بسم الله الرحمن الرحيم

ގަވާއިދު ސަރުކާރުގެ ގެޒެޓް

Volume: 54 Issue: 91 Date: 9 Zul Qaidaa 1446 – 7 May 2025 Wednesday

Regulation No: 2025/R-54

MCAR-AIS & CHARTS

The President's Office
Boduthakurufaanu Magu
Male, Maldives'

Phone: 3336211
Mobile: 7242885
Website: www·gazette·gov·mv

- For publication of regulations and guidelines in the Gazette, send to legalaffairs@po·gov·mv

Maldives Civil Aviation Authority
Republic of Maldives

Maldivian Civil Aviation Regulations

MCAR- AIS & Charts

Issue 3.00, 07 May 2025

Foreword

Maldives Civil Aviation Authority, in exercise of the powers conferred on it under Articles 5 and 6 of the Maldives Civil Aviation Authority Act 2/2012 has adopted this Regulation.

The standards in this regulation are based on those stipulated in Annexes 4 and 15 (entitled "Aeronautical Charts" and "Aeronautical Information Services") to the Convention on International Civil Aviation [as in force and amended from time to time by the Council of the International Civil Aviation Organisation and other relevant ICAO documents, and with such modifications as may be determined by MCAA to be applicable in Maldives.

This Regulation shall be cited as MCAR-AIS & CHARTS and shall come into force on 07th May 2025. Existing aviation requirements in the field of air navigation as listed in MCAR-15 Aeronautical Information Services dated 05th June 2014 and MCAR-4 Aeronautical charts dated 9th September 2021 will be repealed as from 07th May 2025.

Definitions of the terms and abbreviations used in this Regulation, unless the context requires otherwise, are in MCAR-1 Definitions and Abbreviations.

List of Amendments

Rev #	Date	Remarks
Issue 1 Amendment 0	2010-10-10	Initial Issue
Issue 2 Amendment 0	2014-06-05	Incorporate ICAO Annex 15, 14th Edition Amendment 37
Issue 3 Amendment 0	2025-05-07	Incorporating ICAO Annex 15, 16th Edition Amendment 43 and Annex 4, 11th Edition Amendment 62

List of Effective Pages

Chapter	Part	Page	Amendment	Date
	Foreword	ii	Issue: 3.00	07 May 2025
	List of Amendments	iii	Issue: 3.00	07 May 2025
	List of Effective Pages	iv-v	Issue: 3.00	07 May 2025
	Table of Contents	vi-vii	Issue: 3.00	07 May 2025
				07 May 2025
1	General Requirements for the provision of Aeronautical Information & Aeronautical Information Charts	1	Issue: 3.00	07 May 2025
				07 May 2025
2	Technical Requirements for Aeronautical Information Services	4	Issue: 3.00	07 May 2025
				07 May 2025
3	Technical Requirements for Aeronautical Information Charts	27	Issue: 3.00	07 May 2025
				07 May 2025
Appendix 1	Marginal Note Layout	77	Issue: 3.00	07 May 2025
				07 May 2025
Appendix 2	ICAO Chart Symbols	78	Issue: 3.00	07 May 2025
				07 May 2025
Appendix 3	Colour Guide	102	Issue: 3.00	07 May 2025
				07 May 2025
Appendix 4	Hypsometric Tint Guide	104	Issue: 3.00	07 May 2025

Table of Contents

CHAPTER 1- GENERAL REQUIREMENTS FOR THE PROVISION OF AERONAUTICAL INFORMATION AND AERONAUTICAL CHARTS SERVICES

1.1 Applicability

1.1.1 Common Reference Systems for Air Navigation

(Refer to Appendix 1 of ICAO Doc 10066 - PANS-AIM for specifications concerning the accuracy and integrity classification of WGS-84-related aeronautical data and for specifications concerning the accuracy and integrity classification of elevation and geoid undulation at specific positions at aerodromes/heliports.)

a) Horizontal Reference System

(1) World Geodetic System - 1984 (WGS-84) shall be used by the aeronautical information and charts services providers as the horizontal (geodetic) reference system for air navigation. Consequently, published aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.

(2) Geographical coordinates which have been transformed into WGS-84 coordinates but whose accuracy of original field work does not meet the requirements in Annex 11, Chapter 2, and Annex 14, Volumes I and II, Chapter 2, shall be identified by an asterisk.

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

Note 1.— 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 Annex 11, Chapter 2; and for aerodrome/heliport-related positions, in Annex 14, Volumes I and II, Chapter 2.

Note 2.— Specifications concerning the accuracy and integrity classification of WGS-84-related aeronautical data are contained in PANS-AIM (Doc 10066), Appendix 1.

b) Vertical Reference System

(1) Mean sea level (MSL) datum shall be used by the aeronautical information and charts services providers as the vertical reference system for international air navigation.

(2) 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 in Appendix 1 and as specified for a particular chart, by the aeronautical information and charts services providers.

(3) The Earth Gravitational Model - 1996 (EGM-96) shall be used by the aeronautical information and charts services providers as the global gravity model.

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

c) Temporal Reference System

(1) The Gregorian calendar and Coordinated Universal Time (UTC) shall be used by the aeronautical information and charts services providers as the temporal reference system for international air navigation.

(2) 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).

1.1.2 Miscellaneous specifications

a) The aeronautical information and charts services providers shall ensure that:

(1) aeronautical information products intended for international distribution include English text for those parts expressed in plain language;

(2) place names are spelt in conformity with local usage, transliterated, when necessary, into the ISO-Basic Latin alphabet;

(3) units of measurement used in the origination, processing and distribution of aeronautical data and aeronautical information are consistent with the decision taken by the Authority in respect of the use of the tables contained in the Maldives AIP; and

(4) ICAO abbreviations are used in aeronautical information products whenever they are appropriate, and their use facilitates distribution of aeronautical data and aeronautical information.

CHAPTER 2- TECHNICAL REQUIREMENTS FOR AERONAUTICAL INFORMATION SERVICES

2.1 RESPONSIBILITIES AND FUNCTIONS

2.1.1 Service provider responsibilities and functions

a) CAA shall designate the entity/entities responsible for providing Aeronautical Information Services.

b) The aeronautical information services provider shall ensure that the provision of aeronautical data and aeronautical information covers the Male' flight information region and it shall remain responsible for the aeronautical data and aeronautical information provided.

c) Aeronautical data and aeronautical information provided shall be of required quality in accordance with 2.2.4

d) The aeronautical information services provider shall ensure that:

(1) formal arrangements are established between originators of aeronautical data and aeronautical information and itself in relation to the timely and complete provision of aeronautical data and aeronautical information;

(2) aeronautical data, aeronautical information and aeronautical charts necessary for the safety, regularity and efficiency of air navigation are provided in a form suitable for the operational requirements of the air traffic management community, including:

i) those involved in flight operations, including flight crew, flight planning and flight simulators, and

ii) the air traffic services unit responsible for flight information services and the services responsible for pre-flight information.

e) The aeronautical information service provider shall receive, collate or assemble, edit, format, publish/store and distribute aeronautical data and aeronautical information concerning the entire territory of the Maldives. Aeronautical data and aeronautical information shall be provided as aeronautical information products.

f) All reasonable measures shall be taken by the aeronautical information service provider to ensure that the information it makes available is adequate and accurate and that they are maintained up to date by an adequate revision service.

g) Where 24-hour service is not provided, the services shall be available during the whole period an aircraft is in flight in the Male' flight information region, plus a period of at least two hours before and after such a period.

h) The aeronautical information service provider shall, in addition, obtain aeronautical data and aeronautical information to enable it to provide pre-flight information service and to meet the need for in-flight information:

(1) from aeronautical information service providers of other States;

(2) from other sources that may be available.

i) Aeronautical data and aeronautical information obtained under (h) (1) shall, when distributed, be clearly identified as having the authority of the originating State.

j) Aeronautical data and aeronautical information obtained under (h) (2) shall, if possible, be verified before distribution and if not verified shall, when distributed, be clearly identified as such.

k) The aeronautical information service provider shall promptly make available to the aeronautical information service of other States any aeronautical data and aeronautical information necessary for the safety, regularity or efficiency of air navigation required by them.

2.1.2 Exchange of aeronautical data and aeronautical information

(Refer to ICAO Doc 10066 - PANS AIM and Doc 8126 for specifications and guidance concerning the globally interoperable aeronautical information and data exchange models respectively)

a) The aeronautical information services provider shall be the office to which all elements of the aeronautical information products provided by other States are addressed. The office shall be qualified to deal with requests for aeronautical data and aeronautical information provided by other States.

b) The aeronautical information service provider shall arrange as necessary to satisfy operational requirements for the issuance and receipt of NOTAM distributed by telecommunication.

c) Direct contact between the aeronautical information service provider and aeronautical information service providers of other States shall be established, where practicable, in order to facilitate the international exchange of aeronautical data and aeronautical information.

d) One copy of each of the elements of the aeronautical information products that have been requested by the aeronautical information service provider of

another Contracting State shall be made available by the aeronautical information service provider in mutually agreed form(s), without charge, even where authority for publication/storage and distribution has been delegated to a non-governmental agency. The exchange of more than one copy of the elements of the aeronautical information products and other air navigation documents, including those containing air navigation legislation and regulations, should be subject to bilateral agreement between the Maldives Civil Aviation Authority and the Civil Aviation Authority of other Contracting States, and entities.

e) Where aeronautical information and aeronautical data is provided in the form of digital data sets to be used by the aeronautical information service provider, it shall be provided on the basis of agreement between the Maldives Civil Aviation Authority and the Civil Aviation Authority of other Contracting States concerned.

f) The procurement of aeronautical data and aeronautical information, including the elements of aeronautical information products, and other air navigation documents, including those containing air navigation legislation and regulations, by States other than Contracting States and by other entities should be subject to separate agreement between the aeronautical information service provider and the participating States and entities.

g) The aeronautical information service provider shall use globally interoperable aeronautical data and information exchange models for the provision of data sets.

2.1.3 Copyright

a) The Aeronautical Information service provider shall ensure that any aeronautical information product which has been granted copyright protection by the originating State and provided to the AIS provider shall only be made available to a third party on the condition that the third party is made aware that the product is copyright protected and provided that it is appropriately annotated that the product is subject to copyright by the originating State.

b) The Aeronautical information service provider shall ensure that aeronautical information and aeronautical data that is provided to the AIS provider for the provision of pre-flight service and to meet the need for in-flight information from the AIS of other States shall not provide digital data sets of the providing State to any third party without the consent of the providing State.

2.1.4 Cost Recovery

The aeronautical information service provider's overhead cost of collecting and compiling aeronautical data and aeronautical information should be included in the cost basis for airport and air navigation services charges, as appropriate, in accordance with the principles contained in ICAO Doc 9082 - Policies on Charges for Airports and Air Navigation Services.

2.2 AERONAUTICAL INFORMATION MANAGEMENT

2.2.1 Information Management Requirements

Information management resources and processes established by the aeronautical information service provider shall be adequate to ensure the timely collection, processing, storing, integration, exchange and delivery of quality-assured aeronautical data and aeronautical information within the air traffic management system.

2.2.2 Data Quality requirements

(Refer to Appendix 1of ICAO Doc 10066 - PANS-AIM for specifications concerning the order of accuracy (including confidence level) for, specifications concerning the resolution of and specifications concerning the integrity classification related to aeronautical data)

a) Data Accuracy

The aeronautical information service provider shall ensure that the order of accuracy of aeronautical data is in accordance with its intended use.

b) Data Resolution

(1) The aeronautical information service provider shall ensure that the order of resolution of aeronautical data is commensurate with the actual data accuracy.

(2) The resolution of the features contained in the database should be the same or finer than publication resolution.

c) Data Integrity

(1) The aeronautical information service provider shall ensure the integrity of aeronautical data is maintained throughout the data process from origination to distribution to the next intended user.

(2) Based on the applicable integrity classification, procedures shall be put in place in order for:

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

ii) essential data: ensure corruption does not occur at any stage of the data processing life cycle (e.g. collection, processing, storing, integration, exchange and delivery) and include additional measures or steps as needed to address potential risks in the

overall processing of aeronautical data to further ensure data integrity at this level; and

iii) critical data: ensure corruption does not occur at any stage of the data processing life cycle (e.g. collection, processing, storing, integration, exchange and delivery) and include additional data integrity assurance processes to mitigate the risk of errors.

Note.— Guidance concerning measures to ensure data integrity is contained in the Aeronautical Information Service Manual (Doc 8126), Part II, 4.1 and 6.2.

d) Data Traceability

The aeronautical information service provider shall ensure the traceability of aeronautical data and that the traceability is retained for as long as the data is in use.

e) Data Timeliness

The aeronautical information service provider shall ensure the timeliness of aeronautical data by including limits on the effective period of the data elements.

f) Data Completeness

The aeronautical information service provider shall ensure the completeness of the aeronautical data in order to support the intended use.

g) Data Format

The aeronautical information service provider shall ensure that the format of delivered aeronautical data is adequate to make certain that such data is interpreted in a manner that is consistent with its intended use.

