REPUBLIC OF MAURITIUS

DEPARTMENT OF CIVIL AVIATION

Sir Seewoosagur Ramgoolam International Airport, Plaine Magnien

MAURITIUS CIVIL AVIATION REQUIREMENTS

MCAR CHARTS

AERONAUTICAL CHARTS

ISSUE 1, REV 1

08 November 2024

FOREWORD

The purpose of MCAR CHARTS is to ensure that aeronautical charts meet the technological and other requirements of modern aviation operations; as well as, to satisfy the need for uniformity and consistency in the provision of aeronautical charts that contain appropriate information of a defined quality.

This MCAR is to be used in conjunction with the Procedures for Air Navigation Services — ICAO Abbreviations and Codes (PANS-ABC, Doc 8400), Aeronautical Information Services Manual (Doc. 8126) and the Procedures for Air Navigation Services - Aeronautical Information Management (PANS AIM, Doc. 10066).

MCAR CHARTS “Aeronautical Charts” Issue 1, Rev 0 was issued under the provisions of Regulation 135 of the Civil Aviation Regulations as amended and replaced the requirements prescribed in Civil Air Navigation Requirements of Mauritius (CANRM), Section 2: Air Navigation, Series A: Air Traffic Management, Part IV Aeronautical Charts, Edition 2-rev 0, dated March 2015.

MCAR CHARTS-Issue 1 Rev 0 was based on the provisions of ICAO Annex 4 “Aeronautical Charts”, 11th edition, amendment 61 dated 4 of November 2021.

This MCAR CHARTS, Issue 1 Rev 1 is based on the provisions of ICAO Annex 4 “Aeronautical Charts”, 11th edition, amendment 62 dated 28 of November 2024.

This MCAR CHARTS Issue 1 Rev 1 will be effective as from 28 of November 2024.

I POKHUN
Director of Civil Aviation

ISSUE AND REVISION SYSTEM

THE REVISIONS TO THIS REQUIREMENT WILL BE INDICATED BY A VERTICAL BAR ON THE LEFT SIDE, IN FRONT OF THE LINE, SECTION OR FIGURE THAT HAS BEEN AFFECTED. AN ISSUE WILL BE THE REPLACEMENT OF THE COMPLETE DOCUMENT.

THESE REVISIONS MUST BE RECORDED ON THE RECORD OF REVISIONS TABLE OF THIS DOCUMENT, INDICATING THE RESPECTIVE NUMBER, DATE IT WAS ENTERED AND SIGNED BY THE PERSON ENTERING THE REVISION.

RECORD OF REVISIONS

REV NO.	DATE	INSERTED BY
Issue 1, rev. 0	19 July 2024	ANS Inspector
Revision 1	08 November 2024	ANS Inspector

NOTE

The content of this document is arranged as follows:

The main requirements appear first, followed by the related Acceptable Means of Compliance (AMC), even though this MCAR does not have any, and Guidance Material (GM) paragraph(s).

All elements (i.e. Requirement, AMC and GM) are colour-coded and can be identified according to the illustration below:

Requirements

Acceptable means of compliance

Guidance Material

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GENERAL REQUIREMENTS

CHARTS.001 Applicability

This MCAR CHARTS Requirement establishes the Standards to be met by an Aeronautical Information Services provider (AIS/MAP) or an Aeronautical Cartography Services provider, whether they are service providers from the State of Mauritius or an independent Aeronautical Cartography Services provider.

CHARTS.005 Availability

(1) Information

The AIS provider shall on request by another Contracting State provide all information relating to its own territory that is necessary to enable the Standards of this MCAR to be met.

(2) Charts

The AIS provider shall ensure, when specified, the availability of charts in whichever of the following ways is appropriate for a particular chart or single sheet of a chart series.

(a) For any chart or single sheet of a chart series entirely contained within the territory, the AIS/MAP service provider shall either:

(i) produce the chart or sheet itself; or

(ii) arrange for its production by another Contracting State or by an agency; or

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

(b) For any chart or single sheet of a chart series, which includes the territory of two or more Contracting States, the States having jurisdiction over the territory so included shall determine the manner in which the chart or sheet will be made available. This determination shall be made with due regard being given to regional air navigation agreements and to any programme of allocation established by the Council of ICAO.

(3) Guarantee and quality of charts

The AIS/MAP service provider shall take all reasonable measures to ensure that the information it provides, and the aeronautical charts made available are adequate and accurate and that they are maintained up to date by an adequate revision service.

(4) Availability without charge

To improve worldwide dissemination of information on new charting techniques and production methods, appropriate charts produced by the service provider shall be made available without charge to other Contracting States on request on a reciprocal basis.

GM CHARTS.005 Availability

(2) The availability of charts includes specified electronic charts.

(2)(b) The phrase “regional air navigation agreements” refers to the agreements approved by the Council of ICAO normally on the advice of regional air navigation meetings.

(4) Guidance material on the preparation of aeronautical charts, including sample formats, is contained in the Aeronautical Chart Manual (Doc 8697).

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SECTION A

TECHNICAL REQUIREMENTS

CHAPTER 1

General Specifications

CHARTS.010 Operational requirements for charts

(1) Phases of flight

For the purposes of this MCAR, the total flight shall be divided into the following phases:

(a) Phase 1 — Taxi from aircraft stand to take-off point

(b) Phase 2 — Take-off and climb to en-route ATS route structure

(c) Phase 3 — En-route ATS route structure

(d) Phase 4 — Descent to approach

(e) Phase 5 — Approach to land and missed approach

(f) Phase 6 — landing and taxi to aircraft stand.

(2) Human Factors principles

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

(3) Requirements for charts

The Charts shall meet the following requirements:

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

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

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

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

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

(f) The charts shall be True North orientated.

(g) The basic sheet size of the charts shall be 210 × 148 mm (8.27 × 5.82 in) (A5).

GM CHARTS.010 Operational requirements for charts

The Standards and Recommended Practices contained in this chapter are applicable to all ICAO aeronautical charts unless otherwise stated in the specifications of the chart concerned.

(2) Guidance material on the application of Human Factors principles can be found in the Human Factors Training Manual (Doc 9683).

CHARTS.015 Titles

The title of a chart or chart series

The title of a chart or chart series prepared in accordance with the specifications contained in this MCAR and intended to satisfy the function of the chart shall be that of the relevant chapter heading as modified by application of any Standard contained therein, except that such title shall not include “ICAO” unless the chart conforms with all Standards specified in this Chapter 1 and any specified for the particular chart.

CHARTS.020 Miscellaneous information

(1) Marginal note

The marginal note layout shall be as given in Appendix 1, except as otherwise specified by DCA for a particular chart.

(2) Face of each chart

The following information shall be shown on the face of each chart unless otherwise stated in the specification of the chart concerned:

(a) designation or title of the chart series,

(b) name and reference of the sheet,

(c) on each margin an indication of the adjoining sheet (when applicable).

(3) Symbols and abbreviations

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

(4) Margin of the chart

The name and adequate address of the producing agency shall be 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.

GM CHARTS.020 Miscellaneous information

(2)(a) The title may be abbreviated.

CHARTS.025 Symbols

(1) Chart symbols

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

(2) Representation of ground-based navigation aids, intersections and waypoints

To represent ground-based navigation aids, intersections and waypoints, the same basic symbol shall be used on all charts on which they appear, regardless of chart purpose.

(3) Symbol used for significant points

The symbol used for significant points shall be based on a hierarchy of symbols and selected in the following order:

(a) ground-based navigation aid,

(b) intersection,

(c) waypoint symbol.

A waypoint symbol shall be used only when a particular significant point does not already exist as either a ground-based navigation aid or intersection.

(4) Representation of symbols

The AIS/MAP provider shall ensure that symbols are shown in the manner specified in CHARTS.025 (2), CHARTS.025 (3) and Appendix 2 — ICAO Chart Symbols, symbol number 121.

GM CHARTS.025 Symbols

(1) The size and prominence of symbols and the thickness and spacing of lines may be varied according to the scale and functions of the chart, with due regard to the importance of the information they convey.

CHARTS.030 Units of measurements

Units of measurements shall be expressed as follows:

(1) Distances shall be derived as geodesic distances,

(2) Distances shall be expressed in either kilometres or nautical miles or both, provided the units are clearly differentiated,

(3) Altitudes, elevations and heights shall be expressed in feet,

(4) Linear dimensions on aerodromes and short distances shall be expressed in metres,

(5) The order of resolution of distances, dimensions, elevations and heights shall be that as specified for a particular chart,

(6) The units of measurement used to express distances, altitudes, elevations and heights shall be conspicuously stated on the face of each chart,

(7) Conversion scales (kilometres/nautical miles, metres/feet) shall be provided on each chart on which distances, elevations or altitudes are shown. The conversion scales shall be placed on the face of each chart.

CHARTS.035 Scale and projection

(1) Large area charts

For charts of large areas, the name and basic parameters and scale of the projection shall be indicated.

(2) Small area charts

For charts of small areas, a linear scale only shall be indicated.

CHARTS.040 Date of validity of aeronautical information

Date of validity of aeronautical information

The date of validity of aeronautical information shall be clearly indicated on the face of each chart.

CHARTS.045 Spelling of geographical names

(1) Roman alphabet

The symbols of the Roman alphabet shall be used for all writing.

(2) Names of places and of geographical features

The names of places and of geographical features shall be accepted in their official spelling, including the accents and diacritical marks used in the respective alphabets.

(3) Geographical terms

When a geographical term such as “cape”, “point”, “gulf”, “river” is abbreviated on any particular chart, that word shall be spelt out in full in the language used by the publishing agency, in respect of the most important example of each type. Punctuation marks shall not be used in abbreviations within the body of a chart.

(4) Romanized names not been officially produced or adopted

When romanised names have not been officially produced or adopted, and outside the territory of Contracting States, names shall be transliterated from the non-Roman alphabet form by the system generally used by the producing agency.

CHARTS.050 Abbreviations

(1) Use of abbreviations

Abbreviations shall be used on aeronautical charts whenever they are appropriate.

(2) Selection of abbreviations

Abbreviations shall be selected from the Procedures for Air Navigation Services — ICAO Abbreviations and Codes (Doc 8400).

CHARTS.055 Political boundaries

(1) Presentation of international boundaries

International boundaries shall be shown but may be interrupted if data more important to the use of the chart would be obscured.

(2) Names identifying countries

Where the territory of more than one State appears on a chart, the names identifying the countries shall be indicated.

GM CHARTS.055 Political boundaries

(2) In the case of a dependent territory, the name of the sovereign State may be added in brackets.

CHARTS.060 Colours

Colours used on charts

Colours used on charts shall conform to Appendix 3 — Colour Guide.

CHARTS.065 Relief

(1) Portrayed of relief

Relief, where shown, shall be portrayed in a manner that will satisfy the chart users' need for:

(a) orientation and identification,

(b) safe terrain clearance,

(c) clarity of aeronautical information when shown,

(d) planning.

(2) Relief shown by hypsometric tints

Where relief is shown by hypsometric tints, the tints used shall be based on those shown in the Hypsometric Tint Guide in Appendix 4.

(3) Spot elevations

Where spot elevations are used, they shall be shown for selected critical points.

(a) The value of spot elevations of doubtful accuracy shall be followed by the sign ±.

GM CHARTS.065 Relief

(1) Relief is usually portrayed by combinations of contours, hypsometric tints, spot elevations and hill shading, the choice of method being affected by the nature and scale of the chart and its intended use.

CHARTS.070 Prohibited, restricted and danger areas

When prohibited, restricted or danger areas are shown, the reference or other identification shall be included, except that the nationality letters may be omitted.

GM CHARTS.070 Prohibited, restricted and danger areas

Nationality letters are those contained in Doc 7910 — Location Indicators.

CHARTS.075 Air traffic services airspace

(1) ATS airspace

When ATS airspace is shown on a chart, the class of airspace, the type, name or call sign, the vertical limits and the radio frequency(ies) to be used shall be indicated and the horizontal limits depicted in accordance with Appendix 2 — ICAO Chart Symbols.

(2) Visual flight charts

On charts used for visual flight, those parts of the ATS Airspace Classes table (Appendix 4) in MCAR ATS applicable to the airspace depicted on the chart shall be on the face or reverse of each chart.

CHARTS.080 Magnetic variation

(1) True North and magnetic variation

True North and magnetic variation shall be indicated. The order of resolution of magnetic variation shall be that as specified for a particular chart.

(2) Values of magnetic variation

When magnetic variation is shown on a chart, the values shown shall be those for the year nearest to the date of publication that is divisible by 5, i.e. 1980, 1985, etc. In exceptional cases where the current value would be more than one degree different, after applying the calculation for annual change, an interim date and value shall be quoted.

(3) Instrument procedure charts

For instrument procedure charts, the publication of a magnetic variation change shall be completed within a maximum of six AIRAC cycles.

(4) Large terminal areas with multiple aerodromes

In large terminal areas with multiple aerodromes, a single rounded value of magnetic variation shall be applied so that the procedures that service multiple aerodromes use a single, common variation value.

GM CHARTS.080 Magnetic variation

(2) The date and the annual change may be shown.

CHARTS.085 Typography

Samples of type suitable for use on aeronautical charts shall be looked for in the Aeronautical Chart Manual (Doc 8697).

CHARTS.090 Aeronautical data

(1) Properly organized quality system

The AIS/MAP provider shall take all necessary measures to introduce a properly organized quality system containing procedures, processes and resources necessary to implement quality management at each function stage as outlined in MCAR AIS (AIS.065). The execution of such quality management shall be made demonstrable for each function stage, when required. In addition, States shall ensure that established procedures exist in order that aeronautical data at any moment is traceable to its origin so to allow any data anomalies or errors, detected during the production/maintenance phases or in the operational use, to be corrected.

(2) Chart resolution of aeronautical data

The chart provider shall ensure that the chart resolution of aeronautical data shall be that as specified for a particular chart.

(3) Integrity of aeronautical data

The AIS/MAP provider shall ensure that integrity of aeronautical data is maintained throughout the data process from origination to distribution to the next intended user.

(4) Digital data error detection techniques

Digital data error detection techniques shall be used during the transmission and/or storage of aeronautical data and digital data sets.

GM CHARTS.090 Aeronautical data

(1) Specifications governing the quality system are given in MCAR AIS, Chapter 2.

(2) Specifications concerning the chart resolution for aeronautical data are contained in PANS-AIM (Doc 10066), Appendix 1.

(3) Specifications concerning the integrity classification related to aeronautical data are provided in PANS-AIM (Doc 10066), Appendix 1.

(4) Detailed specifications concerning digital data error detection techniques are contained in PANS-AIM (Doc 10066).

CHARTS.095 Common reference systems

(1) Horizontal reference system

(a) World Geodetic System — 1984 (WGS-84) shall be used as the horizontal (geodetic) reference system. Published aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.

(b) Geographical coordinates which have been transformed into WGS-84 coordinates but whose accuracy of original field work does not meet the requirements in MCAR ATS, Chapter 1, and Annex 14, Volumes I and II, Chapter 2, shall be identified by an asterisk.

(c) The chart resolution of geographical coordinates shall be that specified for a particular chart series.

(2) Vertical reference system

(a) Mean sea level (MSL) datum, which gives the relationship of gravity-related height (elevation) to a surface known as the geoid, shall be used as the vertical reference system.

(b) In addition to the elevations referenced to MSL, for the specific surveyed ground positions, geoid undulation (referenced to the WGS-84 ellipsoid) for those positions shall also be published as specified for a particular chart.

(c) The chart resolution of elevation and geoid undulation shall be that specified for a particular chart series.

(3) Temporal reference system

(a) The Gregorian calendar and Coordinated Universal Time (UTC) shall be used as the temporal reference system.

(b) When a different temporal reference system is used for charting, this shall be indicated in GEN 2.1.2 of the Aeronautical Information Publication (AIP).

GM CHARTS.095 Common reference systems

(1)(a) Comprehensive guidance material concerning WGS-84 is contained in the World Geodetic System — 1984 (WGS-84) Manual (Doc 9674).

(1)(c) Specifications concerning the determination and reporting (accuracy of field work and data integrity) of WGS-84-related aeronautical coordinates for geographical positions established by air traffic services are given in MCAR ATS, Chapter 1; and for aerodrome/heliport-related positions, in Annex 14, Volumes I and II, Chapter 2.

