(f) a rate of descent table is shown;

(g) the final approach descent gradient to the nearest one-tenth of a per cent and, in parentheses, descent angle to the nearest one-tenth of a degree is shown for non-precision approach procedures with a final approach fix;

(h) the reference datum height to the nearest half metre or foot and the glide path or elevation or vertical path angle to the nearest one-tenth of a degree is shown for precision approach procedures and approach procedures with vertical guidance;

(i) a clear indication is given whether it applies to the ILS, the associated ILS localizer only procedure, or both when a final approach fix is specified at the final approach point for ILS;

(j) in the case of MLS, a clear indication is given when an FAF has been specified at the final approach point; and

(k) a cautionary note is included, if the final approach descent gradient or angle for any type of instrument approach procedure exceeds the maximum value specified in the Procedures for Air Navigation Services — Aircraft Document 8168 Volume II, Part I, Section 4, Chapter 5.

Aeronautical database requirements.

132. An aeronautical cartographic service provider shall ensure that appropriate data to support navigation database coding is published in accordance with the Procedures for Air Navigation Services — Aircraft Operations Document 8168 Volume II, Part I, Section 4, Chapter 9, for non-RNAV procedures, on the reverse of the chart or as a separate, properly referenced sheet.

PART XII - VISUAL APPROACH CHART – ICAO

Function.

133. An aeronautical cartographic service provider shall ensure that the Visual Approach chart provides flight crews with information which will enable the flight crew to transit from the en-route or descent to approach phases of flight to the runway of intended landing by means of visual reference.

Availability.

134. An aeronautical cartographic service provider shall ensure that the Visual Approach Chart — is made available in the manner specified in regulation 4(b) for all aerodromes used by international civil aviation where-

(a) only limited navigation facilities are available; or

(b) radio communication facilities are not available; or

(c) no adequate aeronautical charts of the aerodrome and its surroundings at 1:500,000 or greater scale are available; or

(d) visual approach procedures have been established.

Scale.

135. An aeronautical cartographic service provider shall ensure that the scale is sufficiently large to permit depiction of significant features and indication of the aerodrome layout.

Format.

136.An aeronautical cartographic service provider shall ensure that the basic sheet size is 210 × 297 mm (8.27 x 11.69 inches) (A4).

Projection

137.An aeronautical cartographic service provider shall ensure that a conformal projection on which a straight line approximates a great circle is used.

Identification.

138.An aeronautical cartographic service provider shall ensure that the chart is identified by the name of the city or town which the aerodrome serves and the name of the aerodrome.

Culture and topography.

139. An aeronautical cartographic service provider shall ensure that the –

(a) natural and cultural landmarks are shown;

(b) geographical place names are included only when they are required to avoid confusion or ambiguity;

(c) shore lines, lakes, rivers and streams are shown;

(d) relief is shown in a manner best suited to the particular elevation and obstacle characteristics of the area covered by the chart;

(e) spot elevations are carefully selected when shown; and

(f) figures relating to different reference levels are clearly differentiated in their presentation.

Magnetic variation.

140. An aeronautical cartographic service provider shall ensure that the magnetic variation is shown

Bearings, tracks and radials.

141. An aeronautical cartographic service provider shall ensure that the –

(a) bearings, tracks and radials are magnetic;

(b) bearings, tracks or radials are clearly indicated where are given with reference to True North or Grid North; and

(c) reference grid meridian is identified when Grid North is used.

*Aeronautical data*

Aerodromes.

142. An aeronautical cartographic service provider shall ensure that –

(a) all aerodromes are shown by the runway pattern;

(b) the restrictions on the use of any landing direction is indicated;

(c) where there is any risk of confusion between two neighbouring aerodromes, this is indicated;

(d) abandoned aerodromes are identified as abandoned and

(e) the aerodrome elevation is shown in a prominent position on the chart.

Obstacles.

143. An aeronautical cartographic service provider shall ensure that the –

(a) obstacles are shown and identified;

(b) elevation of the top of obstacles is shown to the nearest next higher metre or foot;

(c) heights of obstacles above the aerodrome elevation are shown and

(d) height datum is stated in a prominent position on the chart and the heights are given in parentheses on the chart, when the heights of obstacles are shown.

Prohibited, restricted and danger areas.

144. An aeronautical cartographic service provider shall ensure that the prohibited areas, restricted areas, and danger areas are depicted with their identification and vertical limits.

Designated airspace.

145. An aeronautical cartographic service provider shall ensure that the control zones and aerodrome traffic zones are depicted with their vertical limits and the appropriate class of airspace, where applicable.

Visual approach information.

146. An aeronautical cartographic service provider shall ensure that the –

(a) visual approach procedures are shown, where applicable;

(b) visual aids for navigation are shown as appropriate; and

(c) location and type of the visual approach slope indicator systems with their nominal approach slope angle, minimum eye height over the threshold of the on-slope signal and where the axis of the system is not parallel to the runway centre line, the angle and direction of displacement, either left or right, are show

Supplementary information.

147. An aeronautical cartographic service provider shall ensure that the –

(a) radio navigation aids together with their frequencies and identifications are shown as appropriate; and

(b) radio communication facilities with their frequencies are shown as appropriate.

PART XIII - AERODROME/HELIPORT CHART

Function.

148. An aeronautical cartographic service provider shall ensure that the –

(a) aerodrome or heliport chart provides flight crews with information to facilitate the ground movement of aircraft –

(i) from the aircraft stand to the runway; and

(ii) from the runway to the aircraft stand; and

(b) aerodrome or heliport chart provides flight crews with information to facilitate the 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.

(c) aerodrome or heliport chart provides essential operational information at the aerodrome or heliport.

Availability.

149. An aeronautical cartographic service provider shall ensure that the –

(a) Aerodrome or Heliport Chart is made available in the manner specified in Civil Aviation (Aerodrome) Regulations for all aerodromes or heliports regularly used by international civil aviation;

(b) Aerodrome or Heliport Chart is made available in the manner specified in regulation 4(b) of these regulations.

Coverage and scale.

150. An aeronautical cartographic service provider shall ensure that –

(a) the coverage and scale are sufficiently large to show clearly all the elements listed in regulation 153

(b) a linear scale is shown.

Identification.

151. An aeronautical cartographic service provider shall ensure that the chart is identified by the name of the city or town or area which the aerodrome/heliport serves and the name of the aerodrome/heliport.

Magnetic variation.

152. An aeronautical cartographic service provider shall ensure that the True and Magnetic North arrows and magnetic variation to the nearest degree and annual change of the magnetic variation are shown.

Aerodrome/heliport data.

153. An aeronautical cartographic service provider shall ensure that –

(a) the Aerodrome or heliport chart shows:

(i) geographical coordinates in degrees, minutes and seconds for the aerodrome/heliport reference point;

(ii) elevations, to the nearest metre or foot, of the aerodrome/heliport and apron (altimeter checkpoint locations) where applicable; and for non-precision approaches, elevations and geoid

undulations of runway thresholds and the geometric centre of the touchdown and lift-off area;

(iii) elevations and geoid undulations, to the nearest half-metre or foot, of the precision approach runway threshold, the geometric centre of the touchdown and lift-off area, and at the highest elevation of the touchdown zone of a precision approach runway;

(iv) all runways including those under construction with designation number, length and width to the nearest metre, bearing strength, displaced thresholds, stopways, clearways, runway directions to the nearest degree magnetic, type of surface and runway markings;

(v) all aprons, with aircraft/helicopter stands, lighting, markings and other visual guidance and control aids, where applicable, including location and type of visual docking guidance systems, type of surface for heliports, and bearing strengths or aircraft type restrictions where the bearing strength is less than that of the associated runways;

(vi) geographical coordinates in degrees, minutes and seconds for thresholds, geometric centre of touchdown and lift-off area and/or thresholds of the final approach and take-off area (where appropriate);

(vii) all taxiways, helicopter air and ground taxiways with type of surface, helicopter air transit routes, with designations, width, lighting, markings (including runway-holding positions and, where established, intermediate holding positions), 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;

(viii) where established, hot spot locations with additional cartographic properly annotated;

(ix) geographical coordinates in degrees, minutes, seconds and hundredths of seconds for appropriate taxiway centre line points and aircraft stands;

(x) where established, standard routes for taxiing aircraft with their designators;

(xi) the boundaries of the air traffic control service;

(xii) position of runway visual range observation sites;

(xiii) approach and runway lighting;

(xiv) location and type of the visual approach slope indicator systems with their nominal approach slope angle, minimum eye height over the threshold of the on-slope signal, and where the axis of the system is not parallel to the runway centre line, the angle and direction of the displacement;

(xv) relevant communication facilities listed with their channels and, if applicable, logon address;

(xvi) obstacles to taxiing;

(xvii) aircraft servicing areas and buildings of operational significance;

(xviii) VOR checkpoint and radio frequency of the aid concerned;

(xix) any part of the depicted movement area permanently unsuitable for aircraft, clearly identified as such;

(b) in addition to the items in sub regulation (1) relating to heliports, the chart shall show-

(i) heliport type;

(ii) touchdown and lift-off area including dimensions to the nearest metre, slope, type of surface and bearing strength in tonnes;

(iii) final approach and take-off area including type, true bearing to the nearest degree, designation number (where appropriate), length and width to the nearest metre, slope and type of surface;

(iv) safety area including length, width and type of surface;

(v) helicopter clearway including length and ground profile;

(vi) obstacles including type and elevation of the top of the obstacles to the nearest (next higher) metre or foot;

(vii) visual aids for approach procedures, marking and lighting of final approach and take-off area, and of touchdown and lift-off area;

(viii) declared distances to the nearest metre for heliports, where relevant, including:

(i) take-off distance available;

(ii) rejected take-off distance available;

(iii) landing distance available.

## PART XIV - AERODROME GROUND MOVEMENT CHART

Function.

154. An aeronautical cartographic service provider shall ensure that the aerodrome ground movement chart provides flight crews with detailed information to facilitate the ground movement of aircraft to and from the aircraft stands and the parking or docking of aircraft.

Availability.

155. An aeronautical cartographic service provider shall ensure that the Aerodrome Ground Movement Chart is made available in the manner specified in regulation 4(b) where, due to congestion of information, details necessary for the ground movement of aircraft along the taxiways to and from the aircraft stands cannot be shown with sufficient clarity on the Aerodrome/Heliport Chart.

Coverage and scale.

156. An aeronautical cartographic service provider shall ensure that the coverage and scale are sufficiently large to show clearly all the elements listed in regulation 159.

Identification.

157. An aeronautical cartographic service provider shall ensure that the chart is identified by the name of the city or town or area which the aerodrome serves and the name of the aerodrome.

Magnetic variation.