2.2.3 Aeronautical data and aeronautical information validation and verification

a) Aeronautical data and aeronautical information to be published as part of an aeronautical information product shall be checked by the aeronautical information service provider, in order to ensure that all necessary information has been included and that it is correct.

b) The aeronautical information service provider shall establish verification and validation procedures, which ensure that upon receipt of aeronautical data and aeronautical information, quality requirements are met.

2.2.4 Data Error Detection

(Refer to ICAO Doc 10066 - PANS AIM for specifications concerning digital data error detection techniques)

a) The aeronautical information service provider shall use digital data error detection techniques during the transmission and/or storage of aeronautical data and digital data sets.

b) Digital data error detection techniques shall be used in order to maintain the integrity levels as specified in 2.2.2 (c).

2.2.5 Use of Automation

(Refer to ICAO Doc 8126)

a) The aeronautical information service provider shall apply automation in order to ensure the quality, efficiency and cost effectiveness of aeronautical information services.

b) Due consideration to the integrity of data and information shall be given when automated processes are implemented and mitigating steps taken where risks are identified.

c) In order to meet the data quality requirements, automation shall:

iv) enable digital aeronautical data exchange between the parties involved in the data processing chain; and

v) use aeronautical information exchange models and data exchange models designed to be globally interoperable.

2.2.6 Quality Management System

(Refer to ICAO Doc 9839 - *Quality Management System Manual for Aeronautical Service and Doc 9991 – Aeronautical Information Management Training Development Manual)*

a) The aeronautical information service provider shall implement and maintain a quality management system encompassing all functions of its service, as outlined in 2.1.1. The execution of such quality management systems shall be made demonstrable for each function stage.

b) The quality management shall be applicable to the whole aeronautical information data chain from data origination to distribution to the next intended user, taking into consideration the intended use of data. A user feedback system shall be defined and implemented.

c) The quality management system established in accordance with (a) should follow the ISO 9000 series of quality assurance standards and be certified by an approved organization.

d) Within the context of the established quality management system, the aeronautical information service provider shall identify the competencies and the associated knowledge, skills and attitudes required for each function and personnel assigned to perform those functions shall be appropriately trained. Processes shall be in place to ensure that personnel possess the competencies required to perform specific assigned functions. Appropriate records shall be maintained so that the qualifications of personnel can be confirmed. Initial and periodic assessments shall be established that require personnel to demonstrate the required competencies. Periodic assessments of personnel shall be used as a means to detect and correct shortfalls in knowledge, skills and attitudes

e) The training methodology established in accordance with d) should follow the competency-based training and assessment methodology.

Note 1.— Provisions related to the competency-based training and assessment methodology are contained in the Procedures for Air Navigation Services — Training (PANS-TRG, Doc 9868) and in the Procedures for Air Navigation Services — Aeronautical Information Management (PANS-AIM, Doc 10066).

Note 2.— Additional guidance concerning a competency-based training and assessment methodology to ensure the competency of personnel in accordance with the Procedures for Air Navigation Services — Training (PANS-TRG, Doc 9868) is contained in the Manual on Aeronautical Information Services Training (Doc 9991).

f) The quality management system shall include the necessary policies, processes and procedures, including those for the use of metadata, to ensure and verify that aeronautical data are traceable throughout the aeronautical information data chain so as to allow any data anomalies or errors detected in use to be identified by root cause, corrected and communicated to affected users.

g) The established quality management system shall provide users with the necessary assurance and confidence that distributed aeronautical data and aeronautical information satisfy the aeronautical data quality requirements.

h) All necessary measures shall be taken to monitor compliance with the quality management system in place.

i) The aeronautical information service provider shall demonstration compliance of the quality management system by internal audit and if non-compliances are identified, initiating actions to correct their causes shall be determined and

taken without undue delay. All audit observations and remedial actions shall be evidenced and properly documented.

2.2.7 Human factors considerations

a) The aeronautical information service provider shall take into consideration human factors principles which facilitate their optimum utilization in the organization of its service as well as the design, contents, processing and distribution of aeronautical data and aeronautical information.

b) Due consideration shall be given to the integrity of information where human interaction is required and mitigating steps taken where risks are identified.

2.3 SCOPE OF AERONAUTICAL DATA AND AERONAUTICAL INFORMATION

2.3.1 Aeronautical Data and aeronautical information

(Refer to Appendix 1 of ICAO Doc 10066 - PANS-AIM for specifications concerning the accuracy and integrity classification related to aeronautical data)

a) The aeronautical data and aeronautical information to be received and managed by the aeronautical information service provider shall include at least the following sub-domains:

(1) national regulations, rules and procedures;

(2) aerodromes and heliports;

(3) airspace;

(4) ATS routes;

(5) instrument flight procedures;

(6) radio navigation aids/systems;

(7) obstacles;

(8) terrain; and

(9) geographic information.

b) The aeronautical information service provider shall determine and report aeronautical data in accordance with the accuracy and integrity classification required to meet the needs of the end-user of aeronautical data.

2.3.2 Metadata

(Refer to ICAO Doc 10066 - PANS AIM for detailed specifications concerning metadata)

The aeronautical information service provider shall collect metadata for aeronautical data processes and exchange points. Metadata collection shall be applied throughout the aeronautical information data chain, from origination to distribution to the next intended user.

2.4 AERONAUTICAL INFORMATION PRODUCTS AND SERVICES

2.4.1 General specifications

(Refer to ICAO Doc 10066 - PANS AIM for specifications concerning the order of resolution of aeronautical data provided for each aeronautical information product)

a) The aeronautical information service provider shall provide aeronautical information in the form of aeronautical information products and associated services.

b) Where aeronautical data and aeronautical information are provided in multiple formats, processes shall be implemented to ensure data and information consistency between formats.

2.4.2 Aeronautical information in a standardised presentation

(Refer to ICAO Doc 10066 - PANS AIM for detailed specifications about AIP, AIP Amendments, AIP Supplements, AICs and NOTAMs)

a) The aeronautical information service provider shall provide aeronautical information in a standardised presentation, which shall include the AIP, AIP Amendments, AIP Supplements, AICs, NOTAMs and Aeronautical Charts. These shall be provided on paper and/or as an electronic document.

b) The AIP, AIP Amendment, AIP Supplement and AIC provided as an electronic document (eAIP) shall allow for both displaying on electronic devices and printing on paper.

c) Aeronautical Information Publication (AIP)

The aeronautical information service provider shall ensure that the Maldives AIP, herein referred to as AIP, include:

(1) a statement of the Authority responsible for the air navigation facilities, services or procedures covered by the AIP;

(2) the general conditions under which the services or facilities are available for international use;

(3) a list of significant differences between the national regulations and practices of the Maldives and the related ICAO Standards, Recommended Practices and Procedures, given in a form that would enable a user to differentiate readily between the requirements of the Maldives and the related ICAO provisions;

(4) the choice made by the Maldives in each significant case where an alternative course of action is provided for in ICAO Standards, Recommended Practices and Procedures.

d) AIP Supplement

The aeronautical information service provider shall regularly provide a checklist of valid AIP Supplements.

e) Aeronautical Information Circulars (AIC)

(1) The aeronautical information service provider shall use an AIC to provide:

i) a long-term forecast of any major change in legislation, regulations, procedures or facilities; or

ii) information of a purely explanatory or advisory nature liable to affect flight safety; or

iii) information or notification of an explanatory or advisory nature concerning technical, legislative or purely administrative matters.

(2) An AIC shall not be used for information that qualifies for inclusion in AIP or NOTAM.

(3) The validity of AIC currently in force shall be reviewed at least once a year.

(4) A checklist of currently valid AIC shall be regularly provided.

f) Aeronautical Charts

(Refer to Section 3 for technical standards including provision requirements for each aeronautical chart type and Appendix 1 of ICAO Doc 10066 - PANS AIM for specifications concerning the chart resolution for aeronautical data)

(1) The aeronautical information service provider shall ensure that the aeronautical charts listed below, when available for designated international aerodromes/heliports, form part of the AIP or be provided separately to recipients of the AIP:

i) Aerodrome Chart - ICAO;

ii) Aerodrome Ground Movement Chart - ICAO

iii) Aerodrome Obstacle Chart - ICAO Type A;

iv) Aerodrome Obstacle Chart - ICAO Type B (when available);

v) Aerodrome Terrain and Obstacle chart – ICAO (Electronic);

vi) Aircraft Parking/Docking Chart - ICAO;

vii) Area Chart - ICAO;

viii) ATC Surveillance Minimum Altitude Chart — ICAO

ix) Instrument Approach Chart - ICAO;

x) Precision Approach Terrain Chart — ICAO;

xi) Standard Arrival Chart - Instrument (STAR) - ICAO;

xii) Standard Departure Chart - Instrument (SID) – ICAO.

xiii) Visual Approach Chart - ICAO

(2) The "En-route Chart - ICAO" shall form part of the AIP or be provided separately to recipients of the AIP.

(3) The World Aeronautical Chart - ICAO 1:1 000 000 or Aeronautical Chart - ICAO 1:500 000 or Aeronautical Navigation Chart - ICAO Small Scale and Plotting Chart - ICAO chart, when available, shall be provided as aeronautical information products.

(4) Electronic aeronautical charts should be provided based on digital databases and the use of geographic information systems.

(5) The chart resolution of aeronautical data shall be that as specified for a particular chart.

g) NOTAM

The aeronautical information service provider shall regularly provide a checklist of valid *NOTAM*.

2.4.3 Digital data sets

(Refer to ICAO Doc 10066 – PANS AIM for detailed specifications concerning the content of the digital data sets and metadata)

a) GENERAL

(1) The aeronautical information service provider shall ensure that digital data are in the form of the following data sets:

i) AIP data set;

ii) terrain data sets;

iii) obstacle data sets;

iv) aerodrome mapping data sets; and

v) instrument flight procedure data sets.

(2) Each data set shall be provided to the next intended user together with at least the minimum set of metadata that ensures traceability.

(3) A checklist of valid data sets shall be regularly provided.

b) AIP Data Set

(1) The aeronautical information service provider should provide an AIP data set covering the extent of information as provided in the AIP. When it is not possible to provide a complete AIP data set, data subset(s) that are available should be provided.

(2) The AIP data set shall contain the digital representation of aeronautical information of lasting character

(3) (permanent information and long duration temporary changes) essential to air navigation.

c) Terrain and Obstacle Data Sets

(Refer to Appendices 1 and 8 of ICAO Doc 10066 - PANS-AIM for numerical requirements for terrain and obstacle data sets and requirements for terrain and obstacle data collection surfaces).

(1) The aeronautical information service provider shall ensure that the coverage areas for sets of electronic terrain and obstacle data are specified as:

i) Area 1: the entire territory of the Maldives

ii) Area 2: within the vicinity of an aerodrome, subdivided as follows;

- Area 2a: a rectangular area around a runway that comprises the runway strip plus any clearway that exists.
- Area 2b: an area extending from the ends of Area 2a in the direction of departure, with a length of 10 km and a splay of 15 per cent to each side;
- Area 2c: an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a; and
- Area 2d: an area outside the Areas 2a, 2b and 2c up to a distance of 45 km from the aerodrome reference point, or to an existing terminal control area (TMA) boundary, whichever is nearest; and
- Area 3: the area bordering an aerodrome movement area that extends horizontally from the edge of a runway to 90 m from the runway centre line and 50 m from the edge of all other parts of the aerodrome movement area.

- Area 4: the area extending 900 m prior to the runway threshold and 60 m each side of the extended runway centre line in the direction of the approach on a precision approach runway, Category II or III.

d) Terrain Data Sets

(1) The aeronautical information service provider shall ensure that terrain data sets contain the digital representation of the terrain surface in the form of continuous elevation values at all intersections (points) of a defined grid, referenced to common datum.

(2) Terrain data shall be provided for:

i) Area 1;

(3) For aerodromes regularly used by international civil aviation, terrain data shall be provided for

i) Area 2a;

ii) the take-off flight path area; and

iii) an area bounded by the lateral extent of the aerodrome obstacle limitation surfaces.

(4) Additional terrain data should be provided within Area 2 as follows:

i) in the area extending to a 10-km radius from the ARP; and

ii) within the area between 10 km and the TMA boundary or a 45-km radius (whichever is smaller), where terrain penetrates a horizontal terrain data collection surface specified as 120 m above the lowest runway elevation.

(5) Arrangements should be made for coordinating the provision of terrain data for adjacent aerodromes where their respective coverage areas overlap to assure that the data for the same terrain is correct.

(6) Terrain data should be provided for Area 3.

