



Public Authority for Civil Aviation

CAR-177

Civil Aviation Regulation

Aeronautical Charts

Effective: 7th of July 2019

Approved by: HE Dr. Mohamed bin Nasser Al-Zaabi (CEO)

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List of Effective Pages

Page No.	Rev No.	Date of Issue	Page No.	Rev No.	Date of Issue	Page No.	Rev No.	Date of Issue
1	03	07/07/19	46	03	07/07/19	85	03	07/07/19
2	03	07/07/19	47	03	07/07/19	86	03	07/07/19
3	03	07/07/19	48	03	07/07/19	87	03	07/07/19
4	03	07/07/19	49	03	07/07/19	88	03	07/07/19
5	03	07/07/19	50	03	07/07/19	89	03	07/07/19
6	03	07/07/19	51	03	07/07/19	90	03	07/07/19
7	03	07/07/19	52	03	07/07/19	91	03	07/07/19
8	03	07/07/19	53	03	07/07/19	92	03	07/07/19
9	03	07/07/19	54	03	07/07/19	93	03	07/07/19
10	03	07/07/19	55	03	07/07/19	94	03	07/07/19
11	03	07/07/19	56	03	07/07/19	95	03	07/07/19
12	03	07/07/19	57	03	07/07/19	96	03	07/07/19
13	03	07/07/19	58	03	07/07/19	97	03	07/07/19
14	03	07/07/19	59	03	07/07/19	98	03	07/07/19
15	03	07/07/19	60	03	07/07/19	99	03	07/07/19
16	03	07/07/19	61	03	07/07/19	100	03	07/07/19
17	03	07/07/19	62	03	07/07/19	101	03	07/07/19
18	03	07/07/19	63	03	07/07/19	102	03	07/07/19
19	03	07/07/19	64	03	07/07/19	103	03	07/07/19
20	03	07/07/19	65	03	07/07/19	104	03	07/07/19
21	03	07/07/19	66	03	07/07/19	105	03	07/07/19
22	03	07/07/19	67	03	07/07/19	106	03	07/07/19
23	03	07/07/19	68	03	07/07/19	107	03	07/07/19
24	03	07/07/19	69	03	07/07/19	108	03	07/07/19
25	03	07/07/19	70	03	07/07/19	109	03	07/07/19
26	03	07/07/19	71	03	07/07/19	110	03	07/07/19
27	03	07/07/19	72	03	07/07/19	111	03	07/07/19
28	03	07/07/19	73	03	07/07/19	112	03	07/07/19
29	03	07/07/19	74	03	07/07/19	113	03	07/07/19
30	03	07/07/19	75	03	07/07/19	114	03	07/07/19
31	03	07/07/19	76	03	07/07/19	115	03	07/07/19
32	03	07/07/19	77	03	07/07/19	116	03	07/07/19
33	03	07/07/19	78	03	07/07/19	117	03	07/07/19
34	03	07/07/19	79	03	07/07/19	118	03	07/07/19
35	03	07/07/19	80	03	07/07/19	119	03	07/07/19
36	03	07/07/19	76	03	07/07/19	120	03	07/07/19
37	03	07/07/19	77	03	07/07/19	121	03	07/07/19
38	03	07/07/19	78	03	07/07/19	122	03	07/07/19
39	03	07/07/19	79	03	07/07/19	123	03	07/07/19
40	03	07/07/19	80	03	07/07/19	124	03	07/07/19
41	03	07/07/19	81	03	07/07/19	125	03	07/07/19
42	03	07/07/19	82	03	07/07/19	126	03	07/07/19
43	03	07/07/19	83	03	07/07/19	127		
44	03	07/07/19	84	03	07/07/19	128		
45	03	07/07/19	85	03	07/07/19	129		

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Table of Contents - CAR 177 – AERONAUTICAL CHARTS

List of Effective Pages	3
Corrigendum of Amendments.....	5
Glossary of Terms or Abbreviations	14
SUBPART A - GENERAL	18
CAR 177.001 Applicability	18
CAR 177.002 Entry into force.....	18
CAR 177.005 Definitions	18
CAR 177.010 Availability	18
CAR 177.015 Requirement for Certificate	19
CAR 177.020 Application for Certificate	19
CAR 177.025 Issue of Certificate	20
CAR 177.030 Privileges of Certificate.....	20
CAR 177.035 Duration of Certificate.....	20
CAR 177.040 Renewal of Certificate	20
CAR 177.045 Safety Inspections and Audits	20
CAR 177.050 Resolution of Safety Issues.....	21
CAR 177.055 Transferability.....	21
CAR 177.060 Non-Compliance	21
SUBPART B — CERTIFICATION REQUIREMENTS.....	22
CAR 177.100 Personnel Requirements	22
CAR 177.105 Facility Requirements	22
CAR 177.110 Documentation.....	22
CAR 177.115 Collection of Information	23
CAR 177.120 Maintenance of Aeronautical Charts	23
CAR 177.125 Error Correction in Published Information	24
CAR 177.130 Records	24
CAR 177.135 Safety Management System.....	24
CAR 177.140 Organisation Exposition.....	25
CAR 177.145 Continued Compliance	25
CAR 177.150 Changes to Certificate Holder’s Organization	26
CAR 177.155 Operations manuals	26
SUBPART C – OPERATING REQUIREMENTS.....	27
CAR 177.180 Chart Provisions.....	27
CAR 177.185 Regulatory Approval of Aeronautical Charts.....	27
SUBPART D — GENERAL SPECIFICATIONS.....	29

CAR 177.200	Operational requirements for charts	29
CAR 177.205	Titles	29
CAR 177.210	Miscellaneous Information.....	29
CAR 177.215	Symbols	30
CAR 177.220	Units of Measurement	30
CAR 177.225	Scale and Projection	31
CAR 177.230	Date of Validity of Aeronautical Information	31
CAR 177.235	Spelling of Geographical Names.....	31
CAR 177.240	Abbreviations	31
CAR 177.245	Political Boundaries.....	31
CAR 177.250	Colours.....	31
CAR 177.255	Relief.....	31
CAR 177.260	Prohibited, Restricted and Danger Areas	32
CAR 177.265	Air traffic Services Airspaces	32
CAR 177.270	Magnetic Variation	32
CAR 177.271	Topography.....	32
CAR 177.275	Aeronautical Data.....	33
CAR 177.280	Common Reference Systems.....	33
SUBPART E — AERODROME OBSTACLE CHART — ICAO TYPE A (OPERATING LIMITATIONS)		35
CAR 177.300	Function.....	35
CAR 177.305	Availability	35
CAR 177.310	Units of measurement.....	35
CAR 177.315	Coverage and scale	35
CAR 177.320	Format	35
CAR 177.325	Identification	36
CAR 177.330	Magnetic variation	36
CAR 177.335	Aeronautical data	36
CAR 177.340	Accuracy	38
SUBPART F — AERODROME OBSTACLE CHART — ICAO TYPE B.....		39
CAR 177.360	Function.....	39
CAR 177.365	Availability	39
CAR 177.370	Units of Measurement	39
CAR 177.375	Coverage and Scale.....	39
CAR 177.380	Format	39
CAR 177.385	Identification.	40
CAR 177.390	Culture and Topography.....	40

CAR 177.395	Magnetic variation.	40
CAR 177.400	Aeronautical Data.....	40
CAR 177.410	Accuracy.....	41
SUBPART G — (INTENTIONALLY LEFT BLANK) ⁱ		43
SUBPART H — PRECISION APPROACH TERRAIN CHART — ICAO		45
CAR 177.470	Function.....	45
CAR 177.475	Availability	45
CAR 177.480	Scale.....	45
CAR 177.485	Identification	45
CAR 177.490	Plan and Profile Information	45
SUBPART I — EN-ROUTE CHART — ICAO		47
CAR 177.500	Function.....	47
CAR 177.505	Availability.	47
CAR 177.510	Coverage and scale.....	47
CAR 177.515	Projection.	47
CAR 177.520	Identification.	47
CAR 177.525	Culture and topography	47
CAR 177.530	Magnetic variation.	48
CAR 177.535	Bearings, tracks and radials.....	48
CAR 177.540	Aeronautical data.	48
SUBPART J — AREA CHART — ICAO		51
CAR 177.560	Function.....	51
CAR 177.565	Availability	51
CAR 177.570	Coverage and Scale.....	51
CAR 177.575	Projection	51
CAR 177.580	Identification	51
CAR 177.585	Culture and Topography.....	52
CAR 177.590	Magnetic Variation	52
CAR 177.595	Bearings, Tracks and Radials	52
CAR 177.600	Aeronautical Data.....	52
SUBPART K — STANDARD DEPARTURE CHART — INSTRUMENT (SID) — ICAO.....		55
CAR 177.620	Function.....	55
CAR 177.625	Availability	55
CAR 177.630	Coverage and Scale.....	55
CAR 177.635	Projection	55
CAR 177.640	Identification	55

CAR 177.645	Culture and Topography.....	56
CAR 177.650	Magnetic Variation	56
CAR 177.655	Bearings, Tracks and Radials	56
CAR 177.660	Aeronautical data	56
SUBPART L — STANDARD ARRIVAL CHART — INSTRUMENT (STAR) — ICAO.....		59
CAR 177.680	Function.....	59
CAR 177.685	Availability	59
CAR 177.690	Coverage and Scale.....	59
CAR 177.695	Projection	59
CAR 177.700	Identification	59
CAR 177.705	Culture and Topography.....	60
CAR 177.710	Magnetic variation	60
CAR 177.715	Bearings, Tracks and Radials	60
CAR 177.720	Aeronautical data	60
SUBPART M — INSTRUMENT APPROACH CHART— ICAO.....		63
CAR 177.740	Function.....	63
CAR 177.745	Availability	63
CAR 177.750	Coverage and Scale.....	63
CAR 177.755	Format	64
CAR 177.760	Projection	64
CAR 177.765	Identification	64
CAR 177.770	Culture and Topography.....	64
CAR 177.775	Magnetic Variation	65
CAR 177.780	Bearings, Tracks and Radials	65
CAR 177.785	Aeronautical Data.....	65
SUBPART N — VISUAL APPROACH CHART — ICAO.....		71
CAR 177.800	Function.....	71
CAR 177.805	Availability	71
CAR 177.810	Scale.....	71
CAR 177.815	Format	71
CAR 177.820	Projection	71
CAR 177.825	Identification	71
CAR 177.830	Culture and Topography.....	71
CAR 177.835	Magnetic Variation	72
CAR 177.840	Bearings, Tracks and Radials	72
CAR 177.845	Aeronautical Data.....	72

SUBPART O — AERODROME/HELIPORT CHART — ICAO	75
CAR 177.860 Function.....	75
CAR 177.865 Availability	75
CAR 177.870 Coverage and Scale.....	75
CAR 177.875 Identification	75
CAR 177.880 Magnetic Variation	75
CAR 177.885 Aerodrome/Heliport data.....	76
SUBPART P — AERODROME GROUND MOVEMENT CHART — ICAO.....	79
CAR 177.900 Function.....	79
CAR 177.905 Availability	79
CAR 177.910 Coverage and Scale.....	79
CAR 177.915 Identification	79
CAR 177.920 Magnetic Variation	79
CAR 177.925 Aerodrome Data	79
SUBPART Q — AIRCRAFT PARKING/DOCKING CHART — ICAO	81
CAR 177.940 Function.....	81
CAR 177.945 Availability	81
CAR 177.950 Coverage and Scale.....	81
CAR 177.955 Identification	81
CAR 177.960 Magnetic Variation	81
CAR 177.965 Aerodrome Data	81
SUBPART R — WORLD AERONAUTICAL CHART — ICAO 1:1,000,000	83
CAR 177.980 Function.....	83
CAR 177.985 Availability	83
CAR 177.990 Scales	83
CAR 177.995 Format	83
CAR 177.1000 Projection	84
CAR 177.1005 Identification	85
CAR 177.1010 Culture and Topography.....	85
CAR 177.1015 Magnetic Variation	87
CAR 177.1020 Aeronautical Data	87
SUBPART S — (INTENTIONALLY LEFT BLANK) ⁱ	89
SUBPART T — (INTENTIONALLY LEFT BLANK) ⁱ	91
SUBPART V — (INTENTIONALLY LEFT BLANK) ⁱ	93
SUBPART W — ATC SURVEILLANCE MINIMUM ALTITUDE CHART — ICAO	95
CAR 177.1240 Function.....	95

CAR 177.1245	Availability	95
CAR 177.1250	Coverage and Scale.....	95
CAR 177.1255	Projection	95
CAR 177.1260	Identification	95
CAR 177.1265	Culture and Topography.....	96
CAR 177.1270	Magnetic Variation	96
CAR 177.1275	Bearings, Tracks and Radials	96
CAR 177.1280	Aeronautical Data.....	96
Appendix 1 – Marginal Note Layout.....		99
Appendix 2 – ICAO Charts & Symbols		101
Appendix 3 – Colour Guide.....		121
Appendix 4 – Hypsometric Tint Guide.....		123
Appendix 5 – Sheet layout index for the World Aeronautical Chart – ICAO 1:1,000,000.....		125

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Glossary of Terms or Abbreviations

The following terms or acronyms may be used in any manual or document published by PACA. Reproduction in part or whole is allowed without prior approval. The Document Control Office reserves the rights to include such a listing in any PACA manual or document prior to publishing.

ADIZ	Air Defense Identification Zone
AIM	Aeronautical Information Management
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
AMC	Acceptable Means Of Compliance
AOC	Aerodrome Obstacle Chart
AOM	Aerodrome Operating Minima
ATC	Air Traffic Control
ATS	Air Traffic Service
CAR	Civil Aviation Regulation
CAT	Category
COM	Communications/Equipment
DME	Distance Measuring Equipment
FAF	Final Approach Fix
FAP	Final Approach Point
ft	Feet
GM	Guidance Material
IAC	Instrument Approach Chart
ICAO	International Civil Aviation Organisation
ISA	International Standard Atmosphere
IAF	Initial Approach Fix
IF	Intermediate Approach Fix
ILS	Instrument Landing System
in	Inches
Km	Kilometer
m	Meter
MAP	Aeronautical Maps and Charts
MAPt	Missed Approach Point
mm	Millimeter
Nm	Nautical Mile
NOTAM	Notice to Airmen
OCA/H	Obstacle Clearance Altitude/Height
OIS	Obstacle Identification Surface
PACA	Public Authority for Civil Aviation
PANS-OPS	Procedures for air navigation services –operations
RNAV	Area Navigation
SID	Standard instrument departure
STAR	Standard instrument arrival
STD	Standard
UTC	Universal Time Coordinated
VAC	Visual approach chart
VOR	VHF omnidirectional radio range
WAC	World aeronautical chart - ICAO 1:1 000 000
WGS-84	World Geodetic System — 1984

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FOREWORD

- (a) Enforcement Procedures ensuring compliance against Civil Aviation Regulation have been issued by the Public Authority for Civil Aviation of Oman (hereinafter referred as PACA or “the Authority”) under the provisions of the Civil Aviation Law of the Sultanate of Oman.
- (b) This CAR includes the subject matter endorsed within the ICAO Annex 4 (Aeronautical Charts) and ICAO Doc 8697 – Aeronautical Charts Manual.
- (c) CAR-177 prescribes the requirements for:
 - (1) The certification and operation of organisations providing the aeronautical chart services for Oman on behalf of the Authority;
 - (2) Any applicable punitive actions that can be enforced by the Authority against recognised actions of non-compliance.
- (d) Amendments to the text in CAR-177 in revised editions are issued as a complete amendment of pages contained within.
- (e) The editing practices used in this document are as follows:
 - (1) ‘Shall’ is used to indicate a mandatory requirement and may appear in CARs.
 - (2) ‘Should’ is used to indicate a recommendation.
 - (3) ‘May’ is used to indicate discretion by the Authority, or the industry as appropriate.
 - (4) ‘Will’ indicates a mandatory requirement and is used to advise of action incumbent on the Authority.
 - (5) Notes included in the text, where appropriate, give factual information or references bearing on the regulation in question, but not constituting part of the regulations.

Note: The use of the male gender implies the female gender and vice versa.

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SUBPART A - GENERAL

CAR 177.001 Applicability

- (a) This CAR prescribes : —
- (1) The rules governing the certification and operation of organisations providing Aeronautical Charts used for air navigation within the Sultanate of Oman as designated by the Authority; and
 - (2) The requirements and technical regulations for the provision of aeronautical charts design and production.
- (b) This CAR was developed using: —
- (1) ICAO ANNEX 4 (Aeronautical charts) ;
 - (2) ICAO DOC 8697 (Aeronautical Charts Manual);
 - (3) ICAO Document 8168 (Aircraft Operations) :
 - i. Volume I — Flight Procedures
 - ii. Volume II — Construction of Visual and Instrument Flight Procedures)
 - (4) ICAO ANNEX 11 (Air Traffic Services);
 - (5) ICAO ANNEX 14 (Aerodromes)
 - i. Volume I — Aerodrome Design and Operations
 - ii. Volume II — Heliports
 - (6) ICAO Annex 15 — Aeronautical Information Services;
- (c) All charts coming within the scope of this CAR shall conform to the regulations relevant to the particular chart.
- (d) All charts produced under the standard of this CAR shall be sent to the aeronautical information service, after approval by the authority to be published in the Oman AIP as per CAR-177.185.

