

SCHEDULE 3

(Regulation 27)

PART A

The following are the standards required to be met in respect of charts:

Operational requirements for charts

1. (1) Each type of chart shall be designed observing Human Factors principles which facilitate its optimum use and contain information relevant to the function of the chart.

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

(3) 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.

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

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

Titles

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

Miscellaneous information

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

(2) The following information shall be shown on the face of each chart unless otherwise stated in the specification of the chart concerned:
 - (a) designation or title of the chart series;
 - (b) name and reference of the sheet; and
 - (c) on each margin an indication of the adjoining sheet (where applicable).
(3) A legend to the symbols and abbreviations used shall be provided on the face or reverse of each chart except that, where it is impracticable for reasons of space, a legend may be published separately.

(4) 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.

Note: The title may be abbreviated.

Symbols

4. Symbols used shall conform to those shown in Appendix 2, 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.

Units of Measurement

5. (1) Distances shall be—
- (a) derived as geodesic distances; and
 - (b) expressed in kilometres, nautical miles or both, provided the units are clearly differentiated.
- (2) Altitudes, elevations and heights shall be expressed in feet, provided the units are clearly differentiated.
- (3) Linear dimensions on aerodromes and short distances shall be expressed in metres.
- (4) The order of resolution of distances, dimensions, elevations and heights shall be that as specified for a particular chart.
- (5) The units of measurement used to express distances, altitudes, elevations and heights shall be conspicuously stated on the face of each chart.
- (6) Conversion scales such as kilometers to nautical miles or metres to feet and vice versa shall be—
- (a) provided on each chart on which distances, elevations or altitudes are shown; and
 - (b) placed on the face of each chart.

Scale and Projection

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

Date of validity of aeronautical information

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

Spelling of geographical names

8. (1) The symbols of the Roman alphabet shall be used for all writing.
- (2) The names of places and of geographical features in countries which officially use varieties of the Roman alphabet shall be accepted in their official spelling, including the accents and diacritical marks used in the respective alphabets.

(3) Where a geographical term such as cape, point, gulf or river, is abbreviated any particular chart, that word shall be spelt out in full in the language used by the publishing agency, in respect of the most important example of each type.

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

Abbreviations

9. Abbreviations shall be used on aeronautical charts where they are appropriate.

Political boundaries

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

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

Relief

11. (1) Relief, where shown, shall be portrayed in a manner that will satisfy the chart users' need for—

- (a) orientation and identification;
- (b) safe terrain clearance;
- (c) clarity of aeronautical information when shown;
- (d) planning.

(2) Where spot elevations are used they shall be shown for selected critical points.

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

Prohibited, restricted and danger areas

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

Air traffic services airspaces

13. Where ATS airspace is shown on a chart, the class of airspace, the type, name or call sign, the vertical limits and the radio frequency to be used shall be indicated and the horizontal limits depicted in accordance with Appendix 2.

Magnetic variation

14. True North and magnetic variation shall be indicated and the order of resolution of magnetic variation shall be as specified for the particular chart.

Aeronautical data

15. (1) The Director General shall take all necessary measures to introduce a properly organized quality system containing procedures, processes and resources necessary to implement quality management at each function stage as outlined in clause 2 of Part A in Schedule 2.

(2) The execution of quality management under subclause (1), shall be made demonstrable for each function stage, where required.

(3) The Director General shall ensure that established procedures exist in order that aeronautical data at any moment is traceable to its origin to allow any data anomalies or errors, detected during the production or maintenance phases or in the operational use, to be corrected.

(4) The Director General shall ensure that the order of chart resolution of aeronautical data shall be that as specified for a particular chart and as presented in a tabular form in Appendix 3.

(5) The Director General shall ensure that integrity of aeronautical data is maintained throughout the data process from survey or origin to the next intended user.

(6) Aeronautical data integrity requirements shall be based upon the potential risk resulting from the corruption of data and upon the use to which the data item is put and, the following classification and data integrity level shall apply:

- (a) critical data, integrity level 1×10^{-8} : is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe;
- (b) essential data, integrity level 1×10^{-5} : a low probability when using corrupted essential data that the confirmed safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe; and
- (c) routine data, integrity level 1×10^{-3} : a very low probability when using corrupted routine data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe.

(7) Aeronautical data quality requirements related to the integrity and data classification shall be as provided in Tables 1 to 5 in Appendix 3.

(8) Protection of electronic aeronautical data while stored or in transit shall be totally monitored by the CRC.

(9) To achieve protection of the integrity level of critical and essential aeronautical data as classified in subclauses (5) and (6), a 32-bit or 24-bit CRC algorithm shall apply respectively.

Common reference systems

16. (1) The Horizontal reference system shall meet the following standards:

- (a) World Geodetic System—1984 (WGS-84) shall be used as the horizontal geodetic reference system;
- (b) published aeronautical geographical coordinates indicating latitude and longitude shall be expressed in terms of the WGS-84 geodetic reference datum;
- (c) geographical coordinates which have been transformed into WGS-84 coordinates but whose accuracy of original field work does not meet the requirements in Part A of Schedule 1, Volumes I and II, shall be identified by an asterisk; and
- (d) the order of chart resolution of geographical coordinates shall be that specified for a particular chart series and in accordance with Table 1 of Appendix 3.

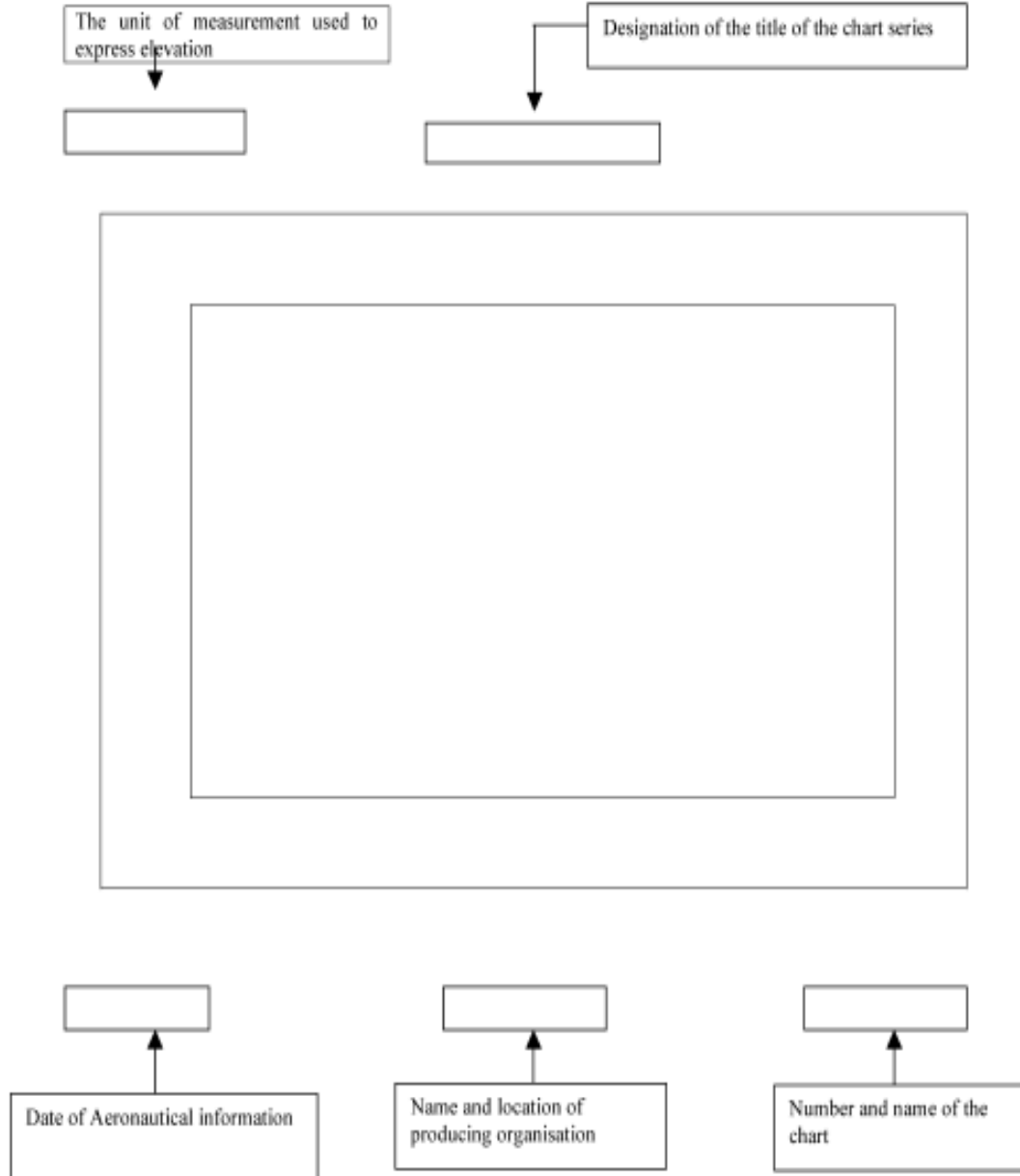
(2) The vertical reference system shall meet the following standards:

- (a) mean sea level datum, which gives the relationship of gravity-related height or elevation to a surface known as the geoid, shall be used as the vertical reference system;
 - (b) in addition to the elevations referenced to mean sea level, 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; and
 - (c) the order of chart resolution of elevation and geoid undulation shall be that specified for a particular chart series and in accordance with Table 2 of Appendix 3.
- (3) The temporal reference system shall meet the following standards:
- (a) the Gregorian calendar and UTC shall be used as the temporal reference system; and
 - (b) where a different temporal reference system is used for charting, this shall be indicated in GEN 2.1.2 of the AIP.