(7) Where additional terrain data is collected to meet other aeronautical requirements, the terrain data sets should be expanded to include this additional data.

e) Obstacle Data Sets

(1) The aeronautical information service provider shall ensure that obstacle data sets contain the digital representation of the vertical and horizontal extent of obstacles.

(2) Obstacle data shall not be included in terrain data sets.

(3) Obstacle data shall be provided for:

i) obstacles in Area 1 for which the height is 100 m or higher above ground.

ii) all obstacles within Area 2 that are assessed as being a hazard to air navigation;

iii) Area 2a, for those obstacles that penetrate an obstacle data collection surface outlined by a rectangular area around a runway that comprises the runway strip plus any clearway that exists.

The Area 2a obstacle collection surface shall have a height of 3 m above the nearest runway elevation measured along the runway centre line, and for those portions related to a clearway, if one exists, at the elevation of the nearest runway end;

iv) 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;

v) penetrations of the aerodrome obstacle limitation surfaces.

vi) Area 2b: an area extending from the ends of Area 2a in the direction of departure, with a length of 10 km and a splay of 15% to each side. The Area 2b obstacle collection surface has a 1.2% slope extending from the ends of Area 2a at the elevation of the runway end in the direction of departure, with a length of 10 km and a splay of 15% to each side;

vii) Area 2c: an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a. The Area 2c obstacle collection surface has a 1.2% slope extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a. The initial elevation of Area 2c shall be the elevation of the point of Area 2a at which it commences;

viii) Area 2d: an area outside Areas 2a, 2b and 2c up to a distance of 45 km from the aerodrome reference point, or to an existing TMA boundary, whichever is nearest. The Area 2d obstacle collection surface has a height of 100 m above ground;

ix) Area 3: for obstacles that penetrate the relevant obstacle data collection surface extending a half-metre (0.5 m) above the horizontal plane passing through the nearest point on the aerodrome movement area.

f) Aerodrome Mapping Data Sets

The aeronautical information service provider shall make available aerodrome mapping data sets, which shall contain the digital representation of aerodrome features.

g) Instrument Flight Procedure Data Sets

The aeronautical information service provider shall make available instrument flight procedure data sets, which shall contain the digital representation of instrument flight procedures.

2.4.4 Distribution services

a) General

(1) The aeronautical information services provider shall distribute aeronautical information products to authorized users who request them. AIP, AIP Amendments, AIP Supplements and AIC shall be made available by the most expeditious means.

(2) Global communication networks such as the Internet should, whenever practicable, be employed for the provision of aeronautical information products.

b) NOTAM Distribution

(*Refer to ICAO Doc 8126 - AIS Manual for guidance material relating to the selective distribution lists).*

(1) The aeronautical information services provider shall prepare NOTAM in conformity with the relevant provisions of the ICAO communication procedures and distribute such NOTAM on the basis of a request using the Aeronautical Fixed Service (AFS), whenever practicable.

(2) When a NOTAM is sent by means other than the AFS, a six-digit date-time group indicating the date and time of NOTAM origination, and the identification of the originator shall be used, preceding the text.

(3) The aeronautical information service provider shall select the NOTAM that are to be given international distribution.

(4) International exchange of NOTAM shall take place only as mutually agreed between the aeronautical information services provider's NOTAM office and other international NOTAM offices concerned and between the aeronautical information services provider's NOTAM office and multinational NOTAM Processing Units.

(5) The aeronautical information services provider shall upon request grant distribution of NOTAM series other than those distributed internationally and selective distribution lists should be used when practicable.

c) Data set information services

(1) When provided, the digital data sets specified in 2.4.3 should be made available through information services.

Note 1.— In the context of system-wide information management, the notion of information service addresses machine-to-machine interaction in a service-oriented architecture.

Note 2.— Procedures on information services are contained in the Procedures for Air Navigation Services — Information Management (PANS-IM, Doc 10199)

Note 3.— Guidance material on information services can be found in the Manual on System-wide Information Management Implementation (Doc 10203).

(2) A data set information service shall provide, as a minimum, the ability to query and retrieve as a whole each of the digital data sets specified in b)

(3) **Recommendation**: A data set information service should provide the ability to query and retrieve selected elements of the digital data sets specified in 5.3.

Note.— Guidance material on how to query digital data sets is contained in the Aeronautical Information Services Manual (Doc 8126), Part IV

(4) **Recommendation**: A data set information service should provide the option to subscribe to notifications on data set updates.

2.4.5 Pre-flight information service

a) The aeronautical information services provider shall make available to flight operations personnel, including flight crews and services responsible for pre-flight information, aeronautical information relative to the route stages originating at the aerodrome.

b) Aeronautical information provided for pre-flight planning purposes shall include information of operational significance from the elements of the aeronautical information products.

2.4.6 Post-flight information service.

a) The aeronautical information service provider shall make arrangements to receive information concerning the state and operation of air navigation facilities or services noted by aircrews at the aerodrome. The arrangements

shall ensure that such information is made available for distribution as the circumstances necessitate.

b) The aeronautical information service provider shall make arrangements to receive information on the presence of wildlife hazards observed by aircrews. The arrangement shall ensure that such information is be made available for distribution as the circumstances necessitate.

2.5 AERONAUTICAL INFORMATION UPDATES

2.5.1 General specifications

The aeronautical information service provider shall keep aeronautical data and aeronautical information up to date.

2.5.2 Aeronautical information regulation and control (AIRAC)

a) The aeronautical information service provider shall distribute information concerning the following circumstances under the regulated system (AIRAC), i.e. basing establishment, withdrawal or significant changes upon a series of common effective dates at intervals of 28 days:

(1) limits (horizontal and vertical), regulations and procedures applicable to:

i) the flight information region;

ii) control areas;

iii) the control zones;

iv) advisory areas;

v) air traffic services (ATS) routes;

vi) permanent prohibited and restricted areas (including type and periods of activity when known);

vii) permanent areas or routes or portions thereof where the possibility of interception exists;

(2) positions, frequencies, call signs, identifiers, known irregularities and maintenance periods of radio navigation aids, and communication and surveillance facilities;

(3) holding and approach procedures, arrival and departure procedures, noise abatement procedures and any other pertinent ATS procedures;

(4) transition levels, transition altitudes and minimum sector altitudes;

(5) meteorological facilities (including broadcasts) and procedures;

(6) runways and stopways;

(7) taxiways and aprons;

(8) aerodrome ground operating procedures (including low visibility procedures);

(9) approach and runway lighting; and

(10) aerodrome operating minima if published by the Authority.

b) The information notified under the AIRAC system shall not be changed further for at least another 28 days after the effective date, unless the circumstance notified is of a temporary nature and would not persist for the full period.

c) The information provided under the AIRAC system shall be made available so as to reach recipients at least 28 days in advance of the effective date. AIRAC information shall be distributed at least 42 days in advance of the AIRAC effective dates with the objective of reaching recipients at least 28 days in advance of the effective date.

d) When information has not been submitted by the AIRAC date, a NIL notification shall be distributed not later than one cycle before the AIRAC effective date concerned.

e) Implementation dates other than AIRAC effective dates shall not be used for pre-planned operationally significant changes requiring cartographic work and/or for updating of navigation databases.

f) The aeronautical information services provider should use the regulated system (AIRAC) for the provision of information relating to the establishment and withdrawal of, and premeditated significant changes in, the circumstances listed below:

(1) position, height and lighting of navigational obstacles;

(2) hours of service of aerodromes, facilities and services;

(3) customs, immigration and health services;

(4) temporary danger, prohibited and restricted areas and navigational hazards, military exercises and mass movements of aircraft; and

(5) temporary areas or routes or portions thereof where the possibility of interception exists.

g) Whenever major changes are planned and where advance notice is desirable and practicable, information should be made available so as to reach recipients at least 56 days in advance of the effective date. This should be applied to the establishment of, and premeditated major changes in, the circumstances listed below, and other major changes if deemed necessary:

(1) new aerodromes for international instrument flight rules (IFR) operations;

(2) new runways for IFR operations at international aerodromes;

(3) design and structure of the ATS route network;

(4) design and structure of a set of terminal procedures (including change of procedure bearings due to magnetic variation change);

(5) circumstances listed in 2.5.2, if the FIR or any significant portion thereof is affected or if cross-border coordination is required.

2.5.3 Aeronautical information product updates

a) AIP Updates

(1) The aeronautical information service provider shall amend or re-issue the AIP at such regular intervals as may be necessary to keep it up to date.

(2) Permanent changes to the AIP shall be published as AIP Amendments.

(3) Temporary changes of long duration (three months or longer) and information of short duration which contains extensive text and/or graphics shall be published as AIP Supplements.

b) NOTAM

(Refer to ICAO *Doc 10066 - PANS-AIM, Doc 10066 for detailed specifications concerning the Trigger NOTAM).*

(1) The aeronautical information service provider shall originate a Trigger NOTAM when an AIP Amendment or an AIP Supplement is published in accordance with AIRAC procedures.

(2) A NOTAM shall be originated and issued promptly whenever the information to be distributed is of a temporary nature and of short duration, or when operationally significant permanent changes or temporary changes of long duration are made at short notice, except for extensive text and/or graphics.

(3) The aeronautical information service provider shall originate and issue NOTAM concerning the following information:

i) establishment, closure or significant changes in operation of aerodrome(s) or runways;

ii) establishment, withdrawal and significant changes in operation of aeronautical services (AGA, AIS, ATS, CNS, MET, SAR, etc.);

iii) establishment, withdrawal and significant changes in operational capability of radio navigation and air- ground communication services. This includes: interruption or return to operation, change of frequencies, change in notified hours of service, change of identification, change of orientation (directional aids), change of location, power increase or decrease amounting to 50% or more, change in broadcast schedules or contents, or irregularity or unreliability of operation of any radio navigation and air-ground communication services or limitations of relay stations including operational impact, affected service, frequency and area;

iv) unavailability of back-up and secondary systems, having a direct operational impact;

v) establishment, withdrawal or significant changes visual aids;

vi) interruption of or return to operation of major components of aerodrome lighting systems;

vii) establishment, withdrawal or significant changes made to procedures for air navigation services;

viii) occurrence or correction of major defects or impediments in the manoeuvring area;

ix) changes to and limitations on availability of fuel, oil and oxygen;

x) major changes to search and rescue facilities and services available;

xi) establishment, withdrawal or return to operation of hazard beacons marking obstacles to air navigation;

xii) changes in regulations requiring immediate action, e.g. prohibited areas for SAR action;

xiii) presence of hazards which affect air navigation (including obstacles, military exercises, and operations, intentional and unintentional radio frequency interferences, rocket launches, displays, fireworks, sky lanterns, rocket debris, races and major parachuting events);

xiv) conflict zones which affect air navigation (to include information that is as specific as possible regarding the nature and extent of threats of that conflict and its consequences for civil aviation);

Note.— Guidance related to conflict zones is contained in the Risk Assessment Manual for Civil Aircraft Operations Over or Near Conflict Zones (Doc 10084).

xv) planned laser emissions, laser displays and search lights if pilots' night vision is likely to be impaired;

xvi) erecting or removal of, or changes to, obstacles to air navigation in the take-off/climb, missed approach, approach areas and runway strip;

xvii) establishment or discontinuance (including activation or deactivation) as applicable, or changes in the status of prohibited, restricted or danger areas;

xviii) establishment or discontinuance of areas or routes or portions thereof where the possibility of interception exists and where the maintenance of guard on the VHF emergency frequency 121.5 MHz is required;

xix) allocation, cancellation or change of location indicators;

xx) changes in aerodrome/heliport for rescue and fire-fighting category provided;

xxi) presence or removal of, or significant changes in, hazardous conditions due to radioactive material, toxic chemicals or water on the movement area;

xxii) outbreaks of epidemics necessitating changes in notified requirements for inoculations and quarantine measures;

xxiii) observations or forecasts of space weather phenomena, the date and time of their occurrence, the flight levels where provided and portions of the airspace which may be affected by the phenomena;

xxiv) an operationally significant change in volcanic activity, the location, date and time of volcanic eruptions and/or horizontal and vertical extent of volcanic ash cloud, including direction of movement, flight levels and routes or portions of routes which could be affected;

xxv) release into the atmosphere of radioactive materials or toxic chemicals following chemical incident, the location, date and

time of the incident, the flight levels and routes or portions thereof which could be affected and the direction of movement;

xxvi) establishment of operations of humanitarian relief missions, such as those undertaken under the auspices of the United Nations, together with procedures and/or limitations which affect air navigation; and

xxvii) implementation of short-term contingency measures in cases of disruption, or partial disruption, of air traffic services and related supporting services.

Note.— See Annex 11, 2.31 and Attachment C to that Annex.

Note.— Specifications concerning the timely promulgation of information by NOTAM are contained in Chapter 6 of the Procedures for Air Navigation Services — Aeronautical Information Management (PANS-AIM, Doc 10066).