CAR 177.002 Entry into force

This CAR shall enter into force from the day of its publication and shall become applicable on 7th of July 2019 except for CAR-177.015 related to the requirement for certification of Aeronautical Charts service providers, which shall apply from 25 December 2021. This exception shall not apply against any Commercial chart-producing organisation providing aeronautical charts services for the Sultanate of Oman.

CAR 177.005 Definitions

Definitions existing in ICAO Documents shall form part of this regulation, supplemented by the definitions contained in CAR 1. Where there are differences between the definitions in the two sources, CAR 1 has precedence.

CAR 177.010 Availability

- (a) *Information.* The Sultanate of Oman shall on request by another Contracting State provide all information relating to its own territory that is necessary to enable the requirements of this CAR to be met;

- (b) *Charts.* The Public Authority for Civil Aviation (PACA) shall, when so specified, ensure the availability of charts in whichever of the following ways is appropriate for a particular chart or single sheet of a chart series.

Note: The availability of charts includes specified electronic charts.

- (c) For any chart or single sheet of a chart series entirely contained within the territory of the Sultanate of Oman, the PACA shall either:
- (1) produce the chart or sheet itself; or
 - (2) arrange for its production by another State or by an agency; or
 - (3) provide another State prepared to accept an obligation to produce the chart or sheet with the data necessary for its production.
- (d) For any chart or single sheet of a chart series, which includes the territory of two or more Contracting States, the States having jurisdiction over the territory so included shall determine the manner in which the chart or sheet will be made available. This determination shall be made with due regard being given to regional air navigation agreements and to any programme of allocation established by the Council of ICAO.

Note: The phrase “regional air navigation agreements” refers to the agreements approved by the Council of ICAO normally on the advice of regional air navigation meetings.

- (e) PACA shall take all reasonable measures to ensure that the information provided and the aeronautical charts made available are adequate and accurate and that aeronautical charts are maintained up to date by an adequate revision service.
- (f) To improve worldwide dissemination of information on new charting techniques and production methods, appropriate charts produced by the PACA or the aeronautical charts service provider shall be made available without charge to other Contracting States on request on a reciprocal basis.

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

CAR 177.015 Requirement for Certificate

No person shall provide an Aeronautical Charts services for the Sultanate of Oman except under the authority of, and in accordance with the provisions of an Aeronautical Charts services certificate issued under this CAR.

CAR 177.020 Application for Certificate

Each applicant for the grant of an Aeronautical Charts services certificate shall complete the form CAA-ANS-MAP and submit it to the Authority with:

- (1) The exposition required by CAR-177.140; and
- (2) A payment of the appropriate application fee prescribed by regulations.

CAR 177.025 Issue of Certificate

An applicant is entitled to an Aeronautical Charts service certificate if the Authority is satisfied that:

- (1) The applicant meets the requirements of Subpart B and applicable part of this CAR; and
- (2) The applicant, and the applicant's senior person or persons required by CAR-177.100 (a)(1) and (2) are fit and proper persons; and
- (3) The granting of the certificate is not contrary to the interests of aviation safety.

CAR 177.030 Privileges of Certificate

The Aeronautical Charts service certificate specifies the services that the certificate holder is authorised to provide.

CAR 177.035 Duration of Certificate

- (a) An Aeronautical Charts service certificate is granted or renewed for a maximum period of three (3) years.
- (b) An Aeronautical Charts service certificate remains in force until it expires, or is suspended or revoked.
- (c) Upon revocation, suspension, or surrender, the Aeronautical Charts service certificate shall be returned to the Authority without delay.
- (d) The holder of the Aeronautical Charts service Certificate that expires shall surrender the certificate to the Authority.
- (e) The holder of a Certificate for the Aeronautical Charts service that is suspended shall immediately return the certificate to the Authority for appropriate endorsement.
- (f) The validity of the Certificate is based upon the continued operation in accordance with this Civil Aviation Regulations.
- (g) The Certificate shall remain valid subject to periodic surveillance audits conducted at the discretion of the Authority confirming ongoing compliance with the Civil Aviation Regulations.

CAR 177.040 Renewal of Certificate

- (a) An application for the renewal of an Aeronautical Charts service certificate shall be made on form CAA-ANS-MAP.
- (b) The application shall be submitted to the Authority before the application renewal date specified on the certificate or, if no such date is specified, not less than thirty (30) days before the certificate expires.

CAR 177.045 Safety Inspections and Audits

- (a) The Authority shall conduct an initial certification audit and thereafter audits at intervals not exceeding two (2) years (24 months) at the certificate holder's office/facility.
- (b) The Authority may require the certificate holder's to provide such information as the Authority considers relevant to the inspection or audit.
- (c) The Authority shall be granted unrestricted access to the certificate holder's facilities and shall be permitted to carry its own equipment (e.g. computers, cameras and recording devices) under all conditions while carrying out its oversight functions.

CAR 177.050 Resolution of Safety Issues

- (a) When objective evidence is found showing non-compliance of the holder of a Certificate with the requirements, the finding shall be set out as follows:
- (1) A level one finding is any non-compliance with these regulations, which could lead to uncontrolled non-compliances with applicable requirements and could affect the safety of aircraft.
 - (2) A level two finding is any non-compliance with these regulations, which is not classified as level one.
 - (3) A level three finding is any opportunity of improvement.
- (b) After a receipt of notification of findings: —
- (1) A level one finding must be rectified immediately or within the short timescale specified;
 - (2) In case of level two findings, the corrective action period granted by the authority shall be appropriate to the nature of the finding but in any case shall not be more than ninety (90) days. In certain circumstances the Authority may extend the 90 days period subject to a satisfactory corrective action plan.
 - (3) the certificate holder's shall:
 - i. Identify the root cause of the non-compliance;
 - ii. Define a corrective action plan; and
 - iii. Demonstrate corrective action implementation to the satisfaction of the Authority within a period agreed with the Authority.
- (c) In the case of level one or level two findings, the Certificate may be subject to a partial or full suspension or revocation. The holder of the certificate shall provide confirmation of receipt of the notice of suspension or revocation of the certificate in a timely manner.

CAR 177.055 Transferability

An aeronautical information service certificate, granted in accordance with the requirements of this CAR, is not transferable.

CAR 177.060 Non-Compliance

- (a) Non-compliance with this regulation may require the AUTHORITY to restrict, suspend or revoke the Aeronautical Charts service certificate.
- (b) Apply any applicable punitive actions that can be enforced by the Authority against recognised actions of non-compliance.

SUBPART B — CERTIFICATION REQUIREMENTS

CAR 177.100 Personnel Requirements

- (a) Each applicant for the grant of an aeronautical charts service certificate shall engage, employ or contract:
 - (1) a senior person identified as the Chief Executive, who has the authority within the applicant's organisation to ensure that each aeronautical charts service listed in their exposition:
 - i. can be financed and is provided to meet operational requirements; and
 - ii. is provided in accordance with the requirements prescribed by this CAR:
 - (2) a senior person or group of senior persons who are responsible for ensuring that the applicant's organisation complies with the requirements of this CAR. Such nominated person or persons shall be ultimately responsible to the Chief Executive:
 - (3) sufficient personnel to collect, collate, check, edit, produce and distribute aeronautical charts listed in the applicant's exposition.
- (b) The applicant shall:
 - (1) establish procedures acceptable to the Authority and follow the approved training programs for cartographic personnel as follows, as appropriate:
 - i. Basic training;
 - ii. Advanced training;
 - iii. Specialized training;
 - iv. Recurrent training;
 - v. On-job-training.
 - (2) establish a procedure to initially assess the competence of those personnel authorised by the applicant to collect, collate, check, edit, produce and distribute aeronautical charts for the services listed in their exposition; and
 - (3) establish a procedure to maintain the competence of those authorised personnel;
 - (4) develop job descriptions for Charts personnel, containing safety responsibilities; and
 - (5) establish procedures acceptable to the AUTHORITY for keeping training record for all technical staff and to be maintained up to date.

CAR 177.105 Facility Requirements

Each applicant for the grant of an aeronautical charts service certificate shall establish offices and facilities that:

- (a) Are appropriate for the aeronautical charts services listed in their exposition; and
- (b) Meet the applicable requirements of this regulation.

CAR 177.110 Documentation

- (a) Each applicant for the grant of an aeronautical charts service certificate shall:
 - (1) document the format and standards for the aeronautical charts produced and revised under the authority of their certificate; and
 - (2) ensure that the format and standards take into account the circumstances under which the information will be used; and
 - (3) hold copies of relevant reference material, standards, practices and procedures, and any other documentation that is necessary for the aeronautical charts services listed in their

exposition. an Aeronautical Charts Service provider shall, at all times, maintain the following reference materials:

- i. ICAO Annex 15 "Aeronautical Information Services" to the Chicago Convention.
 - ii. ICAO Annex 4 to the Chicago Convention "Aeronautical Charts";
 - iii. CAO Aeronautical Chart Manual (Doc 8697).
 - iv. ICAO Doc. 8126 (Aeronautical Information Services Manual);
 - v. Oman AIP;
 - vi. CAR-177 "Aeronautical Charts"; and
 - vii. CAR-175 "Aeronautical Information Services".
- (b) The applicant shall establish a procedure to control all the documentation required by paragraph (a), to ensure that:
- (1) the documentation is reviewed and authorised by appropriate personnel before issue; and
 - (2) current issues of relevant documentation are available to staff at all locations where they need access to such documentation for the aeronautical charts services listed in their exposition; and
 - (3) all obsolete documentation is promptly removed from all points of issue or use; and
 - (4) changes to documentation are reviewed and approved by appropriate personnel; and
 - (5) the current version of each item of documentation can be identified to preclude the use of out-of-date editions.

CAR 177.115 Collection of Information

- (a) Each applicant for the grant of an aeronautical charts service certificate shall establish procedures to collect, collate, coordinate and verify aeronautical information for the aeronautical charts services listed in the applicant's exposition;
- (b) The procedures shall ensure that:
- (1) the aeronautical information appropriate for the aeronautical charting provisions is obtained from organisations that provide services in support of the Oman air navigation system; and
 - (2) the validity and accuracy of aeronautical information are properly checked; and
 - (3) the Aeronautical information supplied complies with the standards defined under this CAR.
- (c) Arrangements for the timely provision of information are made with the information originators prescribed in Paragraph (b)(1); and
- (d) Information received from the data originators prescribed in paragraph (b)(1) is certified as accurate by a person identified by the originator to be responsible for the accuracy of that information.

CAR 177.120 Maintenance of Aeronautical Charts

- (a) An applicant for the grant of an Aeronautical Charts Service Certificate shall establish procedure to ensure that the information on aeronautical charts produced under the authority of their certificate are comprehensive and accurate, and in compliance with this CAR.

- (b) The procedure shall ensure that the charts are reviewed regularly and maintained up to date by a defined revision/amendment service for the AIP/aeronautical charts in accordance with ICAO Aeronautical Chart Manual (Doc-8697) Chapter 3, Maintenance of Charts.

CAR 177.125 Error Correction in Published Information

- (a) An applicant for the grant of an Aeronautical Charts Service shall establish procedures to record, investigate, correct, and report any errors that are detected in the aeronautical charts listed in their exposition.
- (b) The procedures shall ensure that : —
 - (1) the error is corrected by the most appropriate means relative to the operational significance of the error; and
 - (2) the correction is clearly identified in the republished information; and
 - (3) the source of the error is identified and, where possible, eliminated; and
 - (4) the Authority is notified of a promulgated information incident.

CAR 177.130 Records

- (a) Each applicant for the grant of an aeronautical charts service certificate shall establish procedures to identify, collect, index, store, maintain and dispose of the records that are necessary for the aeronautical charts services listed in their exposition.
- (b) The procedures shall ensure that:
 - (1) there are records enabling all incoming and outgoing aeronautical information to be readily identified by serial number and date, and that supplementary information can be similarly verified and, where necessary, authenticated; and
 - (2) there is a record of each person who is authorised by the applicant to check, edit, and publish aeronautical information; and
 - (3) That the records specified are retained for a period of at least three (3) years or for such longer period as may be required by the Authority; and
 - (4) The providing of a record of each occurrence of erroneous of aeronautical charting information reported and detected under the procedures required by CAR-177.125. The record shall detail the nature of the erroneous an aeronautical charting information and the findings of the investigation and the follow-up corrective actions; and
 - (5) That there is a record of each personnel experience, qualifications, training, competence assessments, and current authorizations, for each person who is authorized to provide aeronautical charting service,
- (c) All Aeronautical Charts Service records related to Aeronautical Charts services shall be retained for a period of at least three years unless a longer period is required for retrieval if needed for an aviation safety investigation.

CAR 177.135 Safety Management System

An applicant for the grant of an aeronautical charts service certificate must establish, implement, and maintain a system for safety management in accordance with CAR-100.

CAR 177.140 Organisation Exposition

- (a) An applicant for the grant of an aeronautical charts service certificate shall provide the Authority with an exposition containing:
- (1) a statement signed by the Chief Executive on behalf of the applicant's organisation confirming that:
 - i. the exposition and any included manuals define the organisation and demonstrate its means and methods for ensuring ongoing compliance with this CAR; and
 - ii. the exposition and any included manuals will be complied with at all times; and
 - (2) the titles and names of the senior person or persons required by 177.100 (a)(1) and (2); and
 - (3) duties and responsibilities of the senior persons specified in paragraph (a)(2) including matters for which they have responsibility to deal directly with the Authority or the Authority on behalf of the organisation; and
 - (4) an organisation chart showing lines of responsibility of the senior persons specified in paragraph (a)(2); and
 - (5) a summary of the applicant's staffing structure for each aeronautical charts service listed under paragraph (a)(6); and
 - (6) a list of the aeronautical charts services to be covered by the certificate; and
 - (7) details of the applicant's procedures required : —
 - i. regarding the competence of personnel; and
 - ii. regarding the control of documentation; and
 - iii. regarding the collection of information; and
 - iv. regarding the production and revision of aeronautical charts; and
 - v. regarding the correction of errors in published information; and
 - vi. regarding the identification, collection, indexing, storage, maintenance, and disposal of records; and
 - vii. regarding safety management;
 - (8) procedures to control, amend and distribute the exposition.
- (b) The applicant's exposition must be acceptable to the Authority.

CAR 177.145 Continued Compliance

Each holder of an aeronautical charts service certificate shall:

- (a) Hold at least one complete and current copy of their exposition at each office listed in their exposition; and
- (b) Comply with all procedures and standards detailed in their exposition; and
- (c) Make each applicable part of their exposition available to personnel who require those parts to carry out their duties; and
- (d) Continue to meet the standards and comply with the requirements of Subpart B prescribed for certification under this CAR; and
- (e) Notify the Authority of any change of address for service, telephone number, or facsimile number within twenty-eight (28) days of the change.

CAR 177.150 Changes to Certificate Holder's Organization

- (a) Each holder of an aeronautical charts service certificate shall ensure that their exposition is amended such that it maintains a current description of the holder's organisation and services.
- (b) The certificate holder shall ensure that any amendments made to the holder's exposition meet the applicable requirements of this CAR and comply with the amendment procedures contained in the holder's exposition.
- (c) The certificate holder shall provide the Authority with a copy of each amendment to the holder's exposition as soon as practicable after its incorporation into the exposition.
- (d) Where a certificate holder proposes to make a change to any of the following, prior notification to and acceptance by the Authority is required:
 - (1) the Chief Executive:
 - (2) the listed senior persons:
 - (3) the aeronautical charts services provided by the holder:
 - (4) the format and standards for the aeronautical charts published under the authority of their certificate.
- (e) The Authority may prescribe conditions under which a certificate holder may operate during or following any of the changes specified in paragraph (d).
- (f) A certificate holder shall comply with any conditions prescribed under paragraph (e).
- (g) Where any of the changes referred to in this CAR requires an amendment to the certificate, the certificate holder shall forward the certificate to the Authority as soon as practicable.
- (h) The certificate holder shall make such amendments to the holder's exposition, as the Authority may consider necessary in the interests of aviation safety.

CAR 177.155 Operations manuals

- (a) Each holder of an aeronautical Charts service certificate shall provide and keep up to date its operations manual or system of manuals relating to the provision of the services listed in its exposition for the use and guidance of operations personnel.
- (b) Each holder of an aeronautical Charts service shall ensure that:
 - (1) operations manuals contain the instructions and information required by the operations personnel to perform their duties;
 - (2) relevant parts of the operations manuals are accessible to the personnel concerned; and
 - (3) the operations personnel are informed of amendments to the operations manual applying to their duties in a manner that enables their application as of their entry into force.

SUBPART C – OPERATING REQUIREMENTS

CAR 177.180 Chart Provisions

The holder of the Aeronautical charts service certificate for the Aeronautical charts production and revision shall comply with requirements of subpart D and while producing or revising:

- (a) Aerodrome Obstacle Chart — ICAO Type A (Operating Limitations) shall comply with Subpart E;
- (b) Aerodrome Obstacle Chart — ICAO Type B shall comply with Subpart F;
- (c) Precision Approach Terrain Chart — ICAO shall comply with Subpart H;
- (d) En-route Chart — ICAO shall comply with Subpart I;
- (e) Area Chart — ICAO shall comply with Subpart J;
- (f) Standard Departure Chart — Instrument (SID) — ICAO shall comply with Subpart K;
- (g) Standard Arrival Chart — Instrument (STAR) — ICAO shall comply with Subpart L;
- (h) Instrument Approach Chart — ICAO shall comply with Subpart M;
- (i) Visual Approach Chart — ICAO shall comply with Subpart N;
- (j) Aerodrome/Heliport Chart — ICAO shall comply with Subpart O;
- (k) Aerodrome Ground Movement Chart — ICAO shall comply with Subpart P;
- (l) Aircraft Parking/Docking Chart — ICAO shall comply with Subpart Q;
- (m) World Aeronautical Chart — ICAO 1:1 000 000 shall comply with Subpart R;
- (n) ATC Surveillance Minimum Altitude Chart — ICAO shall comply with Subpart W.