Appendix I

[Schedule 3 Part A 3(1)]

MARGINAL NOTE LAYOUT



APPENDIX 2

(Schedule 3 Part A clauses 4, 1 and 13)

ICAO CHART SYMBOLS

<i>Index</i>	<i>No.</i>	<i>Index</i>	<i>No.</i>
Abandoned canal	30	City or large town	47
Advisory airspace - ADA	115	Clearway - CWY (on Aerodrome	
Advisory route - ADR	118	Obstacle Charts)	167
Aerodrome and Heliport Charts	144-158	Cliff	4
Aerodrome Obstacle Charts	159-167	Coast guard station	73
Building or large structure	161	Collocated VOR and DME radio navigation aids -	
Clearway - CWY	167	VOR/DME	103,110
Escarpment	165	Collocated VOR and TACAN radio navigation	
Pole, tower, spire, antenna	160	aids - VORTAC	107,110
Railroad	162	Compass rose	110
Stopway - SWY	166	Contours	1
Terrain penetrating obstacle plane	164	Control area - CTA	113
Transmission line or overhead cable	163	Controlled route	113
Tree or shrub	159	Control zone - CTR	116
Aerodrome reference point - ARP (on		Coral reefs and ledges	22
Aerodrome and Heliport Charts)	149	Culture	47-83
Aerodromes	84-98	Culture, miscellaneous	63-83
Abandoned or closed	91	Dam	67
Civil, land	84	Danger area	129
Civil, water	85	Danger line	43
Emergency, or with no facilities	90	DME distance	104
For Approach Charts	97,98	Dry lake bed	39
For use on charts on which aerodrome		Dual highway	57
classification is not required	93	Electronic Chart Symbols	100,101,103,107,108,142,168-177
Joint civil and military, land	88	Escarpment	4
Joint civil and military, water	89	Escarpment (on Aerodrome Obstacle Charts)	165
Military, land	86	Esker	9
Military, water	87	Falls	28
Runway pattern in lieu of aerodrome symbol	95	Fence	65
Runway	172	Ferry	68
Aerodrome traffic zone - ATZ	112	Final approach fix - FAF	125
Aeronautical ground light	142	Flight information region - FIR	111
Air defence identification zone - ADIZ	117	Flight levels	126
Airspace Classifications	127,128	Forest ranger station	76
Airspace Restrictions	129,130	Fort	79
Air Traffic Services - ATS	111-126	Gas field	70
Airway - AWY	113	Glaciers	42
Altitudes and flight levels	126	Gravel	8
Antenna (on Aerodrome Obstacle Charts)	160	Hard surface runway (on Aerodrome/Heliport Charts)	144
Approximate contours	2	Helicopter alighting area on an aerodrome	
Areas not surveyed for contour information	18	(on Aerodrome and Heliport Charts)	148
ATS and MET reporting point - MRP		Heliport	94
(compulsory, on request)	123	Highest elevation on chart	12
Basic radio navigation aid	99	Highways	57-62
Bluff	4	Holding pattern	170
Boundaries (international)	63	Hydrography	19-46
Boundaries, other	64	Ice cap	42
Building (on Aerodrome Obstacle Charts)	161	Instrument landing system - ILS	108
Buildings	50	International boundary closed to passage of aircraft	
Built-up areas	47-50	except through air corridor	130
Canal	29	Isogonic line or isogonal	139
Change-over point - COP	122	Lakes (non-perennial)	32
Charted isolated rock	44	Lakes (perennial)	31
Church	80	Landing direction indicator (lighted)	

CIVIL AVIATION [(NO. 15) AIR NAVIGATION SERVICES] REGULATIONS, 2006

<i>Index</i>	<i>No.</i>	<i>Index</i>	<i>No.</i>
(on Aerodrome and Heliport Charts)	155	Restricted airspace (prohibited, restricted or danger area) and common boundary of two areas	129
Landing direction indicator (unlighted)		Restricted area	129
(on Aerodrome and Heliport Charts)	156	Rice field	36
Large river (perennial)	23	Rivers and streams (non-perennial)	25
Large structure (on Aerodrome Obstacle Charts)	161	Rivers and streams (unsurveyed)	26
Large town	47	Road bridge	61
Lava flow	5	Road tunnel	62
Levee	9	Rock awash	45
Lightship	143	Ruins	78
Lookout tower	74	Runway	172
Marine light	141	Runway-holding position (on Aerodrome/Heliport Charts)	158
Mine	75	Runway visual range (RVR) observation site (on Aerodrome/Heliport Charts)	151
Minimum sector altitude - MSA	168	Salt lake	33
Miscellaneous symbols - aeronautical	138-140	Salt pans (evaporator)	34
Miscellaneous symbols - culture	63-83	Sand area	7
Missed approach track	171	Sand dunes	6
Mosque	81	Scale-break (on ATS route)	120
Mountain pass	11	Secondary road	59
Non-directional radio beacon - NDB	100	Sheltered anchorage	92
Nuclear power station	72	Shoals	41
Obstacle light (on Aerodrome/Heliport Charts)	154	Shore line (reliable)	19
Obstacles	131-137	Shore line (unreliable)	20
Elevation of top	137	Shrub (on Aerodrome Obstacle Charts)	159
Exceptionally high	135	Small river (perennial)	24
Exceptionally high, lighted	136	Spire (on Aerodrome Obstacle Charts)	160
Group	133	Spot elevation	13
Height	137	Spot elevation (of doubtful accuracy)	14
Lighted	132	Spring (perennial or intermittent)	37
Lighted group	134	Stadium	77
Obstacle	131	Steel mesh runway (on Aerodrome/Heliport Charts)	152
Ocean station vessel	140	Stop bar (on Aerodrome/Heliport Charts)	157
Oil field	70	Stopway - SWY (on Aerodrome/Heliport Charts)	146
Other boundaries	64	Stopway - SWY (on Aerodrome Obstacle Charts)	166
Other trees	16	Swamp	35
Overhead cable (on Aerodrome Obstacle Charts)	163	TACAN (UHF tactical air navigation aid)	106,110
Pagodas	82	Tank farms	71
Palms	17	Taxiways (on Aerodrome and Heliport Charts)	147
Parking areas (on Aerodrome and Heliport Charts)	147	Telegraph or telephone line (when a landmark)	66
Pierced steel plank or steel mesh runway (on Aerodrome and Heliport Charts)	152	Temple	83
Pipeline	69	Terminal arrival altitude - TAA	169
Point light (on Aerodrome/Heliport Charts)	153	Terrain penetrating obstacle plane (on Aerodrome Obstacle Charts)	164
Pole (on Aerodrome Obstacle Charts)	160	Tidal flats	21
Primary road	58	Topography	1-18
Prohibited area	129	Tower (on Aerodrome Obstacle Charts)	160
Prominent transmission line	138	Town	48
Race track	77	Trail	60
Radio marker beacon	109,174,175,177	Transmission line (on Aerodrome Obstacle Charts)	163
Radio navigation aid - basic	99,173	Tree (on Aerodrome Obstacle Charts)	159
Radio navigation aids	99-110,173-176	Tree, coniferous	15
Railroads	51-56	Tree, other	16
Bridge	54	UHF tactical air navigation aid - TACAN	106,110
Railroad (on Aerodrome Obstacle Charts)	162	Uncontrolled route	114
Single track	51	Unpaved runway (on Aerodrome and Heliport Charts)	145
Station	56	Unusual land features, appropriately labelled	10
Tunnel	55	Unusual water features, appropriately labelled	46
Two or more tracks	52	VHF omnidirectional radio range - VOR	101,110
Under construction	53	Village	49
Rapids	27	Visual aids	141-143
Relief data incomplete	18	Visual flight path	119
Relief shown by hachures	3	VOR (VHF omnidirectional radio range)	101,110
Reporting point - REP (compulsory, on request)	121	VOR check-point (on Aerodrome and Heliport Charts)	150
Reservoir	38	VOR and ME (collocated VOR and DME radio navigation aids)	103,110
		VOR radial	105
		VORTAC (collocated VOR and TACAN radio navigation aids)	107,110
		Wash	40
		Water hole (perennial or intermittent)	37
		Waypoint - WPT	124
		Well (perennial or intermittent)	37

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					15	Coniferous trees		
5	Lava flow			Active volcano		16	Other trees		
6	Sand dunes		11	Mountain pass		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 <i>Note.— Dry canal having landmark value.</i>				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)		45	Rock awash		⊕	
27	Rapids		37	Spring, well or water hole	perennial		46	Unusual water features appropriately labelled		
28	Falls				intermittent					
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	