(1)(c) Specifications concerning the accuracy and integrity classification of WGS-84-related aeronautical data are contained in PANS-AIM (Doc 10066), Appendix 1.

(2)(a) The geoid globally most closely approximates MSL. It is defined as the equipotential surface in the gravity field of the Earth that coincides with the undisturbed MSL extended continuously through the continents.

(2)(a) Gravity-related heights (elevations) are also referred to as orthometric heights while distances of points above the ellipsoid are referred to as ellipsoidal heights.

(2)(b) Specifications concerning the determination and reporting (accuracy of field work and data integrity) of elevation and geoid undulation at specific positions at aerodromes/heliports are given in Annex 14, Volumes I and II, Chapter 2.

(2)(b) Specifications concerning the accuracy and integrity classification of elevation and geoid undulation at specific positions at aerodromes/heliports are contained in PANS-AIM (Doc 10066), Appendix 1.

CHARTS.100 PANS OPS Criteria

All calculus and procedure design criteria for the charts in chapter 8, 9, 10, 11, 12 and 20 of this MCAR, shall be in accordance with ICAO's Document 8168 "Construction of visual and instrument flight procedures" and any other related ICAO document.

CHARTS.105 Training programme

(1) Training and competencies of cartography staff

Within the context of the established AIS quality management system, the AIS provider shall ensure that the following be established and implemented for the cartography staff:

(a) Training programme and training plan

The AIS provider shall develop and implement a training programme and a training plan for its cartography staff, which shall be approved by the Authority and as a minimum shall include initial, OJT, specialized and recurrent training.

(b) OJT requirements

The AIS provider shall ensure that the cartography staff is required to complete in a satisfactorily manner OJT before duties and responsibilities are assigned.

(c) Supplementary training

The AIS provider shall provide supplementary training to its cartography staff, to ensure that they are competent in the use of new or updated equipment, procedures, etc.

(d) Recurrent training

The AIS provider shall provide recurrent training to its cartography staff in those needed areas. The recurrent training shall be provided at least once every three years or if there is no recurrent training for those courses shall take the basic course again every five years to keep the staff updated in any new techniques or requirements.

(e) Training records

The AIS provider shall develop a system or methodology for maintaining training records for its AIS staff, so that the qualifications of personnel can be confirmed.

GM CHARTS.105 Training programme

(1)(d) The recurrent training shall be in those specific courses needed for the improvement of the staff's qualifications, such as:

(i) Cartography

(ii) WGS-84

(iii) GIS

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CHAPTER 2

AERODROME OBSTACLE CHART — ICAO TYPE A

(OPERATING LIMITATIONS)

CHARTS.110 Function

This chart, in combination with the relevant information published in the AIP, shall provide the data necessary to enable an operator to comply with the operating limitations of Annex 6, Part I, Chapter 5, and Part III, Section II, Chapter 3.

CHARTS.115 Availability

(1) Aerodrome Obstacle Charts — ICAO Type A (Operating Limitations) shall be made available in the manner prescribed in CHARTS.005 (2) 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 — ICAO (Electronic) is provided in accordance with Chapter 4.

(2) Where a chart is not required because no obstacles exist in the take-off flight path area, a notification to this effect shall be published in the AIP.

CHARTS.120 Units of measurement

(1) Elevations shall be shown to the nearest foot.

(2) Linear dimensions shall be shown to the nearest half-metre.

CHARTS.125 Coverage and scale

(1) The extent of each plan shall be sufficient to cover all obstacles.

(2) The horizontal scale shall be within the range of 1:10 000 to 1:15 000

(3) The horizontal scale as far as possible shall be 1:10 000.

(4) The vertical scale shall be ten times the horizontal scale.

(5) Linear scales. Horizontal and vertical linear scales showing both metres and feet shall be included in the charts.

GM CHARTS.125 Coverage and scale

(1) Isolated distant obstacles that would unnecessarily increase the sheet size may be indicated by the appropriate symbol and an arrow, provided that the distance and bearing from the end of the runway farthest removed and the elevation are given.

(3) When the production of the charts would be expedited thereby, a scale of 1:20 000 may be used.

CHARTS.130 Format

(1) The charts shall depict a plan and profile of each runway, any associated stopway or clearway, the take-off flight path area and obstacles.

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

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

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

(4) The chart shall include:

(a) a box for recording the operational data specified in CHARTS.145 (3);

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

CHARTS.135 Identification

The chart shall be 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(s) of the runway(s).

CHARTS.140 Magnetic variation

The chart shall indicate the magnetic variation to the nearest degree and date of information.

CHARTS.145 Aeronautical data

(1) Obstacles

(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 shall be regarded as obstacles, except that obstacles lying wholly below the shadow of other obstacles as defined in CHARTS.145 (1)(b) need not be shown. Mobile objects such as boats, trains and trucks, which may project above the 1.2 per cent plane, shall be considered obstacles but shall not be considered as being capable of creating a shadow.

(b) The shadow of an obstacle is considered to be a 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. The plane covers the complete width of the take-off flight path area and extends to the plane defined in CHARTS.145 (1)(a) or to the next higher obstacle if it occurs first. For the first 1 000 ft of the take-off flight path area, the shadow planes are horizontal and beyond this point such planes have an upward slope of 1.2 per cent.

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

(2) Take-off flight path area

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

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

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

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

(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 CHARTS.145 (2)(a)(iii) shall be increased to not less than 12.0 km (6.5 NM) and the slope of the plane surface specified in CHARTS.140 (1)(a) and CHARTS.145 (1)(b) shall be reduced to 1.0 per cent or less.

(3) Declared distances

(a) The following information for each direction of each runway shall be entered in the space provided:

(i) take-off run available;

(ii) accelerate-stop distance available;

(iii) take-off distance available;

(iv) landing distance available.

(b) Where a declared distance is not provided because a runway is usable in one direction only, that runway shall be identified as “not usable for take-off, landing or both”.

(4) Plan and profile views

(a) The plan view shall show the following:

(i) 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;

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

(iii) take-off flight path areas by a dashed line and the centre line by a fine line consisting of short and long dashes;

(iv) alternative take-off flight path areas. When alternative take-off flight path areas not centred on the extension of the runway centre line are shown, notes shall be provided explaining the significance of such areas;

(v) obstacles, including:

1. the exact location of each obstacle together with a symbol indicative of its type;

2. the elevation and identification of each obstacle;

3. the limits of penetration of obstacles of large extent in a distinctive manner identified in the legend.

(vi) The nature of the runway and stopway surfaces shall be indicated.

(vii) Stopways shall be identified as such and shall be shown by a broken line.

(viii) When stopways are shown, the length of each stopway shall be indicated.

(b) The profile view shall show:

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

(ii) the elevation of the runway centre line at each end of the runway, at the stopway and at the origin of each take- off flight path area, and at each significant change in slope of runway and stopway;

(iii) obstacles, including:

(1) 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;

(2) identification of each obstacle;

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

GM CHARTS.145 Aeronautical data

(2)(b) When a 1.0 per cent survey plane touches no obstacles, this plane may be lowered until it touches the first obstacle.

(3)(a) In Annex 14, Volume I, Attachment A, Section 3, guidance is given on declared distances.

(4)(a) This does not exclude the necessity for indicating critical spot elevations within the take-off flight path area.

(4)(b) An obstacle profile consisting of a line joining the tops of each obstacle and representing the shadow created by successive obstacles may be shown.

CHARTS.150 Accuracy

(1) The order of accuracy attained shall be shown on the chart.

(2) The horizontal dimensions and the elevations of the runway, stopway and clearway to be printed on the chart shall be determined to the nearest 0.5 m (1 ft).

(3) The order of accuracy of the field work and the precision of chart production shall be such that measurements in the take-off flight path areas can be taken from the chart within the following maximum deviations:

(a) horizontal distances: 5 m (15 ft) at a point of origin increasing at a rate of 1 per 500;

(b) 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.

(4) Datum. Where no accurate datum for vertical reference is available, the elevation of the datum used shall be stated and shall be identified as assumed.

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CHAPTER 3

AERODROME OBSTACLE CHART — ICAO TYPE B

CHARTS.155 Function

(1) This chart shall provide 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.

CHARTS.160 Availability

(1) Aerodrome Obstacle Charts — ICAO Type B shall be made available, in the manner prescribed in CHARTS.005, for all aerodromes regularly used by international civil aviation except for those aerodromes where the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) is provided in accordance with Chapter 4.

(2) When a chart combining the specifications of Chapters 2 and 3 is made available, it shall be called the Aerodrome Obstacle Chart — ICAO (Comprehensive).

CHARTS.165 Units of measurement

(1) Elevations shall be shown to the nearest foot.

(2) Linear dimensions shall be shown to the nearest half-metre.

CHARTS.170 Coverage and scale

(1) The extent of each plan shall be sufficient to cover all obstacles.

(2) The horizontal scale shall be within the range of 1:10 000 to 1:20 000.

(3) A horizontal linear scale showing both metres and feet shall be included in the chart. When necessary, a linear scale for kilometres and a linear scale for nautical miles shall also be shown.

GM CHARTS.170 Coverage and scale

(1) Isolated distant obstacles that would unnecessarily increase the sheet size may be indicated by the appropriate symbol and an arrow, provided that the distance and bearing from the aerodrome reference point and elevation are given.

CHARTS.175 Format

(1) The charts shall 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 Annex 14, Volume I, Chapter 4;

(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.

GM CHARTS.175 Format

Lines of latitude and longitude may be shown across the face of the chart.

CHARTS.180 Identification

The chart shall be 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.

CHARTS.185 Culture and topography

(1) Drainage and hydrographic details shall be kept to a minimum.

(2) Buildings and other salient features associated with the aerodrome shall be shown. Wherever possible, they shall be shown to scale.

(3) All objects, either cultural or natural, that project above the take-off and approach surfaces specified in CHARTS.195 or the clearing and marking surfaces specified in Annex 14, Volume I, Chapter 4, shall be shown.

(4) 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, shall be shown.

GM CHARTS.185 Culture and topography

Geographical names of features may be shown if of significance.

CHARTS.190 Magnetic variation

The chart shall show 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 information and annual change.

CHARTS.195 Aeronautical data

(1) The charts shall show:

(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 stopway, at the origin of each take-off and approach area, and at each significant change of slope of runway and stopway;

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

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

(h) the length of each stopway;

(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 CHARTS.145 (1) including the obstacles in the shadow of an obstacle, which would otherwise be exempted.

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

(3) Wherever practicable, 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.

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

GM CHARTS.195 Aeronautical data

(l) The take-off area is described in CHARTS.145 (2). The approach area consists of an area on the surface of the earth lying directly below the approach surface as specified in Annex 14, Volume I, Chapter 4.

(m)(iv) This does not exclude the necessity for indicating critical spot elevations within the take-off and approach areas.

(n) The specifications in Annex 14, Volume I, Chapter 4, are minimum requirements. Where the competent authority has established lower surfaces, they may be used in the determination of obstacles.

CHARTS.200 Accuracy

(1) The order of accuracy attained shall be shown on the chart.

(2) The horizontal dimensions and the elevations of the movement area, stopways and clearways to be printed on the chart shall be determined to the nearest 0.5 m (1 ft).

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

(a) 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.

(b) 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.

(4) Datum. Where no accurate datum for vertical reference is available, the elevation of the datum used shall be stated and identified as assumed.

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CHAPTER 4

AERODROME TERRAIN AND OBSTACLE CHART — ICAO (ELECTRONIC)

CHARTS.205 Function

(1) This electronic chart shall portray 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 Annex 6, Part I, Chapter 5, and Part III, Section II, Chapter 3, 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.

CHARTS.210 Availability

(1) Aerodrome Terrain and Obstacle Charts-ICAO (Electronic) shall be made available in the manner prescribed in CHARTS.005 (2) for aerodromes regularly used by international civil aviation.

(2) Aerodrome Terrain and Obstacle Charts — ICAO (Electronic) shall be made available in the manner prescribed in CHARTS.005 (2) for all aerodromes regularly used by international civil aviation.

(3) The Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) shall also be made available in hard copy format upon request.

(4) The ISO 19100 series of standards for geographic information shall be used as a general data modelling framework.

GM CHARTS.210 Availability

(1) Where the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) is made available, the Aerodrome Obstacle Chart — ICAO Type A (Operating Limitations) and the Aerodrome Obstacle Chart — ICAO Type B are not required (see CHARTS.115 and CHARTS.160).

(2) The information required by the Precision Approach Terrain Chart — ICAO may be provided in the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic). Where this occurs, the Precision Approach Terrain Chart — ICAO is not required.

(3) For specifications regarding hard copy printed output, see CHARTS.235 (7).

(4) The use of the ISO 19100 series of standards for geographic information supports the interchange and use of the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) among different users.

CHARTS.215 Identification

Electronic charts shall be 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.

CHARTS.220 Chart coverage

The extent of each chart shall be sufficient to cover Area 2 as specified in MCAR AIS, Chapter 4.

CHARTS.225 Chart content

(1) General

(a) When developing computer graphic applications that are used to portray features on the chart, the relationships between features, feature attributes, and the underlying spatial geometry and associated topological relationships shall be specified by an application schema. Portrayed information shall be provided on the basis of portrayal specifications applied according to defined portrayal rules. Portrayal specifications and portrayal rules shall not be part of the data set. Portrayal rules shall be stored in a portrayal catalogue which shall make reference to separately stored portrayal specifications.

(b) Symbols used to portray features shall be in accordance with CHARTS.025 and Annex 4, Appendix 2 — ICAO Chart Symbols.

(2) Terrain feature

(a) The terrain feature, and associated attributes, to be portrayed and database-linked to the chart shall be based on the terrain data sets which satisfy the requirements of MCAR AIS, Chapter 4.

(b) The terrain feature shall be portrayed in a manner that provides an effective general impression of a terrain. This shall be a representation of terrain surface by continuous elevation values at all intersections of the defined grid, also known as the Digital Elevation Model (DEM).

(c) Representation of terrain surface shall be provided as a selectable layer of contour lines in addition to the DEM.

(d) An ortho-rectified image which matches the features on the DEM with features on the overlying image shall be used to enhance the DEM. The image shall be provided as a separate selectable layer.

(e) The portrayed terrain feature shall be 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.

(f) Additional terrain attributes provided in the database(s) shall be linked to the portrayed terrain feature.

(3) Obstacle features

(a) Obstacle features, and associated attributes, portrayed or database-linked to the chart shall be based on obstacle data sets which satisfy the requirements of MCAR AIS, Chapter 4.

(b) Each obstacle shall be portrayed by an appropriate symbol and obstacle identifier.

(c) The portrayed obstacle feature shall be 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) Additional obstacle attributes provided in the database(s) shall be linked to the portrayed obstacle feature.

(4) Aerodrome features

(a) Aerodrome features, and associated attributes, portrayed and database-linked to the chart shall be based on aerodrome data which satisfy the requirements of MCAR AIS, Chapter 4.

(b) The following aerodrome features shall be portrayed by an appropriate symbol:

(i) aerodrome reference point;

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

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

(c) The portrayed aerodrome feature shall be linked to the following associated attributes in the database(s):

(i) geographical coordinates of the aerodrome reference point;

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

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

(iv) type of surface of runway(s) and stopway(s);

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

(vi) elevations at each end of runway(s), stopway(s) and clearway(s), and at each significant change in slope of runway(s) and stopway(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.

(5) Radio navigation aid features

Each radio navigation aid feature located within the chart coverage shall be portrayed by an appropriate symbol.

GM CHARTS.225 Chart content

(1) General

(a) ISO Standard 19117 contains a definition of the schema describing the portrayal mechanism of feature-based geographic information, while ISO Standard 19109 contains rules for application schema. Spatial geometry and associated topological relationships are defined in ISO Standard 19107.

(2) Terrain feature

(a) Specifications concerning terrain data sets are contained in PANS-AIM (Doc 10066), Chapter 5 and Appendices 1, 6 and 8.

(b) In accordance with MCAR AIS, Chapter 4 and PANS-AIM (Doc 10066), Chapter 5 and Appendices 1 and 8, the DEM for Area 2 post spacing (grid) is specified at 1 arc second (approximately 30 m).

(f) Specifications concerning terrain attributes are contained in PANS-AIM (Doc 10066), Appendix 6, Table A6-1.

(3) Obstacle features

(a) Specifications concerning obstacle data sets are contained in PANS-AIM (Doc 10066), Chapter 5 and Appendices 1, 6 and 8.