CAR 177.185 Regulatory Approval of Aeronautical Charts

- (a) The aeronautical charts submitted to the aeronautical information service provider will require regulatory approval by the Authority before publication.
- (b) The Aeronautical Charts Service provider shall ensure that an approval has been granted by the Authority before submitting for publication new or revised aeronautical charts.
- (c) The Aeronautical Charts Service provider shall take account of the additional time required by the Authority for the approvals process.

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SUBPART D — GENERAL SPECIFICATIONS

Note: The regulations and Recommendations contained in this chapter are applicable to all ICAO aeronautical charts unless otherwise stated in the specifications of the chart concerned.

CAR 177.200 Operational requirements for charts

Note: For the purposes of this Annex, the total flight is divided into the following phases:

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

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

Phase 3 — En-route ATS route structure

Phase 4 — Descent to approach

Phase 5 — Approach to land and missed approach

Phase 6 — Landing and taxi to aircraft stand.

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

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

- (b) Each type of chart shall provide information appropriate to the phase of flight to ensure the safe and expeditious operation of the aircraft.
- (c) The presentation of information shall be accurate, free from distortion and clutter, unambiguous, and be readable under all normal operating conditions.
- (d) Colours or tints and type size used shall be such that the chart can be easily read and interpreted by the pilot in varying conditions of natural and artificial light.
- (e) The information shall be in a form which enables the pilot to acquire it in a reasonable time consistent with workload and operating conditions.
- (f) The presentation of information provided on each type of chart shall permit smooth transition from chart to chart as appropriate to the phase of flight.
- (g) The charts shall be True North orientated.
- (h) The basic sheet size of the charts shall be 210 × 297 mm (8.27 × 11.69 in) (A4).

CAR 177.205 Titles

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

CAR 177.210 Miscellaneous Information.

- (a) The marginal note layout shall be as given in Appendix 1, 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;

Note: The title may be abbreviated.

- (2) name and reference of the sheet;
- (3) on each margin an indication of the adjoining sheet (when applicable).
- (a) 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.
- (b) 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.

CAR 177.215 Symbols

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

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

- (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 - ICAO Chart Symbols, symbol number 121.

CAR 177.220 Units of Measurement

- (a) Distances shall be derived as geodesic distances.
- (b) Distances shall be expressed in either kilometres or nautical miles or both, provided the units are clearly differentiated.
- (c) Altitudes, elevations and heights shall be expressed in either metres or feet or both, provided the units are clearly differentiated.
- (d) Linear dimensions on aerodromes and short distances shall be expressed in metres.
- (e) The order of resolution of distances, dimensions, elevations and heights shall be that as specified for a particular chart.
- (f) The units of measurement used to express distances, altitudes, elevations and heights shall be conspicuously stated on the face of each chart.
- (g) Conversion scales (kilometres/nautical miles, metres/feet) shall be provided on each chart on which distances, elevations or altitudes are shown. The conversion scales shall be placed on the face of each chart.

CAR 177.225 Scale and Projection

- (a) For charts of large areas, the name and basic parameters and scale of the projection shall be indicated.
- (b) For charts of small areas, a linear scale only shall be indicated.

CAR 177.230 Date of Validity of Aeronautical Information

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

CAR 177.235 Spelling of Geographical Names

- (a) The symbols of the Roman alphabet shall be used for all writing.
- (b) 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.
- (c) Where a geographical term such as “cape”, “point”, “gulf”, “river” is abbreviated on any particular chart that word shall be spelt out in full in the language used by the Aeronautical Charts Service provider, in respect of the most important example of each type. Punctuation marks shall not be used in abbreviations within the body of a chart.
- (d) In areas where romanized names have not been officially produced or adopted, and outside the territory of the Sultanate of Oman, names shall be transcribed from the non-Roman alphabet form by the system generally used by the Aeronautical Charts Service provider.

CAR 177.240 Abbreviations

- (a) Abbreviations shall be used on aeronautical charts whenever they are appropriate.
- (b) Where applicable, abbreviations shall be selected from the Procedures for Air Navigation Services — ICAO Abbreviations and Codes (Doc 8400).

CAR 177.245 Political Boundaries

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

Note: In the case of a dependent territory, the name of the sovereign State may be added in brackets.

CAR 177.250 Colours

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

CAR 177.255 Relief

- (a) Relief, where shown, shall be portrayed in a manner that will satisfy the chart users’ need for:
 - (1) orientation and identification;
 - (2) safe terrain clearance;
 - (3) clarity of aeronautical information when shown;
 - (4) planning.

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

- (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.
- (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 \pm .

CAR 177.260 Prohibited, Restricted and Danger Areas

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

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

CAR 177.265 Air traffic Services Airspaces

- (a) When ATS airspace is shown on a chart, the class of airspace, the type, name or call sign, the vertical limits and the radio frequency(ies) to be used shall be indicated and the horizontal limits depicted in accordance with Appendix 2 — ICAO Chart Symbols.
- (b) On charts used for visual flight, those parts of the ICAO Annex 11, (Appendix 4) – ATS Airspace Classes table in applicable to the airspace depicted on the chart shall be on the face or reverse of each chart.

CAR 177.270 Magnetic Variation

- (a) True North and magnetic variation shall be 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 (i.e. 1980, 1985, etc.). In exceptional cases where the current value would be more than one degree different, after applying the calculation for annual change, an interim date and value shall be quoted.

Note: The date and the annual change may be shown.

- (c) For instrument procedure charts, the publication of a magnetic variation change shall be completed within a maximum of six AIRAC cycles.
- (d) In large terminal areas with multiple aerodromes, a single rounded value of magnetic variation shall be applied so that the procedures that service multiple aerodromes use a single, common variation value.

CAR 177.271 Topography

When topographical features are required on an aeronautical chart, these features shall be displayed in compliance with ICAO Document 8697 – Aeronautical Chart Manual.

Note: Samples of type suitable for use on aeronautical charts are included in the Aeronautical Chart Manual (Doc 8697).

CAR 177.275 Aeronautical Data

- (a) The Aeronautical Charts Service provider shall take all necessary measures to introduce a properly organized quality management system containing procedures, processes and resources necessary to implement quality management at each function stage as outlined in CAR-175.325 Quality Management System. 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.

Note: Specifications governing the quality system are given in CAR-175, Subpart F — AERONAUTICAL INFORMATION MANAGEMENT.

- (b) The Aeronautical Charts Service provider shall ensure that the chart resolution of aeronautical data shall be that as specified for a particular chart.

Note: Specifications concerning the chart resolution for aeronautical data are contained in the CAR-175 – AMC, Appendix 1.

- (c) The Aeronautical Charts Service provider shall ensure that integrity of aeronautical data is maintained throughout the data process from origination to distribution to the next intended user.

Note: Specifications concerning the integrity classification related to aeronautical data are provided in the CAR-175 – AMC, Appendix 1.

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

Note: Detailed specifications concerning digital data error detection techniques are contained in the CAR-175 – AMC.

CAR 177.280 Common Reference Systems

- (a) Horizontal reference system

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

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

- (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 ICAO Annex 11, Chapter 2; and for aerodrome/heliport-related positions, in ICAO 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 the CAR-175 – AMC, Appendix 1.

(b) Vertical reference system

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

Note 1: The geoid globally most closely approximates MSL. It is defined as the equipotential surface in the gravity field of the Earth that coincides with the undisturbed MSL extended continuously through the continents.

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

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

Note 1: Specifications concerning the determination and reporting (accuracy of field work and data integrity) of elevation and geoid undulation at specific positions at aerodromes/heliports are given in Annex 14, Volumes I and II, Chapter 2.

Note 2: Specifications concerning the accuracy and integrity classification of elevation and geoid undulation at specific positions at aerodromes/heliports are contained in the CAR-175 – AMC, Appendix 1.

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

Note: Specifications concerning the chart resolution of elevation and geoid undulation are contained in the CAR-175 – AMC, Appendix 1.

(c) Temporal reference system

- (1) The Gregorian calendar and Coordinated Universal Time (UTC) shall be used as the temporal reference system.
- (2) When a different temporal reference system is used for charting, this shall be indicated in GEN 2.1.2 of the Oman Aeronautical Information Publication (AIP).

SUBPART E — AERODROME OBSTACLE CHART — ICAO TYPE A (OPERATING LIMITATIONS)

CAR 177.300 Function

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

CAR 177.305 Availability

- (a) Aerodrome Obstacle Charts — ICAO Type A (Operating Limitations) shall be made available in the manner prescribed in CAR-177.010 for all aerodromes regularly used by international civil aviation, except for those aerodromes where there are no obstacles in the take-off flight path areas or where the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) is provided in accordance with Subpart G.
- (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 Oman AIP.

CAR 177.310 Units of measurement

- (a) Elevations shall be shown to the nearest half-metre or to the nearest foot.
- (b) Linear dimensions shall be shown to the nearest half-metre.

CAR 177.315 Coverage and scale

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

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

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

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

- (c) The vertical scale shall be ten times the horizontal scale.
- (d) *Linear scales.* Horizontal and vertical linear scales showing both metres and feet shall be included in the charts.

CAR 177.320 Format

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

- (c) A profile grid shall be ruled over the entire profile area exclusive of the runway. The zero for vertical coordinates shall be mean sea level. The zero for horizontal coordinates shall be the end of the runway furthest from the take-off flight path area concerned. Graduation marks indicating the sub-divisions of intervals shall be shown along the base of the grid and along the vertical margins.
- (d) The vertical grid shall have intervals of 30 m (100 ft) and the horizontal grid shall have intervals of 300 m (1,000 ft).
- (e) The chart shall include:
 - (1) a box for recording the operational data specified in 177.335 (c);
 - (2) a box for recording amendments and dates thereof.

CAR 177.325 Identification

The chart shall be identified by the name of the country in which the aerodrome is located, the name of the city or town or area that the aerodrome serves, the name of the aerodrome and the designator(s) of the runway(s).

CAR 177.330 Magnetic variation

The magnetic variation to the nearest degree and date of information shall be indicated.

CAR 177.335 Aeronautical data

- (a) Obstacles
 - (1) Objects in the take-off flight path area which project above a plane surface having a 1.2 per cent slope and having a common origin with the take-off flight path area shall be regarded as obstacles, except that obstacles lying wholly below the shadow of other obstacles as defined in (2) need not be shown. Mobile objects such as boats, trains and trucks, which may project above the 1.2 per cent plane, shall be considered obstacles but shall not be considered as being capable of creating a shadow.
 - (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 (1,000 ft) of the take-off flight path area, the shadow planes are horizontal and beyond this point such planes have an upward slope of 1.2 per cent.
 - (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 1,800 m (6,000 ft), where D is the distance from the point of origin;
 - iii. it extends to the point beyond which no obstacles exist or to a distance of 10.0 km (5.4 NM), whichever is the lesser.
- (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 per cent, the extent of the take-off flight path area specified in (1) (iii) shall be increased to not less than 12.0 km (6.5 NM) and the slope of the plane surface specified in (a) (1) and (2) shall be reduced to 1.0 per cent or less.

Note: When a 1.0 per cent survey plane touches no obstacles, this plane may be lowered until it touches the first obstacle.

(c) Declared distances

- (1) The following information for each direction of each runway shall be entered in the space provided:
- i. take-off run available;
 - ii. accelerate-stop distance available;
 - iii. take-off distance available;
 - iv. landing distance available.

Note: In Annex 14, Volume I, Attachment A, Section 3, guidance is given on declared distances.

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

(d) Plan and profile views

- (1) The plan view shall show:
- 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;
 - the limits of penetration of obstacles of large extent in a distinctive manner identified in the legend.

Note: This does not exclude the necessity for indicating critical spot elevations within the take-off flight path area.

- (2) The nature of the runway and stop-way surfaces shall be indicated.
- (3) Stop-ways shall be identified as such and shall be shown by a broken line.
- (4) When stop-ways are shown, the length of each stop-way shall be indicated.

- (5) The profile view shall show:
- i. the profile of the centre line of the runway by a solid line and the profile of the centre line of any associated stop-ways and clearways by a broken line;
 - ii. the elevation of the runway centre line at each end of the runway, at the stop-way and at the origin of each take-off flight path area, and at each significant change in slope of runway and stop-way;
 - iii. 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;
 - the limits of penetration of obstacles of large extent in a distinctive manner identified in the legend.

Note: An obstacle profile consisting of a line joining the tops of each obstacle and representing the shadow created by successive obstacles may be shown.

CAR 177.340 Accuracy

- (a) The order of accuracy attained shall be shown on the chart.
- (b) The horizontal dimensions and the elevations of the runway, stop-way 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 1.0 m (3 ft) per 300 m (1,000 ft).
- (d) Datum. Where no accurate datum for vertical reference is available, the elevation of the datum used shall be stated and shall be identified as assumed.

SUBPART F — AERODROME OBSTACLE CHART — ICAO TYPE B

CAR 177.360 Function

This chart shall provide information to satisfy the following functions:

- (a) The determination of minimum safe altitudes/heights including those for circling procedures;
- (b) The determination of procedures for use in the event of an emergency during take-off or landing;
- (c) The application of obstacle clearing and marking criteria; and
- (d) The provision of source material for aeronautical charts.

CAR 177.365 Availability

- (a) Aerodrome Obstacle Charts — ICAO Type B shall be made available, in the manner prescribed in CAR-177.010, for all aerodromes regularly used by international civil aviation except for those aerodromes where the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) is provided in accordance with Subpart G.
- (b) When a chart combining the specifications of subpart E and subpart F is made available, it shall be called the Aerodrome Obstacle Chart — ICAO (Comprehensive).

CAR 177.370 Units of Measurement

- (a) Elevations shall be shown to the nearest half-metre or to the nearest foot.
- (b) Linear dimensions shall be shown to the nearest half-metre.

CAR 177.375 Coverage and Scale

- (a) The extent of each plan shall be sufficient to cover all obstacles.
Note: Isolated distant obstacles that would unnecessarily increase the sheet size may be indicated by the appropriate symbol and an arrow, provided that the distance and bearing from the aerodrome reference point and elevation are given.
- (b) The horizontal scale shall be within the range of 1:10,000 to 1:20,000.
- (c) A horizontal linear scale showing both metres and feet shall be included in the chart. When necessary, a linear scale for kilometres and a linear scale for nautical miles shall also be shown.

CAR 177.380 Format

The charts shall include:

- (a) Any necessary explanation of the projection used;
- (b) Any necessary identification of the grid used;
- (c) A notation indicating that obstacles are those which penetrate the surfaces specified in Annex 14, Volume I, Chapter 4;
- (d) A box for recording amendments and dates thereof; and
- (e) Outside the neat line, every minute of latitude and longitude marked in degrees and minutes.
Note: Lines of latitude and longitude may be shown across the face of the chart.

CAR 177.385 Identification.

The chart shall be identified by the name of the country in which the aerodrome is located, the name of the city or town or area which the aerodrome serves, and the name of the aerodrome.

CAR 177.390 Culture and Topography.

- (a) Drainage and hydrographic details shall be kept to a minimum.
- (b) Buildings and other salient features associated with the aerodrome shall be shown. Wherever possible, they shall be shown to scale.
- (c) All objects, either cultural or natural, that project above the take-off and approach surfaces specified in CAR-177.400 or the clearing and marking surfaces specified in Annex 14, Volume I, Chapter 4, shall be shown.
- (d) Roads and railroads within the take-off and approach area, and less than 600 m (2,000 ft) from the end of the runway or runway extensions, shall be shown.

Note: Geographical names of features may be shown if of significance.

CAR 177.395 Magnetic variation.

The chart shall show a compass rose orientated to the True North, or a North point, showing the magnetic variation to the nearest degree with the date of magnetic information and annual change.

CAR 177.400 Aeronautical Data.

- (a) The charts shall show:
 - (1) the aerodrome reference point and its geographical coordinates in degrees, minutes and seconds;
 - (2) the outline of the runways by a solid line;
 - (3) the length and width of the runway;
 - (4) the magnetic bearing to the nearest degree of the runway and the runway number;
 - (5) the elevation of the runway centre line at each end of the runway, at the stop-way, at the origin of each take-off and approach area, and at each significant change of slope of runway and stop-way;
 - (6) taxiways, aprons and parking areas identified as such, and the outlines by a solid line;
 - (7) stop-ways identified as such and depicted by a broken line;
 - (8) the length of each stop-way;
 - (9) clearways identified as such and depicted by a broken line;
 - (10) the length of each clearway;
 - (11) take-off and approach surfaces identified as such and depicted by a broken line;
 - (12) take-off and approach areas;

Note: The take-off area is described CAR-177.335(b). The approach area consists of an area on the surface of the earth lying directly below the approach surface as specified in ICAO Annex 14, Volume I, Chapter 4.

- (13) obstacles at their exact location, including:
 - i. a symbol indicative of their type;
 - ii. elevation;

- iii. identification;
- iv. limits of penetration of large extent in a distinctive manner identified in the legend;

Note: This does not exclude the necessity for indicating critical spot elevations within the take-off and approach areas.