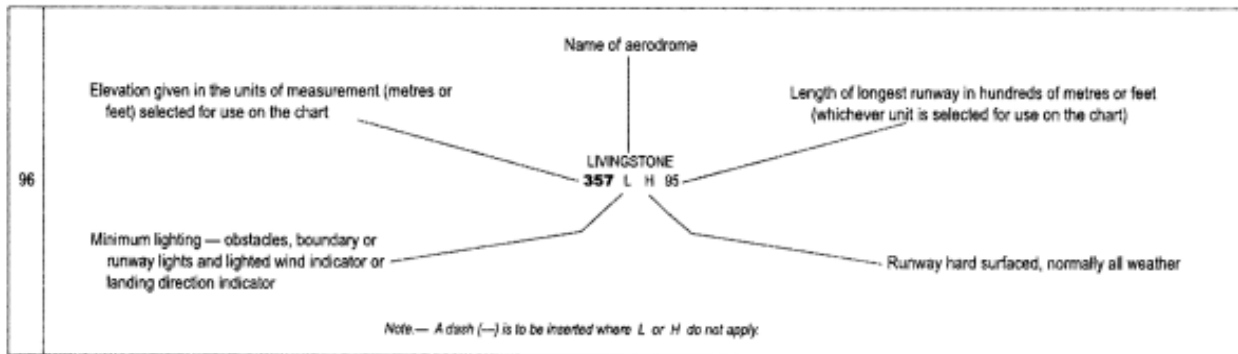
AERODROMES

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:
















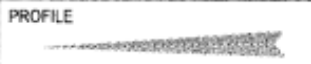



AERODROMES (Cont.)
AERODROME DATA IN ABBREVIATED FORM WHICH MAY BE
IN ASSOCIATION WITH AERODROME SYMBOLS
















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 <i>Note.— This symbol may be used with or without a box to enclose the data.</i>		
100	Non-directional radio beacon NDB		Electronic 
101	VHF omnidirectional radio range VOR		
102	Distance measuring equipment DME		
103	Collocated VOR and DME radio navigation aids VOR/DME		
104	DME distance	Distance in kilometres (nautical miles) to DME _____ → 15 km Identification of radio navigation aid _____ → KAV	
105	VOR radial	Radial bearing from, and identification of, VOR R 090 KAV	
106	UHF tactical air navigation aid TACAN		
107	Collocated VOR and TACAN radio navigation aids VORTAC		Electronic 
108	Instrument landing system ILS	PLAN VIEW  Electronic  FRONT COURSE BACK COURSE PROFILE  Electronic  GLIDE PATH	
109	Radio marker beacon	Elliptical  Bone Shape 	Note.— Marker beacon may be shown by outline, or stipple, or both.

110	Compass rose To be orientated on the chart in accordance with the alignment of the station (normally Magnetic North)		Compass rose to be used as appropriate in combination with the following symbols:								
			<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>VOR</td> <td style="text-align: center;"></td> </tr> <tr> <td>VOR/DME</td> <td style="text-align: center;"></td> </tr> <tr> <td>TACAN</td> <td style="text-align: center;"></td> </tr> <tr> <td>VORTAC</td> <td style="text-align: center;"></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 the Aeronautical Chart Manual (Doc 8697).

AIR TRAFFIC SERVICES

111	Flight information region	FIR		119	Visual flight path	compulsory with radio communication requirement (R)
112	Aerodrome traffic zone	ATZ		compulsory, without radio communication requirement	 (R)	
113	Control area Airway Controlled route	CTA AWY	Alternative 	recommended		
				Scale-break (on ATS route)	Alternative 		
						Reporting point	REP
				114	Uncontrolled route		
115	Advisory airspace	ADA		123	ATS/MET reporting point	MRP	Compulsory ▲ On request ▣
116	Control zone	CTR		124	Waypoint WPT	Flyover WPT (also used for start point and end point of a controlled turn)	
117	Air defence identification zone	ADIZ				Fly-by WPT	
118	Advisory route	ADR	Alternative 	125	Final approach fix	FAF	

126	Altitudes/flight levels	Altitude/flight level "window"	<u>17 000</u> <u>FL 220</u> <u>10 000</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
<i>Note.— For use only on SID and STAR charts. Not intended for depiction of minimum obstacle clearance altitude.</i>			

AIRSPACE CLASSIFICATIONS

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

AIRSPACE RESTRICTIONS

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

OBSTACLES

131	Obstacle		135	Exceptionally high obstacle (optional symbol)	
132	Lighted obstacle		136	Exceptionally high obstacle - lighted (optional symbol)	
133	Group obstacles		Note - For obstacles having a height of the order of 300 m (1 000 ft) above terrain.		
134	Lighted group obstacles		137	<p>Elevation of top (italics) → 52 Height above specified datum (upright type in parentheses) → (15)</p>	



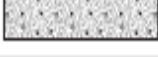

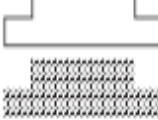














MISCELLANEOUS

138	Prominent transmission line		139	Isogonic line or isogonal		140	Ocean station vessel (normal position)	
-----	-----------------------------	--	-----	---------------------------	--	-----	--	--

VISUAL AIDS

141	Marine light Note 2 - Characteristics are to be indicated as follows:	Alt B F	Alternating Blue Flashed	F G Gp	Flashing Green Group	Occ R SEC	Occulting Rad Sector	sec (U) W	Second Unwatched White		Note 1 - Marine alternating lights are red and white unless otherwise indicated. Marine lights are white unless colours are stated.	
142	Aeronautical ground light		Electronic		143	Lightship						

SYMBOLS FOR AERODROME/HELIPORT CHARTS

144	Hard surface runway			
145	Pierced steel plank or steel mesh runway			
146	Unpaved runway			
147	Stopway	SWY 		
148	Taxiways and parking areas			
149	Helicopter alighting area on an aerodrome			
150	Aerodrome reference point			
151	VOR check-point			
152	Runway visual range (RVR) observation site			
153	Point light			
154	Obstacle light			
155	Landing direction indicator (lighted)			
156	Landing direction indicator (unlighted)			
157	Stop bar			
158	Runway-holding position	Pattern A Pattern B	 	
159	Intermediate holding position			
160	Hot spot			

ADDITIONAL SYMBOLS FOR USE ON PAPER AND ELECTRONIC CHARTS

PLAN VIEW

168	<p>Minimum sector altitude <i>Note.— This symbol may be modified to reflect particular sector shapes.</i></p>	MSA	
169	<p>Terminal arrival altitude <i>Note.— This symbol may be modified to reflect particular TAA shapes.</i></p>	TAA	
170	Holding pattern		
171	Missed approach track		

PROFILE

172	Runway		
173	<p>Radio navigation aid <i>(type of aid and its use in the procedure to be annotated on top of the symbol)</i></p>		
174	<p>Radio marker beacon <i>(type of beacon to be annotated on top of the symbol)</i></p>		
175	<p>Collocated radio navigation aid and marker beacon <i>(type of aid to be annotated on top of the symbol)</i></p>		
176	<p>DME fix <i>(distance from DME and the fix use in the procedure to be annotated on top of the symbol)</i></p>		
177	<p>Collocated DME fix and marker beacon <i>(distance from DME and the type of beacon to be annotated on top of the symbol)</i></p>		

APPENDIX 3

[Part A, Clause 15 (4) & (7), 16 (1) (2) (c)]

AERONAUTICAL DATA QUALITY REQUIREMENTS**Table 1 - Latitude and Longitude**

Latitude and Longitude	Chart Resolution	Integrity / classification
Flight information region boundary points	As plotted	1 x 10 ⁻³ routine
P, R, D area boundary points (outside CTA/CTZ boundaries)	As plotted	1 x 10 ⁻³ routine
P, R, D area boundary points (inside CTA/CTZ boundaries)	As plotted	1 x 10 ⁻⁵ essential
CTA/CTZ boundary points	As plotted	1 x 10 ⁻⁵ essential
En route navaids, intersections and waypoints, and holding STAR/SID points	1 sec	1 x 10 ⁻⁵ essential
Obstacles in Area 1 (the entire State territory)	As plotted	1 x 10 ⁻³ routine
Aerodrome/heliport reference point	1 sec	1 x 10 ⁻³ routine
NAVAIDS located at aerodrome/heliport	As plotted	1 x 10 ⁻⁵ essential
Obstacles in Area 3	1/10 sec	1 x 10 ⁻⁵ essential
Obstacle in Area 2	1/10 sec	1 x 10 ⁻⁵ essential
Final approach fixes/points and other essential fixes/points comprising the instrument approach procedure	1/10 sec	1 x 10 ⁻⁵ essential
Runway threshold	1 sec	1 x 10 ⁻⁸ critical
Runway end (flight path alignment point)	1 sec	1 x 10 ⁻⁸ critical
Runway holding point	1 sec	1 x 10 ⁻⁸ critical
Taxiway centre line/parking guidance line points	1/100 sec	1 x 10 ⁻⁵ essential
Taxiway intersection marking line	1 sec	1 x 10 ⁻⁵ essential
Exit guidance line	1 sec	1 x 10 ⁻⁵ essential
Aircraft stand points/INS checkpoints	1/100 sec	1 x 10 ⁻³ routine
Geometric centre of TLOF or FATO threshold, heliport	1 sec	1 x 10 ⁻⁸ critical
Apron boundaries (polygon)	1 sec	1 x 10 ⁻³ routine
De-icing/anti-icing facility (polygon)	1 sec	1 x 10 ⁻³ routine

Note: See Schedule 2, Appendix 8, for graphical illustrations of obstacle data collection surfaces and criteria used to identify obstacles in the defined areas.

