



MEMORANDUM CIRCULAR NO.: 29-18

TO : ALL CONCERNED

FROM : DIRECTOR GENERAL

SUBJECT : AMENDMENT TO PHILIPPINE CIVIL AVIATION REGULATIONS - AIR NAVIGATION SERVICES (CAR-ANS) PART 4 INCORPORATING AMENDMENT 60 TO ICAO ANNEX 4 AND OTHER SUPPLEMENTARY AMENDMENTS

REFERENCE:

1. Philippine Civil Aviation Regulations- Air Navigation Services Part 4, Issue 3 Amendment No. 4
2. ICAO Annex 4; Amendment 60
3. CAAP Regulations Amendment Procedures
4. Board Resolution No. 2012-054 dated 28 September 2012

Pursuant to the powers vested in me under the Republic Act 9497, otherwise known as the Civil Aviation Authority Act of 2008 and in accordance with the Board Resolution No.: 2012-054 dated 28 September 2012, I hereby approve the incorporation of ICAO Annex 4 Amendment No. 60 and other supplementary amendments to the Philippine Civil Aviation Regulations – Air Navigation Services (CAR-ANS) Part 4.

ORIGINAL REGULATION SUBJECT FOR REVIEW AND REVISION:

CAR-ANS Part 4

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4.1 DEFINITIONS, APPLICABILITY AND AVAILABILITY

4.1.1 Definitions

The following words and phrases as used in this ~~Administrative Order~~ **CAR-ANS** shall have the following meanings:

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Area navigation (RNAV). A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

Note.— Area navigation includes performance-based navigation as well as other operations that do not meet the definition of performance-based navigation.

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Data quality. A degree or level of confidence that the data provided meet the requirements of the data user in terms of accuracy, resolution, integrity (or equivalent assurance level), traceability, timeliness, completeness and format.

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Data resolution. A number of units or digits to which a measured or calculated value is expressed and used.

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Data set series. Collection of data sets sharing the same product specification (ISO 19115*).

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Displaced threshold. A threshold not located at the extremity of a runway.

Electronic aeronautical chart display. An electronic device by which flight crews are enabled to execute, in a convenient and timely manner, route planning, route monitoring and navigation by displaying required information.

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Logon address. A specified code used for data link logon to an ATS unit.

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

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

Area navigation (RNAV) specification. A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.

Note 1.— The Performance-based Navigation (PBN) Manual (Doc 9613), Volume II, contains detailed guidance on navigation specifications.

Note 2.— The term RNP, previously defined as “a statement of the navigation performance necessary for operation within a defined airspace”, has been removed from this Annex as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this Annex is now solely used in the context of navigation specifications that require performance monitoring and alerting, e.g. RNP 4 refers to the aircraft and operating requirements, including a 4 NM lateral performance with on-board performance monitoring and alerting that are detailed in Doc 9613.

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Performance-based navigation (PBN). Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

Note.— Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.

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Procedure altitude/height. ~~A specified altitude/height flown operationally at or above the minimum altitude/height and established to accommodate a stabilized descent at a prescribed descent gradient/angle in the intermediate/final approach segment. A published altitude/height used in defining the vertical profile of a flight procedure, at or above the minimum obstacle clearance altitude/height where established.~~

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Reporting point. A specified (named) geographical location in relation to which the position of an aircraft can be reported.

Note.— There are three categories of reporting points: ground-based navigation aid, intersection and waypoint. In the context of this definition, intersection is a significant point expressed as radials, bearings and/or distances from ground-based navigation aids. A reporting point can be indicated as “on request” or as “compulsory”.

~~**Required navigation performance (RNP).** A statement of the navigation performance necessary for operation within a defined airspace.~~

~~*Note.— Navigation performance and requirements are defined for a particular RNP type and/or application.*~~

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4.1.3 AVAILABILITY

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4.1.3.2 *Charts.* The Philippines shall, when so specified, ensure the availability of charts in whichever of the following ways is appropriate for a particular chart or single sheet of a chart series.

Note.— The availability of charts includes specified electronic charts.

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

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4.2 GENERAL SPECIFICATIONS

4.2.1 Operational requirements for charts

Note.— ~~f~~For the purpose of this administrative order CAR-ANS, the total flight is divided into the following phases:

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

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

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4.2.1.4 Colors 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.