- (14) any additional obstacles, as determined by CAR-177.335 (a) (1) including the obstacles in the shadow of an obstacle, which would otherwise be exempted.

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

- (b) The nature of the runway and stop-way surfaces shall be given.
- (c) Wherever practicable, the highest object or obstacle between adjacent approach areas within a radius of 5,000 m (15,000 ft) from the aerodrome reference point shall be indicated in a prominent manner.
- (d) The extent of tree areas and relief features, part of which constitute obstacles, shall be shown.

CAR 177.410 Accuracy

- (a) The order of accuracy attained shall be shown on the chart.
- (b) The horizontal dimensions and the elevations of the movement area, stop-ways and clearways 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 the resulting data will be within the maximum deviations indicated herein:
 - (1) *Take-off and approach areas:*
 - i. horizontal distances: 5 m (15 ft) at point of origin increasing at a rate of 1 per 500;
 - ii. vertical distances: 0.5 m (1.5 ft) in the first 300 m (1,000 ft) and increasing at a rate of 1 per 1,000.
 - (2) *Other areas:*
 - i. horizontal distances: 5 m (15 ft) within 5,000 m (15,000 ft) of the aerodrome reference point and 12 m (40 ft) beyond that area;
 - ii. vertical distances: 1 m (3 ft) within 1,500 m (5,000 ft) of the aerodrome reference point increasing at a rate of 1 per 1,000.
- (d) *Datum.* Where no accurate datum for vertical reference is available, the elevation of the datum used shall be stated and identified as assumed.

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SUBPART G — (INTENTIONALLY LEFT BLANK)ⁱ

(i) Reserved for “Aerodrome Terrain and Obstacle Chart - ICAO (Electronic)”.

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SUBPART H — PRECISION APPROACH TERRAIN CHART — ICAO**CAR 177.470 Function**

The chart shall provide detailed terrain profile information within a defined portion of the final approach to enable aircraft operating agencies to assess the effect of the terrain on decision height determination by the use of radio altimeters.

CAR 177.475 Availability

- (a) The Precision Approach Terrain Chart — ICAO shall be made available for all precision approach runways Categories II and III at aerodromes used by international civil aviation, except where the requisite information is provided in the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) in accordance with Subpart G.
- (b) The Precision Approach Terrain Chart — ICAO shall be revised whenever any significant change occurs.

CAR 177.480 Scale

- (a) The horizontal scale shall be 1:2,500, and the vertical scale 1:500.
- (b) When the chart includes a profile of the terrain to a distance greater than 900 m (3,000 ft) from the runway threshold, the horizontal scale shall be 1:5,000.

CAR 177.485 Identification

The chart shall be identified by the name of the country in which the aerodrome is located, the name of the city or town or area which the aerodrome serves, the name of the aerodrome and the designator of the runway.

CAR 177.490 Plan and Profile Information

- (a) the chart includes:
 - (1) a plan showing contours at 1 m (3 ft) intervals in the area 60 m (200 ft) on either side of the extended centre line of the runway, to the same distance as the profile, the contours to be related to the runway threshold;
 - (2) an indication where the terrain or any object thereon, within the plan defined in a), differs by ± 3 m (10 ft) in height from the centre line profile and is likely to affect a radio altimeter;
 - (3) a profile of the terrain to a distance of 900 m (3,000 ft) from the threshold along the extended centre line of the runway.
- (b) Where the terrain at a distance greater than 900 m (3,000 ft) from the runway threshold is mountainous or otherwise significant to users of the chart, the profile of the terrain shall be shown to a distance not exceeding 2,000 m (6,500 ft) from the runway threshold.
- (c) The ILS reference datum height shall be shown to the nearest half metre or foot.

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SUBPART I — EN-ROUTE CHART — ICAO

CAR 177.500 Function.

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

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

CAR 177.505 Availability.

- (a) The En-route Chart — ICAO shall be made available in the manner prescribed in CAR-177.010 for all areas where flight information regions have been established.

Note: Under certain conditions, an Area Chart — ICAO may have to be provided.

- (b) Where different air traffic services routes, position reporting requirements or lateral limits of flight information regions or control areas exist in different layers of airspace and cannot be shown with sufficient clarity on one chart, separate charts shall be provided.

CAR 177.510 Coverage and scale.

Note 1: A uniform scale for charts of this type cannot be specified due to the varying degree of congestion of information in certain areas.

Note 2: A linear scale based on the mean scale of the chart may be shown.

- (a) Layout of sheet lines shall be determined by the density and pattern of the ATS route structure.
- (b) Large variations of scale between adjacent charts showing a continuous route structure shall be avoided.
- (c) An adequate overlap of charts shall be provided to ensure continuity of navigation.

CAR 177.515 Projection.

- (a) A conformal projection on which a straight line approximates a great circle shall be used.
- (b) Parallels and meridians shall be shown at suitable intervals.
- (c) Graduation marks shall be placed at consistent intervals along selected parallels and meridians.

CAR 177.520 Identification.

Each sheet shall be identified by chart series and number.

CAR 177.525 Culture and topography

- (a) Generalized shore lines of all open water areas, large lakes and rivers shall be shown except where they conflict with data more applicable to the function of the chart.
- (b) 7.6.2 Within each quadrilateral formed by the parallels and meridians, the area minimum altitude shall be shown.

Note 1.— Quadrilaterals formed by the parallels and meridians normally correspond to the whole degree of latitude and longitude. Regardless of the chart scale being used, the area minimum altitude relates to the consequent quadrilateral.

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

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

CAR 177.530 Magnetic variation.

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

CAR 177.535 Bearings, tracks and radials.

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

CAR 177.540 Aeronautical data.

- (a) Aerodromes. All aerodromes used by international civil aviation to which an instrument approach can be made shall be shown.

Note: Other aerodromes may be shown.

- (b) Prohibited, restricted and danger areas. Prohibited, restricted and danger areas relevant to the layer of airspace shall be depicted with their identification and vertical limits.
- (c) Air traffic services system
- (1) Where appropriate, the components of the established air traffic services system shall be shown.
 - (2) The components shall include the following:
 - i. the radio navigation aids associated with the air traffic services system together with their names, identifications, frequencies and geographical coordinates in degrees, minutes and seconds;
 - ii. in respect of DME, additionally the elevation of the transmitting antenna of the DME to the nearest 30 m (100 ft);
 - iii. an indication of all designated airspace, including lateral and vertical limits and the appropriate class of airspace;
 - iv. All ATS routes for en-route flight including route designators, the track to the nearest degree in both directions along each segment of the routes and, where established, the designation of the navigation specification(s) including any limitations and the direction of traffic flow;

- v. all significant points which define the ATS routes and are not marked by the position of a radio navigation aid, together with their name-codes and geographical coordinates in degrees, minutes and seconds;
- vi. in respect of waypoints defining VOR/DME area navigation routes, additionally,
 - the station identification and radio frequency of the reference VOR/DME;
 - 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;
- vii. an indication of all compulsory and “on-request” reporting points and ATS/MET reporting points;
- viii. the distances to the nearest kilometre or nautical mile between significant points constituting turning points or reporting points;

Note: Overall distances between radio navigation aids may also be shown.

- ix. 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;

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

- x. minimum en-route altitudes and minimum obstacle clearance altitudes, on ATS routes to the nearest higher 50 metres or 100 feet (see ICAO Annex 11, 2.23);
- xi. communication facilities listed with their channels and, if applicable, logon address;
- xii. air defense identification zone (ADIZ) properly identified.

Note: ADIZ procedures may be described in the chart legend.

(d) Supplementary information

- (1) Details of departure and arrival routes and associated holding patterns in terminal areas shall be shown unless they are shown on an Area Chart, a Standard Departure Chart — Instrument (SID) — ICAO or a Standard Arrival Chart — Instrument (STAR) — ICAO.

Note 1: For specifications of these charts, see Subparts J, K and L.

Note 2: Departure routes normally originate at the end of a runway; arrival routes normally terminate at the point where an instrument approach is initiated.

- (2) Where established, altimeter-setting regions shall be shown and identified.

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SUBPART J — AREA CHART — ICAO

CAR 177.560 Function

This chart shall provide the flight crew with information to facilitate the following phases of instrument flight:

- (a) The transition between the en-route phase and approach to an aerodrome;
- (b) The transition between take-off/missed approach and en-route phase of flight; and
- (c) Flights through areas of complex ATS routes or airspace structure.

Note: The function described in (c) may be satisfied by a separate chart or an inset on an En-route Chart — ICAO.

CAR 177.565 Availability

- (a) The Area Chart — ICAO shall be made available in the manner prescribed in CAR-177.010 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, separate charts shall be provided.

Note: Under certain conditions, a Standard Departure Chart — Instrument (SID) — ICAO and a Standard Arrival Chart — Instrument (STAR) — ICAO may have to be provided (see Subparts K and L).

CAR 177.570 Coverage and Scale

- (a) The coverage of each chart shall extend to points that effectively show departure and arrival routes.
- (b) The chart shall be drawn to scale and a scale-bar shown.

CAR 117.575 Projection

- (a) A conformal projection on which a straight line approximates a great circle shall be used.
- (b) Parallels and meridians shall be shown at suitable intervals.
- (c) Graduation marks shall be placed at consistent intervals along the neat lines, as appropriate.

CAR 177.580 Identification

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

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

CAR 177.585 Culture and Topography

- (a) Generalized shorelines of all open water areas, large lakes and rivers shall be shown except where they conflict with data more applicable to the function of the chart.
- (b) To improve situational awareness in areas where significant relief exists, all relief exceeding 300 m (1,000 ft) above the elevation of the primary aerodrome shall be shown by smoothed contour lines, contour values and layer tints printed in brown. Appropriate spot elevations, including the highest elevation within each top contour line, shall be shown printed in black. Obstacles shall also be shown.

Note 1: The next higher suitable contour line appearing on base topographic maps exceeding 300 m (1,000 ft) above the elevation of the primary aerodrome may be selected to start layer tinting.

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

Note 3: Appropriate spot elevations and obstacles are those provided by the procedures specialist.

CAR 177.590 Magnetic Variation

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

CAR 177.595 Bearings, Tracks and Radials

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

CAR 177.600 Aeronautical Data

- (a) Aerodromes:

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

- (b) Prohibited, restricted and danger areas:

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

- (c) Area minimum altitudes:

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

Note 1. — Quadrilaterals formed by the parallels and meridians normally correspond to the whole degree of latitude and longitude. Regardless of the chart scale being used, the area minimum altitude relates to the consequent quadrilateral.

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

(d) Air traffic services system

- (1) The components of the established relevant air traffic services system shall be shown.
- (2) The components shall include the following:
 - i. the radio navigation aids associated with the air traffic services system, together with their names, identifications, frequencies and geographical coordinates in degrees, minutes and seconds;
 - ii. in respect of DME, additionally the elevation of the transmitting antenna of the DME to the nearest 30 m (100 ft);
 - iii. terminal radio aids which are required for outbound and inbound traffic and for holding patterns;
 - iv. the lateral and vertical limits of all designated airspace and the appropriate class of airspace;
 - v. the designation of the navigation specification(s) including any limitations, where established;
 - vi. holding patterns and terminal routings, together with the route designators, and the track to the nearest degree along each segment of the prescribed airways and terminal routings;
 - vii. all significant points which define the terminal routings and are not marked by the position of a radio navigation aid, together with their name-codes and geographical coordinates in degrees, minutes and seconds;
 - viii. in respect of waypoints defining VOR/DME area navigation routes, additionally,
 - the station identification and radio frequency of the reference VOR/DME;
 - 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;
 - ix. an indication of all compulsory and “on-request” reporting points;
 - x. the distances to the nearest kilometre or nautical mile between significant points constituting turning points or reporting points;

Note: Overall distances between radio navigation aids may also be shown.

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

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

- xii. minimum en-route altitudes and minimum obstacle clearance altitudes, on ATS routes to the nearest higher 50 metres or 100 feet (see ICAO Annex 11, 2.23);
- xiii. established minimum vectoring altitudes to the nearest higher 50 m or 100 ft, clearly identified;

Note 1: Where ATS surveillance systems are used to vector aircraft to or from significant points on a published standard departure or arrival route or to issue clearance for descent below the minimum sector altitude during arrival, the relevant procedures may be shown on the Area Chart — ICAO unless excessive chart clutter will result.

Note 2: Where excessive chart clutter will result, an ATC Surveillance Minimum Altitude Chart — ICAO may be provided (see Subpart W), in which case the elements indicated by (xii), need not be duplicated on the Area Chart — ICAO.

- xiv. area speed and level/altitude restrictions where established;
- xv. communication facilities listed with their channels and, if applicable, logon address.
- xvi. an indication of “flyover” significant points.

SUBPART K — STANDARD DEPARTURE CHART — INSTRUMENT (SID) — ICAO**CAR 177.620 Function**

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

Note 1: Provisions governing the identification of standard departure routes are in ICAO Annex 11, Appendix 3; guidance material relating to the establishment of such routes is contained in the Air Traffic Services Planning Manual (Doc 9426).

Note 2: Provisions governing obstacle clearance criteria and details of the minimum information to be published are contained in the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part II.

CAR 177.625 Availability

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

CAR 177.630 Coverage and Scale

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

Note: The departure route normally originates at the end of a runway.

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

CAR 177.635 Projection

- (a) A conformal projection on which a straight line approximates a great circle shall be used.
- (b) When the chart is drawn to scale, parallels and meridians shall be shown at suitable intervals.
- (c) Graduation marks shall be placed at consistent intervals along the neat lines.

CAR 177.640 Identification

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

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

CAR 177.645 Culture and Topography

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

Note 1: The next higher suitable contour line appearing on base topographic maps exceeding 300 m (1,000 ft) above the aerodrome elevation may be selected to start layer tinting.

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

Note 3: Appropriate spot elevations and obstacles are those provided by the procedures specialist.

CAR 177.650 Magnetic Variation

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

CAR 177.655 Bearings, Tracks and Radials

- (a) Bearings, tracks and radials shall be 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).

Note: A note to this effect may be included on the chart.

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

CAR 177.660 Aeronautical data

- (a) Aerodromes:

- (1) The aerodrome of departure shall be shown by the runway pattern.
 - (2) All aerodromes which affect the designated standard departure route — instrument shall be shown and identified. Where appropriate, the aerodrome runway patterns shall be shown.

Note: Appropriate data are those provided by the procedures specialist.

- (b) Prohibited, restricted and danger areas:

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

- (c) Minimum sector altitude:

- (1) The established minimum sector altitude, based on a navigation aid associated with the procedure, shall be shown with a clear indication of the sector to which it applies.
- (2) Where the minimum sector altitude has not been established, the chart shall be drawn to scale and area minimum altitudes shall be shown within quadrilaterals formed by the parallels and meridians. Area minimum altitudes shall also be shown in those parts of the chart not covered by the minimum sector altitude.

Note 1.— Quadrilaterals formed by the parallels and meridians normally correspond to the half degree of latitude and longitude. Regardless of the chart scale being used, the area minimum altitude relates to the consequent quadrilateral.

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

(d) Air traffic services system:

- (1) The components of the established relevant air traffic services system shall be shown.
- (2) The components shall comprise the following:
 - i. a graphic portrayal of each standard departure route — instrument, including:
 - for departure procedures designed specifically for helicopters, the term “CAT H” shall be depicted in the departure chart plan view;
 - route designator;
 - significant points defining the route;
 - track or radial to the nearest degree along each segment of the route;
 - distances to the nearest kilometre or nautical mile between significant points;
 - 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;
 - where the chart is drawn to scale and vectoring on departure is provided, established minimum vectoring altitudes to the nearest higher 50 m or 100 ft, clearly identified;

Note 1: Where ATS surveillance systems are used to vector aircraft to or from significant points on a published standard departure route, the relevant procedures may be shown on the Standard Departure Chart — Instrument (SID) — ICAO unless excessive chart clutter will result.

Note 2: Where excessive chart clutter will result, an ATC Surveillance Minimum Altitude Chart — ICAO may be provided (see Subpart W), in which case the elements indicated by (2), i) 6), need not be duplicated on the Standard Departure Chart — Instrument (SID) — ICAO.

- ii. the radio navigation aid(s) associated with the route(s) including:
 - plain language name;
 - identification;
 - frequency;
 - geographical coordinates in degrees, minutes and seconds;
 - for DME, the channel and the elevation of the transmitting antenna of the DME to the nearest 30 m (100 ft);

- iii. 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;
- iv. applicable holding patterns;
- v. transition altitude/height to the nearest higher 300 m or 1,000 ft;
- vi. the position and height of close-in obstacles which penetrate the obstacle identification surface (OIS). A note shall be included whenever close-in obstacles penetrating the OIS exist but which were not considered for the published procedure design gradient;

Note: In accordance with PANS-OPS, Volume II, information on close-in obstacles is provided by the procedures specialist.

- vii. area speed restrictions, where established;
 - viii. the designation of the navigation specification(s) including any limitations, where established;
 - ix. all compulsory and “on-request” reporting points;
 - x. radio communication procedures, including:
 - call sign(s) of ATS unit(s);
 - frequency;
 - transponder setting, where appropriate;
 - xi. an indication of “flyover” significant points.
- (3) A textual description of standard departure route(s) — instrument (SID) and relevant communication failure procedures shall be provided and shall, whenever feasible, be shown on the chart or on the same page which contains the chart.
- (4) Aeronautical database requirements. Appropriate data to support navigation database coding shall be published in accordance with the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part III, Section 5, Chapter 2, 2.1, on the verso of the chart or as a separate, properly referenced sheet.