(4) The following information shall not be notified by NOTAM:

i) routine maintenance work on aprons and taxiways which does not affect the safe movement of aircraft;

ii) runway marking work, when aircraft operations can safely be conducted on other available runways, or the equipment used can be removed when necessary;

iii) temporary obstructions in the vicinity of aerodromes/heliports that do not affect the safe operation of aircraft;

iv) partial failure of aerodrome/heliport lighting facilities where such failure does not directly affect aircraft operations;

v) partial temporary failure of air-ground communications when suitable alternative frequencies are known to be available and are operative;

vi) the lack of apron marshalling services and road traffic control;

vii) the unserviceability of location, destination or other instruction signs on the aerodrome movement area; (viii) parachuting when in uncontrolled airspace under VFR, when controlled, at promulgated sites or within

viii) danger or prohibited areas;

ix) training activities by ground units;

x) unavailability of back-up and secondary systems if these do not have an operational impact;

xi) limitations to airport facilities or general services with no operational impact;

xii) national regulations not affecting general aviation;

xiii) announcement or warnings about possible/potential limitations, without any operational impact;

xiv) general reminders on already published information;

xv) availability of equipment for ground units without containing information on the operational impact for airspace and facility users;

xvi) information about laser emissions without any operational impact and fireworks below minimum flying heights;

xvii) closure of movement area parts in connection with planned work locally coordinated of duration of less than one hour;

xviii) closure or unavailability of, or changes in, operation of aerodrome(s)/heliport(s) outside the aerodrome(s)/heliport(s) operational hours; and

xix) other non-operational information of a similar temporary nature.

c) DATA set updates

(1) The aeronautical information services provider shall amend or re-issue data sets at such regular intervals as may be necessary to keep them up to date.

(2) Permanent changes and temporary changes of long duration (three months or longer) made available as digital data shall be issued in the form of a complete data set or a subset that includes only the differences from the previously issued complete data set.

(3) When made available as a completely reissued data set, the differences from the previously issued complete data set should be indicated.

(4) When temporary changes of short duration are made available as digital data (digital NOTAM), they should use the same aeronautical information model as the complete data set.

(5) Updates to the AIP and digital data sets shall be synchronized.

CHAPTER 3- TECHNICAL REQUIREMENTS FOR AERONAUTICAL CHARTS

3.1 GENERAL SPECIFICATIONS

3.1.1 Availability

(Refer to ICAO Doc 8697 - Aeronautical Chart *Manual for guidance material on the preparation of aeronautical charts, including sample formats)*

a) CAA shall designate the entity/entities responsible for providing Aeronautical Chart Services.

b) The aeronautical charts service provider shall ensure that all charts coming within the scope of this section conform to the technical standards relevant to the particular chart.

c) On request by another aeronautical charts authority, the aeronautical information service provider shall provide all information relating to Maldives territory that is necessary to enable the technical standards of this section to be met.

d) The aeronautical charts service provider shall ensure the availability of charts, hard copy or electronic for a particular chart or single sheet of a chart series.

e) All reasonable measures shall be taken to ensure that the information provided, and the aeronautical charts made available are adequate and accurate and that they are maintained up to date by an adequate revision service.

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

3.1.2 Operational requirements for charts

a) The aeronautical charts service provider shall ensure that:

(1) each type of chart provides information relevant to the function of the chart and its design observe human factors principles which facilitate its optimum use;

Note: *(Refer to ICAO Doc 9683 - Human Factors Training Manual)*

(2) each type of chart provides information appropriate to the phase of flight to ensure the safe and expeditious operation of the aircraft;

(3) the presentation of information is accurate, free from distortion and clutter, unambiguous, and is readable under all normal operating conditions;

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

(5) the information is in a form which enables the pilot to acquire it in a reasonable time consistent with workload and operating conditions;

(6) the presentation of information provided on each type of chart permit smooth transition from chart to chart as appropriate to the phase of flight;

(7) the charts are True North orientated; and

(8) the basic sheet size of the charts are 210 x 148 mm (8.27 x 5.82 in) (A5).

3.1.3 Titles

The aeronautical charts service provider shall ensure that the title of a chart or chart series prepared in accordance with the specifications contained in this section and intended to satisfy the function of the chart is that of the relevant chapter heading as modified by application of any standard contained therein, except that such title does not include "ICAO" unless the chart conforms with all technical standards specified in this chapter and any specified for the particular chart.

3.1.4 Miscellaneous information

a) The aeronautical charts service provider shall ensure that the marginal note layout is as given in Appendix 1 to this section, except as otherwise specified for a particular chart.

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

(1) designation or title of the chart series;

(2) name and reference of the sheet;

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

c) 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.

d) 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.

3.1.5 Symbols

a) The aeronautical charts service provider shall ensure that symbols used conform to those shown in Appendix 2 to this section, except that where it is desired to show on an aeronautical chart special features or items of importance to civil aviation for which no symbol is at present provided in Appendix 2 to this section, any appropriate symbol is chosen for this purpose, provided that it does not cause confusion with any existing ICAO chart symbol or impair the legibility of the chart.

b) 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.

c) The symbol used for significant points shall be based on a hierarchy of symbols and selected in the following order: ground-based navigation aid, intersection, 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.

d) The aeronautical charts service provider shall ensure that symbols are shown in the manner specified in (b), (c) and Appendix 2 to this section, symbol number 121.

3.1.6 Units of measurement

a) The aeronautical charts service provider shall ensure that:

(1) distances are derived as geodesic distances and expressed in either kilometres or nautical miles or both, provided the units are clearly differentiated.

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

(3) linear dimensions on aerodromes and short distances are expressed in metres.

(4) the order of resolution of distances, dimensions, elevations and heights are that as specified for a particular chart.

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

(6) conversion scales (kilometres/nautical miles, metres/feet) are provided on each chart on which distances, elevations or altitudes are shown and placed on the face of each chart.

3.1.7 Scale and projection

The aeronautical charts service provider shall indicate the name and basic parameters and scale of the projection are indicated for charts of large areas, and a linear scale only for charts of small areas.

3.1.8 Date of validity of aeronautical information

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

3.1.9 Spelling of geographical names

a) The aeronautical charts service provider shall use symbols of the Roman alphabet for all writing.

b) Where a geographical term such as “cape”, “point” and “river” is abbreviated on any particular chart, the term shall be spelt out in full in the language used by the publishing agency, in respect of the most important example of each type.

c) Punctuation marks shall not be used in abbreviations within the body of a chart.

3.1.10 Spelling of geographical names

The names of places and of geographical features in countries which officially use varieties of the Roman alphabet shall be accepted in their official spelling, including the accents and diacritical marks used in the respective alphabets.

3.1.11 Abbreviations

The aeronautical charts service provider shall use abbreviations on aeronautical charts whenever they are appropriate and where applicable, abbreviations should be selected from ICAO Doc 8400 Procedures for Air Navigation Services - ICAO Abbreviations and Codes.

3.1.12 Political boundaries

The aeronautical charts service provider shall ensure international boundaries are shown, but may be interrupted if data more important to the use of the chart would be obscured.

3.1.13 Colours

The aeronautical charts service provider shall ensure that the colours used on charts conform to Appendix 3 of this section.

3.1.14 Relief

a) The aeronautical charts service provider shall ensure that relief, where shown, is portrayed in a manner that willsatisfy the chart users' need for:

   (1) orientation and identification;

   (2) safe terrain clearance;

   (3) clarity of aeronautical information when shown; (4) planning.

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

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

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

3.1.15 Prohibited, restricted and danger areas

The aeronautical charts service provider shall ensure that the reference or other identification are included when prohibited, restricted or danger areas are shown, except that the nationality letters may be omitted.

3.1.16 Air traffic services airspaces

a) When air traffic services airspace is shown on a chart, the aeronautical charts service provider shall indicate the class of airspace, the type, name or call sign, the vertical limits and the radio frequency(ies) to be used and the horizontal limits depicted in accordance with Appendix 2 to this section.

b) On charts used for visual flight, those parts of the air traffic services airspace classes table, Appendix 4 of STS- RoA applicable to the airspace depicted on the chart, should be on the face or reverse of each chart.

3.1.17 Magnetic variation

a) The aeronautical charts service provider shall ensure that true north and magnetic variation is indicated. The order of resolution of magnetic variation shall be that as specified for a particular chart.

b) 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 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.

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

3.1.18 Typography

The aeronautical charts service provider shall use the typography included in the ICAO Doc 8697 - Aeronautical Chart.

3.1.19 Aeronautical data

(Refer to ICAO Doc 10066 - PANS AIM, Appendix 1 for specifications concerning the chart resolution for aeronautical data and specifications concerning the integrity classification related to aeronautical data.)

a) The aeronautical charts service 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 Chapter 2.2, 2.2.6. The execution of such quality management shall be made demonstrable for each function stage, when required. In addition, the aeronautical charts service provider shall ensure that established procedures exist in order that aeronautical data at any moment is traceable to its origin so to allow any data anomalies or errors, detected during the production/maintenance phases or in the operational use, to be corrected.

b) The order of chart resolution of aeronautical data shall be that as specified for a particular chart.

c) The integrity of aeronautical data shall be maintained throughout the data process from origination to distribution to the next intended user.

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

3.2 AERODROME OBSTACLE CHART - ICAO TYPE A (OPERATING LIMITATIONS)

3.2.1 Function

The aeronautical charts service provider shall ensure that this chart, in combination with the relevant information published in the AIP, provides the data necessary to enable an operator to comply with the operating limitations prescribed in the relevant air operations requirements.

3.2.2 Availability

a) The aeronautical charts service provider shall ensure that Aerodrome Obstacle Charts - ICAO Type A (Operating Limitations) are made available in the manner prescribed in 3.1.1 (d) , except where the Aerodrome Terrain and Obstacle Chart - ICAO (Electronic) is provided in accordance with 3.3 of this section.

b) 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.

3.2.3 Units of measurement

The aeronautical charts service provider shall ensure that elevations on the chart are shown to the nearest half-metre or to the nearest foot and linear dimensions are shown to the nearest half-metre.

3.2.4 Coverage and scale

The aeronautical charts service provider shall ensure that:

a) the extent of each plan is sufficient to cover all obstacles

b) the horizontal scale shall be within the range of 1:10 000 to 1:15 000;

c) the vertical scale shall be ten times the horizontal scale and

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

3.2.5 Format

a) The aeronautical charts service provider shall ensure that:

(1) the chart 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 are shown above the corresponding plan of the chart;

(3) the profile of an alternative take-off flight path area on the chart comprises a linear projection of the full take-off flight path and is disposed above its

corresponding plan in the manner most suited to the ready interpretation of the information.

(4) a profile grid is ruled over the entire profile area exclusive of the runway on the chart;

(5) the zero for vertical coordinates on the chart is mean sea level;

(6) the zero for horizontal coordinates on the chart are the end of the runway furthest from the take-off flight path area concerned;

(7) graduation marks indicating the sub-divisions of intervals are shown along the base of the grid and along the vertical margins on the chart; and

(8) the vertical grid has intervals of 30 m (100 ft) and the horizontal grid has intervals of 300 m (1000 ft).

b) The aeronautical charts service provider shall ensure that the chart include:

(1) a box for recording the operational data specified in 3.12.8 (c); (2) a box for recording amendments and dates thereof.

3.2.6 Identification

The aeronautical charts service provider shall identify the chart by the name of the State, the name of the aerodrome and the designators of the runways.

3.2.7 Magnetic variation

The aeronautical charts service provider shall indicate magnetic variation to the nearest degree and date of information on the chart.

3.2.8 Aeronautical data

a) Obstacles

(1) The aeronautical charts service provider shall regard objects in the take-off flight path area which project above a plane surface having a 1.2% slope and having a common origin with the take-off flight path area as obstacles, except that obstacles lying wholly below the shadow of other obstacles as defined in (2) need not be shown. Mobile objects which may project above the 1.2% plane, shall be considered obstacles, but shall not be considered as being capable of creating a shadow.

(2) 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 (1) or to the next higher obstacle if it occurs first. For the first

300 m (1000 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%.

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

b) Take-off Flight Path Area

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

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

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 1800 m (6000 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 lower.

(2) 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%, the extent of the take-off flight path area specified in (b) (1) (iii) shall be increased to not less than 12.0 km (6.5 NM) and the slope of the plane surface specified in (1) and (2) shall be reduced to 1% or less. When a 1% survey plane touches no obstacles, this plane may be lowered until it touches the first obstacle.

c) Declared Distances

(Refer to ICAO Annex 14, Vol. I, Attachment A, Section 3)

The aeronautical charts service provider shall enter the following information for each direction of each runway in the space provided on the chart:

(1) take-off run available;

(2) accelerate-stop distance available;

(3) take-off distance available;

(4) landing distance available.

d) Plan and Profile Views

(1) The aeronautical charts service provider shall show the following on the plan view of the chart:

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 the exact location of each obstacle together with a symbol indicative of its type, the elevation and identification of each obstacle and the limits of penetration of obstacles of large extent in a distinctive manner identified in the legend. This does not exclude the necessity for indicating critical spot elevations within the take-off flight path area.

vi) the nature of the runway and stopway surfaces;

vii) stopways indicated by a broken line and the length of each stopway.