158. An aeronautical cartographic service provider shall ensure that a True North arrow is shown.

Aerodrome data.

159. An aeronautical cartographic service provider shall ensure that the aerodrome ground movement chart shows in a

similar manner all the information on the Aerodrome or Heliport Chart relevant to the area depicted, including-

(a) apron elevation to the nearest metre or foot;

(b) 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;

(c) geographical coordinates in degrees, minutes, seconds and hundredths of seconds for aircraft stands;

(d) taxiways with designations, width to the nearest metre, bearing strength or aircraft type restrictions where applicable, lighting, markings (including runway-holding positions and, where established, intermediate holding positions), stop bars, and other visual guidance and control aids;

(e) where established, hot spot locations with additional cartographic properly annotated;

(f) where established, standard routes for taxiing aircraft, with their designators;

(g) geographical coordinates in degrees, minutes, seconds and hundredths of seconds for appropriate taxiway centre line points;

(h) the boundaries of the air traffic control service;

(i) relevant communication facilities listed with their channels and, if applicable, logon address;

(j) obstacles to taxiing;

(k) aircraft servicing areas and buildings of operational significance;

(l) VOR checkpoint and radio frequency of the aid concerned;

(m) any part of the depicted movement area permanently unsuitable for aircraft, clearly identified as such.

PART XV - AIRCRAFT PARKING/DOCKING CHART — ICAO

160. An aeronautical cartographic service provider shall ensure that the aircraft parking chart provides flight crews with Function.

detailed information to facilitate the ground movement of aircraft between the taxiways and the aircraft stands and the parking/docking of aircraft.

Availability.

161. An aeronautical cartographic service provider shall ensure that the Aircraft Parking/Docking Chart is made available in the manner prescribed regulation 4(b) where, due to the complexity of the terminal facilities, the information cannot be shown with sufficient clarity on the Aerodrome/Heliport Chart or on the Aerodrome Ground Movement Chart.

Coverage and scale.

162. An aeronautical cartographic service provider shall ensure that the coverage and scale shall be sufficiently large to show clearly all the elements listed in regulation 165.

Identification.

163. An aeronautical cartographic service provider shall ensure that the chart is identified by the name of the city or town or area which the aerodrome serves and the name of the aerodrome.

Magnetic variation.

164. An aeronautical cartographic service provider shall ensure that a True North arrow is shown.

Aerodrome data.

165. An aeronautical cartographic service provider shall ensure that the chart shows in a similar manner all the information on the Aerodrome/Heliport Chart and the Aerodrome Ground Movement Chart relevant to the area depicted, including-

(a) apron elevation to the nearest metre or foot;

(b) 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;

(c) geographical coordinates in degrees, minutes, seconds and hundredths of seconds for aircraft stands;

(d) taxiway entries with designations, including runway-holding positions and, where established, intermediate holding positions, and stop bars;

(e) where established, hot spot locations with additional information properly annotated;

(f) geographical coordinates in degrees, minutes, seconds and hundredths of seconds for appropriate taxiway centre line points;

(g) the boundaries of the air traffic control service;

(h) relevant communication facilities listed with their channels and, if applicable, logon address;

(i) obstacles to taxiing;

(j) aircraft servicing areas and buildings of operational significance;

(k) VOR checkpoint and radio frequency of the aid concerned;

(l) any part of the depicted movement area permanently unsuitable for aircraft, clearly identified as such.

PART XVI -WORLD AERONAUTICAL CHART — ICAO 1:1 000 000

Function.

166. An aeronautical cartographic service provider shall ensure that the World Aeronautical chart – 1:1,000.000 provides information to satisfy the requirements of visual air navigation –

(a) as a basic aeronautical chart:

(i) when highly specialized charts lacking visual information do not provide essential data;

(ii) to provide complete world coverage at a constant scale with a uniform presentation of planimetric data;

(iii) in the production of other charts required by international civil aviation;

(b) as a pre-flight planning chart.

Availability.

167. An aeronautical cartographic service provider shall ensure that the –

(a) World Aeronautical Chart 1:1 000 000 is made available in the manner specified in regulation 4(b) for all areas delineated in fifth Schedule;

(b) selection of a scale of other than 1:1 000 000 is determined by regional agreement to ensure complete coverage of all land areas and adequate continuity in any one coordinated series.

Scale.

168. An aeronautical cartographic service provider shall ensure that –

(a) the linear scales for kilometres and nautical miles arranged with their zero points in the same vertical line is shown in the margin in the following order-

(i) kilometres

(ii) nautical miles,

(b) the length of the linear scales represent at least 200 km (110 NM); and

(c) a conversion scale in metre or feet is shown in the margin.

Fornat.

169. An aeronautical cartographic service provider shall ensure that –

(a) the title and marginal notes are in English;

(b) the information regarding the number of the adjoining sheets and the unit of measurement to express elevations is located as to be clearly visible when the sheet is folded;

(c) the sheet lines conform with those shown in the index in fifth Schedule, whenever practicable;

(d) the sheet lines used are notified to the International Civil Aviation Organization for publication in the International Civil Aviation Organization's Aeronautical Chart Catalogue;

(e) overlaps are provided by extending the chart area on the top and right side beyond the area given on the index;

(f) the overlap area contain all aeronautical, topographical, hydrographical and cultural information; and

(g) the overlap extend up to 28 km (15 NM), if possible, but in any case from the limiting parallels and meridians of each chart to the neat line.

Projection.

170. (1) An aeronautical cartographic service provider shall ensure that the projection is the Lambert conformal conic projection, in separate bands for each tier of charts and the standard parallels for each 4° band is 40 ′ south of the northern parallel and 40 ′ north of the southern parallel.

(2) The graticules and graduations are shown as follows:

(a) Parallels:

| Latitude | Distance between Parall ls | Graduation on Parallels |
|---|---|---|
| 0 to $72^0$ | 30' | 1' |
| $72^0$ to $84^0$ | 30' | 5' |
| $84^0$ to $89^0$ | 30' | ' |
| $89^0$ to $90^0$ | 30' | 5' (only on degree parallels from 720 to 890) |

(b) Meridians:

| Latitude | Distance between Parallels | Graduation on Parallels |
|---|---|---|
| 0 to $52^0$ | 30' | 1' |
| $52^0$ to $72^0$ | 30' | 1' (Only on even numbered meridians) |
| $72^0$ to $84^0$ | 10' | 1' |
| $84^0$ to $89^0$ | 50' | 1' |
| $89^0$ to $90^0$ | 150' | 1' (Only on every fourth meridian) |

(c) the graduation marks at 1′ and 5′ intervals extend away from the Greenwich Meridian and from the Equator and each 10′ interval is shown by a mark on both sides of the graticule line;

(d) the length of the graduation marks are approximately 1.3 mm (0.05 in) for the 1′ intervals, and 2 mm (0.08 in) for the 5′ intervals and 2 mm (0.08 in) extending on both sides of the graticule line for the 10′ intervals;

(e) all meridians and parallels shown are numbered in the borders of the chart;

(f) each parallel is numbered within the body of the chart in such a manner that the parallel can be readily identified when the chart is folded; and

(g) the name and basic parameters of the projection are indicated in the margin.

171. An aeronautical cartographic service provider shall ensure that sheet numbering is in conformity with the index in fifth Schedule. Identification.

*Culture and topography*

172. An aeronautical cartographic service provider shall ensure that the cities, towns and villages are selected and shown according to their relative importance to visual air navigation. Built-up areas.

173. An aeronautical cartographic service provider shall ensure that – Railroads.

(a) all railroads having landmark value are shown and named where space permits;

(b) the important tunnels are shown.

174. An aeronautical cartographic service provider shall ensure that the – Highways and roads.

(a) road systems are shown in sufficient detail to indicate significant patterns from the air; and

(b) roads are not be shown in built-up areas unless they can be distinguished from the air as definite landmarks.

175. An aeronautical cartographic service provider shall ensure that the natural and cultural landmarks, such as bridges, prominent transmission lines, permanent cable car installations, wind turbines, mine structures, forts, ruins, levees, pipelines, rocks, bluffs, cliffs, sand dunes, isolated lighthouses and lightships, when considered to be of importance for visual air navigation, are shown. Landmarks.

176. An aeronautical cartographic service provider shall ensure that international boundaries are shown and undemarcated and undefined boundaries are distinguished by descriptive notes. Political boundaries.

177. An aeronautical cartographic service provider shall ensure that all water features compatible with the scale of the chart comprising shore lines, lakes, rivers and streams including those non-perennial in nature, salt lakes, glaciers and ice caps are shown. Hydrography.

178. An aeronautical cartographic service provider shall ensure that the – Contours.

(a) contours are shown and the selection of intervals is governed by the requirement to depict clearly the relief features required in air navigation; and

(b) values of the contours used are shown.

179. An aeronautical cartographic service provider shall ensure that the – Hypsometric tints.

(a) range of elevations for the tints is shown when hypsometric tints are used;

(b) scale of the hypsometric tints used on the chart is shown in the margin.

180. An aeronautical cartographic service provider shall ensure that the – Spot elevations.

(a) spot elevations are shown at selected critical points and the elevations selected are the highest in the immediate vicinity and indicate the top of a peak and ridge;

(b) elevations in valleys and at lake surface level which are of special value to the aviator are shown and the position of each selected elevation is indicated by a dot;

(c) elevation of the highest point on the chart and its geographical position to the nearest five minutes are indicated in the margin; and

(d) spot elevation of the highest point in any sheet is cleared of hypsometric tinting.

181. An aeronautical cartographic service provider shall ensure that the – Incomplete or unreliable relief.

(a) areas that have not been surveyed for contour information are labelled "Relief data incomplete";

(b) charts on which spot elevations are generally unreliable bear a warning note prominently displayed on the face of the chart in the colour used for aeronautical information, as follows: "Warning — The reliability of relief cartographic on this chart is doubtful and elevations are used with caution."

182. An aeronautical cartographic service provider shall ensure that escarpments are shown when they are prominent landmarks or when cultural detail is very sparse. Escarpments.

183. An aeronautical cartographic service provider shall ensure that – Wooded areas.

(a) wooded areas are shown; and

(b) the approximate extreme northern or southern limits of tree growth are indicated by a dashed black line where shown and are appropriately labelled.

Date of topographic information.

184. An aeronautical cartographic service provider shall ensure that the date of latest information shown on the topographic base is indicated in the margin.

Magnetic variation.

185. An aeronautical cartographic service provider shall ensure that the –

(a) isogonic lines are shown; and

(b) date of the isogonic information is indicated in the margin.

*Aeronautical data*

General.

186. An aeronautical cartographic service provider shall ensure that An aeronautical data shown are kept to a minimum consistent with the use of the chart for visual navigation and the revision cycle.