Table 2 - Elevation/ Altitude/Height

Elevation/Altitude/Height	Chart Resolution	Integrity / classification
Aerodrome/heliport elevation	1 m or 1 ft	1×10^{-5} essential
WGS-84 geoid undulation at aerodrome/heliport elevation position	1 m or 1 ft	1×10^{-5} essential
Runway or FATO threshold, non-precision approaches	1 m or 1 ft	1×10^{-5} essential
WGS-84 geoid undulation at runway or FATO threshold, TLOF geometric centre, non-precision approaches	1 m or 1 ft	1×10^{-5} essential
Runway or FATO threshold, precision approaches	0.5 m or 1 ft	1×10^{-8} critical
WGS-84 geoid undulation at runway or FATO threshold, TLOF geometric centre, precision approaches	0.5 m or 1 ft	1×10^{-8} critical
Threshold crossing height, precision approaches	0.5 m or 1 ft	1×10^{-8} critical
Obstacle clearance altitude and height	As specified in PANS-OPS (Doc 8168)	1×10^{-5} essential
Obstacles in Area 2	1 m or 1 ft	1×10^{-5} essential
Obstacles in Area 3	1 m or 1 ft	1×10^{-5} essential
Obstacles in Area 1 (the entire State territory)	3 m or 10 ft	1×10^{-3} routine
Distance measuring equipment (DME)	30 m (100 ft)	1×10^{-5} essential
Minimum altitudes	50 m or 100 ft	1×10^{-3} routine

Note: See the Appendix to Schedule 2 for graphical illustration of obstacle data collection surfaces and criteria used to identify obstacles in defined areas

Table 3 - Magnetic Variation

Declination/Variation	Chart Resolution	Integrity / classification
Aerodrome/heliport magnetic variation	1 degree	1×10^{-5} essential

Table 4 - Bearing

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

Table 5 - Length, Distance and Dimension

Length/Distance/Dimension	Chart Resolution	Integrity / classification
Airways segment length	1 km or 1 NM	1×10^{-3} routine
En-route fix formation distance	2/10 km or 1/10 NM	1×10^{-3} routine
Terminal arrival/departure route segment length	1 km or 1 NM	1×10^{-5} essential
Terminal and instrument approach procedure fix formation distance	2/10 km or 1/10 NM	1×10^{-5} essential
Runway and FATO length, TLOF dimensions	1 m	1×10^{-8} critical
Runway width	1 m	1×10^{-5} essential
Displaced threshold distance.	1 m	1×10^{-3} routine
Stopway length and width	1 m	1×10^{-8} critical
Landing distance available	1 m	1×10^{-8} critical
Take-off run available	1 m	1×10^{-8} critical
Take-off distance available	1 m	1×10^{-8} critical
Accelerate-stop distance available	1 m	1×10^{-8} critical
ILS localizer antenna-runway end, distance	As plotted	1×10^{-3} routine
ILS glide slope antenna-threshold, distance along centre line	As plotted	1×10^{-3} routine
ILS marker-threshold distance	2/10 km or 1/10 NM	1×10^{-5} essential
ILS DME antenna-threshold, distance along centre line	As plotted	1×10^{-5} essential
MLS azimuth antenna-runway end, distance	As plotted	1×10^{-3} routine
MLS elevation antenna-threshold, distance along centre line	As plotted	1×10^{-3} routine
MLS DME/P antenna-threshold, distance along centre line	As plotted	1×10^{-5} essential

Table 6. Gradient and angles

Type of gradient/angle	Chart resolution	Integrity / Classification
Non-precision final approach and descent gradient	0.1 percent	1 x 10 ⁻⁸ Critical
Final approach descent angle (Non-precision approach or approach with vertical guidance)	0.1 degree	1 x 10 ⁻⁸ Critical
Precision approach glide path/elevation angle	0.1 degree	1 x 10 ⁻⁸ Critical

PART B

(Regulation 30)

AERODROME OBSTACLE CHART—ICAO TYPE A, OPERATING LIMITATIONS

The Standards required for Aerodrome, Obstacle Chart—ICAO Type A, Operating limitations are as follows:

Units of measurement

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

Coverage and scale

2. (1) The extent of each plan view shall be sufficient to cover all obstacles.
- (2) The horizontal scale shall be within the range of 1:10 000 to 1:15 000.
- (3) The vertical scale shall be ten times the horizontal scale.
- (4) Horizontal and vertical linear scales showing both metres and feet shall be included on an ICAO Type A chart.

Format

3. (1) An ICAO Type A chart shall depict a plan and profile of each runway, any associated stopway or clearway, the take-off flight path area and obstacles.
- (2) The profile for each runway, stopway, clearway and the obstacles in the take-off flight path area shall be shown above its corresponding plan.
- (3) 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.
- (4) A profile grid shall be ruled over the entire profile area exclusive of the runway.
- (5) The zero for vertical coordinates shall be mean sea level.
- (6) The zero for horizontal coordinates shall be the end of the runway furthest from the take-off flight path area concerned.
- (7) Graduation marks indicating the subdivisions of intervals shall be shown along the base of the grid and along the vertical margins.

Identification

4. A chart shall be identified by—
 - (a) the name of the country in which the aerodrome is located;
 - (b) the name of the city or town, or area, which the aerodrome serves;
 - (c) the name of the aerodrome and the designator of the runway.

Magnetic variation

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

Aeronautical data

6. (1) The following are standards for representing obstacles on a chart:

- (a) objects in the take-off flight path area which project above a plane surface having a 1.2 per cent slope and having a common origin with the take-off flight path area, shall be regarded as obstacles, except that obstacles lying wholly below the shadow of other obstacles as defined in paragraph (c) need not be shown;
- (b) 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;
- (c) 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;
- (d) the plane surface under (c) covers the complete width of the take-off flight path area and extends to the plane surface defined in paragraph (a) or to the next higher obstacle if it occurs first;
- (e) for the first three hundred metres or one thousand feet 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; and
- (f) where the obstacle creating a shadow is likely to be removed, objects that would become obstacles by its removal shall be shown.

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

- (a) the take-off flight path area shall commence at the end of the area declared suitable for take-off (i.e. at the end of the runway or clearway as appropriate);
- (b) the take-off flight path area shall have its width at the point of origin as 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; and
- (c) the take-off flight path area shall extend to the point beyond which no obstacles exist or to a distance of 10.0 km (5.4 NM), whichever is the lesser.

(4) The following information on declared distances for each direction of each runway shall be entered in the space provided:

- (a) take-off run available;
- (b) accelerate-stop distance available;
- (c) take-off distance available; and
- (d) landing distance available.

(5) A plan view shall include—

- (a) an outline of the runway identified by a solid line, including the length and width, the magnetic bearing to the nearest degree and the runway number;
- (b) an outline of the clearways shown by a broken line, including the length and identification as such;
- (c) take-off flight path areas shown by a dashed line and the centre line shown by a fine line consisting of short and long dashes;
- (d) the exact location of each obstacle together with a symbol indicative of its type;
- (e) the elevation and identification of each obstacle;
- (f) the limits of penetration of obstacles of large extent in a distinctive manner identified in the legend;
- (g) alternative take-off flight path areas; and
- (h) indication of the length of each stopway when stopways are shown.

(6) Where 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.

(7) A profile view shall include—

- (a) a profile of the centre line of the runway identified by a solid line and the profile of the centre line of any associated stopways and clearways identified by a broken line;
- (b) an elevation of the runway centre line—
 - (i) at each end of the runway, at the stopway and at the origin of each take-off flight path area; and
 - (ii) wherever there is significant change in slope of runway and stopway; and
- (c) the following information in respect of obstacles:
 - (i) each obstacle shown by a solid vertical line extending from a convenient grid line over at least one other grid line to the elevation of the top of the obstacle;
 - (ii) identification of each obstacle;
 - (iii) the limits of penetration of obstacles of large extent in a distinctive manner identified in the legend.

Accuracy

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

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

PART C

(Regulation 31)

EN ROUTE CHART—ICAO

The standards required for En route Charts-ICAO are as follows:

Coverage and scale

1. En route charts shall have adequate overlap to ensure continuity of navigation and where adjacent charts showing a continuous route structure are used, a large variation of scale between charts shall be avoided.

Projection

2. Parallels and meridians shall be shown at suitable intervals and graduation marks shall be placed at consistent intervals along selected parallels and meridians.

Identification

3. Each sheet of the chart shall be identified by chart series and number.

Culture and topography

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

(2) The area minimum altitude shall be shown on the chart, within each quadrilateral formed by the parallels and meridians.