(d) Specifications concerning obstacle attributes are contained in PANS-AIM (Doc 10066), Appendix 6, Table A6-2.

(4) Aerodrome features

(a) Specifications concerning aerodrome features and associated attributes are contained in PANS-AIM (Doc 10066), Chapter 5 and Appendix 1.

(c) Magnetic variation may be database-linked to the aerodrome reference point.

(g) Annex 14, Volume I, Attachment A, provides guidance on declared distances.

(5) Radio navigation aid features

Navigation aid feature attributes may be linked to the portrayed navigation aid features in the database(s).

CHARTS.230 Accuracy and resolution

(1) The order of accuracy of aeronautical, terrain and obstacle data shall be in accordance with its intended use.

(2) The aeronautical, terrain and obstacle data resolution shall be commensurate with the actual data accuracy.

GM CHARTS.230 Accuracy and resolution

(1) Specifications concerning the accuracy of aeronautical, terrain and obstacle data are contained in the PANS-AIM (Doc 10066), Appendix 1.

(2) Specifications concerning the order of resolution for aeronautical, terrain and obstacle data are provided in the PANS-AIM (Doc 10066), Appendix 1.

CHARTS.235 Electronic functionality

(1) It shall be possible to vary the scale at which the chart is viewed. Symbols and text size shall vary with chart scale to enhance readability.

(2) Information on the chart shall be geo-referenced, and it shall be possible to determine cursor position to at least the nearest second.

(3) The chart shall be compatible with widely available desktop computer hardware, software and media.

(4) The chart shall include its own “reader” software.

(5) It shall not be possible to remove information from the chart without an authorized update.

(6) 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, selectable information layers shall be provided to allow for the customized combination of information.

(7) It shall be possible to print the chart in hard copy format according to the content specifications and scale determined by the user.

GM CHARTS.235 Electronic functionality

(6) An electronic chart format with user-selectable information layers is the preferred method of presentation for most aerodrome features.

(7) Printed output may consist of “tiled” sheets or specific selected areas according to user requirements.

(7) Feature attribute information available through database link may be supplied separately on appropriately referenced sheets.

CHARTS.240 Chart data product specifications

(1) A comprehensive statement of the data sets comprising the chart shall be 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 (application).

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

(3) The overview of the chart data product specifications shall provide an informal description of the product and shall contain general information about the data product. The specification scope of the chart data product specifications shall contain the spatial (horizontal) extent of the chart coverage. The chart data product identification shall include 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.

(4) The data content of the chart data product specifications shall clearly identify the type of coverage and/or imagery and shall provide a narrative description of each.

(5) The chart data product specifications shall include information that defines the reference systems used. This shall include the spatial reference system (horizontal and vertical) and, if appropriate, temporal reference system. The chart data product specifications shall identify the data quality requirements. This shall include a statement on acceptable conformance quality levels and corresponding data quality measures. This statement shall cover 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.

(6) The chart data product specifications shall include a data capture statement which shall be a general description of the sources and of processes applied for the capture of chart data. The principles and criteria applied in the maintenance of the chart shall also be provided in the chart data product specifications, including the frequency with which the chart product is updated. Of particular importance shall be the maintenance information of obstacle data sets included on the chart and an indication of the principles, methods and criteria applied for obstacle data maintenance.

(7) The chart data product specifications shall contain information on how data are portrayed on the chart, as detailed in CHARTS.225 (1)(a). The chart data product specifications shall also contain data product delivery information which shall include delivery formats and delivery medium information.

(8) The core chart metadata elements shall be included in the chart data product specifications. Any additional metadata items required to be supplied shall be

stated in the product specifications together with the format and encoding of the metadata.

GM CHARTS.240 Chart data product specifications

(2) ISO Standard 19131 specifies the requirements and outline of data product specifications for geographic information.

(4) ISO Standard 19123 contains schema for coverage geometry and functions.

(5) ISO Standard 19113 contains quality principles for geographic information while ISO Standard 19114 covers quality evaluation procedures.

(8) ISO Standard 19115 specifies requirements for geographic information metadata.

(9) The chart data product specifications document the chart data product which is implemented as data set. Those data sets are described by metadata.

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CHAPTER 5

PRECISION APPROACH TERRAIN CHART — ICAO

There are no precision approach runways Categories II and III at aerodromes used by international civil aviation within Mauritius; therefore, this chart is not applicable.

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CHAPTER 6

ENROUTE CHART — ICAO

CHARTS.245 Function

This chart shall provide flight crews with information to facilitate navigation along ATS routes in compliance with air traffic services procedures.

GM CHARTS.245 Function

Simplified versions of these charts are appropriate for inclusion in Aeronautical Information Publications to complement the tabulation of communication and navigation facilities.

CHARTS.250 Availability

(1) The Enroute Chart — ICAO shall be made available in the manner prescribed in CHARTS.005 (2) for all areas where flight information regions have been established.

(2) 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, separate charts shall be provided.

GM CHARTS.250 Availability

(1) Under certain conditions, an Area Chart — ICAO may have to be provided. (See Chapter 7.)

CHARTS.255 Coverage and scale

(1) Layout of sheet lines shall be determined by the density and pattern of the ATS route structure.

(2) Large variations of scale between adjacent charts showing a continuous route structure shall be avoided.

(3) An adequate overlap of charts shall be provided to ensure continuity of navigation.

GM CHARTS.255 Coverage and scale

A uniform scale for charts of this type cannot be specified due to the varying degree of congestion of information in certain areas.

A linear scale based on the mean scale of the chart may be shown.

CHARTS.260 Projection

(1) A conformal projection on which a straight line approximates a great circle shall be used.

(2) Parallels and meridians shall be shown at suitable intervals.

(3) Graduation marks shall be placed at consistent intervals along selected parallels and meridians.

CHARTS.265 Identification

Each sheet shall be identified by chart series and number.

CHARTS.270 Culture and topography

(1) Generalized shore lines of all open water areas, large lakes and rivers shall be shown except where they conflict with data more applicable to the function of the chart.

(2) Within each quadrilateral formed by the parallels and meridians, the area minimum altitude shall be shown, except as provided for in CHARTS.270 (3).

(3) Where charts are not True North orientated, this fact and the selected orientation used shall be clearly indicated.

GM CHARTS.270 Culture and topography

(2) Quadrilaterals formed by the parallels and meridians normally correspond to the whole degree of latitude and longitude. Regardless of the chart scale being used, the area minimum altitude relates to the consequent quadrilateral.

(2) Refer to the Procedures for Air Navigation — Aircraft Operations (PANS OPS, Doc 8168), Volume II, Part I, Section 2, Chapter 1, 1.8, for method for determination of area minimum altitude.

CHARTS.275 Magnetic variation

Isogonals shall be indicated and the date of the isogonic information given.

CHARTS.280 Bearings, tracks and radials

(1) Bearings, tracks and radials shall be magnetic, except as provided for in CHARTS.280 (2). Where bearings and tracks are additionally provided as true values for RNAV segments, they shall be shown in parentheses to the nearest tenth of a degree, e.g. 290° (294.9°T).

(2) Where bearings, tracks or radials are given with reference to True North or Grid North, this shall be clearly indicated. When Grid North is used, its reference grid meridian shall be identified.

CHARTS.285 Aeronautical data

(1) Aerodromes

All aerodromes used by international civil aviation to which an instrument approach can be made shall be shown.

(2) Prohibited, restricted and danger areas.

Prohibited, restricted and danger areas relevant to the layer of airspace shall be depicted with their identification and vertical limits.

(3) Air traffic services system

(a) Where appropriate, the components of the established air traffic services system shall be shown.

(i) The components shall include the following:

(1) 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;

(2) in respect of DME, additionally the elevation of the transmitting antenna of the DME to the nearest 30 m (100 ft);

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

(4) All ATS 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;

(5) all significant points which define the ATS routes and are not marked by the position of a radio navigation aid, together with their name-codes and geographical coordinates in degrees, minutes and seconds;

(6) in respect of waypoints defining VOR/DME area navigation routes, additionally,

(a) the station identification and radio frequency of the reference VOR/DME;

(b) 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/ DME, if the waypoint is not collocated with it;

(7) an indication of all compulsory and “on-request” reporting points and ATS/MET reporting points;

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

(9) 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;

(10) minimum en-route altitudes and minimum obstacle clearance altitudes, on ATS routes to the nearest higher 50 metres or 100 feet (see MCAR ATS.115);

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

(12) air defence identification zone (ADIZ) properly identified.

GM CHARTS.285 Aeronautical data

(3)(a)(i)*(4)* Guidance material on the organization of ATS routes for en-route flight publication which may be used to facilitate charting is contained in the Aeronautical Information Services Manual (Doc 8126).

(3)(a)(i)*(8)* Overall distances between radio navigation aids may also be shown.

(3)(a)(i)*(9)* Change-over points established at the mid-point between two aids, or at the intersection of two radials in the case of a route which changes direction between the aids, need not be shown for each route segment if a general statement regarding their existence is made.

(3)(a)(i)*(12)* ADIZ procedures may be described in the chart legend.

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CHAPTER 7

AREA CHART - ICAO

CHARTS.290 Function

(1) This chart shall provide 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 ATS routes or airspace structure.

GM CHARTS.290 Scope of aeronautical data and aeronautical information

The function described in (1)(c) may be satisfied by a separate chart or an inset on an Enroute Chart — ICAO.

CHARTS.295 Availability

(1) The Area Chart — ICAO shall be made available in the manner prescribed in CHARTS.005 (2) where the air traffic services routes or position reporting requirements are complex and cannot be adequately shown on an Enroute Chart — ICAO.

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

GM CHARTS.295 Availability

(2) Under certain conditions, a Standard Departure Chart — Instrument (SID) — ICAO and a Standard Arrival Chart — Instrument (STAR) — ICAO may have to be provided (see Chapters 8 and 9).

CHARTS.300 Coverage and scale

(1) The coverage of each chart shall extend to points that effectively show departure and arrival routes.

(2) The chart shall be drawn to scale and a scale-bar shown.

CHARTS.305 Projection

(1) A conformal projection on which a straight line approximates a great circle shall be used.

(2) Parallels and meridians shall be shown at suitable intervals.

(3) Graduation marks shall be placed at consistent intervals along the neat lines, as appropriate.

CHARTS.310 Identification

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

GM CHARTS.310 Identification

The name may be that of the air traffic services centre, the name of the largest city or town situated in the area covered by the chart or the name of the city that the aerodrome serves. Where more than one aerodrome serves the city or town, the name of the aerodrome on which the procedures are based shall be added.

CHARTS.315 Culture and topography

(1) Generalized shorelines of all open water areas, large lakes and rivers shall be shown except where they conflict with data more applicable to the function of the chart.

(2) To improve situational awareness in areas where significant relief exists, all relief exceeding 1 000 ft above the elevation of the primary aerodrome shall be shown by smoothed contour lines, contour values and layer tints printed in brown. Appropriate spot elevations, including the highest elevation within each top contour line, shall be shown printed in black. Obstacles shall also be shown.

GM CHARTS.315 Culture and topography

(2) The next higher suitable contour line appearing on base topographic maps exceeding 1 000 ft above the elevation of the primary aerodrome may be selected to start layer tinting.

(2) An appropriate brown colour, on which half-tone layer tinting is to be based, is specified in Appendix 3 — Colour Guide for contours and topographic features.

(2) Appropriate spot elevations and obstacles are those provided by the procedures specialist.

CHARTS.320 Magnetic variation

The average magnetic variation of the area covered by the chart shall be shown to the nearest degree.

CHARTS.325 Bearings, tracks and radials

(1) Bearings, tracks and radials shall be magnetic, except where bearings and tracks are additionally provided as true values for RNAV segments, they shall be shown in parentheses to the nearest tenth of a degree, e.g. 290° (294.9°T).

(2) Where bearings, tracks or radials are given with reference to True North or Grid North, this shall be clearly indicated. When Grid North is used, its reference grid meridian shall be identified.

CHARTS.330 Aeronautical data

(1) Aerodromes

All aerodromes which affect the terminal routings shall be shown. Where appropriate, a runway pattern symbol shall be used.

(2) Prohibited, restricted and danger areas

Prohibited, restricted and danger areas shall be depicted with their identification and vertical limits.

(3) Area minimum altitudes

Area minimum altitudes shall be shown within quadrilaterals formed by the parallels and meridians.

(4) Air traffic services system

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

(i) The components shall include the following:

(1) 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;

(2) in respect of DME, additionally the elevation of the transmitting antenna of the DME to the nearest 30 m (100 ft);

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

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

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

(6) 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;

(7) 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;

(8) in respect of waypoints defining VOR/DME area navigation routes, additionally,

(a) the station identification and radio frequency of the reference VOR/DME;

(b) 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/DME, if the waypoint is not collocated with it;

(9) an indication of all compulsory and “on-request” reporting points;

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

(11) 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;

(12) minimum en-route altitudes and minimum obstacle clearance altitudes, on ATS routes to the nearest higher 100 feet (see MCAR ATS.115);

(13) Not applicable to Mauritius;

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

(15) communication facilities listed with their channels and, if applicable, logon address and SATVOICE number; and

(16) an indication of “flyover” significant points.

GM CHARTS.330 Aeronautical data

(3) Quadrilaterals formed by the parallels and meridians normally correspond to the whole degree of latitude and longitude. Regardless of the chart scale being used, the area minimum altitude relates to the consequent quadrilateral.

(3) Refer to the Procedures for Air Navigation — Aircraft Operations (PANS OPS, Doc 8168), Volume II, Part I, Section 2, Chapter 1, 1.8, for method for determination of area minimum altitude.

(4)(a)(i)*(10)* Overall distances between radio navigation aids may also be shown.

(4)(a)(i)*(11)* Change-over points established at midpoint between two aids, or at the intersection of two radials in the case of a route which changes direction between the aids, need not be shown for each route segment if a general statement regarding their existence is made.

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CHAPTER 8

STANDARD DEPARTURE CHART – INSTRUMENT (SID) - ICAO

CHARTS.335 Function

This chart shall provide the flight crew with information to enable it to comply with the designated standard departure route — instrument from take-off phase to the en-route phase.

GM CHARTS.335 Function

Provisions governing the identification of standard departure routes are in MCAR ATS, Appendix 3; guidance material relating to the establishment of such routes is contained in the Air Traffic Services Planning Manual (Doc 9426).

Provisions governing obstacle clearance criteria and details of the minimum information to be published are contained in the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part II.

CHARTS.340 Availability

The Standard Departure Chart — Instrument (SID) — ICAO shall be made available wherever a standard departure route — instrument has been established and cannot be shown with sufficient clarity on the Area Chart — ICAO.

CHARTS.345 Coverage and scale

(1) The coverage of the chart shall be sufficient to indicate the point where the departure route begins and the specified significant point at which the en-route phase of flight along a designated air traffic services route can be commenced.

(2) The chart shall be drawn to scale.

(3) If the chart is drawn to scale, a scale-bar shall be shown.

(4) When the chart is not drawn to scale, the annotation “NOT TO SCALE” shall be shown and the symbol for scale- break shall be used on tracks and other aspects of the chart which are too large to be drawn to scale.

GM CHARTS.345 Coverage and scale

(1) The departure route normally originates at the end of a runway.

CHARTS.350 Projection

(1) A conformal projection on which a straight line approximates a great circle shall be used.

(2) When the chart is drawn to scale, parallels and meridians shall be shown at suitable intervals.

(3) Graduation marks shall be placed at consistent intervals along the neat lines.

CHARTS.355 Identification

The chart shall be identified by the name of the city or town or area which the aerodrome serves, the name of the aerodrome and the identification of the standard departure route(s) — instrument as established in accordance with the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part I, Section 3, Chapter 5.

GM CHARTS.355 Identification

The identification of the standard departure route(s) — instrument is provided by the procedures specialist.

CHARTS.360 Culture and topography

(1) Where the chart is drawn to scale, generalized shore lines of all open water areas, large lakes and rivers shall be shown except where they conflict with data more applicable to the function of the chart.

(2) To improve situational awareness in areas where significant relief exists, the chart shall be drawn to scale and all relief exceeding 1 000 ft above the aerodrome elevation shall be shown by smoothed contour lines, contour values and layer tints printed in brown. Appropriate spot elevations, including the highest elevation within each top contour line, shall be shown printed in black. Obstacles shall also be shown.

GM CHARTS.360 Culture and topography

(2) The next higher suitable contour line appearing on base topographic maps exceeding 1000 ft above the aerodrome elevation may be selected to start layer tinting.