Aerodromes.

187. An aeronautical cartographic service provider shall ensure that the –

(a) land and water aerodromes and heliports are shown with their names, to the extent that they do not produce undesirable congestion on the chart, priority being given to those of greatest aeronautical significance;

(b) aerodrome elevation, the lighting available, the type of runway surface and the length of the longest runway or channel, shown in abbreviated form for each aerodrome in conformity with the example in second schedule, is indicated provided they do not cause undesirable clutter on the chart; and

(c) abandoned aerodromes which are still recognizable as aerodromes from the air are shown and identified as abandoned.

Obstacles.

188. An aeronautical cartographic service provider shall ensure that the –

(a) obstacles are shown; and

(b) prominent transmission lines, permanent cable car installations and wind turbines, which are obstacles, are shown when considered of importance to visual flight.

Prohibited, restricted and danger areas.

189. An aeronautical cartographic service provider shall ensure that the prohibited, restricted and danger areas are shown.

Air traffic services system.

190. An aeronautical cartographic service provider shall ensure that –

(a) significant elements of the air traffic services system including, where practicable, control zones, aerodrome

traffic zones, control areas, flight information regions and other airspaces in which VFR flights operate are shown together with the appropriate class of airspace; and

(b) the air defense identification zone are shown where appropriate and properly identified

Radio navigation aids.

191. An aeronautical cartographic service provider shall ensure that radio navigation aids are shown by the appropriate symbol and named, but excluding their frequencies, coded designators, times of operation and other characteristics unless any or all of the information shown is kept up to date by means of new editions of the chart.

Supplementary information.

192. An aeronautical cartographic service provider shall ensure that the –

(a) aeronautical ground lights together with their characteristics or their identifications or both are shown;

(b) the marine lights on outer prominent coastal or isolated features of not less than 28 km (15 NM) visibility range are shown where they are:

(i) not less distinguishable than more powerful marine lights in the vicinity;

(ii) readily distinguishable from other marine or other types of lights in the vicinity of built-up coastal areas and

(iii) the only lights of significance available.

PART XVII – AERONAUTICAL CHART — ICAO 1:500 000

Function.

193. An aeronautical cartographic service provider shall ensure that the aeronautical chart - 1: 500,000 provides information to satisfy the requirements of visual air navigation for low speed, short- or medium-range operations at low and intermediate altitudes.

Availability

194. An aeronautical cartographic service provider shall ensure that the Aeronautical Chart 1:500 000 is made available in the manner specified in regulation 4(2) for all areas delineated in fifth Schedule.

Scales.

195.An aeronautical cartographic service provider shall ensure that –

(a) the linear scales for kilometres and nautical miles arranged in the following order:

(i) kilometres,

(ii) nautical miles, with their zero points in the same vertical line is shown in the margin; and

(b) a conversion scale is shown in the margin.

Format.

196. An aeronautical cartographic service provider shall ensure that the –

(a) title and marginal notes is in English;

(b) information regarding the number of the adjoining sheets and the unit of measurement used to express elevation is located as to be clearly visible when the sheet is folded;

(c) sheets are quarter sheets of the World Aeronautical Chart 1:1 000 000 whenever practicable;

(d) an appropriate index to adjacent sheets, showing the relationship between the two chart series is included on the face of the chart or on the reverse side;

(e) overlaps are provided by extending the chart area on the top and right side beyond the area given on the index;

(f) overlap area in paragraph (e) contain all aeronautical, topographical, hydrographical and cultural information; and

(g) overlap extend up to 15 km (8 NM), if possible, but in any case from the limiting parallels and meridians of each chart to the neat line.

Projection.

197. An aeronautical cartographic service provider shall ensure that –

(a) a conformal projection is used;

(b) the Parallels are shown at intervals of 30′;

(c) the meridians are shown at intervals of 30 ′;

(d) the graduation marks are shown at 1 ′ intervals along each whole degree meridian and parallel, extending away from the Greenwich Meridian and from the Equator and each 10 ′ interval is shown by a mark on both sides of the graticule line;

(e) the meridians and parallels shown are numbered in the borders of the chart;and

(f) the name and basic parameters of the projection is indicated in the margin.

198. An aeronautical cartographic service provider shall ensure that – Identification.

(a) each sheet is identified by a name of the principal town or of a main geographical feature appearing on the sheet;

(b) the sheets are identified by the reference number of the corresponding World Aeronautical Chart —1:1 000 000 where applicable, with the addition of one or more of the following letter suffixes indicating the quadrant or quadrants:

| Letter | Chart quadrant |
|---|---|
| A | North-West |
| B | North-East |
| C | South-East |
| D | South-West |

*Culture and topography*

199. An aeronautical cartographic service provider shall ensure that the cities, towns and villages are selected and shown according to their relative importance to visual air navigation. Built-up areas.

200. An aeronautical cartographic service provider shall ensure that – Railroads.

(a) all railroads having landmark value are shown; and

(b) the tunnels are shown when they serve as prominent landmarks.

201. An aeronautical cartographic service provider shall ensure that the – Highways and roads.

(a) road systems are shown in sufficient detail to indicate significant patterns from the air; and

(b) roads not are shown in built-up areas unless they can be distinguished from the air as definite landmarks.

202. An aeronautical cartographic service provider shall ensure that the natural and cultural landmarks, such as bridges, prominent transmission lines, permanent cable car installations, Landmarks.

wind turbines, mine structures, lookout towers, forts, ruins, levees, pipelines, rocks, bluffs, cliffs, sand dunes, isolated lighthouses and lightships are shown when considered to be of importance for visual air navigation.

Political boundaries.

203. An aeronautical cartographic service provider shall ensure that the international boundaries are shown and undemarcated and undefined boundaries are distinguished by descriptive notes.

Hydrography.

204. An aeronautical cartographic service provider shall ensure that all water features compatible with the scale of the chart comprising shore lines, lakes, rivers and streams including those non-perennial in nature, salt lakes, glaciers and ice caps are shown.

Contours.

205. An aeronautical cartographic service provider shall ensure that –

(a) the Contours are shown and the selection of intervals shall be governed by the requirement to depict clearly the relief features required in air navigation and

(b) the values of the contours used are shown.

Hypsometric tints.

206. An aeronautical cartographic service provider shall ensure that –

(a) the range of elevations for the tints is shown when hypsometric tints are used; and

(b) the scale of the hypsometric tints used on the chart are shown in the margin.

Spot elevations.

207. An aeronautical cartographic service provider shall ensure that –

(a) the spot elevations are shown at selected critical points.

(b) the elevations selected are the highest in the immediate vicinity and indicate the top of a peak and ridge;

(c) the elevations in valleys and at lake surface levels which are of navigational value are shown and the position of each selected elevation shall be indicated by a dot;

(d) the elevation of the highest point on the chart and its geographical position to the nearest five minutes is indicated in the margin; and

(e) the spot elevation of the highest point on any sheet is cleared of hypsometric tinting.

Incomplete or unreliable relief.

208. An aeronautical cartographic service provider shall ensure that –

(a) the areas that have not been surveyed for contour cartographic are labelled "Relief data incomplete"; and

(b) the charts on which spot elevations are unreliable bear a warning note prominently displayed on the face of the chart in the colour used for aeronautical cartographic, as follows:

"Warning — the reliability of relief cartographic on this chart is doubtful and elevations shall be used with caution."

Escarpments.

209. An aeronautical cartographic service provider shall ensure that the escarpments are shown when they are prominent landmarks or when cultural detail is very sparse.

Wooded areas.

210. An aeronautical cartographic service provider shall ensure that when the wooded areas are shown the approximate northern or southern limits of tree growth shall be indicated by a dashed black line where shown, and are appropriately labelled.

Date of topographic information.

211. An aeronautical cartographic service provider shall ensure that the date of latest information shown on the topographic base is indicated in the margin.

Magnetic variation.

212. An aeronautical cartographic service provider shall ensure that-

(a) the isogonic lines are shown and

(b) the date of the isogonic cartographic is indicated in the margin.

*Aeronautical data*

General information.

213. An aeronautical cartographic service provider shall ensure that the aeronautical information is shown consistent with the use of the chart and the revision cycle.

Aerodromes.

214. An aeronautical cartographic service provider shall ensure that the –

(a) land and water aerodromes and heliports are shown with their names, to the extent that they do not produce undesirable congestion on the chart, priority being given to those of greatest aeronautical significance;

(b) aerodrome elevation, the lighting available, the type of runway surface and the length of the longest runway or channel, shown in abbreviated form for each

aerodrome in conformity with the example in second schedule, provided they do not cause undesirable clutter on the chart, are indicated; and

(c) abandoned aerodromes which are still recognizable as aerodromes from the air are shown and identified as abandoned.

Obstacles.

215. An aeronautical cartographic service provider shall ensure that the –

(a) obstacles are shown; and

(b) prominent transmission lines, permanent cable car installations and wind turbines, which are obstacles are shown when considered of importance to visual flight.

Prohibited, restricted and danger areas.

216. An aeronautical cartographic service provider shall ensure that the prohibited, restricted and danger areas are shown.

Air traffic services system.

217. An aeronautical cartographic service provider shall ensure that the –

(a) significant elements of the air traffic services system including, control zones, aerodrome traffic zones, control areas, flight cartographic regions and other airspaces in which VFR flights operate are shown together with the appropriate class of airspace, where practicable; and

(b) air defence identification zone are shown and properly identified where appropriate.

Radio navigation aids.

218. An aeronautical cartographic service provider shall ensure that the radio navigation aids are shown by the appropriate symbol and named, but excluding their frequencies, coded designators, times of operation and other characteristics unless any or all of this information shown is kept up to date by means of new editions of the chart.

Supplementary information.

219. An aeronautical cartographic service provider shall ensure that the –

(a) aeronautical ground lights together with their characteristics or their identifications or both are shown and

(b) marine lights on outer prominent coastal or isolated features of not less than 28 km (15 NM) visibility range are shown where they are:

(i) not less distinguishable than more powerful marine lights in the vicinity;

(ii) readily distinguishable from other marine or other types of lights in the vicinity of built-up coastal areas;

(iii) the only lights of significance available.

PART XVIII - AERONAUTICAL NAVIGATION CHART - SMALL SCALE

Function.

220. An aeronautical cartographic service provider shall ensure that the aeronautical navigation chart – small scale –

(a) serves as an air navigation aid for flight crews of long-range aircraft at high altitudes;

(b) provides selective checkpoints over extensive ranges for identification at high altitudes and speeds, which are required for visual confirmation of position;

(c) provides for continuous visual reference to the ground during long-range flights over areas lacking radio or other electronic navigation aids, or over areas where visual navigation is preferred or becomes necessary;

(d) provides a general purpose chart series for long-range flight planning and plotting.