(2) The profile view shall show:

(1) 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;

(2) 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;

(3) obstacles, including 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, identification of each obstacle and the limits of penetration of obstacles of large extent in a distinctive manner identified in the legend. An obstacle profile consisting of a line joining the tops of each obstacle and representing the shadow created by successive obstacles may be shown.

3.2.9 Accuracy

a) The aeronautical charts service provider shall show the order of accuracy attained on the chart.

b) 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).

c) 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:

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

   (2) 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.

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

3.3 AERODROME TERRAIN AND OBSTACLE CHART - ICAO (ELECTRONIC)

3.3.1 Function

The aeronautical charts service provider shall ensure that electronic charts 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 the relevant air operations requirements, 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:

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

(2) aerodrome obstacle restriction and removal; and

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

3.3.2 Availability

a) The aeronautical charts service provider shall make available Aerodrome Terrain and Obstacle Charts - ICAO (Electronic) in the manner prescribed in 3.1.1 (d).

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

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

3.3.3 Identification

The aeronautical charts service provider shall identify the electronic terrain and obstacle chart. by the name of the State and the name of the aerodrome.

3.3.4 Chart coverage

The aeronautical charts service provider shall ensure that the extent of each chart is sufficient to cover Area 2 as specified in Chapter 2, 3.4.

3.3.5 Chart content

a) General

(Refer to ISO Standard 19117 for the definition of the schema describing the portrayal mechanism of feature- based geographic information, ISO Standard

19109 for rules for application schema ISO Standard 19107 or Spatial geometry and associated topological relationships)

(1) When developing computer graphic applications that are used to portray features on the chart, the aeronautical charts service provider shall specify the relationships between features, feature attributes, and the underlying spatial geometry and associated topological relationships 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.

(2) Symbols used to portray features shall be in accordance with 3.1.5 and Appendix 2 to this section.

b) Terrain Feature

(Refer to Chapter 5 and Appendices 1, 6 and 8 of ICAO Doc 10066 - PANS AIM for specifications concerning terrain data sets and Appendix 6, Table A6-1 for specifications concerning terrain attributes)

(1) The aeronautical charts service provider shall base the terrain feature, and associated attributes, to be portrayed and database-linked to the chart on the terrain data sets, which satisfy the technical standards of Chapter 2, 3.4.

(2) 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).

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

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

(5) 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.

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

c) Obstacle Features

(Refer to Chapter 5 and Appendices 1, 6 and 8 of ICAO Doc 10066 - PANS AIM for specifications concerning obstacle data sets and Appendix 6, Table A6-2 for specifications concerning obstacle attributes)

(1) The aeronautical charts service provider shall base obstacle features, and associated attributes, portrayed or database-linked to the chart, on obstacle data sets which satisfy the technical standards of Chapter 2, 3.4.

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

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

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

(5) obstacle type; and

(6) obstacle extent, if appropriate.

(7) Additional obstacle attributes provided in the database(s) should be linked to the portrayed obstacle feature.

d) Aerodrome Features

(Refer to Chapter 5 and Appendix 1 of ICAO Doc 10066 - PANS AIM for specifications concerning aerodrome features and associated attributes)

(1) The aeronautical charts service provider shall base aerodrome features, and associated attributes, portrayed and database-linked to the chart on aerodrome data, which satisfy the technical standards of Chapter 2, 3.4 to this STS.

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

i) aerodrome reference point;

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

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

(3) 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 which may be database-linked to the aerodrome reference point, 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.

e) Radio Navigation Aid Features

The aeronautical charts service provider shall portray each radio navigation aid feature located within the chart coverage by an appropriate symbol and the attributes may be linked to the portrayed navigation aid features in the database(s).

3.3.6 Accuracy and resolution

(Refer to Appendix 1 of ICAO Doc 10066 - PANS AIM for specifications concerning the accuracy of aeronautical, terrain, obstacle data and order of resolution)

a) The aeronautical charts service provider shall ensure that the order of accuracy of aeronautical, terrain and obstacle data is in accordance with its intended use.

b) The order of accuracy of aeronautical, terrain and obstacle data resolution shall be commensurate with the actual accuracy.

3.3.7 Electronic functionality

The aeronautical charts service provider shall:

a) provide the possibility to vary the scale at which the chart is viewed. Symbols and text size shall vary with chart scale to enhance readability.

b) ensure information on the chart is geo-referenced;

c) make it be possible to determine cursor position on the chart to at least the nearest second.

d) ensure the chart is compatible with widely available desktop computer hardware, software and media;

e) provide with the chart, its own "reader" software, if possible;

f) ensure it is not be possible to remove information from the chart without an authorized update;

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

h) provide printing possibility of the chart, in hard copy format according to the content specifications and scale determined by the user.

3.3.8 Chart data product specifications

(Refer to ISO Standard 19131 for geographic information requirements and outline of data product specifications, ISO Standard 19123 for coverage geometry and functions schema, ISO Standard 19113 geographic information quality principles and ISO Standard 19114 for quality evaluation procedures)

a) The aeronautical charts service provider shall provide a comprehensive statement of the data sets comprising the chart 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).

b) 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.

c) 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.

d) 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.

e) 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.

f) 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.

g) The chart data product specifications shall contain information on how data are portrayed on the chart, as detailed in 3.4.5 The chart data product specifications shall also contain data product delivery information which shall include delivery formats and delivery medium information.

h) 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.

3.4 EN-ROUTE CHART - ICAO

3.4.1 Function

The aeronautical charts service provider shall for the purpose of providing flight crews with information to facilitate navigation along air traffic services routes in compliance with air traffic services procedures.

3.4.2 Availability

The aeronautical charts service provider shall make available En-route Chart - ICAO in the manner prescribed in 3.1.1 for all areas where the Male" flight information region has been established.

3.4.3 Coverage and scale

a) A uniform scale for charts of this type cannot be specified due to the varying degree of congestion of information in certain areas. The aeronautical charts service provider may show a linear scale based on the mean scale of the chart.

b) The aeronautical charts service provider shall:

(1) determine layout of sheet lines by the density and pattern of the air traffic services route structure for the chart;

(2) shall avoid large variations of scale between adjacent charts showing a continuous route structure; and

(3) shall provide an adequate overlap of charts to ensure continuity of navigation.

3.4.4 Projection

a) The aeronautical charts service provider shall use a conformal projection on which a straight line approximates a great circle for the chart and show parallels and meridians at suitable intervals.

b) The aeronautical charts service provider shall show graduation marks at consistent intervals along selected parallels and meridians on the chart.

3.4.5 Identification

The aeronautical charts service provider shall identify each sheet of the chart by chart series and number.

3.4.6 Culture and topography

(Refer to the ICAO PANS OPS, Doc 8168, Volume II, Part I, Section 2, Chapter 1, 1.8, for area minimum altitude determination method)

The aeronautical charts service provider shall show;

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

b) the area minimum altitude within each quadrilateral formed by the parallels and meridians.

3.4.7 Magnetic variation

The aeronautical charts service provider shall indicate isogonal and the date of the isogonic information given on the chart.

3.4.8 Bearings, tracks and radials

The aeronautical charts service provider shall ensure that bearings, tracks and radials are magnetic. 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).

3.4.9 Aeronautical data

a) Aerodromes

The aeronautical charts service provider shall show the aerodrome on the chart, as the airport use by international civil aviation to which an instrument approach can be made.

b) Prohibited, Restricted and Danger Areas

The aeronautical charts service provider shall depict prohibited, restricted and danger areas relevant to the layer of airspace with their identification and vertical limits on the chart.

c) Air Traffic Services System

The aeronautical charts service provider shall show the components of the established air traffic services system, where appropriate which 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 air traffic services routes for en-route flight including route designators, the track to the nearest degree in both directions along each segment of the routes and, where established, the designation of the navigation specification(s) including any limitations and the direction of traffic flow;

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

(6) in respect of waypoints defining VOR/DME area navigation routes, additionally, the station identification and radio frequency of the reference VOR/DME and 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, except that change-over points established at the mid-point between two navigation 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;

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

(11) communication facilities listed with their channels.

d) Supplementary Information

The aeronautical charts service provider shall show details of departure and arrival routes and associated holding patterns in terminal areas unless they are shown on an Area Chart, a Standard Departure Chart - Instrument (SID)- ICAO or a Standard Arrival Chart - Instrument (STAR) – ICAO.

3.5 AREA CHART - ICAO

3.5.1 Function

The aeronautical charts service provider shall make available the chart which provides 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

3.5.2 Availability

a) The aeronautical charts service provider shall make available the chart in the manner prescribed in 3.1.1 where the air traffic services routes or position reporting requirements are complex and cannot be adequately shown on an En-route Chart - ICAO.

b) 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, the aeronautical charts service provider shall provide separate charts such as Standard Departure Chart - Instrument (SID) - ICAO and a Standard Arrival Chart - Instrument (STAR) - ICAO.

3.5.3 Coverage and scale

The aeronautical charts service provider shall:

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

b) draw the chart to scale and show a scale-bar.

3.5.4 Projection

The aeronautical charts service provider shall:

a) use a conformal projection on the chart, on which a straight line approximates a great circle;

b) show parallels and meridians at suitable intervals on the chart; and

c) place graduation marks at consistent intervals along the neat lines, as appropriate, on the chart.

3.5.5 Identification

The aeronautical charts service provider shall identify the chart by a name associated with the airspace portrayed.

3.5.6 Culture and topography

The aeronautical charts service provider shall show:

a) the shoreline of the open water area except where it conflict with data more applicable to the function of the chart;

b) all relief exceeding 300 m (1000 ft) above the elevation of the aerodrome by smoothed contour lines, contour values and layer tints printed in brown, to improve situational awareness in areas where significant relief exists. Appropriate spot elevations, including the highest elevation within each top contour line, shall be shown printed in black. Obstacles shall also be shown.

3.5.7 Magnetic variation

The aeronautical charts service provider shall show average magnetic variation of the area covered by the chart to the nearest degree.

3.5.8 Bearings, tracks and radials

The aeronautical charts service provider shall ensure that bearings, tracks and radials are magnetic.

3.5.9 Aeronautical data

a) Aerodromes

The aeronautical charts service provider shall show aerodromes which affect the terminal routings on the chart. Where appropriate, a runway pattern symbol shall be used.

b) Area Minimum Altitudes

(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)

The aeronautical charts service provider shall show area minimum altitudes within quadrilaterals formed by the parallels and meridians on the chart.

c) Air Traffic Services System

The aeronautical charts service provider shall show the components of the established relevant air traffic services system. 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) an indication of all compulsory and “on-request” reporting points;

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

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

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

(12) communication facilities listed with their channels;

(13) and an indication of “flyover” significant points.

3.6 STANDARD DEPARTURE CHART - INSTRUMENT (SID) - ICAO

3.6.1 Function and availability

(Refer to STS-ATS, Appendix 3 for provisions governing the identification of standard departure routes, ICAO Doc 9426

- Air Traffic Services Planning Manual (Doc 9426) for guidance material relating to the establishment of such routes and ICAO Doc 8168 - Procedures for Air Navigation Services - Aircraft Operations, Vol. II, Part II for provisions governing obstacle clearance criteria and details of the minimum information to be published)

a) The aeronautical charts service provider shall make available the Standard Departure Charts - Instrument (SID)

   - ICAO which provides the flight crew with information to enable them to comply with the designated standard departure route - instrument from take-off phase to the en-route phase.

b) The chart 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.

3.6.2 Coverage and scale

The aeronautical charts service provider shall:

a) ensure that the coverage of the chart is sufficient to indicate the point where the departure route begins and the specified significant point at which the en-route phase of flight along a designated air traffic services route can be commenced;

b) draw the chart to scale; and

c) show a scale-bar on the chart.

3.6.3 Projection

The aeronautical charts service provider shall:

a) use a conformal projection on which a straight line approximates a great circle on the chart;

b) show parallels and meridians at suitable intervals on the chart; and

c) place graduation marks at consistent intervals along the neat lines on the chart.

3.6.4 Identification

The aeronautical charts service provider shall identify the chart by the name of the aerodrome and the identification of the standard departure route(s) - instrument as established in accordance with the ICAO Doc 8168 - Procedures for Air Navigation Services Aircraft Operations, Vol. II, Part I, Section 3, Chapter 5.