(2) An appropriate brown colour, on which half-tone layer tinting is to be based, is specified in Appendix 3 — Colour Guide for contours and topographic features.

(2) Appropriate spot elevations and obstacles are those provided by the procedures specialist.

CHARTS.365 Magnetic variation

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

CHARTS.370 Bearings, tracks and radials

(1) Bearings, tracks and radials shall be magnetic, except where bearings and tracks are additionally provided as true values for RNAV segments, they shall be shown in parentheses to the nearest tenth of a degree, e.g. 290° (294.9°T).

(2) Where bearings, tracks or radials are given with reference to True North or Grid North, this shall be clearly indicated. When Grid North is used, its reference grid meridian shall be identified.

GM CHARTS.370 Bearings, tracks and radials

(1) A note to this effect may be included on the chart.

CHARTS.375 Aeronautical data

(1) Aerodromes

(a) The aerodrome of departure shall be shown by the runway pattern.

(b) All aerodromes which affect the designated standard departure route – instrument shall be shown and identified. Where appropriate, the aerodrome runway patterns shall be shown.

(2) Prohibited, restricted and danger areas

Prohibited, restricted and danger areas which may affect the execution of the procedures shall be shown with their identification and vertical limits.

(3) Minimum sector altitude

(a) The established minimum sector altitude shall be shown with a clear indication of the sector to which it applies.

(b) Where the minimum sector altitude has not been established, the chart shall be drawn to scale and area minimum altitudes shall be shown within quadrilaterals formed by the parallels and meridians. Area minimum altitudes shall also be shown in those parts of the chart not covered by the minimum sector altitude.

(4) Air traffic services system

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

(i) The components shall comprise the following:

(1) a graphic portrayal of each standard departure route — instrument, including:

(a) for departure procedures designed specifically for helicopters, the term “CAT H” shall be depicted in the departure chart plan view;

(b) route designator;

(c) significant points defining the route;

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

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

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

(g) Not applicable to Mauritius;

(2) the radio navigation aid(s) associated with the route(s) including:

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

(i) plain language name;

(ii) identification;

(iii) Morse code;

(iv) frequency;

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

(vi) for DME, the channel and the elevation of the transmitting antenna of the DME to the nearest 100 ft;

(b) when the radio navigation aid is used as a significant point for area navigation:

(i) plain language name; and

(ii) identification;

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

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

(i) name-code;

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

(iii) bearing to the nearest tenth of a degree from the reference radio navigation aid;

(iv) distance to the nearest two-tenths of a kilometre (tenth of a nautical mile) from the reference radio navigation aid; and

(v) identification of the reference radio navigation aid;

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

(i) name-code;

(4) applicable holding patterns;

(5) transition altitude/height to the nearest higher 1 000 ft;

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

(7) area speed restrictions, where established;

(8) for PBN procedures, a PBN requirement box;

(9) all compulsory and “on-request” reporting points;

(10) radio communication procedures, including:

(a) call sign(s) of ATS unit(s);

(b) frequency and, if applicable, SATVOICE number;

(c) transponder setting, where appropriate;

(11) an indication of “flyover” significant points.

(b) A textual description of standard departure route(s) — instrument (SID) and relevant communication failure procedures shall be provided and shall, whenever feasible, be shown on the chart or on the same page which contains the chart.

(c) Aeronautical database requirements

Appropriate data to support navigation database coding shall be published in accordance with the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part III, Section 5, Chapter 2, 2.1, on the verso of the chart or as a separate, properly referenced sheet.

GM CHARTS.375 Aeronautical data

(3)(b) Quadrilaterals formed by the parallels and meridians normally correspond to the half degree of latitude and longitude. Regardless of the chart scale being used, the area minimum altitude relates to the consequent quadrilateral.

(3)(b) Refer to the Procedures for Air Navigation — Aircraft Operations (PANS OPS, Doc 8168), Volume II, Part I, Section 2, Chapter 1, 1.8, for method for determination of area minimum altitude.

(4)(a)(i)*(6)* In accordance with PANS-OPS, Volume II, information on close-in obstacles is provided by the procedure’s specialist.

(4)(c) Appropriate data are those provided by the procedures specialist.

(4)(a)(i)*(8)* Refer to the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part III, Section 5 for information on a PBN requirements box.

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CHAPTER 9

STANDARD ARRIVAL CHART – INSTRUMENT (STAR) – ICAO

CHARTS.380 Function

This chart shall provide the flight crew with information to enable it to comply with the designated standard arrival route— instrument from the en-route phase to the approach phase.

GM CHARTS.380 Function

Standard arrival routes — instrument are to be interpreted as including “standard descent profiles”, “continuous descent approach”, and other non-standard descriptions. In the case of a standard descent profile, the depiction of a cross-section is not required.

Provisions governing the identification of standard arrival routes are in MCAR ATS, Appendix 3; guidance material relating to the establishment of such routes is contained in the Air Traffic Services Planning Manual (Doc 9426).

CHARTS.385 Availability

The Standard Arrival Chart — Instrument (STAR) — ICAO shall be made available wherever a standard arrival route — instrument has been established and cannot be shown with sufficient clarity on the Area Chart.

CHARTS.390 Coverage and scale

(1) The coverage of the chart shall be sufficient to indicate the points where the en-route phase ends and the approach phase begins.

(2) The chart shall be drawn to scale.

(3) If the chart is drawn to scale, a scale-bar shall be shown.

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

CHARTS.395 Projection

(1) A conformal projection on which a straight line approximates a great circle shall be used.

(2) When the chart is drawn to scale, parallels and meridians shall be shown at suitable intervals.

(3) Graduation marks shall be placed at consistent intervals along the neat lines.

CHARTS.400 Identification

The chart shall be identified by the name of the city or town or area which the aerodrome serves, the name of the aerodrome and the identification of the standard arrival route(s) — instrument as established in accordance with the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part I, Section 4, Chapter 2.

GM CHARTS.400 Identification

The identification of the standard arrival route(s) — instrument is provided by the procedures specialist.

CHARTS.405 Culture and topography

(1) Where the chart is drawn to scale, generalized shore lines of all open water areas, large lakes and rivers shall be shown except where they conflict with data more applicable to the function of the chart.

(2) To improve situational awareness in areas where significant relief exists, the chart shall be drawn to scale and all relief exceeding 1 000 ft above the aerodrome elevation shall be shown by smoothed contour lines, contour values and layer tints printed in brown. Appropriate spot elevations, including the highest elevation within each top contour line, shall be shown printed in black. Obstacles shall also be shown.

GM CHARTS.405 Culture and topography

(2) The next higher suitable contour line appearing on base topographic maps exceeding 1000 ft above the aerodrome elevation may be selected to start layer tinting.

(2) An appropriate brown colour, on which half-tone layer tinting is to be based, is specified in Appendix 3 — Colour Guide for contours and topographic features.

(2) Appropriate spot elevations and obstacles are those provided by the procedures specialist.

CHARTS.410 Magnetic variation

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

CHARTS.415 Bearings, tracks and radials

(1) Bearings, tracks and radials shall be magnetic, except where bearings and tracks are additionally provided as true values for RNAV segments, they shall be shown in parentheses to the nearest tenth of a degree, e.g. 290° (294.9°T).

(2) Where bearings, tracks or radials are given with reference to True North or Grid North, this shall be clearly indicated. When Grid North is used, its reference grid meridian shall be identified.

GM CHARTS.415 Bearings, tracks and radials

(2) A note to this effect may be included on the chart.

CHARTS.420 Aeronautical data

(1) Aerodromes

(a) The aerodrome of landing shall be shown by the runway pattern.

(b) All aerodromes which affect the designated standard arrival route – instrument shall be shown and identified. Where appropriate, the aerodrome runway patterns shall be shown.

(2) Prohibited, restricted and danger areas

Prohibited, restricted and danger areas which may affect the execution of the procedures shall be shown with their identification and vertical limits.

(3) Minimum sector altitude

(a) The established minimum sector altitude shall be shown with a clear indication of the sector to which it applies.

(b) Where the minimum sector altitude has not been established, the chart shall be drawn to scale and area minimum altitudes shall be shown within quadrilaterals formed by the parallels and meridians. Area minimum altitudes shall also be shown in those parts of the chart not covered by the minimum sector altitude.

(4) Air traffic services system

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

(i) The components shall comprise the following:

(1) a graphic portrayal of each standard arrival route — instrument, including:

(a) route designator;

(b) significant points defining the route;

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

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

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

(f) Not applicable to Mauritius;

(2) the radio navigation aid(s) associated with the route(s) including:

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

(i) plain language name;

(ii) identification;

(iii) Morse code;

(iv) frequency;

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

(vi) for DME, the channel and the elevation of the transmitting antenna of the DME to the nearest 100 ft;

(b) when the radio navigation aid is used as a significant point for area navigation:

(i) plain language name; and

(ii) identification;

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

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

(i) name-code;

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

(iii) bearing to the nearest tenth of a degree from the reference radio navigation aid;

(iv) distance to the nearest two-tenths of a kilometre (tenth of a nautical mile) from the reference radio navigation aid; and

(v) identification of the reference radio navigation aid;

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

(ii) name-code;

(4) applicable holding patterns;

(5) transition altitude/height to the nearest higher 1 000 ft;

(6) area speed restrictions, where established;

(7) for PBN procedures, a PBN requirements box;

(8) all compulsory and “on-request” reporting points;

(9) radio communication procedures, including:

(a) call sign(s) of ATS unit(s);

(b) frequency and, if applicable, SATVOICE number;

(c) transponder setting, where appropriate;

(10) an indication of “flyover” significant points.

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

(b) A textual description of standard arrival route(s) — instrument (STAR) and relevant communication failure procedures shall be provided and shall, whenever feasible, be shown on the chart or on the same page which contains the chart.

(c) Aeronautical database requirements

Appropriate data to support navigation database coding shall be published in accordance with the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part III, Section 5, Chapter 2, 2.2, on the verso of the chart or as a separate, properly referenced sheet.

GM CHARTS.420 Aeronautical data

(3)(b) Quadrilaterals formed by the parallels and meridians normally correspond to the half degree of latitude and longitude. Regardless of the chart scale being used, the area minimum altitude relates to the consequent quadrilateral.

(3)(b) Refer to the Procedures for Air Navigation — Aircraft Operations (PANS OPS, Doc 8168), Volume II, Part I, Section 2, Chapter 1, 1.8, for method for determination of area minimum altitude.

(4)(c) Appropriate data are those provided by the procedures specialist.

(4)(a)(i)*(7)* Refer to the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part III, Section 5 for information on a PBN requirements box.

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CHAPTER 10

INSTRUMENT APPROACH CHART – ICAO

CHARTS.425 Function

This chart shall provide the flight crew with information which will enable them to perform an approved instrument approach procedure to the runway of intended landing including the missed approach procedure and, where applicable, associated holding patterns.

GM CHARTS.425 Function

Detailed criteria for the establishment of instrument approach procedures and the resolutions of associated altitudes/heights are contained in the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168).

CHARTS.430 Availability

(1) Instrument Approach Charts — ICAO shall be made available for all aerodromes used by international civil aviation where instrument approach procedures have been established by Mauritius.

(2) A separate Instrument Approach Chart — ICAO shall normally be provided for each precision approach procedure established by Mauririus.

(3) A separate Instrument Approach Chart — ICAO shall normally be provided for each non-precision approach procedure established by Mauritius.

(4) 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, more than one chart shall be provided.

(5) Instrument Approach Charts — ICAO shall be revised at least every five years or whenever information essential to safe operation becomes out of date.

GM CHARTS.430 Availability

(3) A single precision or non-precision approach procedure chart may be provided to portray more than one approach procedure when the procedures for the intermediate approach, final approach and missed approach segments are identical.

(4) For categories of aircraft, see Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part I, Section 4, Chapter 9.

CHARTS.435 Coverage and scale

(1) The coverage of the chart shall be sufficient to include all segments of the instrument approach procedure and such additional areas as may be necessary for the type of approach intended.

(2) The scale selected shall ensure optimum legibility consistent with:

(a) the procedure shown on the chart;

(b) sheet size.

(3) A scale indication shall be given.

(a) Except where this is not practicable, a distance circle with a radius of 10 NM centred on a DME located on or close to the aerodrome, or on the aerodrome reference point where no suitable DME is available, shall be shown; its radius shall be indicated on the circumference.

(b) A distance scale shall be shown directly below the profile.

CHARTS.440 Format

The sheet size shall be 210× 148 mm (8.27 × 5.82 in).

CHARTS.445 Projection

(1) A conformal projection on which a straight line approximates a great circle shall be used.

(2) Graduation marks shall be placed at consistent intervals along the neat lines.

CHARTS.450 Identification

The chart shall be identified by the name of the city or town or area which the aerodrome serves, the name of the aerodrome and the identification of the instrument approach procedure as established in accordance with the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part I, Section 4, Chapter 9.

GM CHARTS.450 Identification

The identification of the instrument approach procedure is provided by the procedures specialist.

CHARTS.455 Culture and topography

(1) Culture and topographic information pertinent to the safe execution of the instrument approach procedure, including the missed approach procedure, associated holding procedures and visual manoeuvring (circling) procedure when established, shall be shown. Topographic information shall be named, only when necessary, to facilitate the understanding of such information, and the minimum shall be a delineation of land masses and significant lakes and rivers.

(2) Relief shall be shown in a manner best suited to the particular elevation characteristics of the area. In areas where relief exceeds 4 000 ft above the aerodrome elevation within the coverage of the chart 2 000 ft within 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 500 ft above the aerodrome elevation shall be shown by smoothed contour lines, contour values and layer tints printed in brown. Appropriate spot elevations, including the highest elevation within each top contour line, shall also be shown printed in black.

(3) In areas where relief is lower than specified in CHARTS.455 (2), all relief exceeding 500 ft above the aerodrome elevation shall be shown by smoothed contour lines, contour values and layer tints printed in brown. Appropriate spot elevations, including the highest elevation within each top contour line, shall also be shown printed in black.

GM CHARTS.455 Culture and topography

(2) The next higher suitable contour line appearing on base topographic maps exceeding 500 ft above the aerodrome elevation may be selected to start layer tinting.

(2) An appropriate brown colour, on which half-tone layer tinting is to be based, is specified in Appendix 3 — Colour Guide for contours and topographic features.

(2) Appropriate spot elevations are those provided by the procedures specialist.

(3) The next higher suitable contour line appearing on base topographic maps exceeding 500 ft above the aerodrome elevation may be selected to start layer tinting.

(3) An appropriate brown colour, on which half-tone layer tinting is to be based, is specified in Appendix 3 — Colour Guide for contours and topographic features.

(3) Appropriate spot elevations are those provided by the procedures specialist.

CHARTS.460 Magnetic variation

(1) The magnetic variation shall be shown.

(2) When shown, the value of the variation, indicated to the nearest degree, shall agree with that used in determining magnetic bearings, tracks and radials.

CHARTS.465 Bearings, tracks and radials

(1) Bearings, tracks and radials shall be magnetic, except where bearings and tracks are additionally provided as true values for RNAV segments, they shall be shown in parentheses to the nearest tenth of a degree, e.g. 290° (294.9°T).

(2) Where bearings, tracks or radials are given with reference to True North or Grid North, this shall be clearly indicated. When Grid North is used, its reference grid meridian shall be identified.

GM CHARTS.465 Bearings, tracks and radials

(1) A note to this effect may be included on the chart.

CHARTS.470 Aeronautical data

(1) Aerodromes

(a) All aerodromes which show a distinctive pattern from the air shall be shown by the appropriate symbol. Abandoned aerodromes shall be identified as abandoned.

(b) The runway pattern, at a scale sufficiently large to show it clearly, shall be 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 shall be shown to the nearest foot in a prominent position on the chart.

(d) The threshold elevation or, where applicable, the highest elevation of the touchdown zone shall be shown to the nearest foot.

(2) Obstacles

(a) Obstacles shall be shown on the plan view of the chart.

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

(c) The elevation of the top of obstacles shall be shown to the nearest (next higher) foot.

(d) The heights of obstacles above a datum other than mean sea level (see CHARTS.470 (2)(c)) shall be shown. When shown, they shall be given in parentheses on the chart.

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

(f) Where a datum other than mean sea level is used, it shall be stated in a prominent position on the chart.