Availability.

221. An aeronautical cartographic service provider shall ensure that the Aeronautical Navigation Chart — Small Scale is made available in the manner specified in regulation 4(b) for all areas delineated in fifth schedule.

Coverage and scale.

222. An aeronautical cartographic service provider shall ensure that the –

(a) the scale is in the range of 1:2 000 000 to 1:5 000 000;

(b) the scale of the chart is substituted in the title for the words "Small Scale";

(c) the Linear scales for kilometres and nautical miles arranged in the following order-

(i) kilometers,

(ii) nautical miles,with their zero points in the same vertical line are shown in the margin; and

(d) a conversion scale in metre or feet is shown in the margin.

Format.

223. An aeronautical cartographic service provider shall ensure that the –

(a) title and marginal notes are in English; and

(b) information regarding the number of the adjoining sheets and the unit of measurement to express elevations is located as to be clearly visible when the sheet is folded.

Projection.

224. An aeronautical cartographic service provider shall ensure that –

(a) a conformal projection is used;

(b) the name and basic parameters of the projection is shown in the margin;

(c) the parallels are shown at intervals of 1°;

(d) the graduations on the parallels are shown at sufficiently close intervals compatible with the latitude and the scale of the chart;

(e) meridians are shown at intervals compatible with the latitude and the scale of the chart.

(f) the graduations on the meridians are shown at intervals not exceeding 5′ ;

(g) the graduation marks extend away from the Greenwich Meridian and from the Equator;

(h) all meridians and parallels shown are numbered in the borders of the chart; and

(i) in addition, when required, meridians and parallels are numbered within the body of the chart in such a manner that they can be readily identified when the chart is folded.

*Culture and topography*

Built-up areas.

225. An aeronautical cartographic service provider shall ensure that the cities, towns and villages are selected and shown according to their relative importance to visual air navigation.

Railroads

226. An aeronautical cartographic service provider shall ensure that all railroads having landmark value are shown.

Highways and roads.

227. An aeronautical cartographic service provider shall ensure that the road systems are shown in sufficient detail to indicate significant patterns from the air.

Political boundaries.

228. An aeronautical cartographic service provider shall ensure that the international boundaries are shown and the

undemarcated including undefined boundaries are distinguished by descriptive notes.

229. An aeronautical cartographic service provider shall ensure that all water features compatible with the scale of the chart comprising shore lines, lakes, rivers and streams including those non-perennial in nature, salt lakes, glaciers and ice caps are shown. Hydrography.

230. An aeronautical cartographic service provider shall ensure that the – Contours.

(a) contours are shown and the selection of intervals are governed by the requirement to depict clearly the relief features required in air navigation; and

(b) values of the contours used are shown.

231. An aeronautical cartographic service provider shall ensure that the – Hypsometric tints.

(a) range of elevations for the tints are shown when hypsometric tints are used;

(b) scale of the hypsometric tints used on the chart is shown in the margin.

232. An aeronautical cartographic service provider shall ensure that the – Spot elevations.

(a) spot elevations are shown at selected critical points;

(b) elevations selected are the highest in the immediate vicinity and indicate the top of a peak or ridge;

(c) elevations in valleys and at lake surface levels which are of value to visual air navigation are shown and the position of each selected elevation are indicated by a dot; and

(d) elevation of the highest point on the chart and its geographical position to the nearest five minutes is indicated in the margin.

233. An aeronautical cartographic service provider shall ensure that the – Incomplete or unreliable relief.

(a) areas that have not been surveyed for contour information are labelled "Relief data incomplete".

(b) charts on which spot elevations are unreliable bear a warning note prominently displayed on the face of the chart in the colour used for aeronautical information, as follows:

"Warning — the reliability of relief cartographic on this chart is doubtful and elevations shall be used with caution."

Date of topographic information.

234. An aeronautical cartographic service provider shall ensure that the date of latest information shown on the topographic base is indicated in the margin

Colours.

235. An aeronautical cartographic service provider shall ensure that the –

(a) the subdued colours are used for the chart background to facilitate plotting and

(b) good colour contrast is ensured to emphasize features important to visual air navigation.

Magnetic variation.

236. An aeronautical cartographic service provider shall ensure that the –

(a) isogonic lines are shown and

(b) date of isogonic cartographic shall be indicated in the margin.

*Aeronautical data*

Aerodromes.....

237. An aeronautical cartographic service provider shall ensure that the land and water aerodromes and heliports are shown with their names, to the extent that they do not produce undesirable congestion on the chart, priority being given to those of greatest aeronautical significance.

Obstacles.

238. An aeronautical cartographic service provider shall ensure that the obstacles are shown.

Prohibited, restricted and danger areas.

239. An aeronautical cartographic service provider shall ensure that the prohibited, restricted and danger areas are shown when considered to be of importance to air navigation.

Air traffic services system.

240. An aeronautical cartographic service provider shall ensure that the –

(a) significant elements of the air traffic services system are shown when considered to be of importance to air navigation; and

(b) air defence identification zone are shown and properly identified where appropriate.

PART XIX - PLOTTING CHART — ICAO

Function.

241. An aeronautical cartographic service provider shall ensure that the plotting chart provides a means of maintaining a continuous flight record of the aircraft position by various fixing methods and dead reckoning in order to maintain an intended flight path.

242. An aeronautical cartographic service provider shall ensure that the plotting chart is made available, in the manner prescribed in regulation 4(b) to cover major air routes over oceanic areas and sparsely settled areas used by international civil aviation. Availability.

243. An aeronautical cartographic service provider shall ensure that the – Coverage and scale.

(a) chart for a particular region covers major air routes and their terminals on a single sheet, where practicable;

(b) scale is governed by the area to be covered.

244. An aeronautical cartographic service provider shall ensure that the sheet is of a size that can be adapted for use on a navigator's plotting table. Format.

245. An aeronautical cartographic service provider shall ensure that – Projection.

(a) the parallels and meridians are shown;

(b) the graduation marks are shown at consistent intervals along an appropriate number of parallels and meridians and the interval selected, regardless of scale, minimizes the amount of interpolation required for accurate plotting; and

(c) If a navigational grid is shown on charts covering the higher latitudes, it shall comprise lines parallel to the Meridian or anti-Meridian of Greenwich.

246. An aeronautical cartographic service provider shall ensure that each sheet is identified by chart series and number. Identification.

247. An aeronautical cartographic service provider shall ensure that the – Culture and topography.

(a) generalized shore lines of all open water areas, large lakes and rivers are shown;

(b) spot elevations for selected features constituting a hazard to air navigation are shown;

(c) particularly hazardous or prominent relief features are emphasized.

248. An aeronautical cartographic service provider shall ensure that the – Magnetic variation.

(a) isogonals are shown at consistent intervals throughout the chart and the interval selected, regardless of scale, minimizes the amount of interpolation required;

(b) date of the isogonic information is shown.

Aeronautical data.

249. An aeronautical cartographic service provider shall ensure that the –

(a) the following aeronautical data are shown –

(i) aerodromes regularly used by international commercial air transport together with their names;

(ii) selected radio aids to navigation that will contribute to position-finding together with their names and identifications;

(iii) lattices of long-range electronic aids to navigation, as required;

(iv) boundaries of flight cartographic regions, control areas and control zones necessary to the function of the chart;

(v) designated reporting points necessary to the function of the chart;

(vi) ocean station vessels;

(b) aeronautical ground lights and marine lights useful for air navigation are shown where other means of navigation are non-existent.

## PART XX - ELECTRONIC AERONAUTICAL CHART DISPLAY — ICAO

Function.

250. An aeronautical cartographic service provider shall ensure that the Electronic Aeronautical Chart Display with adequate back-up arrangements and in compliance with the requirements of Civil Aviation (Operations of aircraft) Regulations for charts, enables flight crews to execute, in a convenient and timely manner, route planning, route monitoring and navigation by displaying the required information.

Information available for display.

251. An aeronautical cartographic service provider shall ensure that the Electronic Aeronautical Chart Display is capable of displaying all aeronautical, cultural and topographic information required by part V and part VII through to part XIX.

*Display requirements*

Display categories.

252. An aeronautical cartographic service provider shall ensure that the –

(a) information available for display is subdivided into the following categories-

(i) basic display information, permanently retained on the display and consisting of the minimum information essential for the safe conduct of flight; and

(ii) other display information, which may be removed from the display or displayed individually on demand, and consisting of information not considered essential for the safe conduct of flight.

(b) adding or removing other display information is a simple function but is not possible to remove information contained in the basic display.

**Display mode and generation of neighbouring area.**

253. An aeronautical cartographic service provider shall ensure that the –

(a) the Electronic Aeronautical Chart Display is capable of continuously plotting the aircraft's position in a true motion mode where reset and generation of the surrounding area takes place automatically.

(b) it is possible manually to change the chart area and the position of the aircraft relative to the edge of the display.

**Scale.**

254. An aeronautical cartographic service provider shall ensure that it is possible to vary the scale at which a chart is displayed.

**Symbols.**

255. An aeronautical cartographic service provider shall ensure that –

(a) the symbols used conform to those specified for electronic charts in the second schedule – International Civil Aviation Organization Chart Symbols except where it is desired to show items for which no International Civil Aviation Organization chart symbol is provided;

(b) in cases where no International Civil Aviation Organization chart symbols are provided, electronic chart symbols are chosen which-

(i) employ a minimum use of lines, arcs and area fills;

(ii) do not cause confusion with any existing aeronautical chart symbol;

(iii) do not impair the legibility of the display.

Display hardware.

256. An aeronautical cartographic service provider shall ensure that the –

(a) effective size of the chart presentation is sufficient to display the information required by regulation 252 without excessive scrolling;

(b) display has the capabilities required to accurately portray required elements of second schedule — International Civil Aviation Organization Chart Symbols;

(c) method of presentation ensures that the displayed information is clearly visible to the observer in the conditions of natural and artificial light experienced in the cockpit; and

(d) display luminance is adjustable by the flight crew.

Provision and updating of data.

257. An aeronautical cartographic service provider shall ensure that –

(a) the provision and updating of data for use by the display is in conformance with the aeronautical data quality system requirements;

(b) the display is capable of automatically accepting authorized updates to existing data and means of ensuring that authorized data and all relevant updates to that data have been correctly loaded into the display is provided;

(c) the display is capable of accepting updates to authorized data entered manually with simple means for verification prior to final acceptance of the data and updates entered manually are distinguishable on the display from authorized data and its authorized updates and shall not affect display legibility;

(d) a record is kept of all updates, including date and time of application;

(e) the display allows the flight crew to display updates so that the flight crew may review the contents of the updates and determine that they have been included in the system.