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4.2.2 Titles

The title of the chart or chart series prepared in accordance with the specifications contained in this ~~Civil Aviation Regulation~~ CAR-ANS are intended to satisfy the function of the chart, shall be that of the relevant chapter heading as modified by application of any Standard contained therein, except that such title shall not include “ICAO” unless the chart conforms with all standards specified in this Chapter 4.2 and any specified for the particular specified chart.

4.2.3 Miscellaneous information

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

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4.2.4 Symbols

4.2.4.1 Symbols used shall conform to those shown in Appendix 2 – ICAO Chart Symbols of this ~~Civil Aviation Regulation~~ CAR-ANS, except that where it was desired to show on an aeronautical chart special features or items of importance to civil aviation for which no 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.

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

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

4.2.4.4 States shall ensure that as of 18 November 2010, symbols are shown in the manner specified in 4.2.4.2, 4.2.4.3 and Appendix 2 — ICAO Chart Symbols, symbol number 121.

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4.2.11 Colors

4.2.11.1 Colors used on charts shall conform to Appendix 3 - Color guide of this ~~administrative order~~ CAR-ANS.

4.2.12 Relief

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4.2.12.2 Where relief is shown by hypsometric tints, the tints shall be based on those shown in the Hypsometric Tint Guide in Appendix 4 of this ~~administrative order~~ CAR-ANS.

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4.2.14 Air traffic services airspaces

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

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4.2.15 Magnetic variation

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

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

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

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4.2.17 Aeronautical data

4.2.17.1 CAAP or aeronautical chart producing company 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 CAR-ANS Part 15, 15.3.4-7.6. The execution of such management shall be made demonstrable of for each function stage when required. In addition, CAAP or aeronautical chart producing company shall ensure that established procedures exist in order that aeronautical data at any moment are traceable to its origin so to allow any data anomalies or error, detected during the production/maintenance phases or in the operational use, be corrected.

Note—Specifications governing the quality system are given in CAR-ANS Part 15, 15.3.

4.2.17.2 CAAP shall ensure that the order of chart resolution of aeronautical data shall be that as specified for a particular chart and as presented in tabular form in Appendix 6.

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

4.2.17.3 CAAP shall ensure that integrity of aeronautical data is maintained throughout the data process from survey/origin origination to distribution to the next intended user. Based on the applicable integrity classifications, the validation and verification procedures shall:

- a) for routine data: avoid corruption throughout the processing of the data;
- b) for essential data: assure corruption does not occur at any stage of the entire process and may include additional processes as needed to address potential risks in the overall system architecture to further assure data integrity at this level; and
- c) for critical data: assure corruption does not occur at any stage of the entire process and include additional integrity assurance processes to fully mitigate the effects of faults identified through analysis of the overall system architecture as potential data integrity risks.

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

Note 1.— Guidance material in respect to the processing of aeronautical data and aeronautical information is contained in RTCA Document DO-200A and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-76—Standards for Processing Aeronautical Data.

Note 2.— Error producing faults in the entire process may be mitigated by additional data quality assurance techniques as may be required. These could include application tests for critical data (for example, by flight check); the use of security, logic, semantic, comparison, and redundancy checks; digital error detection; and the qualification of human resources and process tools such as hardware and software.

4.2.17.4 Aeronautical data quality requirements related to the integrity and data classification shall be as provided in Tables 1 to 6 in Appendix 6.

4.2.17.54 Electronic aeronautical data sets, shall be protected by the inclusion in the data sets of a 32-bit cyclic redundancy check (CRC) implemented by the application dealing with the data sets. This shall apply to the protection of all integrity levels of data sets as specified in 4.2.17.3. To achieve protection of the integrity level of routine aeronautical data as classified in 4.2.17.3, a 16-bit algorithm should apply. Digital data error detection techniques shall be used during the transmission and/or storage of aeronautical data and digital data sets.

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

Note.— Guidance material in aeronautical data quality requirements {accuracy, resolution, integrity, protection and traceability} is contained in the World Geodetic System—1984 {WGS-84} Manual {Doc 9674}. Supporting material in respect to the provision of appendix 6 related to chart resolution and integrity of aeronautical data is contained in RTCA Document DO-201A and European organization for Civil Aviation Equipment {EUROCAE} Document ED-77—Industry Requirements for Aeronautical Information.