(g) Where an obstacle free zone has not been established for a precision approach runway Category I, this shall be indicated.

(3) Prohibited, restricted and danger areas

Prohibited, restricted and danger areas which may affect the execution of the procedures shall be shown with their identification and vertical limits.

(4) Radio communication facilities and navigation aids

(a) Radio navigation aids required for the procedures together with their frequencies, identifications and track-defining characteristics, if any, shall be shown. In the case of a procedure in which more than one station is located on the final approach track, the facility to be used for track guidance for final approach shall be clearly identified. In addition, consideration shall be given to the elimination from the approach chart of those facilities that are not used by the procedure.

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

(b) The initial approach fix (IAF), the intermediate approach fix (IF), the final approach fix (FAF) (or final approach point (FAP) for an ILS approach procedure), the missed approach point (MAPt), where established, and other essential fixes or points comprising the procedure shall be shown and identified.

(c) When the final approach fix is used for conventional navigation (or final approach point for an ILS approach procedure) it shall be identified with its geographical coordinates in degrees, minutes and seconds.

(d) Radio navigation aids that might be used in diversionary procedures together with their track-defining characteristics, if any, shall be shown or indicated on the chart.

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

(f) When required by the procedures, the distance to the aerodrome from each radio navigation aid concerned with the final approach shall be shown to the nearest kilometre or nautical mile. When no track-defining aid indicates the bearing of the aerodrome, the bearing shall also be shown to the nearest degree.

(5) Minimum sector altitude or terminal arrival altitude

The minimum sector altitude or terminal arrival altitude established by the competent authority shall be shown, with a clear indication of the sector to which it applies.

(6) Portrayal of procedure tracks

(a) The plan view shall show 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 manoeuvring (circling) 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;

(ix) an indication of “flyover” significant points.

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

(c) A profile shall be 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, procedure altitudes/heights and heliport crossing height (HCH), 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 shall be shown in parentheses, using the height datum selected in accordance with CHARTS.470 (2)(e).

(e) The profile view shall include a ground profile or a minimum altitude/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/heights in the intermediate and final approach segments indicated within bounded shaded blocks.

(7) Aerodrome operating minima

(a) Aerodrome operating minima when established by the State shall be shown.

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

(8) Supplementary information

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

(i) a distance from the final approach fix, or

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

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 shall be shown.

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

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

(d) A rate of descent table shall be shown.

(e) For non-precision approach procedures with a final approach fix, 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 shall be shown.

(f) For precision approach procedures and approach procedures with vertical guidance, the reference datum height to the nearest half metre or foot and the glide path/elevation/vertical path angle to the nearest one-tenth of a degree shall be shown.

(g) When a final approach fix is specified at the final approach point for ILS, a clear indication shall be given whether it applies to the ILS, the associated ILS localizer only procedure, or both.

(h) If the final approach descent gradient/angle for any type of instrument approach procedure exceeds the maximum value specified in the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, a cautionary note shall be included.

(i) A note shall be included on the chart indicating the approach procedures that are authorized for simultaneous independent or dependent operations. The note shall include the runway(s) involved and if they are closely spaced.

(j) For approach procedures having PBN segments, a PBN requirements box shall be included.

(9) Aeronautical database requirements

Appropriate data to support navigation database coding shall be published in accordance with the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part III, Section 5, Chapter 2, 2.3, for RNAV procedures and Volume II, Part I, Section 4, Chapter 9, 9.4.1.3, for non-RNAV procedures, on the verso of the chart or as a separate, properly referenced sheet.

GM CHARTS.470 Aeronautical data

(2)(a) Appropriate obstacles are those provided by the procedures specialist.

(6)(e) For the ground profile portrayal, actual templates of the primary and secondary areas of the final approach segment are provided to the cartographer by the procedure's specialist.

(6)(e) The minimum altitude/height portrayal is intended for use on charts depicting non-precision approaches with a final approach fix.

(9) Appropriate data are those provided by the procedures specialist.

(8)(j) Refer to the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part III, Section 5 for information on a PBN requirements box.

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CHAPTER 11

VISUAL APPROACH CHART – ICAO

CHARTS.475 Function

This chart shall provide the flight crews with information which will enable them to transit from the en-route/descent to approach phases of flight to the runway of intended landing by means of visual reference.

CHARTS.480 Availability

The Visual Approach Chart — ICAO shall be made available in the manner prescribed in CHARTS.005 (2) for all aerodromes used by international civil aviation where:

(1) only limited navigation facilities are available; or

(2) radio communication facilities are not available; or

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

(4) visual approach procedures have been established.

CHARTS.485 Scale

(1) The scale shall be sufficiently large to permit depiction of significant features and indication of the aerodrome layout.

(2) The scale shall not be smaller than 1:500 000.

(3) When an Instrument Approach Chart is available for a given aerodrome, the Visual Approach Chart shall be drawn to the same scale.

GM CHARTS.485 Scale

(2) A scale of 1:250 000 or 1:200 000 is preferred.

CHARTS.490 Format

The sheet size shall be 210× 148 mm (8.27 × 5.82 in).

GM CHARTS.490 Format

It would be advantageous to print the charts in several colours, selected to provide maximum legibility in varying degrees and kinds of light.

CHARTS.495 Projection

(1) A conformal projection on which a straight line approximates a great circle shall be used.

(2) Graduation marks shall be placed at consistent intervals along the neat lines.

CHARTS.500 Identification

The chart shall be identified by the name of the city or town which the aerodrome serves and the name of the aerodrome

CHARTS. 505 Culture and topography

(1) Natural and cultural landmarks shall be shown (e.g. bluffs, cliffs, sand dunes, cities, towns, roads, railroads, isolated lighthouses).

(a) Geographical place names shall be included only when they are required to avoid confusion or ambiguity.

(2) Shore lines, lakes, rivers and streams shall be shown.

(3) Relief shall be shown in a manner best suited to the particular elevation and obstacle characteristics of the area covered by the chart.

(4) When shown, spot elevations shall be carefully selected.

(5) The figures relating to different reference levels shall be clearly differentiated in their presentation.

GM CHARTS. 505 Culture and topography

(4) The value of certain spot elevations/heights in relation to both mean sea level and aerodrome elevation may be given.

CHARTS.510 Magnetic variation

The magnetic variation shall be shown.

CHARTS.515 Bearings, tracks and radials

(1) Bearings, tracks and radials shall be magnetic.

(2) Where bearings, tracks or radials are given with reference to True North or Grid North, this shall be clearly indicated. When Grid North is used, its reference grid meridian shall be identified.

CHARTS.520 Aeronautical data

(1) Aerodromes

(a) All aerodromes shall be shown by the runway pattern. Restrictions on the use of any landing direction shall be indicated. Where there is any risk of confusion between two neighbouring aerodromes, this shall be indicated. Abandoned aerodromes shall be identified as abandoned.

(b) The aerodrome elevation shall be shown in a prominent position on the chart.

(2) Obstacles

(a) Obstacles shall be shown and identified.

(b) The elevation of the top of obstacles shall be shown to the nearest (next higher) foot.

(c) The heights of obstacles above the aerodrome elevation shall be shown.

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

(3) Prohibited, restricted and danger areas

Prohibited areas, restricted areas, and danger areas shall be depicted with their identification and vertical limits.

(4) Designated airspace

Where applicable, control zones and aerodrome traffic zones shall be depicted with their vertical limits and the appropriate class of airspace.

(5) Visual approach information

(a) Visual approach procedures shall be shown where applicable.

(b) Visual aids for navigation shall be shown as appropriate.

(c) Location and type of the visual approach slope indicator systems with their nominal approach slope angle(s), minimum eye height(s) over the threshold of the on-slope signal(s), and where the axis of the system is not parallel to the runway centre line, the angle and direction of displacement, i.e. left or right, shall be shown.

(6) Supplementary information

(a) Radio navigation aids together with their frequencies and identifications shall be shown as appropriate.

(b) Radio communication facilities with their frequencies shall be shown as appropriate.

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CHAPTER 12

AERODROME/HELIPORT CHART – ICAO

CHARTS.525 Function

(1) This chart shall provide flight crews with information which will facilitate the following movements:

(a) ground movement of aircraft:

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

(ii) from the runway to the aircraft stand;

(b) and helicopter movement:

(i) from the helicopter stand to the touchdown and lift-off area and to the final approach and take-off area;

(ii) from the final approach and take-off area to the touchdown and lift-off area and to the helicopter stand;

(iii) along helicopter ground and air taxiways; and

(iv) along air transit routes;

it shall also provide essential operational information at the aerodrome/heliport.

CHARTS.530 Availability

(1) The Aerodrome/Heliport Chart — ICAO shall be made available in the manner prescribed in CHARTS.005 (2) for all aerodromes/heliports regularly used by international civil aviation.

(2) The Aerodrome/Heliport Chart — ICAO shall be made available also, in the manner prescribed in CHARTS.005 (2), for all other aerodromes/heliports available for use by international civil aviation.

GM CHARTS.530 Availability

Under certain conditions, an Aerodrome Ground Movement Chart — ICAO and an Aircraft Parking/Docking Chart — ICAO may have to be provided (see Chapters 13 and 14); in which case, the elements portrayed on these supplementary charts need not be duplicated on the Aerodrome/Heliport Chart — ICAO.

CHARTS.535 Coverage and Scale

(1) The coverage and scale shall be sufficiently large to show clearly all the elements listed in CHARTS.550 (1).

(2) A linear scale shall be shown.

CHARTS.540 Identification

The chart shall be identified by the name of the city or town or area which the aerodrome/heliport serves and the name of the aerodrome/heliport.

CHARTS.545 Magnetic variation

True and Magnetic North arrows and magnetic variation to the nearest degree and annual change of the magnetic variation shall be shown.

CHARTS.550 Aerodrome/heliport data

(1) This chart shall show:

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

(b) elevations, to the nearest 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;

(c) elevations and geoid undulations, to the nearest 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;

(d) 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;

(e) 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;

(f) 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);

(g) 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;

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

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

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

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

(l) position of runway visual range (RVR) observation sites;

(m) approach and runway lighting;

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

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

(p) obstacles to taxiing;

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

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

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

(2) For aerodromes accommodating aeroplanes with folding wing tips, the areas where it is safe for aeroplanes with folding wing tips to operate with wing tips extended, shall be shown on the chart.

(3) In addition to the items in CHARTS.550 (1) relating to heliports, the chart shall show:

(a) heliport type;

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

(c) 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;

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

(e) helicopter clearway including length and ground profile;

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

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

(h) 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.

GM CHARTS. 550 Aerodrome/heliport data

(1)(d) Bearing strengths may be shown in tabular form on the face or verso of the chart.

(1)(e) and (g) Bearing strengths or aircraft type restrictions may be shown in tabular form on the face or verso of the chart.

(1)(h) Additional information regarding hot spots may be shown in tabular form on the face or verso of the chart.

(3)(a) Heliport types are identified in Annex 14, Volume II, as surface-level, elevated or helideck.

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CHAPTER 13

AERODROME GROUND MOVEMENT CHART – ICAO

CHARTS.555 Function

This supplementary chart shall provide flight crews with detailed information to facilitate the ground movement of aircraft to and from the aircraft stands and the parking/docking of aircraft.

CHARTS.560 Availability

The Aerodrome Ground Movement Chart — ICAO shall be made available in the manner prescribed in CHARTS.005 (2) 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 — ICAO.

CHARTS.565 Coverage and Scale

(1) The coverage and scale shall be sufficiently large to show clearly all the elements listed in CHARTS.580.

(2) A linear scale shall be shown.

CHARTS.570 Identification

The chart shall be identified by the name of the city or town or area which the aerodrome serves and the name of the aerodrome.

CHARTS.575 Magnetic variation

(1) A True North arrow shall be shown.

(2) Magnetic variation to the nearest degree and its annual change shall be shown.

GM CHARTS. 575 Magnetic variation

(2) This chart need not be True North orientated.

CHARTS.580 Aerodrome data

(1) This chart shall show in a similar manner all the information on the Aerodrome/Heliport Chart — ICAO relevant to the area depicted, including:

(a) apron elevation to the nearest 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 information 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.

(2) For aerodromes accommodating aeroplanes with folding wing tips, the areas where it is safe for aeroplanes with folding wing tips to operate with wing tips extended, shall be shown on the chart.

GM CHARTS. 580 Aerodrome data

(e) Additional information regarding hot spots may be shown in tabular form on the face or verso of the chart.

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CHAPTER 14

AIRCRAFT PARKING/DOCKING CHART – ICAO

CHARTS.585 Function

This supplementary chart shall provide flight crews with detailed information to facilitate the ground movement of aircraft between the taxiways and the aircraft stands and the parking/docking of aircraft.

CHARTS.590 Availability

The Aircraft Parking/Docking Chart — ICAO shall be made available in the manner prescribed in CHARTS.005 (2) where, due to the complexity of the terminal facilities, the information cannot be shown with sufficient clarity on the Aerodrome/Heliport Chart — ICAO or on the Aerodrome Ground Movement Chart — ICAO.

CHARTS.595 Coverage and Scale

(1) The coverage and scale shall be sufficiently large to show clearly all the elements listed in CHARTS.610.

(2) A linear scale shall be shown.

CHARTS.600 Identification

The chart shall be identified by the name of the city or town or area which the aerodrome serves and the name of the aerodrome.

CHARTS.605 Magnetic variation

(1) A True North arrow shall be shown.

(2) Magnetic variation to the nearest degree and its annual change shall be shown.

GM CHARTS. 605 Magnetic variation

(2) This chart need not be True North orientated.

CHARTS.610 Aerodrome data

(1) This chart shall show in a similar manner all the information on the Aerodrome/Heliport Chart — ICAO and the Aerodrome Ground Movement Chart — ICAO relevant to the area depicted, including:

(a) apron elevation to the nearest 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.

GM CHARTS. 610 Aerodrome data

(e) Additional information regarding hot spots may be shown in tabular form on the face or verso of the chart.

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CHAPTER 15

WORLD AERONAUTICAL CHART – ICAO

(1:1 000 000)

CHARTS.615 Function

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

GM CHARTS. 615 Function

This chart may also serve:

(1) as a basic aeronautical chart:

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

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

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

(2) as pre-flight planning chart.

CHARTS.620 Availability

(1) The World Aeronautical Chart — ICAO 1:1 000 000 shall be made available in the manner prescribed in CHARTS.005 (2) for all areas delineated in Appendix 5.

(2) To ensure complete coverage of all land areas and adequate continuity in any one coordinated series, the selection of a scale of other than 1:1 000 000 shall be determined by regional agreement.

GM CHARTS. 620 Availability

(1) When operational or chart production considerations indicate that operational requirements can be effectively satisfied by Aeronautical Charts — ICAO 1:500 000 or Aeronautical Navigation Charts — ICAO Small Scale, either of these charts may be made available instead of the basic 1:1 000 000 chart.

CHARTS.625 Scales

(1) Linear scales for kilometres and nautical miles arranged in the following order:

(a) kilometres,

(b) nautical miles,

with their zero points in the same vertical line shall be shown in the margin.

(2) The length of the linear scales shall represent at least 110 NM.

(3) A conversion scale (metres/feet) shall be shown in the margin.

CHARTS.630 Format

(1) The title and marginal notes shall be in English.

(2) The information regarding the number of the adjoining sheets and the unit of measurement used to express elevations shall be so located as to be clearly visible when the sheet is folded.

(3) The method of folding shall be as follows:

Fold the chart on the long axis near the mid-parallel of latitude, face out, with the bottom part of the chart face upward. Fold inward near the meridian, and fold both halves backward in accordion folds.

(4) Whenever practicable, the sheet lines shall conform with those shown in the index in Appendix 5.

(5) Overlaps shall be provided by extending the chart area on the top and right side beyond the area given on the index. This overlap area shall contain all aeronautical, topographical, hydrographical and cultural information. The overlap shall extend up to 15 NM, if possible, but in any case from the limiting parallels and meridians of each chart to the neat line.

GM CHARTS. 630 Format

(4) The area covered by a sheet may vary from the lines shown to satisfy particular requirements.

(4) The value of adopting identical sheet lines for ICAO 1:1 000 000 Charts and the corresponding sheet of the International Map of the World (IMW), provided aeronautical requirements are not compromised, is recognized.