Performance tests, malfunction alarms and indications.

258. An aeronautical cartographic service provider shall ensure that the –

(a) a means is provided for carrying out on-board tests of

major functions and in case of a failure, the test displays information to indicate which part of the system is at fault.

(b) a suitable alarm or indication of system malfunction is provided.

Back-up arrangements.

259. An aeronautical cartographic service provider shall ensure that to ensure safe navigation in case of a failure of the Electronic Aeronautical Chart Display the provision of adequate back-up arrangements include-

(a) facilities enabling a safe takeover of display functions in order to ensure that a failure does not result in a critical situation; and

(b) a back-up arrangement facilitating the means for safe navigation of the remaining part of the flight.

PART XXI - AIR TRAFFIC CONTROL SURVEILLANCE MINIMUM ALTITUDE CHART — ICAO

Function.

260. An aeronautical cartographic service provider shall ensure that –

(a) the Air Traffic Control Surveillance Minimum Altitude chart provides information that will enable flight crews to monitor and cross-check altitudes assigned by a controller using an air traffic services surveillance system;

(b)a note indicating that the chart may only be used for cross-checking of altitudes assigned while the aircraft is identified is prominently displayed on the face of the chart.

Availability.

261. An aeronautical cartographic service provider shall ensure that the Air Traffic Control Surveillance Minimum Altitude Chart is made available, in the manner prescribed in regulation 4(b) where vectoring procedures are established and minimum vectoring altitudes cannot be shown adequately on the Area Chart, Standard Departure Chart — Instrument or Standard Arrival Chart — Instrument.

Coverage and scale.

262. An aeronautical cartographic service provider shall ensure that the –

(a) coverage of the chart is sufficient to effectively show the information associated with vectoring procedures; and

(b) chart is drawn to scale.

263. An aeronautical cartographic service provider shall ensure that – Projection.

(a) a conformal projection on which a straight line approximates a geodesic line is used;

(b) the graduation marks are placed at consistent intervals along the neat lines, as appropriate.

264. An aeronautical cartographic service provider shall ensure that the chart is identified by the name of the aerodrome for which the vectoring procedures are established or, when procedures apply to more than one aerodrome, the name associated with the airspace portrayed. Identification.

265. An aeronautical cartographic service provider shall ensure that the – Culture and topography.

(a) generalized shorelines of all open water areas, large lakes and rivers are shown except where they conflict with data more applicable to the function of the chart;

(b) appropriate spot elevations and obstacles are shown.

266. An aeronautical cartographic service provider shall ensure that the average magnetic variation of the area covered by the chart is shown to the nearest degree. Magnetic variation.

267. An aeronautical cartographic service provider shall ensure that – Bearings, tracks and radials.

(a) the Bearings, tracks and radials are magnetic;

(b) Where bearings, tracks or radials are given with reference to True North or Grid North, the reference is clearly indicated and where Grid North is used, its reference grid meridian is identified.

*Aeronautical data*

268. An aeronautical cartographic service provider shall ensure that – Aerodromes.

(a) all aerodromes that affect the terminal routings are shown and where appropriate, a runway pattern symbol is used;

(b) the elevation of the primary aerodrome to the nearest metre or foot is shown.

269. An aeronautical cartographic service provider shall ensure that the prohibited, restricted and danger areas are depicted with their identification. Prohibited, restricted and danger areas.

Air traffic services system.

270. An aeronautical cartographic service provider shall ensure that the chart shows components of the established air traffic services system including-

(a) relevant radio navigation aids together with their identifications;

(b) lateral limits of relevant designated airspace;

(c) relevant significant points associated with standard instrument departure and arrival procedures;

(d) transition altitude, where established;

(e) information associated with vectoring including-

(i) minimum vectoring altitudes to the nearest higher 50 m or 100 ft, clearly identified;

(ii) lateral limits of minimum vectoring altitude sectors normally defined by bearings and radials to/from radio navigation aids to the nearest degree or, if not practicable, geographical coordinates in degrees, minutes and seconds and shown by heavy lines so as to clearly differentiate between established sectors;

(iii) distance circles at 20-km or 10-NM intervals or, when practicable, 10-km or 5-NM intervals shown as fine dashed lines with the radius indicated on the circumference and centred on the identified aerodrome main VOR radio navigation aid or, if not available, on the aerodrome/heliport reference point;

(iv) notes concerning correction for low temperature effect, as applicable; and

(v) communications procedures including call sign(s) and channel(s) of the Air Traffic Control unit(s) concerned.

Transition provisions.

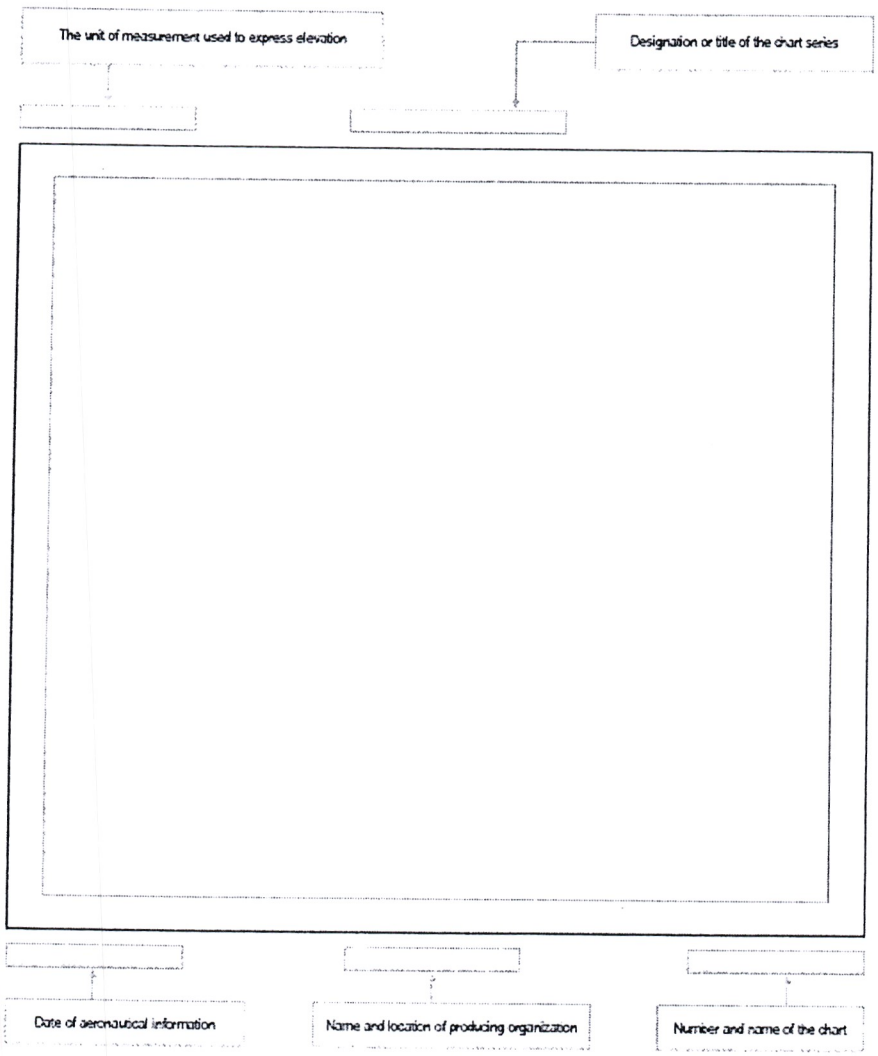
271. (1) A license or any other document issued to an operator prior to the commencement of these Regulations shall continue to be in force as if it was issued under these Regulations until it expires or is cancelled by the Authority.

(2) Notwithstanding any other provision of these Regulations, a person who at the commencement of these Regulations, is carrying out any acts, duties or operations affected

by these Regulations shall, within one (1) year from the date of commencement, or within such longer time that the Cabinet Secretary may, by notice in the Gazette prescribe, comply with the requirements of these Regulations or cease to carry out such acts, duties or operations.

FIRST SCHEDULE (r.7)

MARGINAL LAYOUT



## SECOND SCHEDULE (r. xxxxxxx)

## ICAO CHART SYSMBOLS

### 1. CATEGORY INDEX

| | *Symbol No.* |
|---|---|
| **TOPOGRAPHY (1–18)** | |
| Approximate contours | 2 |
| Areas not surveyed for contour information or relief data incomplete | 18 |
| Bluff, cliff or escarpment | 4 |
| Coniferous trees | 15 |
| Contours | 1 |
| Gravel | 8 |
| Highest elevation on chart | 12 |
| Lava flow | 5 |
| Levee or esker | 9 |
| Mountain pass | 11 |
| Other trees | 16 |
| Palms | 17 |
| Relief shown by hachures | 3 |
| Sand area | 7 |
| Sand dunes | 6 |
| Spot elevation (of doubtful accuracy) | 14 |
| Spot elevation | 13 |
| Unusual land features appropriately labelled | 10 |
| **HYDROGRAPHY (19–46)** | |
| Abandoned canal | 30 |
| Canal | 29 |
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| Coral reefs and ledges | 22 |
| Danger line (2 m or one fathom line) | 43 |
| Dry lake bed | 39 |
| Falls | 28 |
| Glaciers and ice caps | 42 |
| Lakes (non-perennial) | 32 |
| Lakes (perennial) | 31 |
| Large river (perennial) | 23 |
| Rapids | 27 |
| Reservoir | 38 |
| Rice field | 36 |
| Rivers and streams (non-perennial) | 25 |
| Rivers and streams (unsurveyed) | 26 |
| Rock awash | 45 |
| Salt lake | 33 |
| Salt pans (evaporator) | 34 |

| | *Symbol No.* |
|---|---|
| Shoals | 41 |
| Shore line (reliable) | 19 |
| Shore line (unreliable) | 20 |
| Small river (perennial) | 24 |
| Spring, well or water hole | 37 |
| Swamp | 35 |
| Tidal flats | 21 |
| Unusual water features appropriately labelled | 46 |
| Wash | 40 |

CULTURE (47–83)

*Built-up Areas (47–50)*

| | |
|---|---|
| Buildings | 50 |
| City or large town | 47 |
| Town | 48 |
| Village | 49 |