Note: Appropriate data are those provided by the procedures specialist.

SUBPART L — STANDARD ARRIVAL CHART — INSTRUMENT (STAR) — ICAO**CAR 177.680 Function**

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

Note 1: Standard arrival routes — instrument are to be interpreted as including “standard descent profiles”, “continuous descent approach”, and other non-standard descriptions. In the case of a standard descent profile, the depiction of a cross-section is not required.

Note 2: Provisions governing the identification of standard arrival routes are in ICAO Annex 11, Appendix 3; guidance material relating to the establishment of such routes is contained in the Air Traffic Services Planning Manual (Doc 9426).

CAR 177.685 Availability

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

CAR 177.690 Coverage and Scale

- (a) The coverage of the chart shall be sufficient to indicate the points where the en-route phase ends and the approach phase begins.
- (b) The chart shall be drawn to scale.
- (c) If the chart is drawn to scale, a scale-bar shall be shown.
- (d) When the chart is not drawn to scale, the annotation “NOT TO SCALE” shall be shown and the symbol for scale break shall be used on tracks and other aspects of the chart which are too large to be drawn to scale.

CAR 177.695 Projection

- (a) A conformal projection on which a straight line approximates a great circle shall be used.
- (b) When the chart is drawn to scale, parallels and meridians shall be shown at suitable intervals.
- (c) Graduation marks shall be placed at consistent intervals along the neat lines.

CAR 177.700 Identification

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

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

CAR 177.705 Culture and Topography

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

Note 1: The next higher suitable contour line appearing on base topographic maps exceeding 300 m (1,000 ft) above the aerodrome elevation may be selected to start layer tinting.

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

Note 3: Appropriate spot elevations and obstacles are those provided by the procedures specialist.

CAR 177.710 Magnetic variation

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

CAR 177.715 Bearings, Tracks and Radials

- (a) Bearings, tracks and radials shall be 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).

Note: A note to this effect may be included on the chart.

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

CAR 177.720 Aeronautical data

- (a) Aerodromes:
 - (1) The aerodrome of landing shall be shown by the runway pattern.
 - (2) All aerodromes which affect the designated standard arrival route — instrument shall be shown and identified. Where appropriate, the aerodrome runway patterns shall be shown.
- (b) Prohibited, restricted and danger areas:

Prohibited, restricted and danger areas which may affect the execution of the procedures shall be shown with their identification and vertical limits.
- (c) Minimum sector altitude:
 - (1) The established minimum sector altitude shall be shown with a clear indication of the sector to which it applies.

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

Note: Depending on the selected chart scale, quadrilaterals formed by the parallels and meridians normally correspond to the half-degree of latitude and longitude.

Note 1.— Quadrilaterals formed by the parallels and meridians normally correspond to the half degree of latitude and longitude. Regardless of the chart scale being used, the area minimum altitude relates to the consequent quadrilateral.

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

(d) Air traffic services system:

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

- (2) The components shall comprise the following:

- i. a graphic portrayal of each standard arrival route — instrument, including:
 - route designator;
 - significant points defining the route;
 - track or radial to the nearest degree along each segment of the route;
 - distances to the nearest kilometre or nautical mile between significant points;
 - 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;
 - where the chart is drawn to scale and vectoring on arrival is provided, established minimum vectoring altitudes to the nearest higher 50 m or 100 ft, clearly identified;

Note 1: Where ATS surveillance systems are used to vector aircraft to or from significant points on a published standard arrival route or to issue clearance for descent below the minimum sector altitude during arrival, the relevant procedures may be shown on the Standard Arrival Chart — Instrument (STAR) — ICAO unless, excessive chart clutter will result.

Note 2: Where excessive chart clutter will result, an ATC Surveillance Minimum Altitude Chart — ICAO may be provided (see Subpart W), in which case the elements indicated by (2), i (6), need not be duplicated on the Standard Arrival Chart — Instrument (STAR) — ICAO.

- ii. the radio navigation aid(s) associated with the route(s) including:
 - plain language name;
 - identification;
 - frequency;
 - geographical coordinates in degrees, minutes and seconds;
 - for DME, the channel and the elevation of the transmitting antenna of the DME to the nearest 30 m (100 ft);

- iii. 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;
 - iv. applicable holding patterns;
 - v. transition altitude/height to the nearest higher 300 m or 1,000 ft;
 - vi. area speed restrictions, where established;
 - vii. the designation of the navigation specification(s) including any limitations, where established;
 - viii. all compulsory and “on-request” reporting points;
 - ix. radio communication procedures, including:
 - call sign(s) of ATS unit(s);
 - frequency;
 - transponder setting, where appropriate;
 - x. an indication of “flyover” significant waypoints.
- (3) A textual description of standard arrival route(s) — instrument (STAR) and relevant communication failure procedures shall be provided and shall, whenever feasible, be shown on the chart or on the same page which contains the chart.
- (4) Aeronautical database requirements. Appropriate data to support navigation database coding shall be published in accordance with the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part III, Section 5, Chapter 2, 2.2, on the verso of the chart or as a separate, properly referenced sheet.

Note: Appropriate data are those provided by the procedures specialist.

SUBPART M — INSTRUMENT APPROACH CHART— ICAO

CAR 177.740 Function

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

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

CAR 177.745 Availability

- (a) Instrument Approach Charts — ICAO shall be made available for all aerodromes used by international civil aviation where instrument approach procedures have been established by the air navigation service provider or the aerodrome operator.
- (b) A separate Instrument Approach Chart — ICAO shall normally be provided for each precision approach procedure established by the air navigation service provider or the aerodrome operator.
- (c) A separate Instrument Approach Chart — ICAO shall normally be provided for each non-precision approach procedure established by the air navigation service provider or the aerodrome operator.

Note: 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.

- (d) 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.

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

- (e) Instrument Approach Charts — ICAO shall be revised whenever information essential to safe operation becomes out of date.

CAR 177.750 Coverage and Scale

- (a) The coverage of the chart shall be sufficient to include all segments of the instrument approach procedure and such additional areas as may be necessary for the type of approach intended.
- (b) The scale selected shall ensure optimum legibility consistent with:
 - (1) the procedure shown on the chart;
 - (2) sheet size.
- (c) A scale indication shall be given.
- (d) Except where this is not practicable, 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; its radius shall be indicated on the circumference.

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

CAR 177.755 Format

The sheet size shall be 210 × 297 mm (8.27 × 11.69 in) (A4).

CAR 177.760 Projection

- (a) A conformal projection on which a straight line approximates a great circle shall be used.
- (b) Graduation marks shall be placed at consistent intervals along the neat lines.

CAR 177.765 Identification

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

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

CAR 177.770 Culture and Topography

- (a) Culture and topographic information pertinent to the safe execution of the instrument approach procedure, including the missed approach procedure, associated holding procedures and visual manoeuvring (circling) procedure when established, shall be shown. Topographic information shall be named, only when necessary, to facilitate the understanding of such information, and the minimum shall be a delineation of land masses and significant lakes and rivers.
- (b) Relief shall be shown in a manner best suited to the particular elevation characteristics of the area. In areas where relief exceeds 1,200 m (4,000 ft) above the aerodrome elevation within the coverage of the chart or 600 m (2,000 ft) within 11 km (6 NM) of the aerodrome reference point or when final approach or missed approach procedure gradient is steeper than optimal due to terrain, all relief exceeding 150 m (500 ft) above the aerodrome elevation shall be shown by smoothed contour lines, contour values and layer tints printed in brown. Appropriate spot elevations, including the highest elevation within each top contour line, shall also be shown printed in black.

Note 1: The next higher suitable contour line appearing on base topographic maps exceeding 150 m (500 ft) above the aerodrome elevation may be selected to start layer tinting.

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

Note 3: Appropriate spot elevations are those provided by the procedures specialist.

- (c) In areas where relief is lower than specified in (b), all relief exceeding 150 m (500 ft) above the aerodrome elevation shall be shown by smoothed contour lines, contour values and layer

tints printed in brown. Appropriate spot elevations, including the highest elevation within each top contour line, shall also be shown and printed in black.

Note 1: The next higher suitable contour line appearing on base topographic maps exceeding 150 m (500 ft) above the aerodrome elevation may be selected to start layer tinting.

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

Note 3: Appropriate spot elevations are those provided by the procedures specialist.

CAR 177.775 Magnetic Variation

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

CAR 177.780 Bearings, Tracks and Radials

- (a) Bearings, tracks and radials shall be 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).

Note: A note to this effect may be included on the chart.

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

CAR 177.785 Aeronautical Data

(a) Aerodromes:

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

(b) Obstacles:

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

Note: Appropriate obstacles are those provided by the procedures specialist.

- (2) If one or more obstacles are the determining factor of an obstacle clearance altitude/height, those obstacles shall be identified.
- (3) The elevation of the top of obstacles shall be shown to the nearest (next higher) metre or foot.

- (4) The heights of obstacles above a datum other than mean sea level (see part (3) above) shall be shown. When shown, they shall be given in parentheses on the chart.
- (5) When the heights of obstacles above a datum other than mean sea level are shown, the datum shall be the aerodrome elevation except that, at aerodromes having an instrument runway (or runways) with a threshold elevation more than 2 m (7 ft) below the aerodrome elevation, the chart datum shall be the threshold elevation of the runway to which the instrument approach is related.
- (6) Where a datum other than mean sea level is used, it shall be stated in a prominent position on the chart.
- (7) Where an obstacle free zone has not been established for a precision approach runway Category I, this shall be indicated.
- (8) Obstacles that penetrate the visual segment surface (VSS) shall be identified on the chart.

Note.— Guidance on the charting of VSS penetrations can be found in the Aeronautical Chart Manual (Doc 8697).

(c) Prohibited, restricted and danger areas

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

(d) Radio communication facilities and navigation aids:

- (1) Radio navigation aids required for the procedures together with their frequencies, identifications and track-defining characteristics, if any, shall be shown. In the case of a procedure in which more than one station is located on the final approach track, the facility to be used for track guidance for final approach shall be clearly identified. In addition, consideration shall be given to the elimination from the approach chart of those facilities that are not used by the procedure.
- (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 shall be shown and identified.
- (3) The final approach fix (or final approach point for an ILS approach procedure) shall be identified with its geographical coordinates in degrees, minutes and seconds.
- (4) Radio navigation aids that might be used in diversionary procedures together with their track-defining characteristics, if any, shall be shown or indicated on the chart.
- (5) Radio communication frequencies, including call signs, that are required for the execution of the procedures shall be shown.
- (6) When required by the procedures, the distance to the aerodrome from each radio navigation aid concerned with the final approach shall be shown to the nearest kilometre or nautical mile. When no track-defining aid indicates the bearing of the aerodrome, the bearing shall also be shown to the nearest degree.

(e) Minimum sector altitude or terminal arrival altitude:

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

(f) Portrayal of procedure tracks:

- (1) The plan view shall show the following information in the manner indicated:
 - i. the approach procedure track by an arrowed continuous line indicating the direction of flight;
 - ii. the missed approach procedure track by an arrowed broken line;
 - iii. any additional procedure track, other than those specified in i) and ii), by an arrowed dotted line;
 - iv. bearings, tracks, radials to the nearest degree and distances to the nearest two-tenths of a kilometre or tenth of a nautical mile or times required for the procedure;
 - v. where no track-defining aid is available, the magnetic bearing to the nearest degree to the aerodrome from the radio navigation aids concerned with the final approach;
 - vi. the boundaries of any sector in which visual manoeuvring (circling) is prohibited;
 - vii. where specified, the holding pattern and minimum holding altitude/height associated with the approach and missed approach;
 - viii. caution notes where required, prominently displayed on the face of the chart;
 - ix. an indication of “flyover” significant points.
- (2) The plan view shall show the distance to the aerodrome from each radio navigation aid concerned with the final approach.
- (3) A profile shall be provided normally below the plan view showing the following data:
 - i. the aerodrome by a solid block at aerodrome elevation;
 - ii. the profile of the approach procedure segments by an arrowed continuous line indicating the direction of flight;
 - iii. the profile of the missed approach procedure segment by an arrowed broken line and a description of the procedure;
 - iv. the profile of any additional procedure segment, other than those specified in ii) and iii), by an arrowed dotted line;
 - v. bearings, tracks, radials to the nearest degree and distances to the nearest two-tenths of a kilometre or tenth of a nautical mile or times required for the procedure;
 - vi. altitudes/heights required by the procedures, including transition altitude and procedure altitudes/heights, where established;
 - vii. limiting distance to the nearest kilometre or nautical mile on procedure turn, when specified;
 - viii. the intermediate approach fix or point, on procedures where no course reversal is authorized;
 - ix. a line representing the aerodrome elevation or threshold elevation, as appropriate, extended across the width of the chart including a distance scale with its origin at the runway threshold.
- (4) Heights required by procedures shall be shown in parentheses, using the height datum selected in accordance with (b) (5).
- (5) The profile view shall include a ground profile or a minimum altitude/height portrayal as follows:
 - i. a ground profile shown by a solid line depicting the highest elevations of the relief occurring within the primary area of the final approach segment. The

highest elevations of the relief occurring in the secondary areas of the final approach segment shown by a dashed line; or

- ii. minimum altitudes/heights in the intermediate and final approach segments indicated within bounded shaded blocks.

Note 1: For the ground profile portrayal, actual templates of the primary and secondary areas of the final approach segment are provided to the cartographer by the procedures specialist.

Note 2: The minimum altitude/height portrayal is intended for use on charts depicting non-precision approaches with a final approach fix.

(g) Aerodrome operating minima

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

(h) Supplementary information:

- (1) When the missed approach point is defined by:

- i. a distance from the final approach fix, or
- ii. a facility or a fix and the corresponding distance from the final approach fix,

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

- (2) When DME is required for use in the final approach segment, a table showing altitudes/heights for each 2 km or 1 NM, as appropriate, shall be shown. The table shall not include distances, which would correspond to altitudes/heights below the OCA/H.
- (3) For procedures in which DME is not required for use in the final approach segment but where a suitably located DME is available to provide advisory descent profile information, a table showing the altitudes/heights shall be included.
- (4) A rate of descent table shall be shown.
- (5) For non-precision approach procedures with a final approach fix, the final approach descent gradient to the nearest one-tenth of a per cent and, in parentheses, descent angle to the nearest one-tenth of a degree shall be shown.
- (6) For precision approach procedures and approach procedures with vertical guidance, the reference datum height to the nearest half metre or foot and the glide path/elevation/vertical path angle to the nearest one-tenth of a degree shall be shown.
- (7) When a final approach fix is specified at the final approach point for ILS, a clear indication shall be given whether it applies to the ILS, the associated ILS localizer only procedure, or both. In the case of MLS, a clear indication shall be given when an FAF has been specified at the final approach point.
- (8) If the final approach descent gradient/angle for any type of instrument approach procedure exceeds the maximum value specified in the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, Part I, Section 4, Chapter 5, a cautionary note shall be included.

(i) Aeronautical database requirements:

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

Note: Appropriate data are those provided by the procedures specialist.

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SUBPART N — VISUAL APPROACH CHART — ICAO

CAR 177.800 Function

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

CAR 177.805 Availability

The Visual Approach Chart — ICAO shall be made available in the manner prescribed in CAR-177.010 for all aerodromes used by international civil aviation where:

- (a) only limited navigation facilities are available; or
- (b) radio communication facilities are not available; or
- (c) no adequate aeronautical charts of the aerodrome and its surroundings at 1:500,000 or greater scale are available; or
- (d) visual approach procedures have been established.

CAR 177.810 Scale

- (a) The scale shall be sufficiently large to permit depiction of significant features and indication of the aerodrome layout.
- (b) The scale shall not be smaller than 1:500,000.
Note: A scale of 1:250,000 or 1:200,000 is preferred.
- (c) When an Instrument Approach Chart is available for a given aerodrome, the Visual Approach Chart shall be drawn to the same scale.

CAR 177.815 Format

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

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

CAR 177.820 Projection

- (a) A conformal projection on which a straight line approximates a great circle shall be used.
- (b) Graduation marks shall be placed at consistent intervals along the neat lines.

CAR 177.825 Identification

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

CAR 177.830 Culture and Topography

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

- (b) Geographical place names shall be included only when they are required to avoid confusion or ambiguity.
- (c) Shore lines, lakes, rivers and streams shall be shown.
- (d) Relief shall be shown in a manner best suited to the particular elevation and obstacle characteristics of the area covered by the chart.
- (e) When shown, spot elevations shall be carefully selected.

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

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

CAR 177.835 Magnetic Variation

The magnetic variation shall be shown.

CAR 177.840 Bearings, Tracks and Radials

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

CAR 177.845 Aeronautical Data

- (a) Aerodromes:

- (1) All aerodromes shall be shown by the runway pattern. Restrictions on the use of any landing direction shall be indicated. Where there is any risk of confusion between two neighboring aerodromes, this shall be indicated. Abandoned aerodromes shall be identified as abandoned.
- (2) The aerodrome elevation shall be shown in a prominent position on the chart.

- (b) Obstacles:

- (1) Obstacles shall be shown and identified.
- (2) The elevation of the top of obstacles shall be shown to the nearest (next higher) metre or foot.
- (3) The heights of obstacles above the aerodrome elevation shall be shown.
- (4) When the heights of obstacles are shown, the height datum shall be stated in a prominent position on the chart and the heights shall be given in parentheses on the chart.