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4.2.18 Common reference systems

4.2.18.1 Horizontal reference system

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4.2.18.1.2 Geographical coordinates which have been transformed into WGS-84 coordinates but whose accuracy of original field work does not meet the requirements in CAR-ANS Part 11, 11-1.2.1 and CAAP MOS Aerodromes Chapter 1 Section 1.2 shall be identified by asterisk.

4.2.18.1.3 The order of chart resolution of geographical coordinates shall be that specified for a particular chart series and in accordance with Appendix 6, Table 1.

Note 1 — Specifications governing concerning the determination and reporting (accuracy of field work and data integrity) of WGS-84 related aeronautical coordinates for geographical positions established by Air Traffic Service are given in CAR-ANS Part 11, Appendix 11.5 Table 1 Chapter 11.2: and for aerodrome/ heliport- related positions, in Annex 14, Volume I

and H, Chapter 2 CAAP MOS Aerodromes and in Table 1 of Appendices 5 and 1 respectively.

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

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4.2.18.2 Vertical reference system

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

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

Note 2.— Gravity-related heights {elevations} are also referred to as orthometric heights while distances of points above the ellipsoid are referred to as ellipsoidal heights.

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

Note 1 — Specifications governing concerning the determination and reporting (accuracy of field work and data integrity) of elevation and geoid undulation at the specific position at aerodromes/heliports are given in CAAP MOS Aerodromes Annex 14, Volumes I and II, and Table 2 Appendices 5 and 1 respectively.

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

4.2.18.2.3 The order of chart resolution of elevation and geoid undulation shall be that specified for a particular chart series and in accordance with Appendix 6, Table 2.

Note.— Specifications concerning the chart resolution of elevation and geoid undulation are contained in PANS-AIM (Doc 10066), Appendix 1.

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4.3 AERODROME OBSTACLE CHART — ICAO TYPE A (OPERATING LIMITATIONS)

4.3.1 Function

This chart, in combination with the Aerodrome Obstacle Chart — ICAO Type C or with the relevant information published in the AIP, shall provide the data necessary to enable an operator to comply with the operating limitations of Annex 6, Parts I and H, Chapter 5, and Part III, Section II, Chapter 3.

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4.3.3 Units of Measurement

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4.3.3.2 ~~Where a chart is not required because no obstacles exist in the take-off flight path area, a notification to this effect shall be published.~~ Linear dimensions shall be shown to the nearest half-meter.

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4.3.5 Format

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4.3.5.4 The chart shall include:

a) a box for recording the operational data specified in 4.3.8.3;

b) a box for recording amendments and dates thereof.

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4.3.8 Aeronautical data

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4.3.8.4 Plain and profile views

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4.3.9 Accuracy

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4.3.9.2 The horizontal dimensions and the elevations of the runway, stopway and clearway to be printed on the chart ~~should~~ shall be determined to the nearest 0.5 m (1.5 ft).

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4.4.9 Aeronautical data

4.4.9.1 The chart shall show:

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l) take-off and approach areas;

Note.— The take-off area is described in 4.3.8.2.1. The approach area consists of an area on the surface of the earth lying directly below the approach surface as specified in CAAP MOS Aerodromes, Chapter 7. ~~The approach area consists of an area on the surface as specified in CAAP MOS Aerodromes Chapter 7.~~

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4.4 AERODROME OBSTACLE CHART — ICAO TYPE B

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4.4.10 Accuracy

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4.4.10.2 The horizontal dimensions and the elevations of the movement area, stopways and clearways to be printed on the chart ~~should~~ shall be determined to the nearest 0.5 m (1.5 ft).

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4.5 AERODROME TERRAIN AND OBSTACLE CHART — ICAO (ELECTRONIC)

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4.5.4 Chart coverage

4.5.4.1 The extent of each chart shall be sufficient to cover Area 2 as specified in CAR-ANS Part 15, ~~45.10.2~~ 15.5.

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4.5.5 Chart content

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4.5.5.2 Terrain feature

4.5.5.2.1 The terrain feature, and associated attributes, to be portrayed and database linked to the chart shall be based on the electronic terrain data sets which satisfy the requirements of CAR-ANS Part 15, 15.5 and Appendix 5G.

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

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

Note. — In accordance with CAR-ANS Part 15, 15.5 and Appendix 5G, and PANS-AIM (Doc 10066), Chapter 5 and Appendices 1 and 8, the DEM for Area 2 post spacing (grid) is specified at 1 arc second (approximately 30 m).