3.6.5 Culture and topography

The aeronautical charts service provider shall show on the chart:

a) the shore lines of open water areas; and

b) all relief exceeding 300 m (1000 ft) above the elevation of the aerodrome by smoothed contour lines, contour values and layer tints printed in brown, to improve situational awareness in areas where significant relief exists to improve situational awareness. Appropriate spot elevations, including the highest elevation within each top contour line, shall be shown printed in black. Obstacles shall also be shown.

3.6.6 Magnetic variation

The aeronautical charts service provider shall show on the chart, magnetic variation used in determining the magnetic bearings, tracks and radials to the nearest degree.

3.6.7 Bearings, tracks and radials

The aeronautical charts service provider shall ensure that bearings, tracks and radials on the chart are magnetic.

3.6.8 Aeronautical data

a) Aerodromes

(1) The aeronautical charts service provider shall show the aerodrome of departure by the runway pattern on the chart.

(2) Aerodromes which affect the designated standard departure route - instrument shall be shown and identified on the chart. Where appropriate, the aerodrome runway patterns shall be shown.

b) Minimum Sector Altitude

The aeronautical charts service provider shall show the established minimum sector altitude with a clear indication of the sector to which it applies on the chart.

c) Air Traffic Services System

The aeronautical charts service provider shall show the components of the established relevant air traffic services system on the chart. The components shall comprise the following:

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

i) route designator;

ii) significant points defining the route;

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

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

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

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

(3) applicable holding patterns;

(4) transition altitude/height to the nearest higher 300 m or 1000 ft;

(5) 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;

(6) area speed restrictions;

(7) the designation of the navigation specifications including any limitations;

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

(9) radio communication procedures, including call signs of the air traffic services units and frequencies;

(10) an indication of “flyover” significant points; and

(11) a textual description of standard departure routes - instrument (SID) and relevant communication failure procedures.

d) Aeronautical Database Requirements

The aeronautical charts service provider shall publish appropriate data to support navigation database coding in accordance with the ICAO Doc 8168 - Procedures for Air Navigation Services - Aircraft Operations, Vol. II, Part III, Section 5, Chapter 2, 2.1, on the verso of the chart or as a separate, properly referenced sheet.

3.7 STANDARD ARRIVAL CHART - INSTRUMENT (STAR) - ICAO

3.7.1 Function and availability

(Refer to STS-ATS, Appendix 3 for provisions governing the identification of standard arrival routes and ICAO Doc 9426

- Air Traffic Services Planning Manual (Doc 9426) for guidance material relating to the establishment of such routes)

a) The aeronautical charts service provider shall make available the Standard Arrival Charts - Instrument (STAR)

- ICAO 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.

b) The chart shall be made available wherever a standard arrival route - instrument has been established and cannot be shown with sufficient clarity on the Area Chart.

3.7.2 Coverage and scale

The aeronautical charts service provider shall:

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

b) draw the chart to scale; and

c) show a scale-bar on the chart.

3.7.3 Projection

The aeronautical charts service provider shall:

a) use a conformal projection on which a straight line approximates a great circle on the chart;

b) show parallels and meridians at suitable intervals on the chart; and

c) place graduation marks at consistent intervals along the neat lines on the chart.

3.7.4 Identification

The aeronautical charts service provider shall identify the chart by the name of the aerodrome and the identification of the standard arrival route(s) - instrument as established in accordance with the ICAO Doc 8168 - Procedures for Air Navigation Services Aircraft Operations, Vol. II, Part I, Section 4, Chapter 2

3.7.5 Culture and topography

The aeronautical charts service provider shall show on the chart:

a) the shore lines of open water areas; and

b) all relief exceeding 300 m (1000 ft) above the elevation of the aerodrome by smoothed contour lines, contour values and layer tints printed in brown, to improve situational awareness in areas where significant relief exists to improve situational awareness. Appropriate spot elevations, including the highest elevation within each top contour line, shall be shown printed in black. Obstacles shall also be shown.

3.7.6 Magnetic variation

The aeronautical charts service provider shall show on the chart, magnetic variation used in determining the magnetic bearings, tracks and radials to the nearest degree.

3.7.7 Bearings, tracks and radials

The aeronautical charts service provider shall ensure that bearings, tracks and radials on the chart are magnetic.

3.7.8 Aeronautical data

a) Aerodromes

(1) The aeronautical charts service provider shall show the aerodrome of landing by the runway pattern on the chart.

(2) Aerodromes which affect the designated standard arrival route - instrument shall be shown and identified on the chart. Where appropriate, the aerodrome runway patterns shall be shown.

b) Minimum Sector Altitude

The aeronautical charts service provider shall show the established minimum sector altitude with a clear indication of the sector to which it applies on the chart.

c) Air Traffic Services System

The aeronautical charts service provider shall show the components of the established relevant air traffic services system on the chart. The components shall comprise the following:

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

i) route designator;

ii) significant points defining the route;

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

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

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

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

(3) applicable holding patterns;

(4) transition altitude/height to the nearest higher 300 m or 1000 ft;

(5) 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;

(6) area speed restrictions;

(7) the designation of the navigation specifications including any limitations;

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

(9) radio communication procedures, including call signs of the air traffic services units and frequencies;

(10) an indication of “flyover” significant points; and

(11) a textual description of standard arrival routes - instrument (STAR) and relevant communication failure procedures.

d) AERONAUTICAL DATABASE REQUIREMENTS

The aeronautical charts service provider shall publish appropriate data to support navigation database coding in accordance with the ICAO Doc 8168 - Procedures for Air Navigation Services - Aircraft Operations, Vol. II, Part III, Section 5, Chapter 2, 2.1, on the verso of the chart or as a separate, properly referenced sheet.

3.8 INSTRUMENT APPROACH CHART - ICAO

3.8.1 Function

(Refer to ICAO Doc 8168 - Procedures for Air Navigation Services - Aircraft Operations for establishment of instrument approach procedures and the resolutions of associated altitudes/heights detailed criteria and Volume II, Part I, Section 4, Chapter 9 for categories of aircraft)

a) The aeronautical charts service provider shall make available:

(1) Instrument Approach Charts - ICAO chart to provide flight crews with information which will enable them to perform an approved instrument approach procedure to the runway of intended landing including the missed approach procedure and associated holding patterns;

(2) Instrument Approach Charts - ICAO chart shall be made available for all aerodromes used by international civil aviation where instrument approach procedures have been established by the Service Provider

b) The aeronautical charts service provider shall provide:

(1) a separate Instrument Approach Chart - ICAO for each precision approach procedure established by the Service Provider

(2) a separate Instrument Approach Chart - ICAO for each non-precision approach procedure established by the Service provider ;

except that 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.

c) 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.

d) Instrument Approach Charts - ICAO shall be revised by the aeronautical charts service provider whenever information essential to safe operation becomes out of date.

3.8.2 Coverage and scale

a) The aeronautical charts service provider shall ensure that the coverage of the chart is sufficient to include all segments of the instrument approach procedure and such additional areas as may be necessary for the type of approach intended.

b) The scale selected by the aeronautical charts service provider shall ensure optimum legibility consistent with the procedure shown on the chart and sheet size. The scale shall be shown on the chart directly below the profile.

c) A distance circle with a radius of 20 km (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 with its radius indicated on the circumference.

3.8.3 Format

The sheet size used by the aeronautical charts service provider for the chart shall be 210 x 148 mm (8.27 x 5.82 in).

3.8.4 Projection

a) The aeronautical charts service provider shall use a conformal projection on which a straight line approximates a great circle for the chart.

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

3.8.5 Identification

The aeronautical charts service provider shall identify the chart by the name of the aerodrome and the identification of the instrument approach procedure, as established in accordance with the ICAO Doc 8168 - Procedures for Air Navigation Services Aircraft Operations, Vol. II, Part I, Section 4, Chapter 9.

3.8.6 Culture and topography

The aeronautical charts service provider shall show:

a) culture and topographic information pertinent to the safe execution of the instrument approach procedure, including the missed approach procedure, associated holding procedures and visual manoeuvring (circling) procedure when established. 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;

b) relief in a manner best suited to the particular elevation characteristics of the area;

c) all relief exceeding 150 m (500 ft) above the aerodrome elevation by smoothed contour lines, contour values and layer tints printed in brown where they exceed 600 m (2000 ft) within 11 km (6 NM) of the aerodrome reference point or when final approach or missed approach procedure gradient is steeper than optimal due to terrain,. Appropriate spot elevations, including the highest elevation within each top contour line, shall also be shown printed in black;

d) all relief exceeding 150 m (500 ft) above the aerodrome elevation by smoothed contour lines, contour values and layer tints printed in brown in areas where relief is lower than specified in (c). Appropriate spot elevations, including the highest elevation within each top contour line, should also be shown printed in black.

3.8.7 Magnetic variation

Magnetic variation, when shown on the chart by the aeronautical charts service provider, shall be indicated to the nearest degree and shall agree with that used in determining magnetic bearings, tracks and radials.

3.8.8 Bearings, tracks and radials

The aeronautical charts service provider shall ensure that bearings, tracks and radials on the chart are magnetic.

3.8.9 Aeronautical data

a) Aerodromes

The aeronautical charts service provider shall show:

(1) the runway pattern at a scale sufficiently large and clear on the chart, for the aerodrome on which the procedure is based;

(2) the aerodrome elevation to the nearest metre or foot in a prominent position on the chart;

(3) the threshold elevation to the nearest metre or foot.

b) Obstacles

The aeronautical charts service provider shall show:

(1) obstacles provided by the procedures design specialist on the plan view of the chart. If one or more obstacles are the determining factor of an obstacle clearance altitude/height, those obstacles shall be identified;

(2) the elevation of the top of obstacles to the nearest (next higher) metre or foot;

(3) the heights of obstacles above a datum other than mean sea level in parentheses on the chart. The datum shall be stated in a prominent position on the chart;

(4) obstacles that penetrate the visual segment surface on the chart in accordance with ICAO Doc 8697 - Aeronautical Chart Manual.

c) Radio Communication Facilities and Navigation Aids

The aeronautical charts service provider shall show on the chart:

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

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

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

(4) the distance to the aerodrome from each radio navigation aid concerned with the final approach 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.

d) Minimum Sector Altitude or Terminal Arrival Altitude

The aeronautical charts service provider shall show on the chart, the minimum sector altitude or terminal arrival altitude established by the Authority with a clear indication of the sector to which it applies.

e) Portrayal Of Procedure Tracks

(1) The aeronautical charts service provider shall show on the chart, the plan view with 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 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;

x) the distance to the aerodrome from the radio navigation aid concerned with the final approach.

(2) The aeronautical charts service provider shall provide on the chart, a profile 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;

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;

x) heights required by procedures in parentheses, using the height datum selected in accordance with (b) (3).

(3) On charts depicting non-precision approaches with a final approach fix, the aeronautical charts service provider shall provide in the profile view, minimum altitudes/heights in the intermediate and final approach segments indicated within bounded shaded blocks.

f) Supplementary Information

(1) The aeronautical charts service provider shall show on the chart:

i) 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, when the missed approach point is defined by a distance from the final approach fix or a facility or a fix and the corresponding distance from the final approach fix;

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

iii) a table showing the altitudes/heights 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;

iv) a rate of descent table on the chart;

v) 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 for non-precision approach procedures with a final approach fix;

vi) 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 for precision approach procedures and approach procedures with vertical guidance.

(2) When a final approach fix is specified at the final approach point for ILS, a clear indication shall be given by the aeronautical charts service provider on the chart, whether it applies to the ILS, the associated ILS localizer only procedure, or both.

(3) When the final approach descent gradient/angle for any type of instrument approach procedure exceeds the maximum value specified in the ICAO Doc 8168 - Procedures for Air Navigation Services - Aircraft Operations,

Volume II, the aeronautical charts service provider shall include a cautionary note on the chart.

g) Aeronautical Database Requirements

The aeronautical charts service provider shall publish appropriate data to support navigation database coding in accordance with the ICAO Doc 8168 - Procedures for Air Navigation Services - Aircraft Operations, 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.

3.9 AERODROME CHART - ICAO

3.9.1 Function and availability

a) The aeronautical charts service provider shall make available the Aerodrome Chart – ICAO which provides flight crews with information which will facilitate the ground movement of aircraft from the aircraft stand to the runway and from the runway to the aircraft stand. The chart shall also provide essential operational information at the aerodrome.

b) The chart shall be made available in the manner prescribed in 3.1.1 which is used by international civil aviation.

3.9.2 Coverage and scale

a) The aeronautical charts service provider shall ensure the coverage and scale of the chart is sufficiently large to show clearly all the elements listed in 3.9.4.

b) A linear scale shall be shown on the chart.

3.9.3 Identification

The aeronautical charts service provider shall identify the chart by the name of the State and the name of the aerodrome.