*Railroads (51–56)*

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

*Highways and Roads (57–62)*

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

*Miscellaneous (63–83)*

| | |
|---|---|
| Boundaries (international) | 63 |
| Church | 80 |
| Coast guard station | 73 |
| Dam | 67 |
| Fence | 65 |
| Ferry | 68 |
| Forest ranger station | 76 |
| Fort | 79 |
| Lookout tower | 74 |
| Mine | 75 |
| Mosque | 81 |
| Nuclear power station | 72 |
| Oil or gas field | 70 |
| Outer boundaries | 64 |
| Pagoda | 82 |

| | *Symbol No.* |
|---|---|
| Pipeline | 69 |
| Race track or stadium | 77 |
| Ruins | 78 |
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| Telegraph or telephone line (when a landmark) | 66 |
| Temple | 83 |
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| Aerodrome for use on charts on which aerodrome classification is not required | 93 |
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| Emergency aerodrome or aerodrome with no facilities | 90 |
| Heliport | 94 |
| Joint civil and military — Land | 88 |
| Joint civil and military — Water | 89 |
| Military — Land | 86 |
| Military — Water | 87 |
| Runway pattern in lieu of the aerodrome symbol | 95 |
| Sheltered anchorage | 92 |
| *Aerodrome data in abbreviated form which may be in association with aerodrome symbols* | 96 |
| *Aerodrome symbols for Approach Charts (97 and 98)* | |
| Aerodromes affecting the traffic pattern on the aerodrome on which the procedure is based | 97 |
| The aerodrome on which the procedure is based | 98 |
| **RADIO NAVIGATION AIDS (99–110)** | |
| Basic radio navigation aid symbol | 99 |
| Collocated VOR and DME radio navigation aids — VOR/DME | 103 |
| Collocated VOR and TACAN radio navigation aids — VORTAC | 107 |
| Compass rose | 110 |
| Distance measuring equipment — DME | 102 |
| DME distance | 104 |
| Instrument landing system — ILS | 108 |
| Non-directional radio beacon — NDB | 100 |
| Radio marker beacon | 109 |
| UHF tactical air navigation aid — TACAN | 106 |
| VHF omnidirectional radio range — VOR | 101 |
| VOR radial | 105 |
| **AIR TRAFFIC SERVICES (111–144)** | |
| Advisory airspace — ADA | 115 |
| Advisory route — ADR | 118 |
| Aerodrome traffic zone — ATZ | 112 |
| Air defence identification zone — ADIZ | 117 |
| Altitudes/flight levels | 125 |

| | *Symbol No.* |
|---|---|
| ATS/MET reporting point — MRP | 123 |
| Change-over point — COP | 122 |
| Control area, Airway. Controlled route | 113 |
| Control zone — CTR | 116 |
| Final approach fix — FAF | 124 |
| Flight information region — FIR | 111 |
| Reporting and Fly-by/Flyover functionality | 121 |
| Scale-break (on ATS route) | 120 |
| Uncontrolled route | 114 |
| Visual flight path | 119 |
| *Airspace Classifications (126 and 127)* | |
| Aeronautical data in abbreviated form to be used in association with airspace classification symbols | 127 |
| Airspace classifications | 126 |
| *Airspace Restrictions (128 and 129)* | |
| International boundary closed to passage of aircraft except through air corridor | 129 |
| Restricted airspace (prohibited, restricted or danger area) | 128 |
| *Obstacles (130–136)* | |
| Elevation of top/Height above specified datum | 136 |
| Exceptionally high obstacle — lighted (optional symbol) | 135 |
| Exceptionally high obstacle (optional symbol) | 134 |
| Group obstacles | 132 |
| Lighted group obstacles | 133 |
| Lighted obstacle | 131 |
| Obstacle | 130 |
| *Miscellaneous ((137–141)* | |
| Isogonic line or isogonal | 138 |
| Ocean station vessel (normal position) | 139 |
| Prominent transmission line | 137 |
| Wind turbine — unlighted and lighted | 140 |
| Wind turbines — minor group and group in major area, lighted | 141 |
| *Visual Aids (142–144)* | |
| Aeronautical ground light | 143 |
| Lightship | 144 |
| Marine light | 142 |
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| Hard surface runway | 145 |
| Helicopter alighting area on an aerodrome | 150 |
| Hot spot | 161 |
| Intermediate holding position | 160 |
| Landing direction indicator (lighted) | 156 |
| Landing direction indicator (unlighted) | 157 |
| Obstacle light | 155 |

| | *Symboi No.* |
|---|---|
| Pierced steel plank or steel mesh runway | 146 |
| Point light | 154 |
| Runway-holding position | 159 |
| Runway visual range (RVR) observation site | 153 |
| Stop bar | 158 |
| Stopway | 148 |
| Taxiways and parking areas | 149 |
| Unpaved runway | 147 |
| VOR check-point | 152 |
| **SYMBOLS FOR AERODROME OBSTACLE CHARTS — TYPE A, B AND C (162–170)** | |
| Building or large structure | 164 |
| Clearway | 170 |
| Escarpment | 168 |
| Pole, tower, spire, antenna, etc. | 163 |
| Railroad | 165 |
| Stopway | 169 |
| Terrain penetrating obstacle plane | 167 |
| Transmission line or overhead cable | 166 |
| Tree or shrub | 162 |
| **ADDITIONAL SYMBOLS FOR USE ON PAPER AND ELECTRONIC CHARTS (171–180)** | |
| Collocated DME fix and marker beacon | 180 |
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| DME fix | 179 |
| Holding pattern | 173 |
| Minimum sector altitude | 171 |
| Missed approach track | 174 |
| Radio marker beacon | 177 |
| Radio navigation aid | 176 |
| Runway | 175 |
| Terminal arrival altitude | 172 |

## 2. ALPHABETICAL INDEX


| | *Symbol No.* |
|---|---|
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| Advisory route — ADR | 118 |
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| Aerodrome/Heliport Charts | 145-161 |
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*Symbol No.*

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*Symbol No.*

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Lakes
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Overhead cable ..... 166

*Symbol No.*

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  Collocated radio navigation aid and marker beacon ..... 178
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  (Perennial), small ..... 24
  (Perennial), large ..... 23
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| | *Symbol No.* |
|---|---|
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| Controlled | 113 |
| Uncontrolled | 114 |
| Ruins | 78 |
| Runway | 175 |
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| Unpaved | 147 |
| Runway-holding position | 159 |
| Runway visual range (RVR) observation site | 153 |

S

| | |
|---|---|
| Salt lake | 33 |
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| Sand area | 7 |
| Sand dunes | 6 |
| Scale-break (on ATS route) | 120 |
| Secondary road | 59 |
| Sheltered anchorage | 92 |
| Shoals | 41 |
| Shore line | |
| Reliable | 19 |
| Unreliable | 20 |
| Shrub | 162 |
| Small river (perennial) | 24 |
| Spire | 163 |
| Spot elevation | 13 |
| Spot elevation (of doubtful accuracy) | 14 |
| Spring (perennial or intermittent) | 37 |
| Stadium | 77 |
| Steel mesh runway | 146 |
| Steel plank, pierced | 146 |
| Stop bar | 158 |
| Stopway — SWY (on Aerodrome/Heliport Charts) | 148 |
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| Streams | 25, 26 |
| Structure, large | 164 |
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T

| | |
|---|---|
| TACAN | 121 |
| TACAN (UHF tactical air navigation aid) | 106, 110 |
| Tank farms | 71 |
| Taxiways | 149 |
| Telegraph or telephone line (when a landmark) | 66 |
| Temple | 83 |

| | *Symbol No* |
|---|---|
| Terminal arrival altitude — TAA | 172 |
| Terrain penetrating obstacle plane | 167 |
| Tidal flats | 21 |
| Topography | 1-18 |
| Tower | |
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| On Aerodrome Obstacle Charts | 163 |
| Town | 48 |
| Town, large | 47 |
| Trail | 60 |
| Transmission line | |
| On Aerodrome Obstacle Charts | 166 |
| Prominent | 137 |
| Tree | |
| Coniferous | 15 |
| On Aerodrome Obstacle Charts | 162 |
| Other | 16 |

U

| | |
|---|---|
| UHF tactical air navigation aid — TACAN | 106, 110 |
| Uncontrolled route | 114 |
| Unpaved runway | 147 |
| Unusual land features appropriately labelled | 10 |
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V

| | |
|---|---|
| VFR reporting point | 121 |
| VHF omnidirectional radio range — VOR | 101, 110 |
| Village | 49 |
| Visual aids | 142-144 |
| Visual flight path | 119 |
| VOR | 121 |
| VOR check-point | 152 |
| VOR/DME | 121 |
| VOR/DME (collocated VOR and DME radio navigation aids) | 103 |
| VOR radial | 105 |
| VORTAC | 121 |
| VORTAC (collocated VOR and TACAN radio navigation aids) | 107 |
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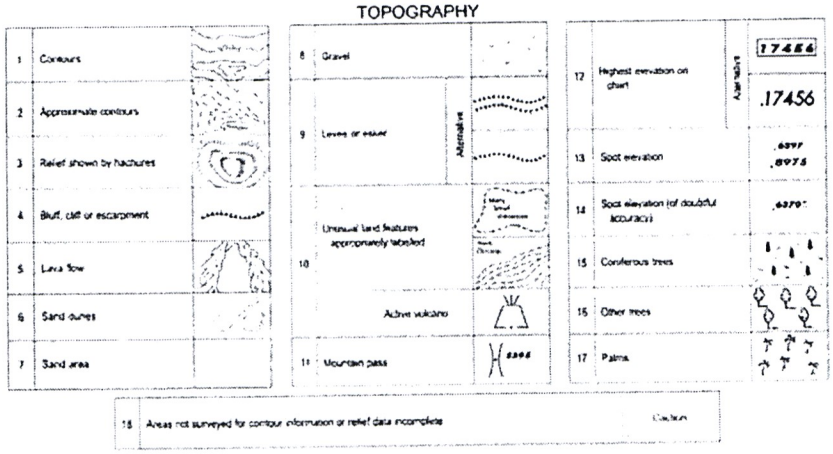
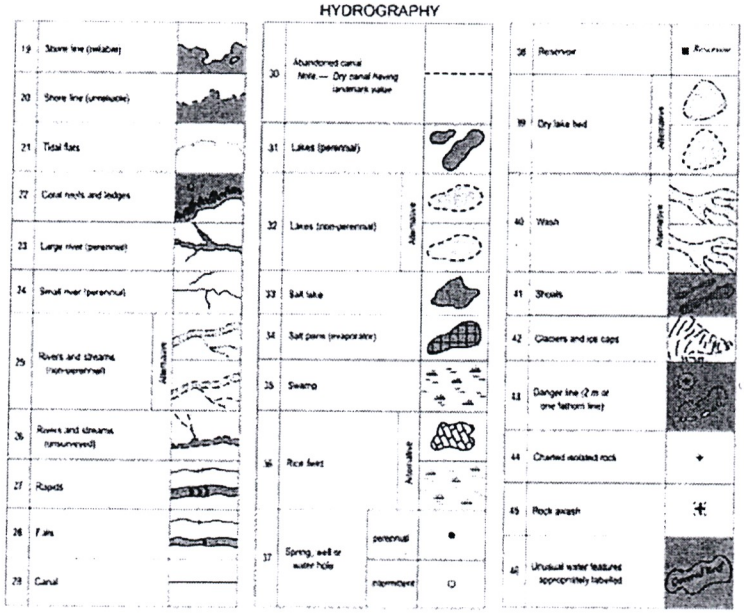
| | *Symbol No.* |
|---|---|
| **W** | |
| Wash | 40 |
| Water | |
| Civil | 85 |
| Military | 87 |
| Joint civil and military | 89 |
| Water features appropriately labelled, unusual | 46 |
| Water hole (perennial or intermittent) | 37 |
| Waypoint — WPT | 121 |
| Well (perennial or intermittent) | 37 |
| Wind turbine, unlighted and lighted | 140 |
| Wind turbines, minor group and group in major area, lighted | 141 |