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4.5.5.2.6 Other Additional terrain attributes specified in CAR-ANS Part 15 Table 15G-3 and provided in the database(s) should shall be linked to the portrayed terrain feature.

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

4.5.5.3 Obstacle features

4.5.5.3.1 Obstacle features, and associated attributes, portrayed or database-linked to the chart shall be based on electronic obstacle data sets which satisfy the requirements of CAR-ANS Part 15, Table 15G-3 15.5.

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

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4.5.5.3.4 Other Additional obstacle attributes specified in CAR-ANS Part 15 Table 15G-4 and provided in the database(s) should be linked to the portrayed obstacle feature.

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

4.5.5.4 Aerodrome features

4.5.5.4.1 Aerodrome features, and associated attributes, portrayed and database-linked to the chart shall be based on aerodrome data which satisfy the requirements of Annex 14, Volume I, Appendix 5 and CAR-ANS Part 15, Appendix 15F. CAR-ANS Part 15, 15.5.

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

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4.5.6 Accuracy and resolution

4.5.6.1 The order of accuracy of aeronautical, terrain and obstacle data shall be in accordance

with its intended use as specified in CAR-ANS Part 11, Appendix 11.5 and Annex 14, Volume I, Appendix 5 and Volume II, Appendix 1. The order of accuracy of terrain and obstacle data shall be as specified in CAR-ANS Part 15, Appendix 15G.

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

4.65.56.2 The aeronautical, terrain and obstacle data resolution shall be commensurate with the actual data accuracy as specified in CAR-ANS Part 15, Appendix 15F while the resolution for terrain and obstacle data shall be as specified in CAR-ANS Part 15, Appendix 15G.

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

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4.7 ENROUTE CHART — ICAO

4.7.1 Function

This chart shall provide flight crews with information to facilitate navigation along ATS routes in compliance with air traffic services procedures ~~the determination of minimum safe altitudes/heights including those for circling procedures.~~

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4.7.8 Bearings, tracks and radials

4.7.8.1 Bearings, tracks and radials shall be magnetic, ~~except as provided for in 7.8.2.~~ Where bearings and tracks are additionally provided as true values for RNAV segments, they shall be shown in parentheses to the nearest tenth of a degree, e.g. 290° (294.9°T).

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4.7.9 Aeronautical data

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4.7.9.3.21.1 The components shall include the following:

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

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

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

...

10) minimum en-route altitudes and minimum obstacle clearance altitudes, on ATS routes to the nearest higher 50 meters or 100 feet (see Annex CAR-ANS Part 11, 11.2.242);

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4.8 AREA CHART — ICAO

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4.8.6 Culture and topography

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4.8.6.2 To improve situational awareness in areas where significant relief exists, all relief exceeding 300 m (1 000 ft) above the elevation of the primary aerodrome ~~should~~ shall be shown by smoothed contour lines, contour values and layer tints printed in brown. Appropriate spot elevations, including the highest elevation within each top contour line, ~~should~~ shall be shown printed in black. Obstacles ~~should~~ shall also be shown.

...

4.8.8 Bearings, tracks and radials

4.8.8.1 Bearings, tracks and radials shall be magnetic, ~~except as provided for in 8.8.2.~~ Where bearings and tracks are additionally provided as true values for RNAV segments, they shall be shown in parentheses to the nearest tenth of a degree, e.g. 290° (294.9°T).

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4.8.9 Aeronautical data

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4.9.8.9.2 Prohibited, restricted and danger areas

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4.9 STANDARD DEPARTURE CHART — INSTRUMENT (SID) — ICAO

4.9.1 Function

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

Note 1.— Provisions governing the identification of standard departure routes are in ~~Annex~~ CAR-ANS Part 11, Appendix 11.3; guidance material relating to the establishment of such routes is contained in the Air Traffic Services Planning Manual (Doc 9426).

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4.9.3 Coverage and Scale

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4.9.3.2 The chart ~~shall~~ may be drawn to scale.

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4.9.8 Bearings, tracks and radials

4.9.8.1 Bearings, tracks and radials shall be magnetic, ~~except as provided for in 9.8.2.~~ Where bearings and tracks are additionally provided as true values for RNAV segments, they shall be shown in parentheses to the nearest tenth of a degree, e.g. 290° (294.9°T).