- (c) Prohibited, restricted and danger areas:

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

- (d) Designated airspace:

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

- (e) Visual approach information:

- (1) Visual approach procedures shall be shown where applicable.
 - (2) Visual aids for navigation shall be shown as appropriate.
 - (3) Location and type of the visual approach slope indicator systems with their nominal approach slope angle(s), minimum eye height(s) over the threshold of the on-slope signal(s), and where the axis of the system is not parallel to the runway centre line, the angle and direction of displacement, i.e. left or right, shall be shown.
- (f) Visual approach information:
- (1) Visual approach procedures shall be shown where applicable.
 - (2) Visual aids for navigation shall be shown as appropriate.
 - (3) Location and type of the visual approach slope indicator systems with their nominal approach slope angle(s), minimum eye height(s) over the threshold of the on-slope signal(s), and where the axis of the system is not parallel to the runway centre line, the angle and direction of displacement, i.e. left or right, shall be shown.
- (g) Supplementary information
- (1) Radio navigation aids together with their frequencies and identifications shall be shown as appropriate.
 - (2) Radio communication facilities with their frequencies shall be shown as appropriate.

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SUBPART O — AERODROME/HELIPORT CHART — ICAO

CAR 177.860 Function

- (a) This chart shall provide flight crews with information which will facilitate the ground movement of aircraft:
 - (1) from the aircraft stand to the runway; and
 - (2) from the runway to the aircraft stand;
- (b) and helicopter movement:
 - (1) from the helicopter stand to the touchdown and lift-off area and to the final approach and take-off area;
 - (2) from the final approach and take-off area to the touchdown and lift-off area and to the helicopter stand;
 - (3) along helicopter ground and air taxiways; and
 - (4) along air transit routes;
- (c) it shall also provide essential operational information at the aerodrome/heliport.

CAR 177.865 Availability

- (a) The Aerodrome/Heliport Chart — ICAO shall be made available in the manner prescribed in CAR-177.010 for all aerodromes/heliports regularly used by international civil aviation.
- (b) The Aerodrome/Heliport Chart — ICAO shall be made available also, in the manner prescribed in CAR-177.010, for all other aerodromes/heliports available for use by international civil aviation.

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

CAR 177.870 Coverage and Scale

- (a) The coverage and scale shall be sufficiently large to show clearly all the elements listed in CAR-177.885 para (a).
- (b) A linear scale shall be shown.

CAR 177.875 Identification

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

CAR 177.880 Magnetic Variation.

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

CAR 177.885 Aerodrome/Heliport data.

(a) This chart shall show:

- (1) geographical coordinates in degrees, minutes and seconds for the aerodrome/heliport reference point;
- (2) elevations, to the nearest metre or foot, of the aerodrome/heliport and apron (altimeter checkpoint locations) where applicable; and for non-precision approaches, elevations and geoid undulations of runway thresholds and the geometric centre of the touchdown and lift-off area;
- (3) 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;
- (4) all runways including those under construction with designation number, length and width to the nearest metre, bearing strength, displaced thresholds, stop-ways, clearways, runway directions to the nearest degree magnetic, type of surface and runway markings;

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

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

Note: Bearing strengths or aircraft type restrictions may be shown in tabular form on the face or verso of the chart.

- (6) geographical coordinates in degrees, minutes and seconds for thresholds, geometric centre of touchdown and lift-off area and/or thresholds of the final approach and take-off area (where appropriate);
- (7) all taxiways, helicopter air and ground taxiways with type of surface, helicopter air transit routes, with designations, width, lighting, markings (including runway-holding positions and, where established, intermediate holding positions), stop bars, other visual guidance and control aids, and bearing strength or aircraft type restrictions where the bearing strength is less than that of the associated runways;

Note: Bearing strengths or aircraft type restrictions may be shown in tabular form on the face or verso of the chart.

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

Note: Additional information regarding hot spots may be shown in tabular form on the face or verso of the chart.

- (9) geographical coordinates in degrees, minutes, seconds and hundredths of seconds for appropriate taxiway centre line points and aircraft stands;
- (10) where established, standard routes for taxiing aircraft with their designators;
- (11) the boundaries of the air traffic control service;
- (12) position of runway visual range (RVR) observation sites;
- (13) approach and runway lighting;
- (14) 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;

- (15) relevant communication facilities listed with their channels and, if applicable, logon address;
- (16) obstacles to taxiing;
- (17) aircraft servicing areas and buildings of operational significance;
- (18) VOR checkpoint and radio frequency of the aid concerned;
- (19) any part of the depicted movement area permanently unsuitable for aircraft, clearly identified as such.

(b) In addition to the items in CAR-177.885 para (a) relating to heliports, the chart shall show:

- (1) heliport type;

Note: Heliport types are identified in ICAO Annex 14, Volume II, as surface-level, elevated or helideck.

- (2) touchdown and lift-off area including dimensions to the nearest metre, slope, type of surface and bearing strength in tonnes;
- (3) final approach and take-off area including type, true bearing to the nearest degree, designation number (where appropriate), length and width to the nearest metre, slope and type of surface;
- (4) safety area including length, width and type of surface;
- (5) helicopter clearway including length and ground profile;
- (6) obstacles including type and elevation of the top of the obstacles to the nearest (next higher) metre or foot;
- (7) visual aids for approach procedures, marking and lighting of final approach and take-off area, and of touchdown and lift-off area;
- (8) declared distances to the nearest metre for heliports, where relevant, including:
 - i. take-off distance available;
 - ii. rejected take-off distance available;
 - iii. landing distance available.

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SUBPART P — AERODROME GROUND MOVEMENT CHART — ICAO

CAR 177.900 Function

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

CAR 177.905 Availability

The Aerodrome Ground Movement Chart — ICAO shall be made available in the manner prescribed in CAR-177.010 where, due to congestion of information, details necessary for the ground movement of aircraft along the taxiways to and from the aircraft stands cannot be shown with sufficient clarity on the Aerodrome/Heliport Chart — ICAO.

CAR 177.910 Coverage and Scale

- (a) The coverage and scale shall be sufficiently large to show clearly all the elements listed in CAR-177.925.
- (b) A linear scale shall be shown.

CAR 177.915 Identification

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

CAR 177.920 Magnetic Variation

- (a) A True North arrow shall be shown.
- (b) Magnetic variation to the nearest degree and its annual change shall be shown.

Note: This chart need not be True North orientated.

CAR 177.925 Aerodrome Data

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

- (a) Apron elevation to the nearest metre or foot;
- (b) Aprons with aircraft stands, bearing strengths or aircraft type restrictions, lighting, marking and other visual guidance and control aids, where applicable, including location and type of visual docking guidance systems;
- (c) Geographical coordinates in degrees, minutes, seconds and hundredths of seconds for aircraft stands;
- (d) Taxiways with designations, width to the nearest metre, bearing strength or aircraft type restrictions where applicable, lighting, markings (including runway-holding positions and, where established, intermediate holding positions), stop bars, and other visual guidance and control aids;
- (e) Where established, hot spot locations with additional information properly annotated;

Note: Additional information regarding hot spots may be shown in tabular form on the face or verso of the chart.

- (f) Where established, standard routes for taxiing aircraft, with their designators;
- (g) Geographical coordinates in degrees, minutes, seconds and hundredths of seconds for appropriate taxiway centre line points;
- (h) The boundaries of the air traffic control service;
- (i) Relevant communication facilities listed with their channels and, if applicable, logon address;
- (j) Obstacles to taxiing;
- (k) Aircraft servicing areas and buildings of operational significance;
- (l) VOR checkpoint and radio frequency of the aid concerned;
- (m) Any part of the depicted movement area permanently unsuitable for aircraft, clearly identified as such.

SUBPART Q — AIRCRAFT PARKING/DOCKING CHART — ICAO

CAR 177.940 Function

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

CAR 177.945 Availability

The Aircraft Parking/Docking Chart — ICAO shall be made available in the manner prescribed in CAR-177.010 where, due to the complexity of the terminal facilities, the information cannot be shown with sufficient clarity on the Aerodrome/Heliport Chart — ICAO or on the Aerodrome Ground Movement Chart — ICAO.

CAR 177.950 Coverage and Scale

- (a) The coverage and scale shall be sufficiently large to show clearly all the elements listed in CAR-177.965.
- (b) A linear scale shall be shown.

CAR 177.955 Identification

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

CAR 177.960 Magnetic Variation

- (a) A True North arrow shall be shown.
- (b) Magnetic variation to the nearest degree and its annual change shall be shown.

Note: This chart need not be True North orientated.

CAR 177.965 Aerodrome Data

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

- (a) Apron elevation to the nearest 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;

Note: 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) VOR checkpoint and radio frequency of the aid concerned;
- (l) Any part of the depicted movement area permanently unsuitable for aircraft, clearly identified as such.

SUBPART R — WORLD AERONAUTICAL CHART — ICAO 1:1,000,000**CAR 177.980 Function**

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

Note: This chart may also serve:

a) as a basic aeronautical chart:

- 1) when highly specialized charts lacking visual information do not provide essential data;*
- 2) to provide complete world coverage at a constant scale with a uniform presentation of planimetric data;*
- 3) in the production of other charts required by international civil aviation;*

b) as a pre-flight planning chart.

CAR 177.985 Availability

- (a) The World Aeronautical Chart — ICAO 1:1,000,000 shall be made available in the manner prescribed in CAR-177.010 for all areas delineated in Appendix 5.

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

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

CAR 177.990 Scales

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

- (1) Kilometres;
- (2) nautical miles;

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

- (b) The length of the linear scales shall represent at least 200 km (110 NM).
(c) A conversion scale (metres/feet) shall be shown in the margin.

CAR 177.995 Format

- (a) The title and marginal notes shall be in one of the working languages of ICAO.

Note: The language of the publishing country may be used in addition to the ICAO working language.

- (b) The information regarding the number of the adjoining sheets and the unit of measurement to express elevations shall be so located as to be clearly visible when the sheet is folded.
(c) The method of folding shall be as follows: Fold the chart on the long axis near the mid-parallel of latitude, face out, with the bottom part of the chart face upward. Fold inward near the meridian, and fold both halves backward in accordion folds.

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

Note 1: The area covered by a sheet may vary from the lines shown to satisfy particular requirements.

Note 2: The value of adopting identical sheet lines for ICAO 1:1,000,000 Charts and the corresponding sheet of the International Map of the World (IMW), provided aeronautical requirements are not compromised, is recognized.

- (e) Overlaps shall be provided by extending the chart area on the top and right side beyond the area given on the index. This overlap area shall contain all aeronautical, topographical, hydrographical and cultural information. The overlap shall extend up to 28 km (15 NM), if possible, but in any case from the limiting parallels and meridians of each chart to the neat line.

CAR 177.1000 Projection

- (a) The projections shall be as follows:

- (1) between the Equator and 80° latitude: the Lambert conformal conic projection, in separate bands for each tier of charts. The standard parallels for each 4° band shall be 40'south of the northern parallel and 40'north of the southern parallel;
- (2) between 80° and 90° latitude: the Polar stereographic projection with scale matching that of the Lambert conformal conic projection at latitude 80°, except that in the northern hemisphere the Lambert conformal conic projection may be used between 80° and 84° latitude and the Polar stereographic projection between 84° and 90° with the scales matching at 84° North.

- (b) Graticules and graduations are shown as follows:

- (1) Parallels:

Latitude	Distance between parallels	Graduations on parallels
0° to 72°	30'	1'
72° to 84°	30'	5'
84° to 89°	30'	1°
89° to 90°	30'	5°

(Only on degree parallels from 72° to 89°)

(2) Meridians:

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

- (c) The graduation marks at 1′ and 5′ intervals shall extend away from the Greenwich Meridian and from the Equator. Each 10′ interval shall be shown by a mark on both sides of the graticule line.
- (d) The length of the graduation marks shall be approximately 1.3 mm (0.05 in) for the 1′ intervals, and 2 mm (0.08 in) for the 5′ intervals and 2 mm (0.08 in) extending on both sides of the graticule line for the 10′ intervals.
- (e) All meridians and parallels shown shall be numbered in the borders of the chart. In addition, each parallel shall be numbered within the body of the chart in such a manner that the parallel can be readily identified when the chart is folded.
- Note: Meridians may be numbered within the body of the chart.*
- (f) The name and basic parameters of the projection shall be indicated in the margin.

CAR 177.1005 Identification

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

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

CAR 177.1010 Culture and Topography

(a) Built-up areas:

- (1) Cities, towns and villages shall be selected and shown according to their relative importance to visual air navigation.
- (2) Cities and towns of sufficient size shall be indicated by the outline of their built-up areas and not of their established city limits.

(b) Railroads:

- (1) All railroads having landmark value shall be shown.

Note 1: In congested areas, some railroads may be omitted in the interest of legibility.

Note 2: Railroads may be named where space permits.

- (2) Important tunnels shall be shown.

Note: A descriptive note may be added.

(c) Highways and roads:

- (1) Road systems shall be shown in sufficient detail to indicate significant patterns from the air.
- (2) Roads shall not be shown in built-up areas unless they can be distinguished from the air as definite landmarks.

Note: The numbers or names of important highways may be shown.

(d) Landmarks:

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

Note: Descriptive notes may be added.

(e) Political boundaries:

International boundaries shall be shown. Un-demarcated and undefined boundaries shall be distinguished by descriptive notes.

(f) Hydrography:

- (1) All water features compatible with the scale of the chart comprising shore lines, lakes, rivers and streams(including those non-perennial in nature), salt lakes, glaciers and ice caps shall be shown.
- (2) The tint covering large open water areas shall be kept very light.

Note: A narrow band of darker tone may be used along the shore line to emphasize this feature.

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

Note: Groups of rocks may be shown by a few representative rock symbols within the area.

(g) Contours:

- (1) Contours shall be shown. The selection of intervals shall be governed by the requirement to depict clearly the relief features required in air navigation.
- (2) The values of the contours used shall be shown.

(h) Hypsometric tints:

- (1) When hypsometric tints are used, the range of elevations for the tints shall be shown.
- (2) The scale of the hypsometric tints used on the chart shall be shown in the margin.

(i) Spot elevations:

- (1) Spot elevations shall be shown at selected critical points. The elevations selected shall always be the highest in the immediate vicinity and shall generally indicate the top of a peak, ridge, etc. Elevations in valleys and at lake surface levels which are of special value to the aviator shall be shown. The position of each selected elevation shall be indicated by a dot.
- (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 in any sheet shall be cleared of hypsometric tinting.
- (j) Incomplete or unreliable relief:
 - (1) Areas that have not been surveyed for contour information shall be labelled “Relief data incomplete”.
 - (2) Charts on which spot elevations are generally unreliable shall bear a warning note prominently displayed on the face of the chart in the colour used for aeronautical information, as follows: “Warning — The reliability of relief information on this chart is doubtful and elevations shall be used with caution.”
- (k) Escarpments:

Escarpments shall be shown when they are prominent landmarks or when cultural detail is very sparse.
- (l) Wooded areas:
 - (1) Wooded areas shall be shown.
 - (2) Where shown, the approximate extreme northern or southern limits of tree growth shall be indicated by a dashed black line and shall be appropriately labelled.
- (m) Date of topographic information. The date of latest information shown on the topographic base shall be indicated in the margin.

CAR 177.1015 Magnetic Variation

- (a) Isogonic lines shall be shown.
- (b) The date of the isogonic information shall be indicated in the margin.

CAR 177.1020 Aeronautical Data

- (a) General:

Aeronautical data shown shall be kept to a minimum consistent with the use of the chart for visual navigation and the revision cycle.
- (b) Aerodromes:
 - (1) Land and water aerodromes and heliports shall be shown with their names, to the extent that they do not produce undesirable congestion on the chart, priority being given to those of greatest aeronautical significance.
 - (2) 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.
 - (3) Abandoned aerodromes which are still recognizable as aerodromes from the air shall be shown and identified as abandoned.
- (c) Obstacles:
 - (1) Obstacles shall be shown.

Note: Objects of a height of 100 m (300 ft) or more above ground are normally regarded as obstacles.

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

(d) Prohibited, restricted and danger areas:

Prohibited (P), restricted (R) and danger (D) areas shall be shown.

(e) Air traffic services system:

(1) Significant elements of the air traffic services system including, where practicable, control zones, aerodrome traffic zones, control areas, flight information regions and other airspaces in which VFR flights operate shall be shown together with the appropriate class of airspace.

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

Note: ADIZ procedures may be described in the chart legend.

(f) Radio navigation aids:

Radio navigation aids shall be shown by the appropriate symbol and named, but excluding their frequencies, coded designators, times of operation and other characteristics unless any or all of this information which is shown is kept up to date by means of new editions of the chart.

(g) Supplementary information:

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

(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.

SUBPART S — (INTENTIONALLY LEFT BLANK)ⁱ

(i) Reserved for “AERONAUTICAL CHART — ICAO 1:500,000”.

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SUBPART T — (INTENTIONALLY LEFT BLANK)ⁱ

(i) Reserved for “AERONAUTICAL NAVIGATION CHART — ICAO SMALL SCALE”

SUBPART U —(INTENTIONALLY LEFT BLANK)ⁱ

(i) Reserved for “PLOTting CHART — ICAO”.

SUBPART V — (INTENTIONALLY LEFT BLANK)ⁱ

(i) Reserved for “ELECTRONIC AERONAUTICAL CHART DISPLAY — ICAO”.