## TOPOGRAPHY



HYDROGRAPHY



## CULTURE

### *BUILT-UP AREAS*

47 City or large town

48 Town

49 Village

50 Buildings

### *RAILROADS*

51 Railroad (single track)

52 Railroad (two or more tracks)

53 Railroad (under construction)

54 Railroad bridge

55 Railroad tunnel

56 Railroad station

### *HIGHWAYS AND ROADS*

57 Dual highway

58 Primary road

59 Secondary road

60 Trail

61 Road bridge

62 Road tunnel

### *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

### *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

## 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

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*

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)

Name of aerodrome

Elevation given in the units of measurement (metres or feet) selected for use on the chart

Length of longest runway in hundreds of metres or feet (whichever unit is selected for use on the chart)

96 [illegible]

Minimum lighting - obstacles, boundary or runway lights and lighted wind indicator or landing direction indicator

Runway hard surfaced, normally all weather

NOTE. — A dash (-) is to be inserted where Length do not apply

## *AERODROME SYMBOLS FOR APPROACH CHARTS*

97 Aerodromes affecting the traffic pattern of 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

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; Identification of radio navigation aid

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

108 Instrument landing system — LS

PLAN VIEW

Elevation

FRONT COURSE

BACK COURSE

PROFILE

Elevation

GLIDE PATH

109 Radio marker beacon

Elliptical

Fan Shape

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

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

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

VOR

VOR/DME

TACAN

VORTAC

Note — Additional points of compass may be added as required

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

## AIR TRAFFIC SERVICES

| | | | |
|---|---|---|---|
| 111 | Flight information region | FIR | |
| 112 | Aerodrome traffic zone | ATZ | |
| 113 | Control area<br>Airway<br>Controlled route | CTA<br>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 (for ATS routes) | | Alternative |

| | | | Significant Point Depiction for Conventional Navigation | | Significant Point Depiction for Area Navigation | | | |
|---|---|---|---|---|---|---|---|---|
| | | REPORTING FLY-BY/FLY-OVER | On request (NIA) | Compulsory (NIA) | On request fly-by | Compulsory fly-by | On request flyover | Compulsory flyover |
| 121 | Basic Symols with functionality | VFR reporting point | △ | ▲ | △ | ▲ | △ | ▲ |
| | | Intersection INT | △ | ▲ | △ | ▲ | △ | ▲ |
| | | VORTAC | | | | | | |
| | | TACAN | | | | | | |
| | | VOR | | | | | | |
| | | VOR/DME | | | | | | |
| | | NDB | | | | | | |
| | | Waypoint WPT | Not Used | Not Used | | | | |

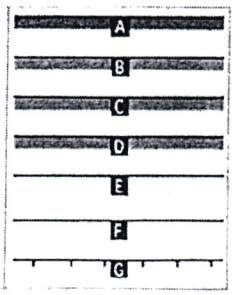
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 122 | Changeover point<br>To be superimposed on the appropriate route symbol at right angles to the route | COP | | 123 | ATS/MET reporting point | used | Compulsory<br>On request | 124 | Final approach fix FAF |

## AIR TRAFFIC SERVICES *(cont.)*

| | | | | |
|---|---|---|---|---|
| 1.25 | Altitudes/flight levels | Altitude/flight level "window" | 17 000<br>10 000 | FL 220<br>10 000 |
| | | "At or above" altitude/flight level | 7 000 | FL 70 |
| | | "At or below" altitude/flight level | 5 000 | FL 50 |
| | | "Mandatory" altitude/flight level | 3 000 | FL 30 |
| | | "Recommended" procedure altitude/flight level | 5 000 | FL 50 |
| | | "Expected" altitude | Expect 5 000 | Expect FL 50 |
| | *Note — For use only on SID and STAR charts. Italic numbers for depiction of minimum obstacle clearance altitude.* | | | |

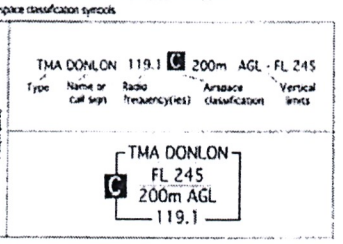
## *AIRSPACE CLASSIFICATIONS*

1.26 Airspace classifications




Aeronautical data in abbreviated form to be used in association with airspace classification symbols

1.27 Alternative



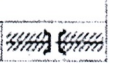

## *AIRSPACE RESTRICTIONS*

1.28 Restricted airspace (prohibited, restricted or danger areas)

Common boundary of two areas

*Note — The angle and density of hangs may be varied according to scale and the size, shape and orientation of the area.*

1.29 International boundary closed to passage of aircraft except through air corridor



## *OBSTACLES*

1.30 Obstacle

1.31 Lighted obstacle

1.32 Group obstacles

1.33 Lighted group obstacles

1.34 Exceptionally high obstacle (optional symbol)

1.35 Exceptionally high obstacle – lighted (optional symbol)

*Note — For obstacles having a height of the order of 300 m (1 000 ft) above terrain.*

1.36 Elevation of top (italics) — *52* — (15) — Height above specified datum (upright type in parentheses)

## MISCELLANEOUS

| | | |
|---|---|---|
| 137 | Prominent transmission line | |
| 138 | Isogonic line or isogonal | |
| 139 | Ocean station vessel (normal position) | |
| 140 | Wind turbine – unlighted and lighted | |
| 141 | Wind turbines – minor group and group in major area, lighted | |

## VISUAL AIDS

| | | | | |
|---|---|---|---|---|
| 142 | Marine light<br>Note 2. Characteristics are to be indicated as follows | Alt Alternating<br>B Blue<br>F Fixed | Note 1. Marine alternating lights are red and white unless otherwise indicated. Marine lights are white unless colours are stated.<br>Fl Flashing<br>G Green<br>Gp Group | Occ Occulting<br>R Red<br>SEC Sector<br>Sec Second<br>U Unwatched<br>W White |
| 143 | Aeronautical ground light | Electric | 144 | Lightship |

## SYMBOLS FOR AERODROME/HELIPORT CHARTS

| | | | | |
|---|---|---|---|---|
| 145 | Hard surface runway | | 154 | Point light |
| 146 | Perforated steel plank or steel mesh runway | | | |
| 147 | Unpaved runway | | 155 | Obstacle light |
| 148 | Stopway SWY | | 156 | Landing direction indicator (lighted) |
| 149 | Taxiways and parking areas | | 157 | Landing direction indicator (unlighted) |
| | | | 158 | Stop bar |
| 150 | Helicopter alighting area on an aerodrome | | 159 | Runway-holding position Pattern A Pattern B<br>Note – For application, see Annex 14, Volume I, 5.2.10 |
| 151 | Aerodrome reference point ARP | | 160 | Intermediate holding position<br>Note – For application, see Annex 14, Volume I, 5.2.11 |
| 152 | VOR check point | | 161 | Hot spot<br>Note – Hot spot operator to be carried |
| 153 | Runway visual range (RVR) observation site | | | |

## SYMBOLS FOR AERODROME OBSTACLE CHARTS - TYPE A, B AND C

| | | Plan | Profile |
|---|---|---|---|
| 162 | Tree or shrub | | Identification number |
| 163 | Pole, tower, spire, antenna, etc. | | |
| 164 | Building or large structure | | |
| 165 | Railroad | | |
| 166 | Transmission line or overhead cable | | |
| 167 | Terrain penetrating obstacle plane | | |
| 168 | Escarpment | | |
| 169 | Stopway SWY | | |
| 170 | Clearway CWY | | |

## ADDITIONAL SYMBOLS FOR USE ON PAPER AND ELECTRONIC CHARTS

| | PLAN VIEW | | Electronic |
|---|---|---|---|
| 171 | Minimum sector altitude<br>Note – This symbol may be modified to reflect particular sector shapes | MSA | |
| 172 | Terminal arrival altitude<br>Note – This symbol may be modified to reflect particular TAA shapes | TAA | COMING<br>7000 |
| 173 | Holding pattern | | |
| 174 | Missed approach track | | |

| | PROFILE | |
|---|---|---|
| 175 | Runway | |
| 176 | Radio navigation aid<br>(Type of aid and its use in the procedure to be annotated on top of the symbol) | |
| 177 | Radio marker beacon<br>(type of beacon to be annotated on top of the symbol) | |
| 178 | Collocated radio navigation aid and marker beacon<br>(type of aid to be annotated on top of the symbol) | |
| 179 | DME fix<br>(distance from DME and the fix use in the procedure to be annotated on top of the symbol) | |
| 180 | Collocated DME fix and marker beacon<br>(distance from DME and the type of beacon to be annotated on top of the symbol) | |

# THIRD SCHEDULE

## COULOUR GUIDE

### CHART SYMBOLS

| | | |
|---|---|---|
| Outline, except highways and roads, names of large islands, grids and graticules, spot elevations, danger areas and off-shore rocks, names and lettering except for aeronautical and hydrographic features | | BLACK |
| Built-up areas of cities | | BLACK Stipple |
| Highways and roads | Optional colours | BLACK Half tone |
| | | RED |
| Built-up areas for cities (alternative to Black Stipple) | | YELLOW |
| Contours and topographic features, items 1 through 12 of Appendix 2<br>Hydrographic features, items 39 through 41 of Appendix 2 | | BROWN |
| Shore lines, drainage rivers, lakes, bathymetric contours and other hydrographic features including their names or description | | BLUE |
| Open water areas | | BLUE Half tone |
| Salt lakes and salt pans | | BLUE Stipple |
| Large non perennial rivers and non perennial lakes | | BLUE Stipple |
| Aeronautical data, except for Enroute and Area Charts — ICAO, where different colours may be required. Both continuity may be used on the same sheet. But, where only one colour is used, dark blue is preferred | Optional colours | MAGENTA |
| | | DARK BLUE |