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

Bearings, tracks and radials

5. Bearings, tracks and radials shall be magnetic.

Aeronautical data for Aerodromes

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

Aeronautical Data for Prohibited, Restricted and Danger Areas

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

Aeronautical data for air traffic system

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

(2) The components under subclause (1) shall include the following:

- (a) the names, identifications, frequencies and geographical coordinates in degrees, minutes and seconds of all radio navigation aids associated with the air traffic services system;

- (b) where there is a DME under paragraph (a), the elevation of, in addition to the elevation of the transmitting antenna of the DME, to the nearest 100 feet;
- (c) an indication of all designated airspace, including lateral and vertical limits and the appropriate class of airspace;
- (d) all ATS routes for enroute flight including route designators, RNP types, the track to the nearest degree in both directions along each segment of the routes and, where applicable, the direction of traffic flow;
- (e) name-codes and geographical coordinates in degrees, minutes and seconds of all significant points which define the ATS routes and which are not marked by the position of a radio navigation aid;
- (f) for waypoints defining VOR and DME navigation routes:
 - (i) the station identification and radio frequency of the reference VOR and DME; and
 - (ii) the bearing to the nearest tenth of a degree and the distance to the nearest two-tenths of a kilometre or tenth of a nautical mile from the reference VOR or DME, where the waypoint is not collocated with the VOR or DME;
- (g) an indication of all compulsory and “on-request” reporting points and ATS and MET reporting points;
- (h) the distances to the nearest kilometre or nautical mile between significant points constituting turning points or reporting points;
- (i) change-over points on route segments defined by reference to VOR indicating the distances to the nearest kilometre or nautical mile to the navigation aids;
- (j) minimum en-route altitudes and minimum obstacle clearance altitudes on ATS routes to the nearest higher 100 feet as provided in clause 16 of Part A to Schedule 1;
- (k) communication facilities listed with their channels and, where applicable, logon address; and
- (l) properly identified air defence identification zone.

Supplementary information to Aeronautical data

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

(2) Altimeter setting regions shall be shown and identified where established.

PART D

(Regulation 32)

AREA CHART—ICAO

The standards required for Area Charts—ICAO are as follows:

Coverage and scale

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

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

Projection

2. (1) Parallels and meridians shall be shown at suitable intervals with graduation marks placed at consistent intervals along the neat lines, as appropriate.

Identification

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

Culture and topography

4. Generalized shorelines of all open water areas, large lakes and rivers shall be shown on a chart except where there would be conflict with data more applicable to the function of the chart.

Magnetic variation

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

Bearings, tracks and radials

6. Bearings, tracks and radials shall be magnetic.

Aeronautical data for aerodrome

7. All aerodromes which affect the terminal routings shall be shown and where appropriate a runway pattern symbol shall be used.

Aeronautical data for prohibited, restricted and danger areas

8. Prohibited, restricted and danger areas shall be depicted with the associated identification and vertical limits.

Aeronautical data for area minimum altitudes

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

Aeronautical data for Air traffic services system

10. The components of the established relevant ATS shall be shown which shall include the following:

- (a) the names, identifications, frequencies and geographical coordinates in degrees, minutes and seconds of all radio navigation aids associated with the ATS system;
- (b) where there is a DME, under paragraph (a), the elevation of the transmitting antenna of the DME, to the nearest 100 feet;
- (c) terminal radio aids which are required for outbound and inbound traffic and for holding patterns;
- (d) the lateral and vertical limits of all designated airspace and the appropriate class of airspace;
- (e) 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;
- (f) name-codes and geographical coordinates in degrees, minutes and seconds of all significant points which define the terminal routings and are not marked by the position of a radio navigation aid;
- (g) for waypoints defining VOR and DME area navigation routes:
 - (i) the station identification and radio frequency of the reference VOR and DME; and
 - (ii) the bearing to the nearest tenth of a degree and the distance to the nearest two-tenths of a kilometre or one-tenth of a nautical mile from the reference VOR and DME, where the waypoint is not collocated with the VOR or DME;
- (h) an indication of all compulsory and “on-request” reporting points;
- (i) the distances to the nearest kilometre or nautical mile between significant points constituting turning points or reporting points;
- (j) change-over points on route segments defined by reference to VOR, indicating the distances to the nearest kilometre or nautical mile to the radio navigation aids;
- (k) minimum en route altitudes and minimum obstacle clearance altitudes on ATS routes to the nearest higher 100 feet as provided in clause 16 of Part A in Schedule 1;
- (l) established minimum vectoring altitudes to the nearest higher 100 feet, clearly identified;
- (m) area, speed and level or altitude restrictions where established; and
- (n) communication facilities listed with their channels and, if applicable, log on address.

PART E

(Regulation 33)

STANDARD DEPARTURE CHART—INSTRUMENT (SID)—ICAO

The standards required to be met on Standard Departure Charts—Instrument (SID)—ICAO are as follows:

Coverage and scale

1. (1) The coverage of a 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 ATS route can be commenced.

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

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

Projection

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

Identification

3. A chart shall be identified by—

(a) the name of the city or town, or area, which the aerodrome serves;

(b) the name of the aerodrome; and

(c) the identification of the standard departure route—instrument as established in accordance with the ICAO Procedures for Air Navigation Services Doc 8168, Volume II, Part II, Chapter 5.

Culture and topography

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

Magnetic variation

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

Bearings, tracks and radials

6. Bearings, tracks and radials shall be magnetic.

Aeronautical data for aerodrome

7. (1) The aerodrome of departure shall be shown by the runway pattern symbol.

(2) All aerodromes which affect the designated standard instrument departure route shall be shown and identified and where appropriate the aerodrome runway patterns shall also be shown.

Aeronautical Data for Prohibited, Restricted and Danger Areas

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

Aeronautical data for minimum sector altitude

9. (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 shown within quadrilaterals formed by the parallels and meridians.

(3) Area minimum altitudes under subclause (2), shall also be shown in those parts of the chart not covered by the minimum sector altitude.

Aeronautical data for air traffic services system

10. (1) The components of the established relevant ATS system shall be shown and shall comprise the following:

- (a) a graphic portrayal of each standard instrument departure route, including—
 - (i) route designator;
 - (ii) significant points defining the route;
 - (iii) track or radial to the nearest degree along each segment of the route;
 - (iv) distances to the nearest kilometre or nautical mile between significant points;
 - (v) minimum obstacle clearance altitudes along the route or route segments and altitudes required by the procedure to the nearest higher 100 feet and flight level restrictions where established;
 - (vi) where the chart is drawn to scale and vectoring on departure is provided, established minimum vectoring altitudes to the nearest higher 100 feet, clearly identified;
- (b) the radio navigation aid associated with the route including—
 - (i) plain language name;
 - (ii) identification;
 - (iii) frequency;
 - (iv) geographical coordinates in degrees, minutes and seconds;
 - (v) for DME, the channel and the elevation of the transmitting antenna of the DME to the nearest 100 feet;

- (c) the name-codes and geographical coordinates in degrees, minutes and seconds of the significant points not marked by the position of a radio navigation aid, the bearing to the nearest one-tenth of a degree and distance to the nearest two-tenths of a kilometre or one-tenth of a nautical mile from the reference radio navigation aid;
- (d) applicable holding patterns;
- (e) transition altitude or height to the nearest higher 100 feet;
- (f) the position and height of close-in obstacles which penetrate the obstacle identification surface and a note included where close-in obstacles penetrating the obstacle identification surface exist but which were not considered for the published procedure design gradient;
- (g) area speed restrictions, where established;
- (h) all compulsory and “on-request” reporting points;
- (i) radio communication procedures, including—
 - (i) call sign of ATS unit;
 - (ii) frequency;
 - (iii) transponder setting, where appropriate.

Aeronautical Database Requirements

11. Appropriate data provided by the procedures specialist to support navigation database coding shall be published in accordance with the Procedures for Air Navigation Services – Aircraft Operations (Doc 8168) Volume II, Section 5, Chapter 2, 2.1 on the verso of the chart or as a separate, properly reference sheet.

PART F

(Regulation 34)

STANDARD ARRIVAL CHART—INSTRUMENT (STAR)—ICAO

The standards required to be met for Standard Arrival Charts—Instrument (STAR)— ICAO are as follows:

Coverage and scale

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

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

(3) When a 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.

Projection

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

Identification

3. A chart shall be identified by—

(a) the name of the city or town, or area, which the aerodrome serves;

(b) the name of the aerodrome; and

(c) the identification of the Standard Arrival Route—Instrument as established in accordance with the ICAO Procedures for Air Navigation Services, Doc 8168, Volume II, Part III, Chapter 3.

Culture and topography

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

Magnetic variation

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

Bearings, tracks and radials

6. Bearings, tracks and radials shall be magnetic.

Aeronautical data for aerodrome

7. (1) The aerodrome of landing shall be shown by the runway pattern symbol.

(2) All aerodromes which affect the designated standard instrument arrival route shall be shown and identified and where appropriate the aerodrome runway patterns shall be shown.

Aeronautical Data for Prohibited, Restricted and Danger Areas

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

Aeronautical data for minimum sector altitude

9. (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 shown within quadrilaterals formed by the parallels and meridians.