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SUBPART W — ATC SURVEILLANCE MINIMUM ALTITUDE CHART — ICAO**CAR 177.1240 Function**

- (a) This supplementary chart shall provide information that will enable flight crews to monitor and cross-check altitudes assigned by a controller using an ATS surveillance system.

Note: The objectives of the air traffic control service as prescribed in ICAO Annex 11 do not include prevention of collision with terrain. The procedures prescribed in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444) do not relieve pilots of their responsibility to ensure that any clearances issued by air traffic control units are safe in this respect. When an IFR flight is vectored or is given a direct routing which takes the aircraft off an ATS route, the PANS-ATM, Chapter 8, 8.6.5.2, applies.

- (b) A note indicating that the chart may only be used for cross-checking of altitudes assigned while the aircraft is identified shall be prominently displayed on the face of the chart.

CAR 177.1245 Availability

The ATC Surveillance Minimum Altitude Chart — ICAO shall be made available, in the manner prescribed in CAR-177.010, where vectoring procedures are established and minimum vectoring altitudes cannot be shown adequately on the Area Chart — ICAO, Standard Departure Chart — Instrument (SID) — ICAO or Standard Arrival Chart — Instrument (STAR) — ICAO.

CAR 177.1250 Coverage and Scale

- (a) The coverage of the chart shall be sufficient to effectively show the information associated with vectoring procedures.
- (b) The chart shall be drawn to scale.
- (c) The chart shall be drawn to the same scale as the associated Area Chart — ICAO.

CAR 177.1255 Projection

- (a) A conformal projection on which a straight line approximates a geodesic line shall be used.
- (b) Graduation marks shall be placed at consistent intervals along the neat lines, as appropriate.

CAR 177.1260 Identification

The chart shall be identified by the name of the aerodrome for which the vectoring procedures are established or, when procedures apply to more than one aerodrome, the name associated with the airspace portrayed.

Note: The name may be that of the city which the aerodrome serves or, when the procedures apply to more than one aerodrome, that of the air traffic services centre or the largest city or town situated in the area covered by the chart.

CAR 177.1265 Culture and Topography

- (a) Generalized shorelines of all open water areas, large lakes and rivers shall be shown except where they conflict with data more applicable to the function of the chart.
- (b) Appropriate spot elevations and obstacles shall be shown.

Note: Appropriate spot elevations and obstacles are those provided by the procedures specialist.

CAR 177.1270 Magnetic Variation

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

CAR 177.1275 Bearings, Tracks and Radials

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

CAR 177.1280 Aeronautical Data

- (a) Aerodromes:

- (1) All aerodromes that affect the terminal routings shall be shown. Where appropriate, a runway pattern symbol shall be used.
- (2) The elevation of the primary aerodrome to the nearest metre or foot shall be shown.

- (b) Prohibited, restricted and danger areas:

Prohibited (P), restricted (R) and danger (D) areas shall be depicted with their identification.

- (c) Air traffic services system:

- (1) The chart shall show components of the established air traffic services system including:
 - i. relevant radio navigation aids together with their identifications;
 - ii. lateral limits of relevant designated airspace;
 - iii. relevant significant points associated with standard instrument departure and arrival procedures;

Note: Routes used in the vectoring of aircraft to and from the significant points may be shown.

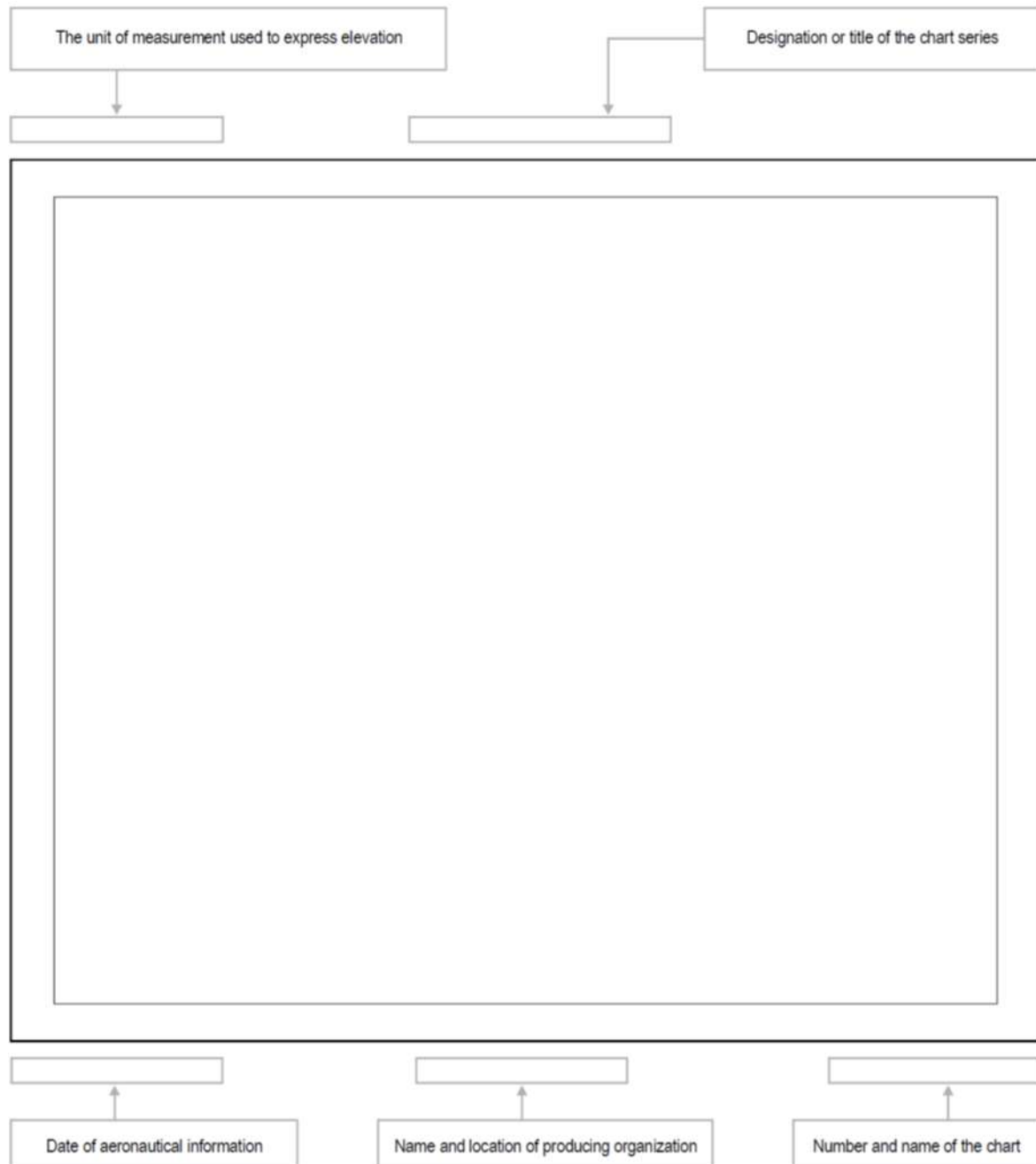
- iv. transition altitude, where established;
- v. information associated with vectoring including:
 - minimum vectoring altitudes to the nearest higher 50 m or 100 ft, clearly identified;
 - lateral limits of minimum vectoring altitude sectors normally defined by bearings and radials to/from radio navigation aids to the nearest degree or, if not practicable, geographical coordinates in degrees, minutes and seconds and shown by heavy lines so as to clearly differentiate between established sectors;

Note: In congested areas, geographical coordinates may be omitted in the interest of legibility.

- distance circles at 20-km or 10-NM intervals or, when practicable, 10-km or 5-NM intervals shown as fine dashed lines with the radius indicated on the circumference and centred on the identified aerodrome main VOR radio navigation aid or, if not available, on the aerodrome/heliport reference point;
 - notes concerning correction for low temperature effect, as applicable;
 - vi. communications procedures including call sign(s) and channel(s) of the ATC unit(s) concerned.
- (2) A textual description of relevant communication failure procedures shall be provided and shall, whenever feasible, be shown on the chart or on the same page that contains the chart.

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Appendix 1 – Marginal Note Layout



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Appendix 2 – ICAO Charts & Symbols

1. CATEGORY INDEX

	<i>Symbol No.</i>
TOPOGRAPHY (1–18)	
Approximate contours	2
Areas not surveyed for contour information or relief data incomplete	18
Bluff, cliff or escarpment.....	4
Coniferous trees.....	15
Contours	1
Gravel	8
Highest elevation on chart	12
Lava flow	5
Levee or esker.....	9
Mountain pass.....	11
Other trees	16
Palms	17
Relief shown by hachures.....	3
Sand area	7
Sand dunes.....	6
Spot elevation (of doubtful accuracy).....	14
Spot elevation	13
Unusual land features appropriately labelled.....	10
HYDROGRAPHY (19–46)	
Abandoned canal	30
Canal.....	29
Charted isolated rock	44
Coral reefs and ledges.....	22
Danger line (2 m or one fathom line)	43
Dry lake bed	39
Falls	28
Glaciers and ice caps	42
Lakes (non-perennial)	32
Lakes (perennial)	31
Large river (perennial)	23
Rapids.....	27
Reservoir.....	38
Rice field	36
Rivers and streams (non-perennial)	25
Rivers and streams (unsurveyed)	26
Rock awash.....	45
Salt lake	33
Salt pans (evaporator)	34

	<i>Symbol No.</i>
Shoals	41
Shore line (reliable)	19
Shore line (unreliable)	20
Small river (perennial)	24
Spring, well or water hole.....	37
Swamp	35
Tidal flats.....	21
Unusual water features appropriately labelled.....	46
Wash.....	40
 CULTURE (47–83)	
<i>Built-up Areas (47–50)</i>	
Buildings	50
City or large town.....	47
Town.....	48
Village	49
<i>Railroads (51–56)</i>	
Railroad (single track)	51
Railroad (two or more tracks).....	52
Railroad (under construction).....	53
Railroad bridge.....	54
Railroad station.....	56
Railroad tunnel	55
<i>Highways and Roads (57–62)</i>	
Dual highway	57
Primary road.....	58
Road bridge	61
Road tunnel.....	62
Secondary road.....	59
Trail	60
<i>Miscellaneous (63–83)</i>	
Boundaries (international)	63
Church	80
Coast guard station	73
Dam	67
Fence	65
Ferry	68
Forest ranger station	76
Fort	79
Lookout tower	74
Mine	75
Mosque	81
Nuclear power station.....	72
Oil or gas field.....	70
Outer boundaries	64
Pagoda.....	82

*Symbol
No.*

Pipeline.....	69
Race track or stadium.....	77
Ruins.....	78
Tank farms.....	71
Telegraph or telephone line (when a landmark)	66
Temple.....	83

AERODROMES (84–95)

Abandoned or closed aerodrome	91
Aerodrome for use on charts on which aerodrome classification is not required	93
Civil — Land.....	84
Civil — Water	85
Emergency aerodrome or aerodrome with no facilities	90
Heliport.....	94
Joint civil and military — Land.....	88
Joint civil and military — Water	89
Military — Land.....	86
Military — Water	87
Runway pattern in lieu of the aerodrome symbol.....	95
Sheltered anchorage.....	92
 <i>Aerodrome data in abbreviated form which may be in association with aerodrome symbols.....</i>	 96
 <i>Aerodrome symbols for Approach Charts (97 and 98)</i>	
Aerodromes affecting the traffic pattern on the aerodrome on which the procedure is based.....	97
The aerodrome on which the procedure is based.....	98

RADIO NAVIGATION AIDS (99–110)

Basic radio navigation aid symbol.....	99
Collocated VOR and DME radio navigation aids — VOR/DME	103
Collocated VOR and TACAN radio navigation aids — VORTAC	107
Compass rose.....	110
Distance measuring equipment — DME.....	102
DME distance	104
Instrument landing system — ILS.....	108
Non-directional radio beacon — NDB.....	100
Radio marker beacon	109
UHF tactical air navigation aid — TACAN.....	106
VHF omnidirectional radio range — VOR.....	101
VOR radial.....	105

AIR TRAFFIC SERVICES (111–144)

Advisory airspace — ADA.....	115
Advisory route — ADR.....	118
Aerodrome traffic zone — ATZ	112
Air defence identification zone — ADIZ	117
Altitudes/flight levels	125

*Symbol
No.*

ATS/MET reporting point — MRP	123
Change-over point — COP	122
Control area, Airway, Controlled route	113
Control zone — CTR	116
Final approach fix — FAF	124
Flight information region — FIR	111
Reporting and Fly-by/Flyover functionality	121
Scale-break (on ATS route)	120
Uncontrolled route	114
Visual flight path	119

Airspace Classifications (126 and 127)

Aeronautical data in abbreviated form to be used in association with airspace classification symbols ..	127
Airspace classifications	126

Airspace Restrictions (128 and 129)

International boundary closed to passage of aircraft except through air corridor	129
Restricted airspace (prohibited, restricted or danger area)	128

Obstacles (130–136)

Elevation of top/Height above specified datum	136
Exceptionally high obstacle — lighted (optional symbol)	135
Exceptionally high obstacle (optional symbol)	134
Group obstacles	132
Lighted group obstacles	133
Lighted obstacle	131
Obstacle	130

Miscellaneous ((137–141)

Isogonic line or isogonal	138
Ocean station vessel (normal position)	139
Prominent transmission line	137
Wind turbine — unlighted and lighted	140
Wind turbines — minor group and group in major area, lighted	141

Visual Aids (142–144)

Aeronautical ground light	143
Lightship	144
Marine light	142

SYMBOLS FOR AERODROME/HELIPORT CHARTS (145–161)

Aerodrome reference point	151
Hard surface runway	145
Helicopter alighting area on an aerodrome	150
Hot spot	161
Intermediate holding position	160
Landing direction indicator (lighted)	156
Landing direction indicator (unlighted)	157
Obstacle light	155

*Symbol
No.*

Pierced steel plank or steel mesh runway	146
Point light	154
Runway-holding position	159
Runway visual range (RVR) observation site.....	153
Stop bar.....	158
Stopway	148
Taxiways and parking areas.....	149
Unpaved runway	147
VOR check-point.....	152

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

Building or large structure.....	164
Clearway.....	170
Escarpment	168
Pole, tower, spire, antenna, etc.	163
Railroad	165
Stopway	169
Terrain penetrating obstacle plane.....	167
Transmission line or overhead cable	166
Tree or shrub.....	162

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

Collocated DME fix and marker beacon	180
Collocated radio navigation aid and marker beacon.....	178
DME fix.....	179
Holding pattern.....	173
Minimum sector altitude.....	171
Missed approach track	174
Radio marker beacon	177
Radio navigation aid.....	176
Runway.....	175
Terminal arrival altitude	172

2. ALPHABETICAL INDEX

	<i>Symbol No.</i>
A	
Abandoned canal	30
Advisory airspace — ADA.....	115
Advisory route — ADR.....	118
Aerodrome data in abbreviated form.....	96
Aerodrome/Heliport Charts	145-161
Aerodrome Obstacle Charts.....	162-170
Aerodrome reference point.....	151
Aerodromes	84-98
Abandoned or closed aerodrome	91
Emergency aerodrome or aerodrome with no facilities.....	90
Aerodrome symbols for Approach Charts.....	97, 98
Aerodrome traffic zone — ATZ.....	112
Aeronautical ground light.....	143
Air defence identification zone — ADIZ	117
Airspace, advisory — ADA.....	115
Airspace classifications	126, 127
Airspace (prohibited, restricted or danger area), restricted, and common boundary of two areas.....	128
Airspace restrictions	128, 129
Air Traffic Services	111-144
Airway — AWY.....	113
Altitude	
Minimum sector	171
Terminal arrival.....	172
Altitudes/flight levels	125
Anchorage, sheltered	92
Antenna	163
Areas	
Built-up.....	47-50
Not surveyed for contour information or relief data incomplete	18
Prohibited	128
Restricted.....	128
ATS/MET reporting point — MRP (compulsory, on request)	123
B	
Bluff.....	4
Boundaries	
International.....	63
Outer.....	64
Building (on Aerodrome Obstacle Charts)	164
Buildings.....	50

	<i>Symbol No.</i>
E	
Electronic chart symbols	108, 143, 171-180
Elevation (of doubtful accuracy), spot.....	14
Elevation, spot	13
Escarpment	4
Escarpment (on Aerodrome Obstacle Charts)	168
Esker	9
F	
Falls	28
Fence	65
Ferry	68
Final approach fix — FAF.....	124
Flight information region — FIR	111
Flight levels	125
Forest ranger station	76
Fort	79
G	
Gas field.....	70
Glaciers.....	42
Gravel	8
H	
Hard surface runway.....	145
Helicopter alighting area on an aerodrome	150
Heliport.....	94
Highest elevation on chart	12
Highway, dual.....	57
Highways and roads.....	57-62
Holding pattern.....	173
Hot spot	161
Hydrography.....	19-46
I	
Ice caps	42
Instrument landing system — ILS.....	108
Intermediate holding position	160
International boundary closed to passage of aircraft except through air corridor.....	129
Intersection INT.....	121
Isogonic line or isogonal.....	138

*Symbol
No.***L**

Lake bed, dry	39
Lakes	
Non-perennial	32
Perennial	31
Land	
Civil	84
Military	86
Joint civil and military	88
Land features appropriately labelled, unusual	10
Landing direction indicator	
Lighted	156
Unlighted	157
Large river (perennial)	23
Large structure	164
Lava flow	5
Ledges	22
Levee	9
Lightship	144
Lookout tower	74