## CHART SYMBOLS *(Cont.)*

| | | | |
|---|---|---|---|
| Aids | | GREEN | |
| Areas which have not been surveyed for contour information or travel data are incomplete | Optional colours | GOLDEN BUFF | |
| | | WHITE | |

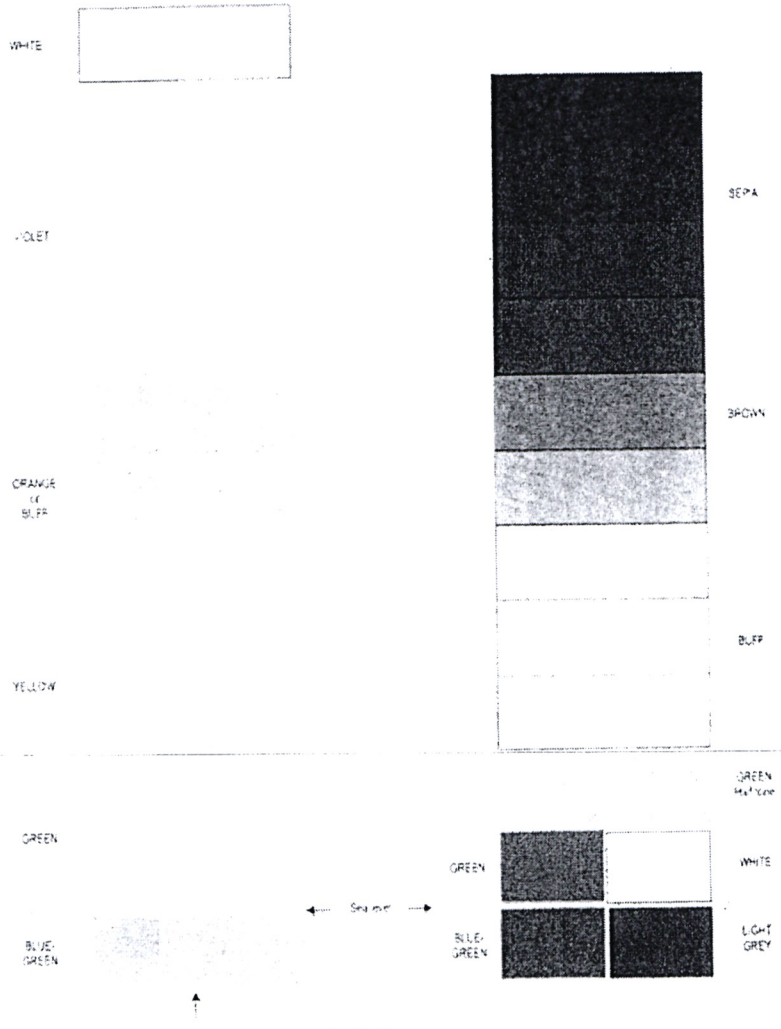
## HYPSOMETRIC TINTS

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

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

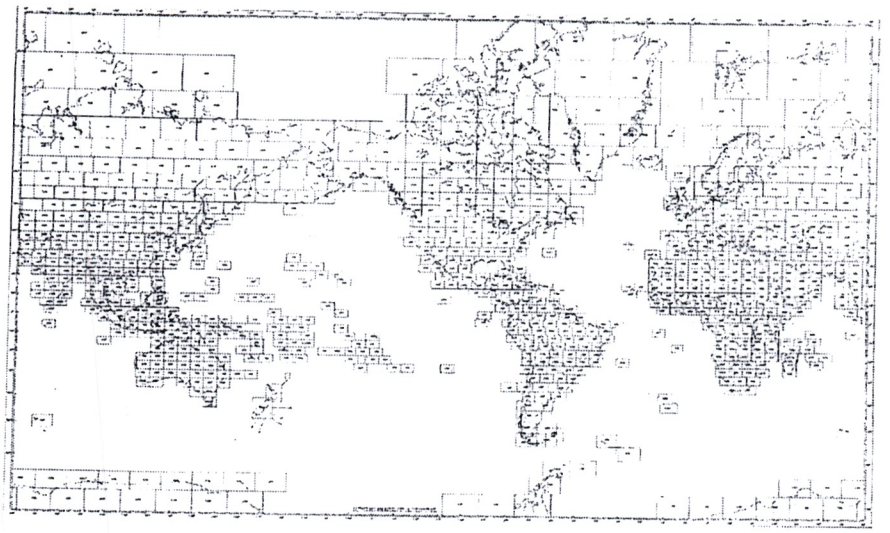
FOURTH SCHEDULE

HYPOSOMETRIC TINT GUIDE



## FIFTH SCHEDULE

## SHEET LAYOUT FOR THE WORLD AERONAUTICAL CHART ICAO 1:1,000,000



## SIXTH SCHEDULE

## AERONAUTICAL DATA QUALITY REQUIREMENTS

Table 1 Latitude and Longitude

| *Latitude and Longitude* | *Chart Resolution* | *Integrity Classification* |
|---|---|---|
| Flight information region boundary points. | as plotted | routine |
| P, R, D area boundary points (outside CTA/CTZ boundaries). | as plotted | routine |
| P, R, D area boundary points (inside CTA/CTZ boundaries). | as plotted | essential |
| CTA/CTZ boundary points. | as plotted | essential |
| En-route NAV/AIDS and fixes, holding STAR/SID points. | 1sec | essential |
| Obstacles in Area 1 (the entire State territory). | as plotted | routine |
| Aerodrome/ heliport reference point. | 1 sec | routine |
| NAVAIDS located at the aerodrome/heliport. | as plotted | essential |
| Obstacles in Area 3. | 1/10sec | essential |

| *Latitude and Longitude* | *Chart Resolution* | *Integrity Classification* |
|---|---|---|
| Obstacles in Area 2. | 1/10sec | essential |
| Final approach fixes/points and other essential fixes/points comprising the instrument procedure. | 1 sec | essential |
| Runway thresholds | 1 sec | critical |
| Taxiway centre line/parking guidance line points | 1/100 sec | essential |
| Runway end (flight path alignment point) | 1 sec | critical |
| Runway holding position. | 1 sec | critical |
| Taxiway intersection marking line. | 1 sec | essential |
| Exit guidance line. | 1 sec | essential |
| Apron boundaries (polygon) | 1 sec | routine |
| Aircraft stand points/INS checkpoints. | 1/100 sec | routine |
| Geometric centre of TLOF or Final approach and take-off area thresholds, heliports. | 1 sec | critical |

Table 2 Elevation/ Altitude/ Height

| *Elevation/Altitude/Height* | *Chart Resolution* | *Integrity Classification* |
|---|---|---|
| Aerodrome/heliport elevation | 1m or1ft | essential |
| World Geodetic System 84 geoid undulation at aerodrome/heliport elevation position. | 1m or 1ft | essential |
| Runway or Final approach and take-off area threshold, non-precision approaches. | 1m or 1ft | essential |
| World Geodetic System -84 geoid undulation at runway or Final approach and take-off area threshold, TLOF geometric centre, non-precision approaches | 1m or 1ft | essential |
| Runway or Final approach and take-off area threshold, precision approaches. | 0.5m or 1ft | critical |
| World Geodetic System -84 geoid undulation at runway or Final approach and take-off area threshold, TLOF geometric centre, precision approaches | 0.5m or 1ft | critical |
| Threshold crossing height (Reference datum height) precision approaches | 0.5m or 1ft | critical |
| Obstacle clearance altitude/height | As specified in | essential |

| *Elevation/Altitude/Height* | *Chart Resolution* | *Integrity Classification* |
|---|---|---|
| | (Doc 8168) | |
| Obstacles in Area 1 (the entire state territory). | 3m (10 ft) | routine |
| Obstacles in Area 2. | 1m or 1ft | essential |
| Obstacles in Area 3. | 1m or 1ft | essential |
| Distance measuring Equipment | 30m (100ft) | essential |
| Instrument approach procedures altitude | As specified in (Doc 8168) | essential |
| Minimum altitudes | 50m or 100ft | Routine |
| Heliport crossing height, PinS approaches | 1m or 1ft | essential |

Table 3 Gradients and Angles

| *Type of gradient/angle* | *Chart resolution* | *Integrity Classification* |
|---|---|---|
| Non-precision final approach descent gradient | 0.1 per cent | critical |
| Final approach descent angle (Non-precision approach or approach with vertical guidance). | 0.1 degree | critical |
| Precision approach glide path/elevation angle | 0.1 degree | critical |

Table 4 Magnetic Variation

| *Magnetic variation Chart* | *Chart resolution* | *Integrity Classification* |
|---|---|---|
| Aerodrome/heliport magnetic variation | 1 Degree | essential |

Table 5 Bearing

| *Bearing* | *Publication Resolution* | *Integrity Classification* |
|---|---|---|
| Airway segments. | 1 degree | routine |
| Bearings used for the formation of an en route and of a terminal fix | 1/10 degree | routine |
| Terminal arrival/departure route segment | 1 degree | routine |
| Bearings used for the formation of an instrument approach procedure fix | 1/10 degree | essential |
| ILS localizer alignment | 1 degree | essential |
| MLS zero azimuth alignment | 1 degree | essential |
| Runway and Final approach and take-off area bearing | 1 degree | routine |

Table 6 Length / Distance / Dimension

| *Length/distance/dimension* | *Chart resolution* | *Integrity Classification* |
|---|---|---|
| Airway segment length | 1 km or 1 NM | routine |
| Distance used for the formation of an en route fix | 2/10 km (1/10 NM) | routine |
| Terminal arrival/departure route segment length | 1 km or 1 NM | essential |
| Distance used for the formation of a terminal and instrument approach procedure fix | 2/10 km (1/10 NM) | essential |
| Runway and Final approach and take-off area length, TLOF dimensions | 1m | critical |
| Runway width | 1m | essential |
| Stop way length and width | 1m | critical |
| Landing distance available | 1m | critical |
| Take-off run available | 1m | critical |
| Take-off distance available | 1m | critical |
| Accelerate-stop distance available | 1m | critical |
| ILS localizer antenna-runway end, distance | As plotted | routine |
| ILS glide slope antenna-threshold, distance along centre line | As plotted | routine |
| ILS marker-threshold distance | 2/10 km (1/10 NM) | essential |
| ILS DME antenna-threshold, distance along | as plotted | essential |

| *Length/distance/dimension* | *Chart resolution* | *Integrity Classification* |
|---|---|---|
| centre line 1v 10-5 / essential | | |
| MLS azimuth antenna-runway end, distance 1 × 10-3 / routine | as plotted | routine |
| MLS elevation antenna-threshold, distance along centre line | as plotted | routine |
| MLS DME/P antenna-threshold, distance along centre line | as plotted | essential |

Made on the 18th June, 2018.

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