(3) Area minimum altitudes under subclause (2) shall also be shown in those parts of the chart not covered by the minimum sector altitude.

Aeronautical data for air traffic services system

10. The components of the established relevant ATS system shall be shown and shall comprise the following:

- (a) a graphic portrayal of each standard instrument arrival route, including—
 - (i) route designator;
 - (ii) significant points defining the route;
 - (iii) track or radial to the nearest degree along each segment of the route;
 - (iv) distances to the nearest kilometre or nautical mile between significant points;
 - (v) minimum obstacle clearance altitudes along the route or route segments and altitudes required by the procedure to the nearest higher 100 feet and flight level restrictions where established; and
 - (vi) where the chart is drawn to scale and vectoring on arrival is provided, established minimum vectoring altitudes to the nearest higher 100 feet, clearly identified;
- (b) the radio navigation aid associated with the route including—
 - (i) plain language name;
 - (ii) identification;
 - (iii) frequency;
 - (iv) geographical coordinates in degrees, minutes and seconds; and
 - (v) for DME, the channel and the elevation of the transmitting antenna of the DME to the nearest 100 feet;
- (c) the name-codes and geographical coordinates in degrees, minutes and seconds of the significant points not marked by the position of a radio navigation aid, the bearing to the nearest one-tenth of a degree and distance to the nearest two-tenths of a kilometre or one-tenth of a nautical mile from the reference radio navigation aid;

- (d) applicable holding patterns;
- (e) transition altitude or height to the nearest higher 1,000 feet;
- (f) area speed restrictions, where established;
- (g) all compulsory and “on-request” reporting points;
- (h) radio communication procedures, including:
 - (i) call sign of ATS unit;
 - (ii) frequency; and
 - (iii) transponder setting, where appropriate.

Aeronautical Database Requirements

11. Appropriate data provided by the procedures specialist to support navigation database coding shall be published in accordance with the Procedures for Air Navigation Services – Aircraft Operations (Doc 8168) Volume II, Section 5, Chapter 2, 2.2 on the verso of the chart or as a separate, properly reference sheet.

PART G

(Regulation 35)

INSTRUMENT APPROACH CHART—ICAO

The standards required to be met on Instrument Approach Charts—ICAO are as follows:

Coverage and scale

1. (1) The coverage of a chart shall be sufficient to include all segments of the instrument approach procedure and any additional areas as may be necessary for the type of approach intended.
- (2) The scale selected for a chart shall provide for optimum legibility and be consistent with—
 - (a) the procedure shown on the chart; and
 - (b) sheet size.
- (3) An indication of the scale selected under subclause (2) shall be shown on a chart.
- (4) Except where this is not practicable, a distance circle with a radius of 20 kilometres or 10 nautical miles centered 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 and its radius indicated on the circumference.

Projection

2. A conformal projection on which a straight line approximates a great circle shall be used.

Identification

3. A chart shall be identified by—
 - (a) the name of the city or town, or area, which the aerodrome serves;
 - (b) the name of the aerodrome; and
 - (c) the identification of the instrument approach procedure as established in accordance with the ICAO Procedures for Air Navigation Services, Doc 8168, Volume II, Part III, Chapter 1.

Culture and topography

4. (1) Culture and topographic information pertinent to the safe execution instrument approach procedure, including missed approach procedure associated holding patterns and visual manoeuvres or circling procedures when established shall be shown.
 - (2) The topographic information under subclause (1), shall be named, only where necessary to facilitate the understanding of such information.
 - (3) The minimum topographic information under this clause shall be a delineation of land masses and significant lakes and rivers.
 - (4) Relief shall be shown in a manner best suited to the particular elevation characteristics of the area.

(5) In areas where relief exceeds one thousand 200 metres or 4,000 feet above the aerodrome elevation within the coverage of the chart or 600 metres or 2,000 feet within eleven metres or 6 nautical miles of the aerodrome reference point or where final approach or missed approach procedure gradient is steeper than optimal due to terrain, all relief exceeding 150 metres or 500 feet above the aerodrome elevation shall be shown by smoothed contour lines with contour values and layer tints printed in brown.

(6) Appropriate spot elevations, including the highest elevation within each top contour line, shall also be shown printed in black.

Magnetic variation

5. Where the value of magnetic variation is used it shall be displayed to the nearest degree and agree with the magnetic variation used in determining magnetic bearings, tracks and radials.

Bearings, tracks and radials

6. Bearings, tracks and radials shall be magnetic.

Aeronautical data for aerodromes

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

(2) The runway pattern shall be shown at a scale sufficiently large to show it clearly.

(3) The runway pattern under subclause (1), shall be shown for—

(a) the aerodrome on which the procedure is based; and

(b) aerodromes affecting the traffic pattern or so situated as to be likely, under adverse weather conditions, to be mistaken for the aerodrome of intended landing.

(4) Aerodrome elevation shall be shown to the nearest foot in a prominent position on the chart.

(5) Threshold elevation or, where applicable, the highest elevation of the touchdown zone shall be shown to the nearest foot.

Aeronautical data for obstacles

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

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

(3) When 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 with a threshold elevation more than 7 feet below the aerodrome elevation, the chart datum shall be the threshold elevation of the runway to which the instrument approach is related.

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

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

Aeronautical data for prohibited, restricted and danger areas

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

Aeronautical data for radio communication facilities and navigation aids

10. (1) Radio navigation aids required for instrument approach procedures together with associated frequencies, identifications and track-defining characteristics, if any, shall be shown.

(2) For an instrument approach procedure when 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, and consideration given to the elimination from the approach chart of those facilities that are not used by the procedure.

(3) The initial approach fix (IAF), the inter-mediate 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.

(4) Radio navigation aids that might be used in diversionary procedures together with associated 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) The distance to the aerodrome from each radio navigation aid concerned with the final approach when required by the instrument approach procedure, shall be shown to the nearest kilometre or nautical mile.

(7) When no track-defining aid indicates the bearing of the aerodrome, the bearing shall also be shown to the nearest degree.

Aeronautical data for minimum sector altitude or terminal arrival altitude

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

Aeronautical data for portrayal of procedure tracks

12. (1) The plan view shall show the following:

- (a) the approach procedure track by an arrowed continuous line indicating the direction of flight;
- (b) the missed approach procedure track by an arrowed broken line;
- (c) any additional procedure track, other than those specified in paragraphs (a) and (b), by an arrowed dotted line;
- (d) bearings, tracks, radials to the nearest degree and distances to the nearest two-tenths of a kilometre or one-tenth of a nautical mile or times required for the procedure;
- (e) where no track-defining aid is available, the magnetic bearing to the nearest degree to the aerodrome from the radio navigation aids concerned with the final approach;

- (f) the boundaries of any sector in which visual manoeuvring is prohibited;
 - (g) where specified the holding pattern and minimum holding altitude or height associated with the approach and missed approach; and
 - (h) caution notes where required, prominently displayed on the face of the chart.
- (2) A profile shall be provided showing the following:
- (a) the aerodrome by a solid block at aerodrome elevation;
 - (b) the profile of the approach procedure segments by an arrowed continuous line indicating the direction of flight;
 - (c) the profile of the missed approach procedure segment by an arrowed broken line and a description of the procedure;
 - (d) the profile of any additional procedure segment, other than those specified in paragraphs (b) and (c), by an arrowed dotted line;
 - (e) bearings, tracks, radials to the nearest degree and distances to the nearest two-tenths of a kilometre or one-tenth of a nautical mile or times required for the procedure;
 - (f) altitudes or height required by the procedure, including transition altitude and procedure altitudes or heights, where established;
 - (g) limiting distance to the nearest kilometre or nautical mile on procedure turn, where specified;
 - (h) the intermediate approach fix or point, on procedures where no course reversal is authorized; and
 - (i) a line representing the aerodrome elevation or threshold elevation, as appropriate, extended across the width of the chart including a distance scale with its origin at the runway threshold.

Note: The profile is normally located below the plan view.

Aeronautical data for aerodrome operating minima

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

Aeronautical data for supplementary information

14. (1) The distance to the nearest two-tenths of a kilometre or one-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 where the missed approach point defined by—

(a) a distance from the final approach fix; or

(b) a facility or a fix and the corresponding distance from the final approach fix.

(2) Where DME is required for use in the final approach segment, a table showing altitude or height for every 2 kilometre or 1 nautical mile, as appropriate, shall be shown.

(3) The table under subclause (2), shall not include distances which would correspond to altitude or height below the OCA or OCH.

(4) 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 parenthesis, descent angle to the nearest one-tenth of a degree shall be shown.

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

(6) Where ILS or MLS glide path or elevation angle exceeds 3.5 degrees, a note shall be included referring to appropriate aircraft and flight crew qualification requirements for such a procedure.

(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 procedure, the associated ILS localizer only procedure, or both.

(8) For MLS, a clear indication shall be given where a final approach fix has been specified at the final approach point.

(9) Where 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 IV, Chapter 5, a cautionary note shall be included.

Aeronautical Data base Requirements

(10) Appropriate data provided by a procedures specialist to support navigation database coding shall be published in accordance with the *Procedures for Air Navigation Services – Aircraft Operations* (Doc 8168) Volume II, Section 5, Chapter 2, 2.2 on the verso of the chart or as a separate, properly reference sheet.