3.9.4 Magnetic variation

The aeronautical charts service provider shall show True and Magnetic North arrows and magnetic variation to the nearest degree and annual change of the magnetic variation on the chart.

3.9.5 Aerodrome data

The aeronautical charts service provider shall show the following on the chart:

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

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

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. Bearing strengths may be shown in tabular form on the face or verso of the chart;

e) all aprons, with aircraft stands, lighting, markings and other visual guidance and control aids, where applicable, including location and type of visual docking guidance systems and bearing strengths or aircraft type restrictions where the bearing strength is less than that of the associated runways. Bearing strengths or aircraft type restrictions may be shown in tabular form on the face or verso of the chart;

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

g) all taxiways with type of surface, designations, width, lighting, markings including runway-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. Bearing strengths or aircraft type restrictions may be shown in tabular form on the face or verso of the chart;

h) where established, hot spot locations with additional information properly annotated. Additional information regarding hot spots may be shown in tabular form on the face or verso of the chart;

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) approach and runway lighting;

m) 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;

n) relevant communication facilities listed with their channels;

o) obstacles to taxiing;

p) aircraft servicing areas and buildings of operational significance;

q) navigation aids and their radio frequencies;

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

3.10 AIRCRAFT PARKING/DOCKING CHART - ICAO

3.10.1 Function and availability

a) The aeronautical charts service provider shall make available the Aircraft Parking/Docking Chart - ICAO supplementary chart which provides flight crews with detailed information to facilitate the ground movement of aircraft between the taxiways and the aircraft stands and the parking/docking of aircraft.

b) The chart shall be made available in the manner prescribed in 3.1.1 where, due to the complexity of the terminal facilities, the information cannot be shown with sufficient clarity on the Aerodrome/Heliport Chart - ICAO.

3.10.2 Coverage and scale

The aeronautical charts service provider shall ensure the coverage and scale is sufficiently large to show clearly all the elements listed in 3.10.5. A linear scale shall be shown on the chart.

3.10.3 Identification

The aeronautical charts service provider shall identify the chart by the name of the State and the name of the aerodrome.

3.10.4 Magnetic variation

The aeronautical charts service provider shall show a True North arrow and magnetic variation to the nearest degree with its annual change on the chart. The chart need not be True North orientated.

3.10.5 Aerodrome data

The aeronautical charts service provider shall show in a similar manner, on the chart, all the information on the Aerodrome

Chart - ICAO relevant to the area depicted, including:

a) apron elevation to the nearest metre or foot;

b) aprons with aircraft stands, bearing strengths or aircraft type restrictions, lighting, marking and other visual guidance and control aids, where applicable, including location and type of visual docking guidance systems;

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

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

e) where established, hot spot locations with additional information properly annotated. Additional information regarding hot spots may be shown in tabular form on the face or verso of the chart.

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

3.11 AERONAUTICAL CHART – ICAO 1: 500 000

3.11.1 Function and availability

a) The aeronautical chart service provider shall make available this chart which provides information to satisfy the requirements of visual air navigation for low speed, short- or medium-range operations at low and intermediate altitudes.

b) This chart shall be available in the manner prescribed in 3.1.1 for all areas delineated in Appendix 5 to this section.

3.11.2 Scales

a) The aeronautical chart service provider shall ensure that linear scales for kilometres and nautical miles arranged in the order of kilometres and nautical miles, with their zero points in the same vertical line are shown in the margin of the chart.

b) The length of the linear scale shall be not less than 200 mm (8 in). (c) A conversion scale (metres/feet) shall be shown in the margin.

3.11.3 Format

a) The aeronautical chart service provider shall use English language for the title and marginal notes on the chart.

b) The information regarding the number of the adjoining sheets and the unit of measurement used to express elevation shall be so located as to be clearly visible when the sheet is folded. The method of folding should be as follows:

c) Fold the chart on the long axis near the mid-parallel of latitude, face out, with the bottom part of the chart face upward.

d) Fold inward near the meridian, and fold both halves backward in accordion folds.

e) Sheets should 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, should be included on the face of the chart or on the reverse side.

f) Overlaps should be provided by extending the chart area on the top and right side beyond the area given on the index. This overlap area should contain all aeronautical, topographical, hydrographical and cultural information. The overlap should extend up to 15 km (8 NM), if possible, but in any case from the limiting parallels and meridians of each chart to the neat line.

3.11.4 Projection

a) The aeronautical chart service provider shall use a conformal (orthomorphic) projection, preferably that of the World Aeronautical Chart — ICAO 1:1 000 000.

b) Parallels and meridians shall be shown at intervals of 30′.

c) 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.

d) The length of the graduation marks should be approximately 1.3 mm (0.05 in) for the 1′ intervals, and 2 mm

e) (0.08 in) for the 5′ intervals and 2 mm (0.08 in) extending on both sides of the graticule line for the 10′ intervals. (e) All meridians and parallels shown shall be numbered in the borders of the chart.

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

3.11.5 Identification

The aeronautical chart service provider shall identify each sheet by a name, which should be that of the principal town or of a main geographical feature appearing on the sheet.

3.11.6 Culture and topography

a) Built-up Areas

The aeronautical chart service provider shall ensure that cities, towns and villages are selected and shown according to their relative importance to visual air navigation.

b) Highways And Roads

(1) The aeronautical chart service provider shall ensure that road systems are shown in sufficient detail to indicate significant patterns from the air.

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

c) Political Boundaries

The aeronautical chart service provider shall ensure that international boundaries are shown. Undemarcated and undefined boundaries shall be distinguished by descriptive notes.

d) Hydrography

(1) The aeronautical chart service provider shall ensure that all water features compatible with the scale of the chart comprising shore lines, rivers and streams (including those non-perennial in nature are shown. The tint covering large open water areas should be kept very light.

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

e) Contours

The aeronautical chart service provider shall ensure that contours and their values are shown. The selection of intervals shall be governed by the requirement to depict clearly the relief features required in air navigation.

f) Hypsometric Tints

(1) The aeronautical chart service provider shall show the range of elevations for the tints, when hypsometric tints are used.

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

g) Spot Elevations

(1) The aeronautical chart service provider shall show spot elevations 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. The position of each selected elevation shall be indicated by a dot.

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

(3) The spot elevation of the highest point on any sheet should be cleared of hypsometric tinting.

h) Date Of Topographic Information

The aeronautical chart service provider shall indicate the date of latest information shown on the topographic base in the margin of the chart.

3.6.1 Magnetic variation

The aeronautical chart service provider shall show isogonic lines on the chart with the date of the isogonic information indicated in the margin.

3.6.2 Aeronautical data

a) General

The aeronautical chart service provider shall show aeronautical information consistent with the use of the chart and the revision cycle.

b) Aerodromes

(1) The aeronautical chart service provider shall show aerodromes with their names on the chart, with priority given to those of greatest aeronautical significance.

(2) 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) Obstacles

(1) The aeronautical chart service provider shall show obstacles on the chart.

(2) When considered of importance to visual flight, prominent transmission lines and wind turbines, which are obstacles, shall be shown.

d) Prohibited, Restricted and Danger Areas

The aeronautical chart service provider shall show prohibited, restricted and danger areas on the chart, as applicable.

e) Air Traffic Services System

The aeronautical chart service provider shall show significant elements of the air traffic services system including, control zones, aerodrome traffic zones, control areas, the flight information region and other airspaces in which VFR flights operate together with the appropriate class of airspace.

f) Radio Navigation Aids

The aeronautical chart service provider shall show radio navigation aids 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.

g) Supplementary Information

(1) The aeronautical chart service provider shall show aeronautical ground lights together with their characteristics or their identifications or both.

(2) Marine lights on outer prominent coastal or isolated features of not less than 28 km (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.

3.12 PLOTTING CHART - ICAO

3.12.1 Function and availability

a) The aeronautical chart service provider shall make available the plotting chart – ICAO which provides a means of maintaining a continuous flight record of the aircraft position by various fixing methods and dead reckoning in order to maintain an intended flight path.

b) This chart shall be made available in the manner prescribed in 3.1.1, to cover major air routes over oceanic areas.

3.12.2 Coverage and scale

a) The aeronautical chart service provider shall ensure that the chart for a particular region covers major air routes and their terminals on a single sheet.

b) The scale shall be governed by the area to be covered and be within a range from 1:3,000 000 to 1:7,500 000.

3.12.3 Format

The aeronautical chart service provider shall ensure that the sheet is of a size that can be adapted for use on a navigator's plotting table.

3.12.4 Projection

a) The aeronautical chart service provider shall use a conformal projection on which a straight line approximates a great circle.

b) Parallels and meridians shall be shown and be numbered so that a number appears at least once every 15 cm (6 in) on the face of the chart.

c) The intervals shall be arranged to permit accurate plotting to be carried out with a minimum of time and effort.

d) Graduation marks shall be shown at consistent intervals along an appropriate number of parallels and meridians.

e) Regardless of scale, the interval selected shall minimize the amount of interpolation required for accurate plotting.

f) If a navigational grid is shown on charts covering the higher latitudes, it shall comprise lines parallel to the

g) Meridian or anti-Meridian of Greenwich.

3.12.5 Identification

The aeronautical chart service provider shall ensure that each sheet is identified by chart series and number.

3.12.6 Culture and topography

a) The aeronautical chart service provider shall ensure that the chart show:

(1) generalized shore lines of all open water areas; and

(2) spot elevations for selected features constituting a hazard to air navigation.

b) Particularly hazardous or prominent relief features shall be emphasized.

3.12.7 Magnetic variation

a) The aeronautical chart service provider shall show isogonals or, in higher latitudes, isogrivs, or both, at consistent intervals throughout the chart. Regardless of scale, the interval selected shall minimize the amount of interpolation required.

b) The date of the isogonic information shall be shown.

3.12.8 Aeronautical data

The aeronautical chart service provider shall show the following aeronautical data on the chart:

a) aerodromes regularly used by international commercial air transport together with their names;

b) selected radio aids to navigation that will contribute to position-finding together with their names and identifications;

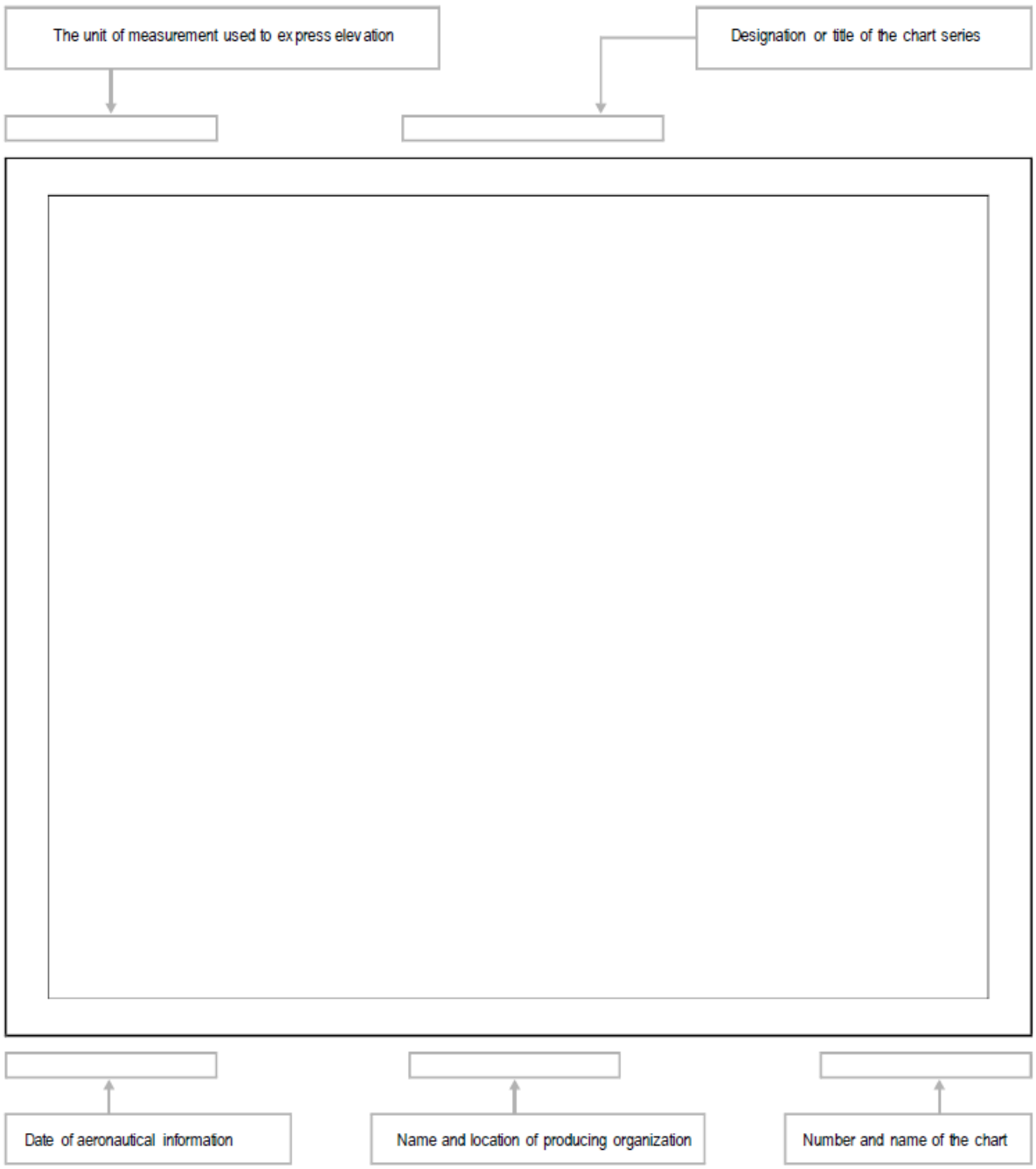
c) lattices of long-range electronic aids to navigation, as required;

d) the boundaries of the flight information region, control areas and control zones necessary to the function of the chart;

e) designated reporting points necessary to the function of the chart;

f) aeronautical ground lights and marine lights useful for air navigation, where other means of navigation are non-existent.