CHARTS.635 Projection

(1) The projections shall be as follows:

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

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

(2) Graticules and graduations shall be shown as follows:

a) Parallels:

Latitude	*Distance between parallels*	*Graduations on parallels*
0° to 72°	30′	1′
72° to 84°	30′	5′
84° to 89°	30′	1°
89° to 90°	30′	5° (Only on degree parallels from 72° to 89°)

b) Meridians:

Latitude	*Interval between meridians*	*Graduations on meridians*
0° to 52°	30′	1′
52° to 72°	30′	1′ (Only on even numbered meridians)
72° to 84°	1°	1′
84° to 89°	5°	1′
89° to 90°	15°	1′ (Only on every fourth meridian)

(3) The graduation marks at 1′ and 5′ intervals shall extend away from the Greenwich Meridian and from the Equator. Each 10′ interval shall be shown by a mark on both sides of the graticule line.

(4) The length of the graduation marks shall be 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.

(5) All meridians and parallels shown shall be numbered in the borders of the chart. In addition, each parallel shall be numbered within the body of the chart in such a manner that the parallel can be readily identified when the chart is folded.

(6) The name and basic parameters of the projection shall be indicated in the margin.

GM CHARTS. 635 Projection

(4) Meridians may be numbered within the body of the chart.

CHARTS.640 Identification

Sheet numbering shall be in conformity with the index in Appendix 5.

GM CHARTS. 640 Identification

The corresponding International Map of the World (IMW) sheet number may also be shown.

CHARTS.645 Culture and topography

(1) Built-up areas

(a) Cities, towns and villages shall be selected and shown according to their relative importance to visual air navigation.

(b) Cities and towns of sufficient size shall be indicated by the outline of their built-up areas and not of their established city limits.

(2) Railroads

(a) All railroads having landmark value shall be shown.

(b) Important tunnels shall be shown.

(3) Highways and roads

(a) Road systems shall be shown in sufficient detail to indicate significant patterns from the air.

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

(4) Landmarks

Natural and cultural landmarks, such as bridges, prominent transmission lines, permanent cable car installations, wind turbines, mine structures, lookout towers, forts, ruins, levees, pipelines, rocks, bluffs, cliffs, sand dunes, isolated lighthouses and lightships, when considered to be of importance for visual air navigation, shall be shown.

(5) Political boundaries

International boundaries shall be shown. Undemarcated and undefined boundaries shall be distinguished by descriptive notes.

(6) Hydrography

(a) 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 shall be shown.

(b) The tint covering large open water areas shall be kept very light.

(c) Reefs and shoals, including rocky ledges, tidal flats, isolated rocks, sand, gravel, stone and all similar areas, shall be shown by symbols when of significant landmark value.

(7) Contours

(a) Contours shall be shown. The selection of intervals shall be governed by the requirement to depict clearly the relief features required in air navigation.

(b) The values of the contours used shall be shown.

(8) Hypsometric tints

(a) When hypsometric tints are used, the range of elevations for the tints shall be shown.

(b) The scale of the hypsometric tints used on the chart shall be shown in the margin.

(9) Spot elevations

(a) Spot elevations shall be shown at selected critical points. The elevations selected shall always be the highest in the immediate vicinity

and shall generally indicate the top of a peak, ridge, etc. Elevations in valleys and at lake surface levels which are of special value to the aviator shall be shown. The position of each selected elevation shall be indicated by a dot.

(b) The elevation in feet of the highest point on the chart and its geographical position to the nearest five minutes shall be indicated in the margin.

(c) The spot elevation of the highest point in any sheet shall be cleared of hypsometric tinting.

(10) Incomplete or unreliable relief

(a) Areas that have not been surveyed for contour information shall be labelled “Relief data incomplete”.

(b) Charts on which spot elevations are generally unreliable shall bear a warning note prominently displayed on the face of the chart in the colour used for aeronautical information, as follows:

(i) “Warning — The reliability of relief information on this chart is doubtful and elevations shall be used with caution.”

(11) Escarpments

Escarpments shall be shown when they are prominent landmarks or when cultural detail is very sparse.

(12) Wooded areas

(a) Wooded areas shall be shown.

(b) Where shown, the approximate extreme northern or southern limits of tree growth shall be indicated by a dashed black line and shall be appropriately labelled.

(13) Date of topographic information

The date of latest information shown on the topographic base shall be indicated in the margin.

GM CHARTS. 645 Culture and topography

(2)(a) In congested areas, some railroads may be omitted in the interest of legibility.

(2)(a) Railroads may be named where space permits.

(2)(b) A descriptive note may be added.

(3)(b) The numbers or names of important highways may be shown.

(4) Descriptive notes may be added.

(6)(b) A narrow band of darker tone may be used along the shoreline to emphasize this feature.

(6)(c) Groups of rocks may be shown by a few representative rock symbols within the area.

CHARTS.650 Magnetic variation

(1) Isogonic lines shall be shown.

(2) The date of the isogonic information shall be indicated in the margin.

CHARTS.655 Aeronautical data

(1) General

Aeronautical data shown shall be kept to a minimum consistent with the use of the chart for visual navigation and the revision cycle (see charts.655 (6)).

(2) Aerodromes

(a) Land and water aerodromes and heliports shall be 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) The 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 given in Appendix 2, provided they do not cause undesirable clutter on the chart, shall be indicated.

(c) Abandoned aerodromes which are still recognizable as aerodromes from the air shall be shown and identified as abandoned.

(3) Obstacles

(a) Obstacles shall be shown.

(b) When considered of importance to visual flight, prominent transmission lines, permanent cable car installations and wind turbines, which are obstacles, shall be shown.

(4) Prohibited, restricted and danger areas

Prohibited, restricted and danger areas shall be shown.

(5) Air traffic services system

(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 shall be shown together with the appropriate class of airspace.

(b) Where appropriate, the air defence identification zone (ADIZ) shall be shown and properly identified.

(6) Radio navigation aids

Radio navigation aids shall be 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 which is shown is kept up to date by means of new editions of the chart.

(7) Supplementary information

(a) Aeronautical ground lights together with their characteristics or their identifications or both shall be shown.

(b) Marine lights on outer prominent coastal or isolated features of not less than 15 NM visibility range shall be shown:

(i) where they are not less distinguishable than more powerful marine lights in the vicinity;

(ii) where they are readily distinguishable from other marine or other types of lights in the vicinity of built-up coastal areas;

(iii) where they are the only lights of significance available.

GM CHARTS. 655 Aeronautical data

(3)(a) Objects of a height of 300 ft or more above ground are normally regarded as obstacles.

(5)(b) ADIZ procedures may be described in the chart legend.

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CHAPTER 16

AERONAUTICAL CHART – ICAO

(1:500 000)

CHARTS.660 Function

This chart shall provide information to satisfy the requirements of visual air navigation for low speed, short- or medium-range operations at low and intermediate altitudes.

GM CHARTS. 660 Function

(1) This chart may be used:

(a) to serve as a basic aeronautical chart:

(b) to provide a suitable medium for basic pilot and navigation training;

(c) to supplement highly specialized charts which do not provide essential visual information;

(d) in pre-flight planning.

(2) It is intended that these charts be provided for land areas where charts of this scale are required for civil air operations employing visual air navigation independently or in support of other forms of air navigation.

(3) Where States produce charts of this series covering their national territories, the entire area being portrayed is usually treated on a regional basis.

CHARTS.665 Availability

The Aeronautical Chart — ICAO 1:500 000 shall be made available in the manner prescribed in CHARTS.005 (2) for all areas delineated in Appendix 5.

GM CHARTS. 665 Availability

The selection of this scale as an alternative to the World Aeronautical Chart — ICAO 1:1 000 000 is covered by CHARTS.620 (1) and CHARTS.620 (2).

CHARTS.670 Scales

(1) Linear scales for kilometres and nautical miles arranged in the following order:

(a) kilometres,

(b) nautical miles,

with their zero points in the same vertical line shall be shown in the margin.

(2) The length of the linear scales shall not be less than 200 mm (8 inches).

(3) A conversion scale (metres/feet) shall be shown in the margin.

CHARTS.675 Format

(1) The title and marginal notes shall be in English.

(2) The information regarding the number of the adjoining sheets and the unit of measurement used to express elevations shall be so located as to be clearly visible when the sheet is folded.

(3) The method of folding shall be as follows:

Fold the chart on the long axis near the mid-parallel of latitude, face out, with the bottom part of the chart face upward. Fold inward near the meridian, and fold both halves backward in accordion folds.

(4) Whenever practicable, sheets shall be quarter sheets of the World Aeronautical Chart — ICAO 1:1 000 000. An appropriate index to adjacent sheets, showing the relationship between the two chart series, shall be included on the face of the chart or on the reverse side.

(5) Overlaps shall be provided by extending the chart area on the top and right side beyond the area given on the index. This overlap area shall contain all aeronautical, topographical, hydrographical and cultural information. The overlap shall extend up to 8 NM, if possible, but in any case from the limiting parallels and meridians of each chart to the neat line.

GM CHARTS.675 Format

(4) Sheet lines may be varied to satisfy particular requirements.

CHARTS.680 Projection

(1) A conformal (orthomorphic) projection shall be used.

(2) The projection of the World Aeronautical Chart — ICAO 1:1 000 000 shall be used.

(3) Parallels shall be shown at intervals of 30′.

(4) Meridians shall normally be shown at intervals of 30′.

(5) Graduation marks shall be shown at 1′ intervals along each whole degree meridian and parallel, extending away from the Greenwich Meridian and from the Equator. Each 10′ interval shall be shown by a mark on both sides of the graticule line.

(6) The length of the graduation marks shall be 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.

(7) All meridians and parallels shown shall be numbered in the borders of the chart.

(8) Each meridian and parallel shall be numbered within the body of the chart whenever this data is required operationally.

(9) The name and basic parameters of the projection shall be indicated in the margin.

GM CHARTS. 680 Projection

(4) At high latitudes, this interval may be increased.

CHARTS.685 Identification

(1) Each sheet shall be identified by a name which shall be that of the principal town or of a main geographical feature appearing on the sheet.

(2) Where applicable, sheets shall also be identified by the reference number of the corresponding World Aeronautical Chart — ICAO 1:1 000 000, with the addition of one or more of the following letter suffixes indicating the quadrant or quadrants:

CHARTS.690 Culture and topography

(1) Built-up areas

(a) Cities, towns and villages shall be selected and shown according to their relative importance to visual air navigation.

(b) Cities and towns of sufficient size shall be indicated by the outline of their built-up areas and not of their established city limits.

(2) Railroads

(a) All railroads having landmark value shall be shown.

(b) Tunnels shall be shown when they serve as prominent landmarks.

(3) Highways and roads

(a) Road systems shall be shown in sufficient detail to indicate significant patterns from the air.

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

(4) Landmarks

Natural and cultural landmarks, such as bridges, prominent transmission lines, permanent wind turbines, lookout towers, cable car installations, mine structures, pipelines, sand dunes, forts, ruins, levees, rocks, bluffs, cliffs, and lightships, isolated lighthouses of importance when considered to be navigation, for visual air shall be shown.

(5) Political boundaries

Letter	Chart Quadrant
A	North-West
B	North-East
C	South-East
D	South-West

International boundaries shall be shown. Undemarcated and undefined boundaries shall be distinguished by descriptive notes.

(6) Hydrography

(a) 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 shall be shown.

(b) The tint covering large open water areas shall be kept very light.

(c) Reefs and shoals, including rocky ledges, tidal flats, isolated rocks, sand, gravel, stone and all similar areas, shall be shown by symbols when of significant landmark value.

(7) Contours

(a) Contours shall be shown. The selection of intervals shall be governed by the requirement to depict clearly the relief features required in air navigation.

(b) The values of the contours used shall be shown.

(8) Hypsometric tints

(a) When hypsometric tints are used, the range of elevations for the tints shall be shown.

(b) The scale of the hypsometric tints used on the chart shall be shown in the margin.

(9) Spot elevations

(a) Spot elevations shall be shown at selected critical points. The elevations selected shall always be the highest in the immediate vicinity and shall generally indicate the top of a peak, ridge, etc. Elevations in valleys and at lake surface levels which are of navigational value shall be shown. The position of each selected elevation shall be indicated by a dot.

(b) The elevation in feet of the highest point on the chart and its geographical position to the nearest five minutes shall be indicated in the margin.

(c) The spot elevation of the highest point in any sheet shall be cleared of hypsometric tinting.

(10) Incomplete or unreliable relief

(a) Areas that have not been surveyed for contour information shall be labelled “Relief data incomplete”.

(b) Charts on which spot elevations are generally unreliable shall bear a warning note prominently displayed on the face of the chart in the colour used for aeronautical information, as follows:

(i) “Warning — The reliability of relief information on this chart is doubtful and elevations shall be used with caution.”

(11) Escarpments

Escarpments shall be shown when they are prominent landmarks or when cultural detail is very sparse.

(12) Wooded areas

(a) Wooded areas shall be shown.

(b) Where shown, the approximate extreme northern or southern limits of tree growth shall be indicated by a dashed black line and shall be appropriately labelled.

(13) Date of topographic information

The date of latest information shown on the topographic base shall be indicated in the margin.

GM CHARTS.690 Culture and topography

(2)(a) In congested areas, some railroads may be omitted in the interest of legibility.

(2)(a) Railroads may be named where space permits.

(2)(a) Rail stations may be shown.

(2)(b) A descriptive note may be added, if necessary, to accentuate this feature.

(3)(a) Roads under construction may be shown.

(3)(b) The numbers or names of important highways may be shown.

(4) Descriptive notes may be added.

(5) Other boundaries may be shown.

(6)(b) A narrow band of darker tone may be used along the shoreline to emphasize this feature.

(6)(c) Groups of rocks may be shown by a few representative rock symbols within the area.

CHARTS.695 Magnetic variation

(1) Isogonic lines shall be shown.

(2) The date of the isogonic information shall be indicated in the margin.

CHARTS.700 Aeronautical data

(1) General

Aeronautical information shall be shown consistent with the use of the chart and the revision cycle.

(2) Aerodromes

(a) Land and water aerodromes and heliports shall be 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) The 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 given in Appendix 2, provided they do not cause undesirable clutter on the chart, shall be indicated.

(c) Abandoned aerodromes which are still recognizable as aerodromes from the air shall be shown and identified as abandoned.

(3) Obstacles

(a) Obstacles shall be shown.

(b) When considered of importance to visual flight, prominent transmission lines, permanent cable car installations and wind turbines, which are obstacles, shall be shown.

(4) Prohibited, restricted and danger areas

Prohibited, restricted and danger areas shall be shown.

(5) Air traffic services system

(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 shall be shown together with the appropriate class of airspace.

(b) Where appropriate, the air defence identification zone (ADIZ) shall be shown and properly identified.

(6) Radio navigation aids

Radio navigation aids shall be 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 which is shown is kept up to date by means of new editions of the chart.

(7) Supplementary information

(a) Aeronautical ground lights together with their characteristics or their identifications or both shall be shown.

(b) Marine lights on outer prominent coastal or isolated features of not less than 15 NM visibility range shall be shown:

(i) where they are not less distinguishable than more powerful marine lights in the vicinity;

(ii) where they are readily distinguishable from other marine or other types of lights in the vicinity of built-up coastal areas;

(iii) where they are the only lights of significance available.

(iv)

GM CHARTS.700 Aeronautical data

(3)(a) Objects of a height of 300 ft or more above ground are normally regarded as obstacles.

(5)(b) ADIZ procedures may be described in the chart legend.

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CHAPTER 17

AERONAUTICAL NAVIGATION CHART –

ICAO SMALL SCALE

CHARTS.705 Function

This chart shall:

(1) serve as an air navigation aid for flight crews of long-range aircraft at high altitudes;

(2) provide selective checkpoints over extensive ranges for identification at high altitudes and speeds, which are required for visual confirmation of position;

(3) provide 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;

(4) provide a general purpose chart series for long-range flight planning and plotting.

CHARTS.710 Availability

The Aeronautical Navigation Chart — ICAO Small scale shall be made available in the manner prescribed in CHARTS.005 (2) for all areas delineated in Appendix 5.

GM CHARTS.710 Availability

The selection of this scale as an alternative to the World Aeronautical Chart — ICAO 1:1 000 000 is covered by CHARTS.620 (1) and CHARTS.620 (2).

CHARTS.715 Coverage and Scale

(1) The Aeronautical Navigation Chart — ICAO Small Scale shall provide, as a minimum, complete coverage of the major land masses of the world.

(2) The scale shall be in the range of 1:2 000 000 to 1:5 000 000.