PART H

(Regulation 36)

VISUAL APPROACH CHART—ICAO

The standards required to be met for Visual Approach Charts—ICAO are as follows:

Scale

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

Projection

2. A conformal projection on which a straight line approximates a great circle shall be used.

Identification

3. A chart shall be identified by—

- (a) the name of the city or town which the aerodrome serves; and
- (b) the name of the aerodrome.

Culture and topography

4. (1) The following shall be shown on a Visual Approach Chart—ICAO:

- (a) natural and cultural landmarks such as bluffs, cliffs, sand dunes, cities, towns, roads, railroads and isolated lighthouses;
- (b) shore lines, lakes, rivers and streams shall be shown; and
- (c) relief depicted in a manner best suited to the particular elevation and obstacle characteristics of the area covered by the chart.

(2) The figures relating to different reference levels shall be clearly differentiated.

Magnetic variation

5. The magnetic variation shall be shown.

Bearings, tracks and radials

6. Bearings, tracks and radials shall be magnetic.

Aeronautical data for aerodromes

7. (1) An aerodrome shall be shown by the runway pattern and abandoned aerodromes shall be identified as abandoned.

(2) Restrictions on the use of any landing direction shall be indicated.

(3) Where the aeronautical data of two or more aerodromes are similar to an extent that would confuse identification one from the other, this shall be indicated.

(4) Aerodrome elevation shall be shown in a prominent position on the chart.

Aeronautical data for obstacles

8. (1) Obstacles shall be shown and identified on a chart.

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

(3) Where the height of an obstacle is shown, the height datum shall be stated in a prominent position on the charts and heights given in parentheses on the chart.

Aeronautical data for prohibited, restricted and danger areas

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

Aeronautical data for designated airspace

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

Aeronautical data for visual approach information

11. (1) Visual approach procedures shall be shown on a chart, where applicable.

(2) Visual aids for navigation shall be shown on a chart, where appropriate.

(3) Location and type of the visual approach slope indicator systems shall be shown with associated:

(a) nominal approach slope angle;

(b) minimum eye height over the threshold of the on-slope signal; and

(c) the angle and direction of displacement, left or right, where the axis of the system is not parallel to the runway centre line.

Aeronautical data for Supplementary information

12. (1) Radio navigation aids together with associated frequencies and identifications shall be shown, where appropriate.

(2) Radio communication facilities with associated frequencies shall be shown, where appropriate.

PART I

(Regulation 37)

AERODROME/HELIPORT CHART – ICAO

The standards required to be met on Aerodrome or Heliport Charts—ICAO are as follows:

Coverage and scale

1. The chart shall use a linear scale which shall in addition to the coverage be sufficiently large to show clearly all the elements listed in subclause 4(1).

Identification

2. A chart shall be identified by—

- (a) the name of the city or town, or area, which the aerodrome or heliport serves; And
- (b) the name of the aerodrome or heliport.

Magnetic variation

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

Data for aerodrome or heliport

4. (1) The following shall be shown on a chart:

- (a) geographical coordinates in degrees, minutes and seconds for the aerodrome or heliport reference point;
- (b) elevations, to the nearest foot, of the aerodrome or heliport and apron altimeter checkpoint locations where applicable and for non-precision approaches, elevation and geoid undulations of runway threshold and the geometric centre of the touchdown and lift-off area;
- (c) elevation and geoid undulation, to the nearest foot—
 - (i) of the precision approach runway threshold;
 - (ii) of the geometric centre of the touchdown and lift-off area; and
 - (iii) at the highest elevation of the touchdown zone of a precision approach runway;
- (d) all runways including those under construction with designation number, length and width to the nearest metre, bearing strength, displaced thresholds, stopways, clearways, runway directions to the nearest degree magnetic, type of surface and runway markings;
- (e) all aprons, with aircraft or helicopter stands, lighting, markings and other visual guidance and control aids, where applicable, including location and type of visual docking guidance systems, type of surface for heliports, and bearing strengths or aircraft type restrictions where the bearing strength is less than that of the associated runways;

- (f) geographical coordinates in degrees, minutes and seconds for threshold, geometric centre of touchdown and lift-off area and threshold of the final approach and take-off area where appropriate;
 - (g) all taxiways, helicopter air and ground taxiways with type of surface, helicopter air transit route, with designation, width, lighting, markings, including runway-holding positions and where established, intermediate holding positions stop bars, other visual guidance and control aids, and bearing strength or aircraft type restrictions where the bearing strength is less than that of the associated runways;
 - (h) geographical coordinates in degrees, minutes, seconds and hundredths of seconds for appropriate taxiway centre line point and aircraft stand;
 - (i) where established, standard routes for taxiing aircraft with associated designators;
 - (j) the boundaries of the air traffic control service;
 - (k) position of RVR observation sites;
 - (l) approach and runway lighting;
 - (m) location and type of the visual approach slope indicator systems with associated nominal approach slope angle, minimum eye height over the threshold of the on-slope signal, and the angle and direction of the displacement, left or right where the axis of the system is not parallel to the runway centre line;
 - (n) relevant communication facilities listed with their channels and, where applicable, logon address
 - (o) obstacles to taxiing;
 - (p) aircraft servicing areas and buildings of operational significance;
 - (q) VOR checkpoint and radio frequency of the aid concerned;
 - (r) any part of the depicted movement area permanently unsuitable for aircraft, clearly identified as such; and
 - (s) where established, hot spot locations with additional information properly annotated in tabular form on the face or verso of the chart.
- (2) In addition to those items applicable to heliports in subclause (1), a chart shall show:
- (a) heliport type;
 - (b) touchdown and lift-off area including dimensions to the nearest metre, slope, type of surface and bearing strength in tonnes;
 - (c) final approach and take-off area including type, true bearing to the nearest degree, designation number where appropriate, length and width to the nearest metre, slope and type of surface;
 - (d) safety area including length, width and type of surface;
 - (e) helicopter clearway including length and ground profile;

- (f) obstacles including type and elevation of the top of the obstacles to the next higher foot;
- (g) visual aids for approach procedures, marking and lighting of final approach and take-off area, and of touchdown and lift-off area; and
- (h) declared distances to the nearest metre for heliports, where relevant, including—
 - (i) take-off distance available;
 - (ii) rejected take-off distance available; and
 - (iii) landing distance available.

PART J

(Regulation 37A)

AERONAUTICAL CHART – ICAO 1:500 000

The Standards required for Aeronautical Chart – ICAO 1:500 000 are as follows:

Scale

1. (1) Linear scales for kilometres and nautical miles arranged in the following order:
 - (a) kilometres; and
 - (b) nautical miles,

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

- (2) A conversion scale (metres or feet) shall be shown in the margin.

Format

2. (1) The title and marginal notes shall be in the English Language.
 - (2) The information regarding the number of the adjoining sheets and the unit of measurement used to express elevation shall be so located as to be clearly visible when the sheet is folded.

Projection

3. (1) A conformal or orthomorphic projection shall be used.
 - (2) Parallels shall be shown at intervals of thirty minutes.
 - (3) Meridians shall normally be shown at intervals of thirty minutes.
 - (4) Graduation marks shall be shown at one minute intervals along each whole degree meridian and parallel, extending away from the Greenwich Meridian and from the Equator and each ten minute interval shall be shown by a mark on both sides of the graticule line.
 - (5) All meridians and parallels shown shall be numbered in the borders of the chart.
 - (6) The name and basic parameters of the projection shall be indicated in the margin.

Identification

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

Culture and Topography

5. (1) In built-up areas, cities, towns and villages shall be selected and shown on the chart according to their relative importance to visual air navigation.
 - (2) All railroads having landmark value shall be shown on the chart.

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

Note 2: Railroads may be named.

Note 3: Rail stations may be shown.

(3) Tunnels shall be shown on the chart when they serve as prominent landmarks.

Note: A descriptive note may be added, if necessary to accentuate this feature.

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

Note 1: Roads under construction may be shown.

Note 2: The number or names of important highways may be shown.

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

Note: Descriptive notes may be added.

(6) International boundaries shall be shown on the chart and un-demarcated or undefined boundaries shall be distinguished by descriptive notes.

Note: Other boundaries may be shown.

(7) Hydrograph information such as water features compatible with the scale of the chart comprising shore lines, lakes, rivers and streams including those that are non-perennial in nature, salt lakes, glaciers and ice caps shall be shown the chart.

(8) Contours shall be shown on the chart with the selection of intervals governed by the requirement to depict clearly the relief features required in air navigation.

(9) The values of the contours used shall be shown on the chart.

(10) When hypsometric tints are used, the range of elevations for the tints shall be shown on the chart and the scale used shown in the margin.

(11) Spot elevations shall be shown on the chart at selected critical points.

(12) The elevation selected in subclause (11) shall always be the highest in the immediate vicinity and shall generally indicate the top of a peak and ridge.

(13) Elevations in valleys and at lake surface levels which are of navigational value shall be shown on the chart.

(14) The position of each selected elevation shall be indicated by a dot on the chart.

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

(16) Areas on the chart that have not been surveyed for contour information shall be labelled "Relief data incomplete".