Appendix 1 – Marginal Note Layout



Appendix 2 – ICAO Chart Symbols

1. CATEGORY INDEX

SYMBOL ID

TOPOGRAPHY (1–18)

HYDROGRAPHY (19–46)

CULTURE (47–83)

Built-up Areas (47–50)

Railroads (51–56)

AERODROMES (84–95)

RADIO NAVIGATION AIDS (99–110)

AIR TRAFFIC SERVICES (111–144)

Airspace Classifications (126 and 127)

Airspace Restrictions (128 and 129)

Obstacles (130–136)

SYMBOLS FOR AERODROME/HELIPORT CHARTS (145–161)

SYMBOLS FOR AERODROME OBSTACLE CHARTS — TYPE A, B AND C (162–170)

ADDITIONAL SYMBOLS FOR USE ON PAPER AND ELECTRONIC CHARTS (171–180)

2. ALPHABET INDEX

SYMBOL ID

A

B

C

D

E

F

G

H

I

L

M

N

O

P

R

S

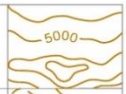
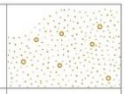
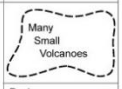
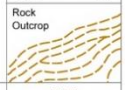
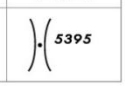
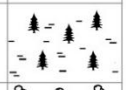
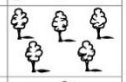
T

U

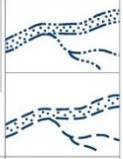
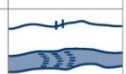
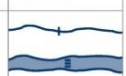
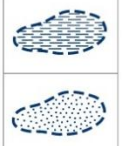
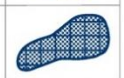
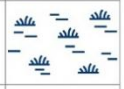
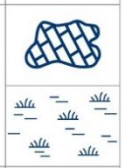
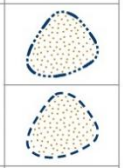
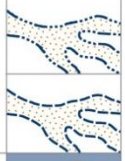
V

W

TOPOGRAPHY

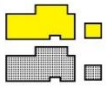
1	Contours	
2	Approximate contours	
3	Relief shown by hachures	
4	Bluff, cliff or escarpment	
5	Lava flow	
6	Sand dunes	
7	Sand area	
8	Gravel	
9	Levee or esker (Alternative)	 
10	Unusual land features appropriately labelled	 
	Active volcano	
11	Mountain pass	
12	Highest elevation on chart (Alternative)	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

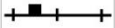
19	Shore line (reliable)	
20	Shore line (unreliable)	
21	Tidal flats	
22	Coral reefs and ledges	
23	Large river (perennial)	
24	Small river (perennial)	
25	Rivers and streams (non-perennial) (Alternative)	
26	Rivers and streams (unsurveyed)	
27	Rapids	
28	Falls	
29	Canal	
30	Abandoned canal *Note.— Dry 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	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

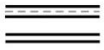
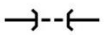
BUILT-UP AREAS

47	City or large town	
48	Town	
49	Village	
50	Buildings	

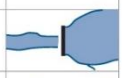
RAILROADS

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.)

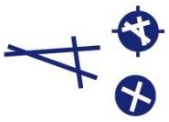
69	Pipeline	Pipeline
70	Oil or gas field	
71	Tank farms	
72	Nuclear power station	
73	Coast guard station	
74	Lookout tower	
75	Mine	
76	Forest ranger station	
77	Race track or stadium	
78	Ruins	
79	Fort	
80	Church	
81	Mosque	
82	Pagoda	
83	Temple	

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*	

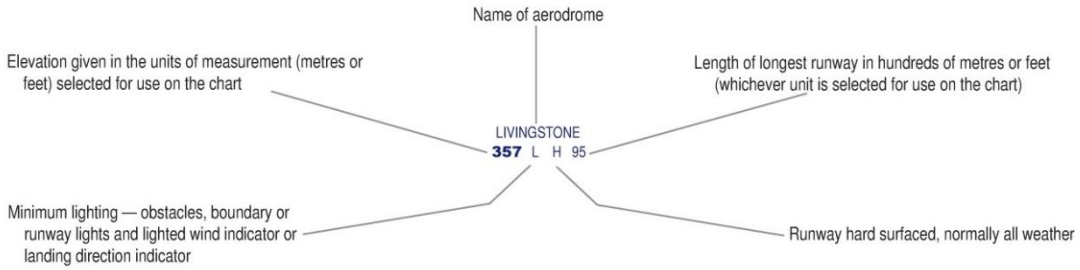
95	*Note.— Where required by the function of the chart, the runway pattern of the aerodrome may be shown in lieu of the aerodrome symbol, for example:*	

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



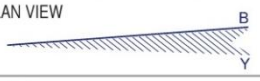
Note.— A dash (—) is to be inserted where L or H do not apply.

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		Electronic 
101	VHF omnidirectional radio range	VOR		
102	Distance measuring equipment	DME		
103	Collocated VOR and DME radio navigation aids	VOR/DME		
104	DME distance	Distance in kilometres (nautical miles) to DME → 15 km Identification of radio navigation aid → KAV		
105	VOR radial	Radial bearing from, and identification of, VOR	R 090 KAV	
106	UHF tactical air navigation aid	TACAN		

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

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

110

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

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

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

VOR	
VOR/DME	
TACAN	
VORTAC	

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

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	
		compulsory, without radio communication requirement	
		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

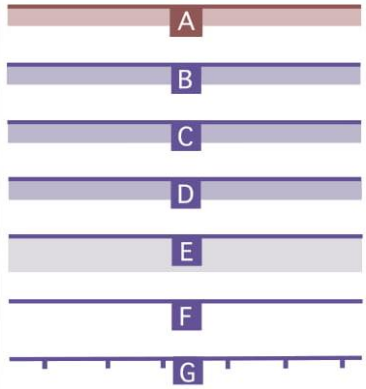
122	Change-over point COP To be superimposed on the appropriate route symbol at right angles to the route	26 / 36	123	ATS/MET reporting point MRP	Compulsory On request	124	Final approach fix FAF	

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

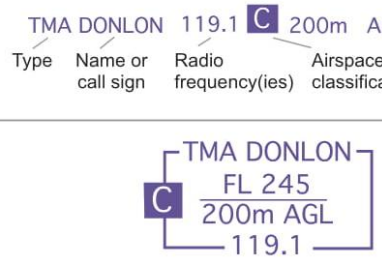
AIRSPACE CLASSIFICATIONS

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

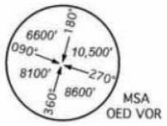
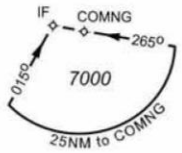
145	Hard surface runway		154	Point light	
146	Pierced steel plank or steel mesh runway				
147	Unpaved runway		155	Obstacle light	
148	Stopway SWY		156	Landing direction indicator (lighted)	T
149	Taxiways and parking areas		157	Landing direction indicator (unlighted)	T
			158	Stop bar	
150	Helicopter alighting area on an aerodrome	H	159	Runway-holding position Pattern A Pattern B *Note.— For application, see Annex 14, Volume I, 5.2.10.*	
151	Aerodrome reference point ARP		160	Intermediate holding position *Note.— For application, see Annex 14, Volume I, 5.2.11.*	
152	VOR check-point		161	Hot spot *Note.— Hot spot location to be circled.*	
153	Runway visual range (RVR) observation site				

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

		Plan	Profile
162	Tree or shrub		Identification number
163	Pole, tower, spire, antenna, etc.		
164	Building or large structure		
165	Railroad		
166	Transmission line or overhead cable		

		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 and 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	 

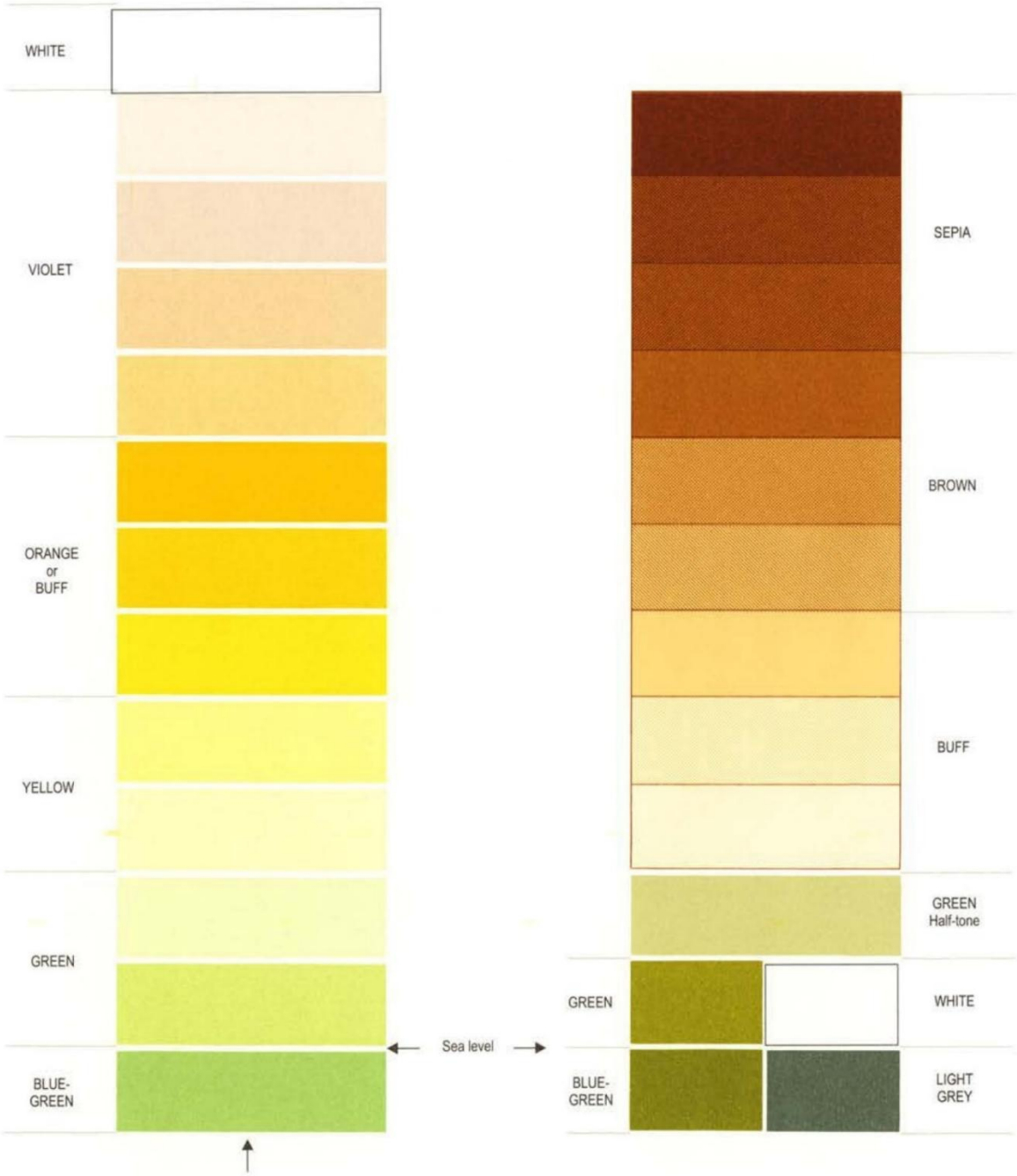
Woods		GREEN	
Areas which have not been surveyed for contour information or relief data are incomplete	Optional Colours	GOLDEN BUFF WHITE	

HYPOSOMETRIC TINTS

WHITE VIOLET	Tint for extreme elevations		SEPIA	
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.