(3) The scale of the chart shall be substituted in the title for the words “Small Scale”.

(4) Linear scales for kilometres and nautical miles arranged in the following order:

(a) kilometres,

(b) nautical miles,

with their zero points in the same vertical line shall be shown in the margin.

(5) The length of the linear scales shall not be less than 200 mm (8 inches).

(6) A conversion scale (metres/feet) shall be shown in the margin.

GM CHARTS.715 Coverage and scale

(1) A sheet layout for this series is contained in the Aeronautical Chart Manual (Doc 8697).

(1) The sheet size may represent the maximum press size available to the producing agency.

CHARTS.720 Format

(1) The title and marginal notes shall be in English.

(2) The information regarding the number of the adjoining sheets and the unit of measurement used to express elevations shall be so located as to be clearly visible when the sheet is folded.

GM CHARTS.720 Format

(2) There is no internationally agreed sheet numbering.

CHARTS.725 Projection

(1) A conformal (orthomorphic) projection shall be used.

(2) The name and basic parameters of the projection shall be shown in the margin.

(3) Parallels shall be shown at intervals of 1°.

(4) Graduations on the parallels shall be shown at sufficiently close intervals compatible with the latitude and the scale of the chart.

(5) Meridians shall be shown at intervals compatible with the latitude and the scale of the chart.

(6) Graduations on the meridians shall be shown at intervals not exceeding 5′.

(7) The graduation marks shall extend away from the Greenwich Meridian and from the Equator.

(8) All meridians and parallels shown shall be numbered in the borders of the chart. In addition, when required, meridians and parallels shall be numbered within the body of the chart in such a manner that they can be readily identified when the chart is folded.

CHARTS.730 Culture and topography

(1) Built-up areas

(a) Cities, towns and villages shall be selected and shown according to their relative importance to visual air navigation.

(b) Cities and towns of sufficient size shall be indicated by the outline of their built-up areas and not of their established city limits.

(2) Railroads

(a) All railroads having landmark value shall be shown.

(b) Important tunnels shall be shown.

(3) Highways and roads

(a) Road systems shall be shown in sufficient detail to indicate significant patterns from the air.

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

(4) Landmarks

Natural and cultural landmarks, such as bridges, prominent transmission lines, permanent cable car installations, wind turbines, mine structures, lookout towers, forts, ruins, levees, pipelines, rocks, bluffs, cliffs, sand dunes, isolated lighthouses and lightships, when considered to be of importance for visual air navigation, shall be shown.

(5) Political boundaries

International boundaries shall be shown. Undemarcated and undefined boundaries shall be distinguished by descriptive notes.

(6) Hydrography

(a) 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 shall be shown.

(b) The tint covering large open water areas shall be kept very light.

(c) Reefs and shoals, including rocky ledges, tidal flats, isolated rocks, sand, gravel, stone and all similar areas, shall be shown by symbols when of significant landmark value.

(7) Contours

(a) Contours shall be shown. The selection of intervals shall be governed by the requirement to depict clearly the relief features required in air navigation.

(b) The values of the contours used shall be shown.

(8) Hypsometric tints

(a) When hypsometric tints are used, the range of elevations for the tints shall be shown.

(b) The scale of the hypsometric tints used on the chart shall be shown in the margin.

(9) Spot elevations

(a) Spot elevations shall be shown at selected critical points. The elevations selected shall always be the highest in the immediate vicinity and shall generally indicate the top of a peak, ridge, etc. Elevations in valleys and at lake surface levels which are of value to visual air navigation shall be shown. The position of each selected elevation shall be indicated by a dot.

(b) The elevation in feet of the highest point on the chart and its geographical position to the nearest five minutes shall be indicated in the margin.

(c) The spot elevation of the highest point in any sheet shall be cleared of hypsometric tinting.

(10) Incomplete or unreliable relief

(a) Areas that have not been surveyed for contour information shall be labelled “Relief data incomplete”.

(b) Charts on which spot elevations are generally unreliable shall bear a warning note prominently displayed on the face of the chart in the colour used for aeronautical information, as follows:

(ii) "Warning — The reliability of relief information on this chart is doubtful and elevations shall be used with caution."

(11) Escarpments

Escarpments shall be shown when they are prominent landmarks or when cultural detail is very sparse.

(12) Wooded areas

Wooded areas shall be shown.

(13) Date of topographic information

The date of latest information shown on the topographic base shall be indicated in the margin.

(14) Colours

(a) Subdued colours shall be used for the chart background to facilitate plotting.

(b) Good colour contrast shall be ensured to emphasize features important to visual air navigation.

GM CHARTS.730 Culture and topography

(2)(a) In congested areas, some railroads may be omitted in the interest of legibility.

(2)(b) A descriptive note may be added

(4) Descriptive notes may be added.

(6)(b) A narrow band of darker tone may be used along the shoreline to emphasize this feature.

CHARTS.735 Magnetic variation

(1) Isogonic lines shall be shown.

(2) The date of the isogonic information shall be indicated in the margin.

CHARTS.740 Aeronautical data

(1) Aerodromes

Land and water aerodromes and heliports shall be 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.

(2) Obstacles

Obstacles shall be shown.

(3) Prohibited, restricted and danger areas

Prohibited, restricted and danger areas shall be shown when considered to be of importance to air navigation.

(4) Air traffic services system

(a) Significant elements of the air traffic services system shall be shown when considered to be of importance to air navigation.

(b) Where appropriate, the air defence identification zone (ADIZ) shall be shown and properly identified.

(5) Radio navigation aids

GM CHARTS.740 Aeronautical data

(4)(b) ADIZ procedures may be described in the chart legend.

(5) Radio aids to navigation may be shown by the appropriate symbol and named.

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CHAPTER 18

PLOTTING CHART – ICAO

Since the Enroute Chart — ICAO is provided within all areas of Mauritius FIR; there is no need for a requirement for a plotting chart.

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CHAPTER 19

ELECTRONIC AERONAUTICAL CHART DISPLAY – ICAO

CHARTS.745 Function

The Electronic Aeronautical Chart Display — ICAO, with adequate back-up arrangements and in compliance with the requirements of Annex 6 for charts, shall enable flight crews to execute, in a convenient and timely manner, route planning, route monitoring and navigation by displaying required information.

CHARTS.750 Information available for display

The Electronic Aeronautical Chart Display — ICAO shall be capable of displaying all aeronautical, cultural and topographic information required by Chapter 4 and Chapters 6 through 17.

GM CHARTS.750 Information available for display

The Electronic Aeronautical Chart Display — ICAO may display supplementary information, in addition to that required for the equivalent paper chart, which may be considered useful for safe navigation.

CHARTS.755 Display requirements

(1) Display categories

(a) Information available for display shall be 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) It shall be a simple function to add or remove other display information but shall not be possible to remove information contained in the basic display.

(2) Display mode and generation of neighbouring area

(a) The Electronic Aeronautical Chart Display — ICAO shall be capable of continuously plotting the aircraft's position in a true motion mode where reset and generation of the surrounding area shall take place automatically.

(b) It shall be possible manually to change the chart area and the position of the aircraft relative to the edge of the display.

(3) Scale

It shall be possible to vary the scale at which a chart is displayed.

(4) Symbols

Symbols used shall conform to those specified for electronic charts in Appendix 2 — ICAO Chart Symbols except where it is desired to show items for which no ICAO chart symbol is provided. In these cases, electronic chart symbols shall be chosen which:

(a) employ a minimum use of lines, arcs and area fills;

(b) do not cause confusion with any existing aeronautical chart symbol;

(c) do not impair the legibility of the display.

(5) Display hardware

(a) The effective size of the chart presentation shall be sufficient to display the information required by CHARTS.750 without excessive scrolling.

(b) The display shall have the capabilities required to accurately portray required elements of Appendix 2 — ICAO Chart Symbols.

(c) The method of presentation shall ensure that the displayed information is clearly visible to the observer in the conditions of natural and artificial light experienced in the cockpit.

(d) The display luminance shall be adjustable by the flight crew.

GM CHARTS.755 Display requirements

(2)(a) Other modes, such as static chart displays, may be available.

(4)(c) Additional details for each symbol may be added according to the resolution of the output media, but any enhancements may not change the basic recognizability of the symbol.

CHARTS.760 Provision and updating of data

(1) The provision and updating of data for use by the display shall be in conformance with the aeronautical data quality system requirements.

(2) The display shall be capable of automatically accepting authorized updates to existing data. A means of ensuring that authorized data and all relevant updates to that data have been correctly loaded into the display shall be provided.

(3) The display shall be capable of accepting updates to authorized data entered manually with simple means for verification prior to final acceptance of the data. Updates entered manually shall be distinguishable on the display from authorized data and its authorized updates and shall not affect display legibility.

(4) A record shall be kept of all updates, including date and time of application.

(5) The display shall allow 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.

GM CHARTS.760 Provision and updating of data

(1) For aeronautical data quality system requirements, see CHARTS.090, and MCAR AIS.045.

CHARTS.765 Performance tests, malfunction alarms and indications

(1) A means shall be provided for carrying out on-board tests of major functions. In case of a failure, the test shall display information to indicate which part of the system is at fault.

(2) A suitable alarm or indication of system malfunction shall be provided.

CHARTS.770 Back up arrangements

To ensure safe navigation in case of a failure of the Electronic Aeronautical Chart Display — ICAO, the provision of adequate back-up arrangements shall include:

(1) facilities enabling a safe takeover of display functions in order to ensure that a failure does not result in a critical situation; and

(2) a back-up arrangement facilitating the means for safe navigation of the remaining part of the flight.

GM CHARTS.760 Back up arrangements

(2) A suitable back-up system may include the carriage of paper charts.

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CHAPTER 20

ATC SURVEILLANCE MINIMUM ALTITUD CHART – ICAO

The air traffic control provided in Mauritius is based on procedural control and not surveillance control, where the air traffic controller would be vectoring traffic. Therefore, this chart is not applicable for Mauritius.

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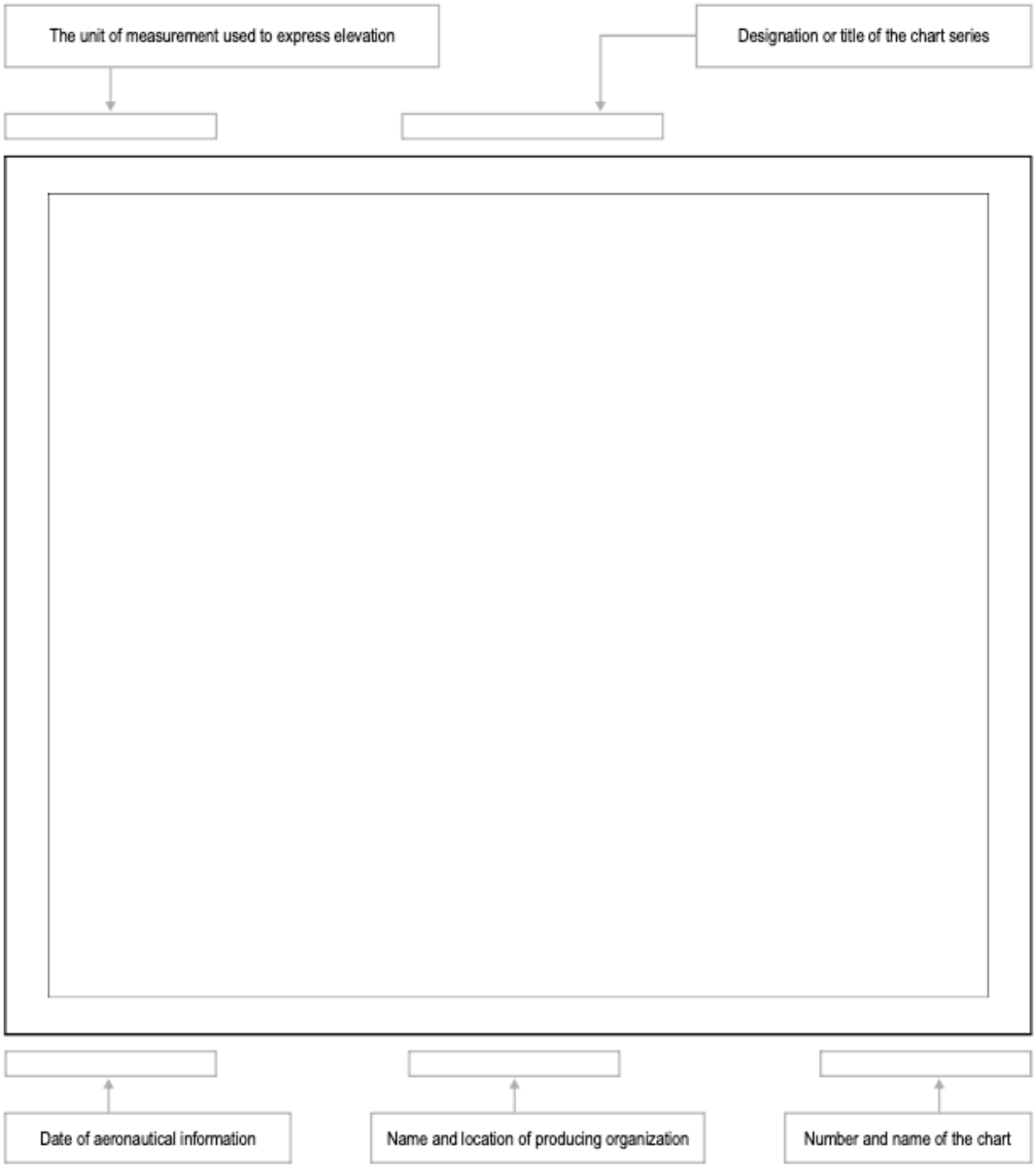
APPENDIX 1

MARGINAL NOTE LAYOUT



APPENDIX 2

ICAO CHARTS SYMBOLS

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
Charted isolated rock	44
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
Tank farms	71
Telegraph or telephone line (when a landmark)	66
Temple	83
AERODROMES (84–95)	
Abandoned or closed aerodrome	91
Aerodrome for use on charts on which aerodrome classification is not required	93
Civil — Land	84
Civil — Water	85
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
SYMBOLS FOR AERODROME/HELIPORT CHARTS (145–161)	
Aerodrome reference point	151
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

	Symbol 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
Collocated radio navigation aid and marker beacon	178
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.
A	
Abandoned canal	30
Advisory airspace — ADA	115
Advisory route — ADR	118
Aerodrome data in abbreviated form	96
Aerodrome/Heliport Charts	145-161
Aerodrome Obstacle Charts	162-170
Aerodrome reference point	151
Aerodromes	84-98
Abandoned or closed aerodrome	91
Emergency aerodrome or aerodrome with no facilities	90
Aerodrome symbols for Approach Charts	97, 98
Aerodrome traffic zone — ATZ	112
Aeronautical ground light	143
Air defence identification zone — ADIZ	117
Airspace, advisory — ADA	115
Airspace classifications	126, 127
Airspace (prohibited, restricted or danger area), restricted, and common boundary of two areas	128
Airspace restrictions	128, 129
Air Traffic Services	111-144
Airway — AWY	113
Altitude	
Minimum sector	171
Terminal arrival	172
Altitudes/flight levels	125
Anchorage, sheltered	92
Antenna	163
Areas	
Built-up	47–50
Not surveyed for contour information or relief data incomplete	18
Prohibited	128
Restricted	128
ATS/MET reporting point — MRP (compulsory, on request)	123
B	
Bluff	4
Boundaries	
International	63
Outer	64
Building (on Aerodrome Obstacle Charts)	164
Buildings	50

	Symbol No.
C	
Cable, overhead	166
Canal	29
Canal, abandoned	30
Change-over point — COP	122
Charted isolated rock	44
Chart, highest elevation on	12
Chart symbols, electronic	108, 143, 171-180
Church	80
City or large town	47
Clearway — CWY	170
Cliff	4
Coast guard station	73
Collocated DME fix and marker beacon	180
Collocated radio navigation aid and marker beacon	178
Collocated VOR and DME radio navigation aids — VOR/DME	103, 110
Collocated VOR and TACAN radio navigation aids — VORTAC	107, 110
Compass rose	110
Coniferous trees	15
Contours	1
Contours, approximate	2
Control area — CTA	113
Controlled route	113
Control zone — CTR	116
Coral reefs and ledges	22
Culture	47-83
Culture, miscellaneous	63-83
D	
Dam	67
Danger area	128
Danger line	43
Distance measuring equipment — DME	102, 110, 176, 177
DME distance	104
DME fix	179
Collocated DME fix and marker beacon	180
Dry lake bed	39
Dual highway	57
Dunes, sand	6