M

Marine light	142
Mine	75
Minimum sector altitude — MSA	171
Miscellaneous symbols	
Air Traffic Services	137-141
Culture	63-83
Missed approach track	174
Mosque	81
Mountain pass	11

N

NDB	121
Non-directional radio beacon — NDB	100
Nuclear power station	72

O

Obstacle light	155
Obstacles	130-136
Ocean station vessel	139
Oil field	70
Overhead cable	166

*Symbol
No.*

P

Pagoda	82
Palms	17
Parking areas	149
Pierced steel plank or steel mesh runway	146
Pipeline	69
Point light	154
Pole	163
Power station, nuclear	72
Primary road	58
Prohibited area	128
Prominent transmission line	137

R

Race track	77
Radio marker beacon	109, 177
Radio navigation aid	176
Basic	99
Collocated radio navigation aid and marker beacon	178
Collocated VOR and DME	103
Collocated VOR and TACAN	107
Radio navigation aids	99-110, 176, 178
Railroad (on Aerodrome Obstacle Charts)	165
Railroads (Culture)	51-56
Rapids	27
Relief data incomplete	18
Relief shown by hachures	3
Reporting and fly-by/flyover functionality	121
Reservoir	38
Restricted airspace (prohibited, restricted or danger area) and common boundary of two areas	128
Restricted area	128
Rice field	36
River	
(Perennial), small	24
(Perennial), large	23
Rivers and streams	
Non-perennial	25
Unsurveyed	26
Road bridge	61
Road, primary	58
Road, secondary	59
Roads (Highways and Roads)	57-62
Road tunnel	62
Rock awash	45
Rock, charted isolated	44

	<i>Symbol No.</i>
Route	
Advisory — ADR.....	118
Controlled.....	113
Uncontrolled.....	114
Ruins.....	78
Runway.....	175
Hard surface	145
Unpaved	147
Runway-holding position	159
Runway visual range (RVR) observation site.....	153
 S	
Salt lake	33
Salt pans (evaporator)	34
Sand area	7
Sand dunes.....	6
Scale-break (on ATS route)	120
Secondary road	59
Sheltered anchorage.....	92
Shoals	41
Shore line	
Reliable.....	19
Unreliable	20
Shrub	162
Small river (perennial).....	24
Spire.....	163
Spot elevation	13
Spot elevation (of doubtful accuracy).....	14
Spring (perennial or intermittent)	37
Stadium.....	77
Steel mesh runway	146
Steel plank, pierced.....	146
Stop bar.....	158
Stopway — SWY (on Aerodrome/Heliport Charts)	148
Stopway — SWY (on Aerodrome Obstacle Charts)	169
Streams	25, 26
Structure, large	164
Swamp	35
 T	
TACAN	121
TACAN (UHF tactical air navigation aid)	106, 110
Tank farms.....	71
Taxiways.....	149
Telegraph or telephone line (when a landmark)	66
Temple.....	83

	<i>Symbol No.</i>
Terminal arrival altitude — TAA	172
Terrain penetrating obstacle plane	167
Tidal flats	21
Topography	1-18
Tower	
Lookout	74
On Aerodrome Obstacle Charts	163
Town	48
Town, large	47
Trail	60
Transmission line	
On Aerodrome Obstacle Charts	166
Prominent	137
Tree	
Coniferous	15
On Aerodrome Obstacle Charts	162
Other	16

U

UHF tactical air navigation aid — TACAN	106, 110
Uncontrolled route	114
Unpaved runway	147
Unusual land features appropriately labelled	10
Unusual water features appropriately labelled	46

V

VFR reporting point	121
VHF omnidirectional radio range — VOR	101, 110
Village	49
Visual aids	142-144
Visual flight path	119
VOR	121
VOR check-point	152
VOR/DME	121
VOR/DME (collocated VOR and DME radio navigation aids)	103
VOR radial	105
VORTAC	121
VORTAC (collocated VOR and TACAN radio navigation aids)	107
VOR (VHF omnidirectional radio range)	101

	<i>Symbol No.</i>
W	
Wash.....	40
Water	
Civil.....	85
Military.....	87
Joint civil and military.....	89
Water features appropriately labelled, unusual.....	46
Water hole (perennial or intermittent)	37
Waypoint — WPT	121
Well (perennial or intermittent)	37
Wind turbine, unlighted and lighted	140
Wind turbines, minor group and group in major area, lighted.....	141

TOPOGRAPHY

1	Contours		8	Gravel		12	Highest elevation on chart	Alternative	17456
2	Approximate contours		9	Levee or esker	Alternative	13	Spot elevation		.6397 .8975
3	Relief shown by hachures		10	Unusual land features appropriately labelled	 	14	Spot elevation (of doubtful accuracy)		.6370±
4	Bluff, cliff or escarpment		11	Mountain pass		15	Coniferous trees		
5	Lava flow					16	Other trees		
6	Sand dunes					17	Palms		
7	Sand area								
18	Areas not surveyed for contour information or relief data incomplete								Caution

HYDROGRAPHY

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

CULTURE

BUILT-UP AREAS

47	City or large town	
48	Town	
49	Village	
50	Buildings	

HIGHWAYS AND ROADS

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

MISCELLANEOUS (Cont.)

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

RAILROADS

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

MISCELLANEOUS

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

AERODROMES

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

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

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

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:










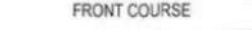

















AERODROMES (Cont.)
AERODROME DATA IN ABBREVIATED FORM WHICH MAY BE
IN ASSOCIATION WITH AERODROME SYMBOLS
 (Reference: 16.9.2.2)

96	<div style="text-align: center;"> <p>Name of aerodrome</p> <p>LIVINGSTONE</p> <p>357 L H 95</p> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;"> <p>Elevation given in the units of measurement (metres or feet) selected for use on the chart</p> </div> <div style="width: 30%;"> <p>Length of longest runway in hundreds of metres or feet (whichever unit is selected for use on the chart)</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;"> <p>Minimum lighting – obstacles, boundary or runway lights and lighted wind indicator or landing direction indicator</p> </div> <div style="width: 30%;"> <p>Runway hard surfaced, normally all weather</p> </div> </div> <p style="text-align: center; font-size: small;">Note.— A dash (–) is to be inserted where L or H do not apply.</p>
----	--

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.			107	Collocated VOR and TACAN radio navigation aids	VORTAC									
100	Non-directional radio beacon	NDB		108	Instrument landing system	ILS	PLAN VIEW								
101	VHF omnidirectional radio range	VOR					Electronic								
102	Distance measuring equipment	DME					FRONT COURSE								
103	Collocated VOR and DME radio navigation aids	VOR/DME					BACK COURSE								
104	DME distance	Distance in kilometres (nautical miles) to DME → 15 km Identification of radio navigation aid → KAV		109	Radio marker beacon		PROFILE								
105	VOR radial	Radial bearing from, and identification of, VOR R 090 KAV					Electronic								
106	UHF tactical air navigation aid	TACAN					GLIDE PATH								
				Note.— Marker beacon may be shown by outline, or stipple, or both.											
110	Compass rose To be orientated on the chart in accordance with the alignment of the station (normally Magnetic North)			Compass rose to be used as appropriate in combination with the following symbols:											
				<table><tr><td>VOR</td><td></td></tr><tr><td>VOR/DME</td><td></td></tr><tr><td>TACAN</td><td></td></tr><tr><td>VORTAC</td><td></td></tr></table>				VOR		VOR/DME		TACAN		VORTAC	
VOR															
VOR/DME															
TACAN															
VORTAC															
Note.— Additional points of compass may be added as required.															

Note: Guidance material on the presentation of radio navigation aid data is given in ICAO Doc 8697 Aeronautical Charts Manual.

AIR TRAFFIC SERVICES

111	Flight information region	FIR		117	Air defence identification zone	ADIZ	
112	Aerodrome traffic zone	ATZ		118	Advisory route	ADR	
113	Control area Airway Controlled route	CTA AWY		119	Visual flight path		
114	Uncontrolled route			120	Scale-break (on ATS route)		
115	Advisory airspace	ADA					
116	Control zone	CTR					

		On request fly-by	Compulsory fly-by	On request flyover	Compulsory flyover
121	Reporting and fly-by/flyover functionality				
	VFR reporting point				
	Intersection INT				
	VORTAC				
	TACAN				
	VOR				
	VOR/DME				
	NDB				
	Waypoint WPT				
Note.— See 2.4.4					

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

AIR TRAFFIC SERVICES (cont.)

125	Altitudes/flight levels	Altitude/flight level "window"	<u>17 000</u> <u>10 000</u>	<u>FL 220</u> <u>10 000</u>
		"At or above" altitude/flight level	<u>7 000</u>	<u>FL 70</u>
		"At or below" altitude/flight level	<u>5 000</u>	<u>FL 50</u>
		"Mandatory" altitude/flight level	<u>3 000</u>	<u>FL 30</u>
		"Recommended" procedure altitude/flight level	5 000	FL 50
		"Expected" altitude	Expect 5 000	Expect FL 50
Note.— For use only on SID and STAR charts. Not intended for depiction of minimum obstacle clearance altitude.				

AIRSPACE CLASSIFICATIONS

126	Airspace classifications		<p>Aeronautical data in abbreviated form to be used in association with airspace classification symbols:</p>
		<p>127</p> <p>Alternative</p> <p>TMA DONLON 119.1 C 200m AGL - FL 245</p> <p>Type Name or call sign Radio frequency(ies) Airspace classification Vertical limits</p> <p>C TMA DONLON FL 245 200m AGL 119.1</p>	

AIRSPACE RESTRICTIONS

128	Restricted airspace (prohibited, restricted or danger area)		Common boundary of two areas	
129	International boundary closed to passage of aircraft except through air corridor			

OBSTACLES

130	Obstacle		134	Exceptionally high obstacle (optional symbol)	
131	Lighted obstacle		135	Exceptionally high obstacle — lighted (optional symbol)	
132	Group obstacles		Note.— For obstacles having a height of the order of 300 m (1 000 ft) above terrain.		
133	Lighted group obstacles		136	<p>Elevation of top (italics) → 52</p> <p>→ (15) Height above specified datum (upright type in parentheses)</p>	

MISCELLANEOUS

137	Prominent transmission line		140	Wind turbine — unlighted and lighted	
138	Isogonic line or isogonal		141	Wind turbines — minor group and group in major area, lighted	
139	Ocean station vessel (normal position)				

VISUAL AIDS

142	Marine light <i>Note 2:— Characteristics are to be indicated as follows:</i>		<i>Note 1:— Marine alternating lights are red and white unless otherwise indicated. Marine lights are white unless colours are stated.</i>	Fl G Gp	Flashing Green Group	Occ R SEC	Occulting Red Sector	sec (U) W	Second Unwatched 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)	
149	Taxiways and parking areas		157	Landing direction indicator (unlighted)	
150	Helicopter alighting area on an aerodrome		158	Stop bar	
151	Aerodrome reference point ARP		159	Runway-holding position <i>Note:— For application, see Annex 14, Volume I, 5.2.10.</i>	
152	VOR check-point		160	Intermediate holding position <i>Note:— For application, see Annex 14, Volume I, 5.2.11.</i>	
153	Runway visual range (RVR) observation site		161	Hot spot <i>Note:— Hot spot location to be circled.</i>	

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

	Plan	Profile		Plan	Profile
162	Tree or shrub		167	Terrain penetrating obstacle plane	
163	Pole, tower, spire, antenna, etc.		168	Escarpment	
164	Building or large structure		169	Stopway SWY	
165	Railroad		170	Clearway CWY	
166	Transmission line or overhead cable				

ADDITIONAL SYMBOLS FOR USE ON PAPER AND ELECTRONIC CHARTS

PLAN VIEW		Electronic
171	Minimum sector altitude <i>Note.— This symbol may be modified to reflect particular sector shapes.</i>	MSA OED VOR
172	Terminal arrival altitude <i>Note.— This symbol may be modified to reflect particular TAA shapes.</i>	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)	

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Appendix 3 – Colour Guide








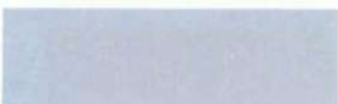
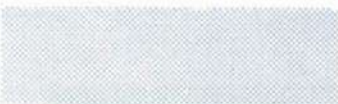



CHART SYMBOLS		
Culture, except highways and roads; outlines of large cities, grids and graticules; spot elevations; danger lines and off-shore rocks; names and lettering except for aeronautical and hydrographic features	BLACK	
Built-up areas of cities	BLACK Stipple	
Highways and roads	Optional colours	
	BLACK Half-tone	
	RED	
Built-up areas for cities (alternative to black stipple)	YELLOW	
Contours and topographic features: Items 1 through 10 of Appendix 2 Hydrographic features: Items 39 through 41 of Appendix 2	BROWN	
Shore lines, drainage, rivers, lakes, bathymetric contours and other hydrographic features including their names or description	BLUE	
Open water areas	BLUE Half-tone	
Salt lakes and salt pans	BLUE Stipple	
Large non-perennial rivers and non-perennial lakes	BLUE Stipple	
Aeronautical data, except for Enroute and Area Charts — ICAO, where different colours may be required. Both contours may be used on the same sheet but, where only one colour is used, dark blue is preferred	Optional colours	
	MAGENTA	
	DARK BLUE	

CHART SYMBOLS (Cont.)

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

HYPSONETRIC TINTS

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

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

Appendix 4 – Hypsometric Tint Guide

CHART SYMBOLS (Cont.)

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

HYPSONETRIC TINTS

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

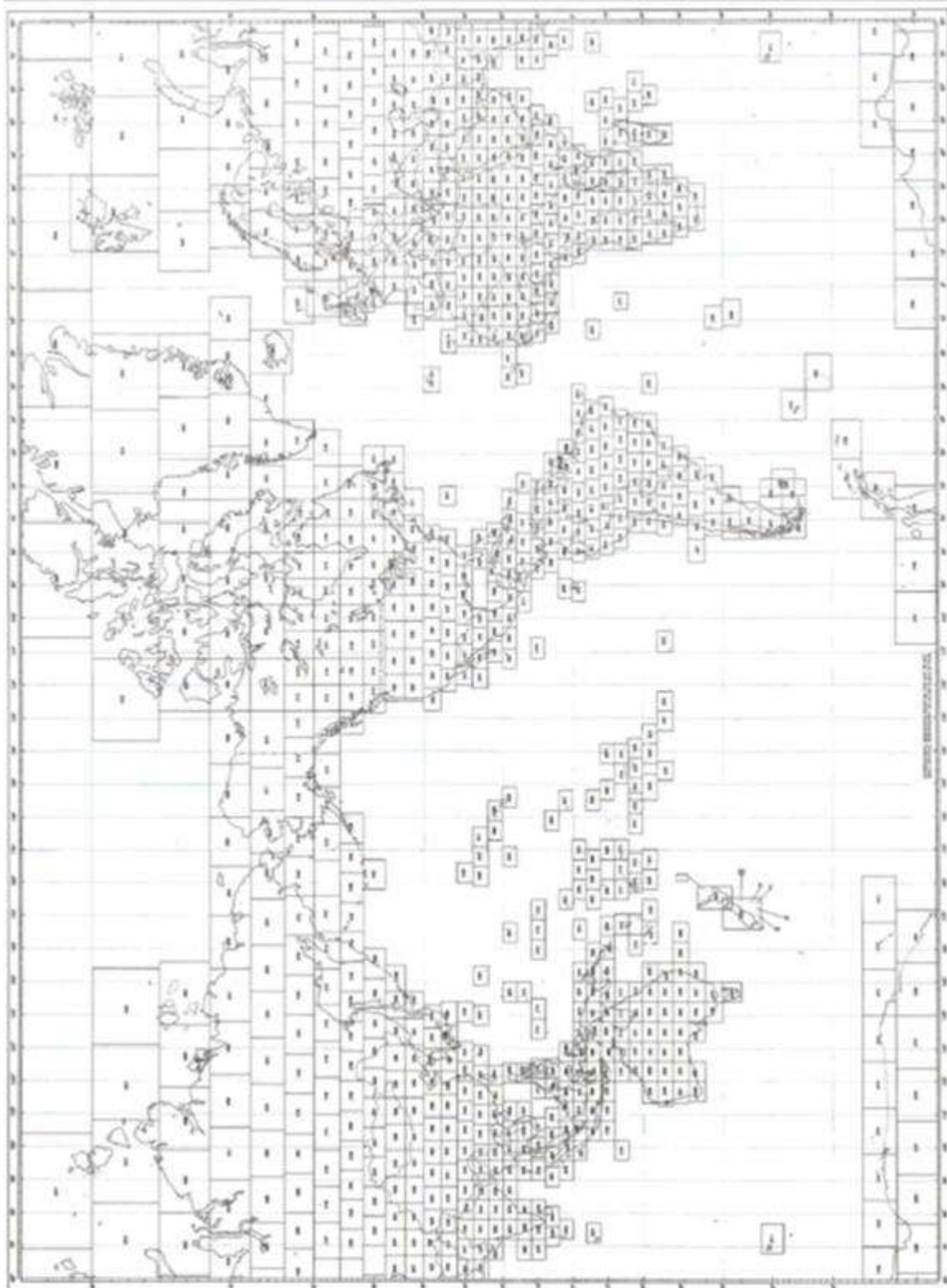
Note.— Basic tints are identical to those specified in the International Map of the World.

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.

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Appendix 5 – Sheet layout index for the World Aeronautical Chart – ICAO 1:1,000,000



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