(17) 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 should be used with caution”.

(18) Wooded areas shall be shown with the approximate northern or southern limits of tree growth indicated by a dashed black line and appropriately labelled.

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

Magnetic Variation

8. (1) Isogonic lines shall be shown on the chart.

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

Aeronautical Data

9. (1) Aeronautical information shall be shown consistent with the use of the chart and the revision cycle.

(2) 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.

(3) 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.

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

(5) Objects of a height of 300 feet and more above ground shall be shown as obstacles on the chart.

(6) When considered of importance to visual flight, prominent transmission and permanent cable car installations, which are obstacles, shall be shown on the chart.

(7) Prohibited, restricted and danger areas shall be shown on the chart.

(8) 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 on the chart together with the appropriate class of airspace.

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

(10) Radio navigation aids shall be shown on the chart 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.

(11) Aeronautical ground lights together with their characteristics or identifications or both shall be shown on the chart.

(12) Marine lights on outer prominent coastal or isolated features of not less than 28 kilometres or 15 nautical miles visibility range shall be shown on the chart –

- (a) where they are not less distinguishable than more powerful marine lights in the vicinity;
- (b) where they are readily distinguishable from other marine or other types of lights in the vicinity of built-up coastal areas; or
- (c) where they are the only lights of significance available.

PART K

(Regulation 37B)

AERODROME TERRAIN AND OBSTACLE CHARTS – ICAO (ELECTRONIC)

The Standards required for Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) are as follows:

Function

1. The function of the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be to portray the terrain and obstacle data in combination with aeronautical data, as appropriate, necessary to –

- (a) enable an operator to comply with the aircraft performance limitations by developing contingency procedures for use in the event of an emergency during a missed approach or take-off, and by performing aircraft operating limitations analysis; and
- (b) support the following air navigation applications:
 - (i) instrument procedure design including circling procedure;
 - (ii) aerodrome obstacle restriction and removal; and
 - (iii) provision of source data for the production of aeronautical charts.

Availability

2. Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall –

- (a) be made available for all aerodromes regularly used by international civil aviation from 18th November 2010;
- (b) be made available in hard copy format upon request;
- (c) use ISO 19100 series of standards for geographic information as a general data modelling framework.

Note: The use of ISO 19100 series of standards for geographic information supports the inter-change and use of the Aerodrome Terrain and Obstacle Chart – ICAO (Electronic) among different users.

Identification

3. Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be identified by –

- (a) the name of the country in which the aerodrome is located;
- (b) the name of city or town which the aerodrome serves; and
- (c) the name of the aerodrome.

Chart Coverage

4. The extent of each Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be sufficient to cover Area 2 as specified in Clause 2 of Part H of Schedule 3 in the Regulations.

Chart Content

5. (1) Where computer graphic applications are being developed to portray features on the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic), the relationships between features, feature attributes, and the underlying spatial geometry and associated topological relationships shall be specified by an application schema.

(2) Portrayed information on the Aerodrome Terrain and Obstacle Charts ICAO (Electronic) shall be provided on the basis of portrayal specifications applied according to defined portrayal rules.

(3) Portrayal specifications and portrayal rules shall not be part of the data set of the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic).

(4) Portrayal rules of the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be stored in a portrayal catalogue which shall make reference to separately-stored portrayal specifications.

Note: ISO Standards 19117 contains a definition of the schema describing the portrayal mechanism of feature-based geographic information, ISO Standards 19109 contains rules for application schema and ISO Standards 19107 defines spatial geometry and associated topographical relationships.

(5) Symbols used to portray features on the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be in accordance with Clause 4 of Part A of Schedule 3 in the regulations and Appendix 2 of Part A of Schedule 3 in the Regulations.

6. (1) The terrain feature, and associated attributes, to be portrayed and database linked to the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be based on the electronic terrain data sets which satisfy the requirements of Part H of Schedule 2 of the Regulations.

(2) The terrain feature on the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be portrayed in a manner that provides an effective general impression of a terrain.

(3) The portrayal of the terrain features on the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be a presentation of terrain surface by continuous elevation values at all intersections of the defined grid, also known as the Digital Elevation Model (DEM).

7. The portrayed terrain feature of the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be linked to the following associated attributes in the database:

- (a) horizontal positions of grid points in geographic co-ordinates and elevations of the points;
- (b) surface type;
- (c) contour line values, where provided; and
- (d) names of cities, towns and other prominent topographic features.

8. (1) Obstacle features, and associated attributes, portrayed or database linked to the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be based on electronic obstacle data sets which satisfy the requirements of Part H of Schedule 2 of the Regulations.

(2) Each obstacle shall be portrayed by an appropriate symbol and obstacle identifier on the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic).

(3) The portrayed obstacle feature of the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be linked to the following associated attributes in the database:

- (a) horizontal position in geographic co-ordinates and associated elevation;
- (b) obstacle type; and
- (c) obstacle extent, where appropriate.

9. (1) Aerodrome features, and associated attributes, portrayed and database linked to the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be based on aerodrome data which satisfy the requirements of Annex 14, Volume I, Appendix 5 and the Appendix to Part A of Schedule 2 of the Regulations.

(2) The following aerodrome features of the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be portrayed by an appropriate symbol:

- (a) aerodrome reference point;
- (b) runways, with designation numbers, and where available, stopways and clearways; and
- (c) taxiways, aprons, large buildings and other prominent aerodrome features.

(3) The portrayed aerodrome feature of the Aerodrome Terrain and Obstacle Charts – ICAO (Electronic) shall be linked to the following associated attributes in the database:

- (a) geographical co-ordinates of the aerodrome reference point;
- (b) aerodrome magnetic variation, year of information and annual change;

Note: Magnetic variation may be database linked to the aerodrome reference point.

- (c) length and width of runways, stopways and clearways;
- (d) type of surface of runways and stopways;
- (e) magnetic bearings of the runways to the nearest degree;
- (f) elevations at each end of runway(s), stopways and clearways, and at each significant change in slope of runways and stopways; and
- (g) declared distances for each runway direction, or the abbreviation “NU” where a runway direction cannot be used for take-off or landing or both.

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

Note: Navigation aid feature attributes may be linked to the portrayed navigation aid features in the databases.

Accuracy and resolution

11. (1) The order of accuracy of aeronautical data shall be as specified in Appendix 5, Part A, Schedule 1 of the Regulations and Annex 14, Volume I, Appendix 5 and Volume II, Appendix 1.

(2) The order of accuracy of terrain and obstacle data shall be as specified in Part H of Schedule 2 in the Regulations.

(3) The aeronautical data resolution shall be as specified in the Appendix to Part A of Schedule 2 in the Regulations while the resolution for terrain and obstacle data shall be as specified in the Appendix to Part H of Schedule 2 in the Regulations.

Electronic functionality

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

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

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

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

(5) To avoid clutter of information and where the details necessary to support the function of the chart cannot be shown with sufficient clarity on a single comprehensive chart view, selectable information layers shall be provided to allow for the customized combination of information.

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

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

Note 1: Printed output may be 'tiled' sheets or specific selected areas according to user requirements.

Note 2: Feature attribute information available through database link may be supplied separately on appropriately reference sheets.

Chart data product specifications

13. (1) A comprehensive statement of the data sets comprising the chart shall be provided in the form of data product specifications on which basis air navigation users will be able to evaluate the chart data product and whether it fulfills the requirements for its intended use or application.

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

Note: ISO Standard 19131 specifies the requirements and outline of data product specifications for geographic information.

(3) The overview of the chart data product specifications shall provide an informal description of the product and shall contain general information about the data product.

(4) The specification scope of the chart data product specifications shall contain the spatial (horizontal) extent of the chart coverage.

(5) The chart data product identification shall include the title of the product, a brief narrative summary of the content and purpose, and a description of the geographic area covered by the chart.

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

Note: ISO Standard 19123 contains schema for coverage geometry and functions.

(7) The chart data product specifications shall include information that defines the reference systems used.

(8) The reference system referred to in subclause (7) shall include the spatial reference system (horizontal and vertical) and, where appropriate, temporal reference system.

(9) The chart data product specifications shall identify the data quality requirement and include a statement on acceptable conformance quality levels and corresponding data quality measures covering all the data quality elements and data quality sub-elements, even if only to state that a specific data quality element or sub-element is not applicable.

Note: ISO Standard 19113 contains quality principles for geographic information and ISO Standard 19114 covers quality evaluation procedures.

(10) The chart data product specifications shall include a data statement which shall be a general description of the sources and of processes applied for the capture of chart data.

(11) The principles and criteria applied in the maintenance of the shall also be provided in the chart data product specifications, including the frequency with which the chart product is updated particularly the maintenance information of obstacle data sets included on the chart and an indication of the principles, methods and criteria applied for obstacle data maintenance.

(12) The chart data product specifications shall contain –

(a) information on how data are portrayed on the chart, as detailed in clause 5; and

(b) data product delivery information including delivery formats and delivery medium information.

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

Note 1: ISO Standard 19115 specifies requirements for geographic information metadata.

Note 2: The chart data product specifications document in the chart data product which is implemented as a data set which is described by metadata.

- **END** -