	Symbol No.
E	
Electronic chart symbols	108, 143, 171–180
Elevation (of doubtful accuracy), spot	14
Elevation, spot	13
Escarpment	4
Escarpment (on Aerodrome Obstacle Charts)	168
Esker	9
F	
Falls	28
Fence	65
Ferry	68
Final approach fix — FAF	124
Flight information region — FIR	111
Flight levels	125
Forest ranger station	76
Fort	79
G	
Gas field	70
Glaciers	42
Gravel	8
H	
Hard surface runway	145
Helicopter alighting area on an aerodrome	150
Heliport	94
Highest elevation on chart	12
Highway, dual	57
Highways and roads	57-62
Holding pattern	173
Hot spot	161
Hydrography	19-46
I	
Ice caps	42
Instrument landing system — ILS	108
Intermediate holding position	160
International boundary closed to passage of aircraft except through air corridor	129
Intersection INT	121
Isogonic line or isogonal	138

	Symbol No.
L	
Lake bed, dry	39
Lakes	
Non-perennial	32
Perennial	31
Land	
Civil	84
Military	86
Joint civil and military	88
Land features appropriately labelled, unusual	10
Landing direction indicator	
Lighted	156
Unlighted	157
Large river (perennial)	23
Large structure	164
Lava flow	5
Ledges	22
Levee	9
Lightship	144
Lookout tower	74
M	
Marine light	142
Mine	75
Minimum sector altitude — MSA	171
Miscellaneous symbols	
Air Traffic Services	137-141
Culture	63-83
Missed approach track	174
Mosque	81
Mountain pass	11
N	
NDB	121
Non-directional radio beacon — NDB	100
Nuclear power station	72
O	
Obstacle light	155
Obstacles	130-136
Ocean station vessel	139
Oil field	70
Overhead cable	166

	Symbol No.
P	
Pagoda	82
Palms	17
Parking areas	149
Pierced steel plank or steel mesh runway	146
Pipeline	69
Point light	154
Pole	163
Power station, nuclear	72
Primary road	58
Prohibited area	128
Prominent transmission line	137
R	
Race track	77
Radio marker beacon	109, 177
Radio navigation aid	176
Basic	99
Collocated radio navigation aid and marker beacon	178
Collocated VOR and DME	103
Collocated VOR and TACAN	107
Radio navigation aids	99-110, 176, 178
Railroad (on Aerodrome Obstacle Charts)	165
Railroads (Culture)	51-56
Rapids	27
Relief data incomplete	18
Relief shown by hachures	3
Reporting and fly-by/flyover functionality	121
Reservoir	38
Restricted airspace (prohibited, restricted or danger area) and common boundary of two areas	128
Restricted area	128
Rice field	36
River	
(Perennial), small	24
(Perennial), large	23
Rivers and streams	
Non-perennial	25
Unsurveyed	26
Road bridge	61
Road, primary	58
Road, secondary	59
Roads (Highways and Roads)	57-62
Road tunnel	62
Rock awash	45
Rock, charted isolated	44

	Symbol No.
Route	
Advisory — ADR	118
Controlled	113
Uncontrolled	114
Ruins	78
Runway	175
Hard surface	145
Unpaved	147
Runway-holding position	159
Runway visual range (RVR) observation site	153

S

Salt lake	33
Salt pans (evaporator)	34
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
Stopway — SWY (on Aerodrome Obstacle Charts)	169
Streams	25, 26
Structure, large	164
Swamp	35

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	
Lookout	74
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
Unusual water features appropriately labelled	46

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
VOR (VHF omnidirectional radio range)	101

	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

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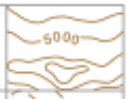
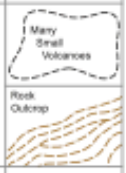
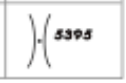
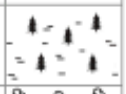
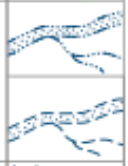
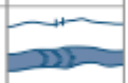
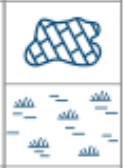
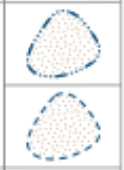
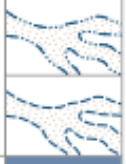
TOPOGRAPHY

1	Contours	
2	Approximate contours	
3	Relief shown by hachures	
4	Bluff, cliff or escarpment	
5	Lava flow	
6	Sand dunes	
7	Sand area	
8	Gravel	
9	Levee or esker (Alternative)	
10	Unusual land features appropriately labelled	
	Active volcano	
11	Mountain pass	
12	Highest elevation on chart (Alternative)	17456 / .17456
13	Spot elevation	.6397 .8975
14	Spot elevation (of doubtful accuracy)	.6370?
15	Coniferous trees	
16	Other trees	
17	Palms	
18	Areas not surveyed for contour information or relief data incomplete	Caution

HYDROGRAPHY

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

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	
66	Telegraph or telephone line (when a landmark)	
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*	H

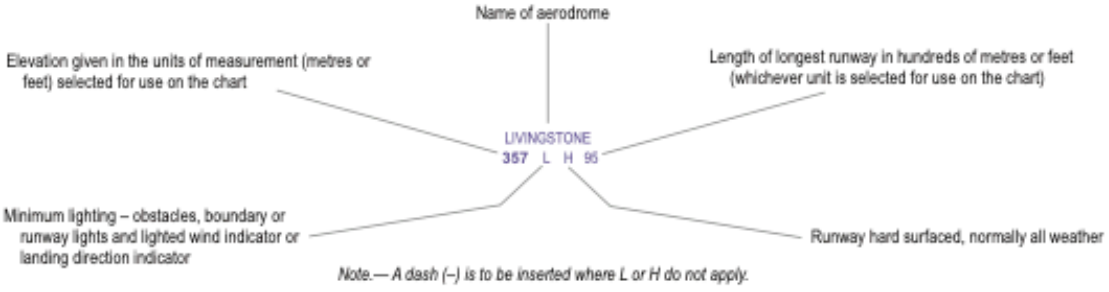
95	*Note.— Where required by the function of the chart, the runway pattern of the aerodrome may be shown in lieu of the aerodrome symbol, for example:*	

AERODROMES *(Cont.)*

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

(Reference: 16.9.2.2 and 17.9.2.2)

96



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

AERODROME SYMBOLS FOR APPROACH CHARTS

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

RADIO NAVIGATION AIDS*

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

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

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

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

Compass rose to be used as appropriate in combination 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 Airway Controlled route	CTA AWY	Alternative
114	Uncontrolled route		
115	Advisory airspace	ADA	
116	Control zone	CTR	

117	Air defence identification zone	ADIZ	ADIZ
118	Advisory route	ADR	Alternative
119	Visual flight path	compulsory with radio communication requirement	R
		compulsory, without radio communication requirement	R
		recommended	
120	Scale-break (on ATS route)		Alternative

Significant Point Functionality

			Significant point depiction for conventional navigation		Significant point depiction for area navigation			
		REPORTING FLY-BY/FLY-OVER	On request (NA)	Compulsory (NA)	On request fly-by	Compulsory fly-by	On request flyover	Compulsory flyover
121	Basic Symbols with functionality	VFR reporting point	△	▲	△	▲	◎	▲
		Intersection INT	△	▲	△	▲	◎	▲
		VORTAC	⛉	⛉	⛉	⛉	⛉	⛉
		TACAN	▽	▽	▽	▽	▽	▽
		VOR	⬡	⬢	⬡	⬢	⬡	⬢
		VOR/DME	⌧	⌧	⌧	⌧	⌧	⌧
		NDB	✺	✺	✺	✺	✺	✺
		Waypoint WPT	Not used	Not used	✧	◆	✧	◆

For details on use and meaning of these symbols, refer to paragraph 2.4

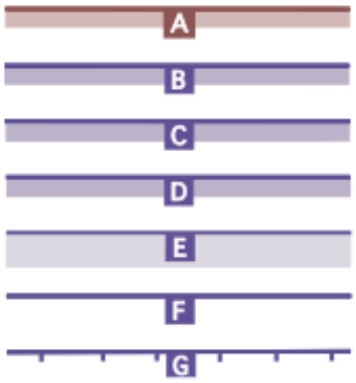
122	Change-over point To be superimposed on the appropriate route symbol at right angles to the route	COP	26 / 36	123	ATS/MET reporting point	MRP	Compulsory On request	124	Final approach fix	FAF	

AIR TRAFFIC SERVICES *(cont.)*

125	Procedure altitudes/flight levels	Altitude/flight level "window"	17 000 10 000	FL 220 10 000
		"At or above" altitude/flight level	7 000	FL 070
		"At or below" altitude/flight level	5 000	FL 050
		"At" altitude/flight level	3 000	FL 030
		"Recommended" altitude/flight level	5 000	FL 050
		"Expected" altitude/flight level	Expect 5 000	Expect FL 050

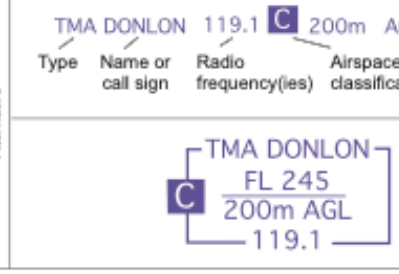
AIRSPACE CLASSIFICATIONS

126 Airspace classifications



Aeronautical data in abbreviated form to be used in association with airspace classification symbols:

127 Alternative



AIRSPACE RESTRICTIONS

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

OBSTACLES

130	Obstacle	
131	Lighted obstacle	
132	Group obstacles	
133	Lighted group obstacles	

134	Exceptionally high obstacle (optional symbol)	
135	Exceptionally high obstacle – lighted (optional symbol) *Note.— For obstacles having a height of the order of 300 m (1 000 ft) above terrain.*	
136	Elevation of top (italics) 52 (15) Height above specified datum (upright type in parentheses)	

MISCELLANEOUS

137	Prominent transmission line	
138	Isogonic line or isogonal	3° E
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 *Note 2.— Characteristics are to be indicated as follows:*	F	Alt Alternating B Blue F Fixed	*Note 1.— Marine alternating lights are red and white unless otherwise indicated. Marine lights are white unless colours are stated.*	Fl Flashing G Green Gp Group	Occ Occulting R Red SEC Sector	sec Second (U) Unwatched W White	
143	Aeronautical ground light	☆	Electronic ★	144	Lightship			

SYMBOLS FOR AERODROME/HELIPORT CHARTS

145	Hard surface runway	
146	Pierced steel plank or steel mesh runway	
147	Unpaved runway	
148	Stopway SWY	
149	Taxiways and parking areas	
150	Helicopter alighting area on an aerodrome	Ⓗ
151	Aerodrome reference point ARP	
152	VOR check-point	
153	Runway visual range (RVR) observation site	

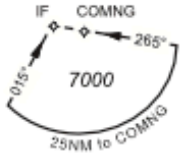
154	Point light	● / ○
155	Obstacle light	
156	Landing direction indicator (lighted)	
157	Landing direction indicator (unlighted)	T
158	Stop bar	
159	Runway-holding position Pattern A Pattern B *Note.— For application, see Annex 14, Volume I, 5.2.10.*	
160	Intermediate holding position *Note.— For application, see Annex 14, Volume I, 5.2.11.*	
161	Hot spot *Note.— Hot spot location to be circled.*	

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		

		Plan	Profile
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 *Note.— This symbol may be modified to reflect particular sector shapes.*	MSA	
172	Terminal arrival altitude *Note.— This symbol may be modified to reflect particular TAA shapes.*	TAA	
173	Holding pattern		
174	Missed approach track		

PROFILE

175	Runway	
176	Radio navigation aid (type of aid and its use in the procedure to be annotated on top of the symbol)	
177	Radio marker beacon (type of beacon to be annotated on top of the symbol)	
178	Collocated radio navigation aid and marker beacon (type of aid to be annotated on top of the symbol)	
179	DME fix (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 (distance from DME and the type of beacon to be annotated on top of the symbol)	

APPENDIX 3

COLOUR GUIDE

CHART SYMBOLS

Culture, except highways and roads; outlines of large cities, grids and graticules; spot elevations; danger lines 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 10 of Appendix 2 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 contours 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.)*

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

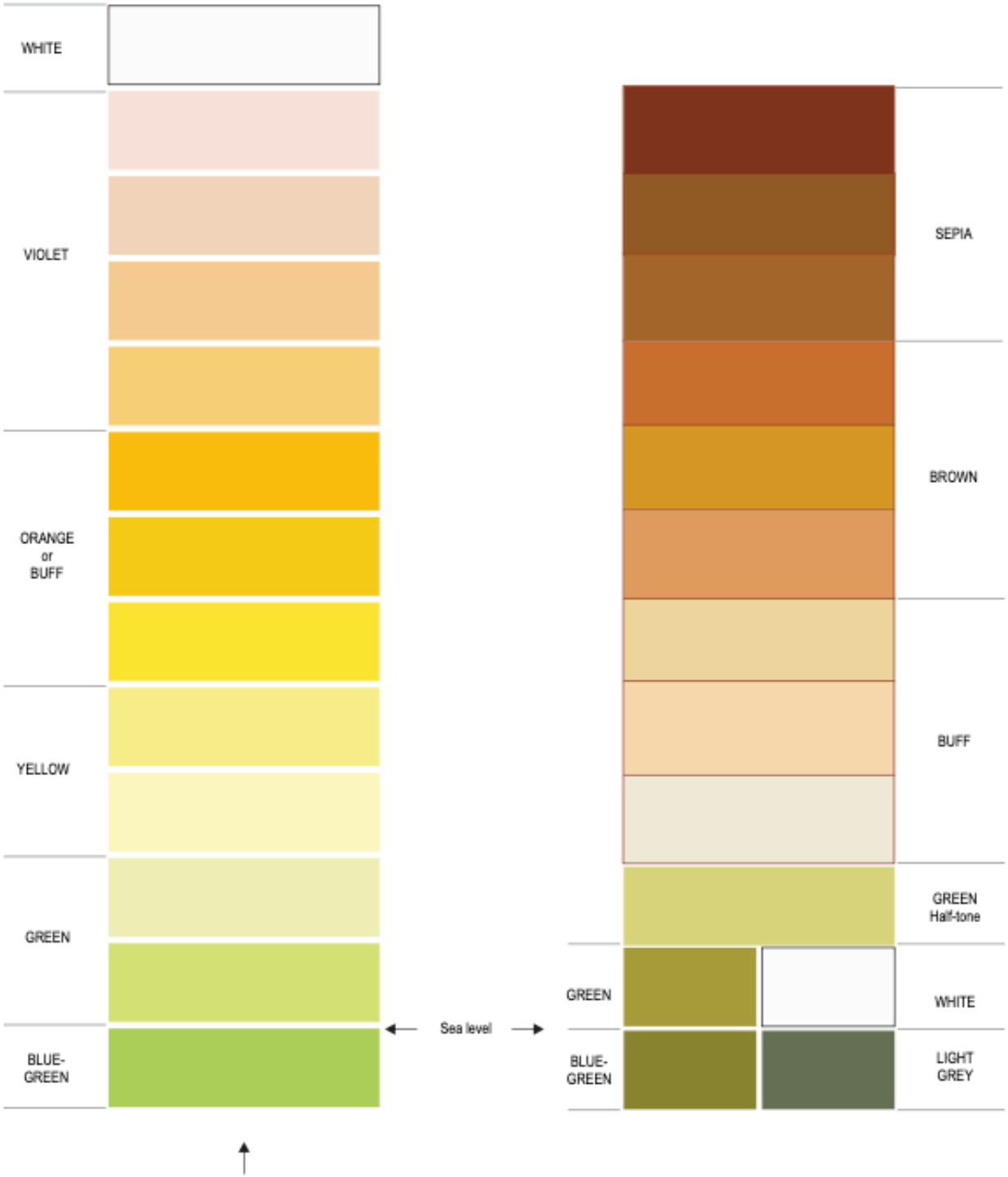
HYPSOMETRIC TINTS

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

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

APPENDIX 4

HYPSOMETRIC TINT GUIDE



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

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

APPENDIX 5

SHEET LAYOUT FOR THE WORLD AERONAUTICAL CHART – ICAO 1:1 000 000