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

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4.9.9 Aeronautical data

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4.9.9.4.1.1 The components shall comprise the following:

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

...

g) ~~in respect of waypoints defining VOR/DME area navigation routes, additionally~~ where the chart is drawn to scale and vectoring on departure is provided, established minimum vectoring altitudes to the nearest higher 50 m or 100 ft, clearly identified;

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

Note 2.— Where excessive chart clutter will result, an ~~Radar~~ **ATC Surveillance Minimum Altitude Chart — ICAO** may be provided (see Chapter 4.21), in which case the elements indicated by 4.9.9.4.1.1, 1) f), need not be duplicated on the Standard Departure Chart — Instrument (SID) — ICAO.

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k) an indication of “flyover” significant points.

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4.9.9.4.2 A textual description of standard departure route(s) — instrument (SID) and communication failure procedures in relation to radar control ~~should~~ **shall** be provided and ~~should~~ **shall**, whenever feasible, be shown on the chart or on the same page which contains the chart.

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4.10 STANDARD ARRIVAL CHART — INSTRUMENT (STAR) — ICAO

4.10.1 Function

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

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Note 2.— Provisions governing the identification of standard arrival routes are in ~~Annex~~ **CAR-ANS Part 11, Appendix 11.3**; guidance material relating to the establishment of such routes is contained in the Air Traffic Services Planning Manual (Doc 9426).

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4.10.4 Projection

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4.10.4.2 When the chart is drawn to scale, parallels and meridians ~~should~~ **shall** be shown at suitable intervals.

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4.10.5 Identification

4.10.5.1 The chart shall be identified by the name of the city or town, or area, which the aerodrome serves, the name of the aerodrome, and the identification of the standard arrival route(s) € instrument as established in accordance with the *Procedures for Air Navigation Services — Aircraft Operations* (PANS- OPS, Doc 8168), Volume II, Part III, **Section 4, Chapter 32**.

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4.10.8 Bearings, tracks and radials

4.10.8.1 Bearings, tracks and radials shall be magnetic, ~~except as provided for in 10.8.2.~~ Where bearings and tracks are additionally provided as true values for RNAV segments, they shall be shown in parentheses to the nearest tenth of a degree, e.g. 290° (294.9°T).

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

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4.10.9 Aeronautical data

4.10.9.4.1.1 The components shall comprise the following:

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

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

*Note 2.— Where excessive chart clutter will result, an ~~Radar~~ **ATS Surveillance Minimum Altitude Chart** — ICAO may be provided (see Chapter 4.21), in which case the elements indicated by 4.10.9.4.1.1, 1) f), need not be duplicated on the Standard Arrival Chart — Instrument (STAR) — ICAO.*

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4.10.9.4.2 A textual description of standard arrival route(s) — instrument (STAR) and communication failure procedures in relation to radar control ~~should~~ **shall** be provided and ~~should~~ **shall**, whenever feasible, be shown on the chart or on the same page which contains the chart.

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

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4.11 INSTRUMENT APPROACH CHART — ICAO

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4.11.3 Coverage and Scale

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4.11.3.5 A distance scale ~~should~~ **shall** be shown directly below the profile.

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4.11.4 Format

4.11.4.1 The sheet size ~~should~~ **may** be 210 x 148 mm (8.27 x 5.82 in).

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4.11.5 Projection

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4.11.5.2 Graduation marks ~~should~~ **shall** be placed at consistent intervals along the neat lines.

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4.11.8 Magnetic variation

4.11.8.1 The magnetic variation ~~should~~ **shall** be shown.

4.11.8.2 ~~When shown, the~~ **The** value of the variation, indicated to the nearest degree, shall agree with that used in determining magnetic bearings, tracks and radials.

...

4.11.9 Bearings, tracks and radials

4.11.9.1 Bearings, tracks and radials shall be magnetic, ~~except as provided for in 11.9.2.~~ Where bearings and tracks are additionally provided as true values for RNAV segments, they shall be shown in parentheses to the nearest tenth of a degree, e.g. 290° (294.9°T).

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

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4.11.10 Aeronautical data

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4.11.10.2.4 The heights of obstacles above a datum other than mean sea level (see 4.11.10.2.3) ~~should~~ shall be shown. When shown, they ~~should~~ shall be given in parentheses on the chart.

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4.11.10.4.3 The final approach fix (or final approach point for an ILS approach procedure) ~~should~~ may be identified with its ~~geographical coordinates in degrees, minutes and seconds distance (in nautical miles) from the DME.~~

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4.11.10.6.1 The plan view shall show the following information in the manner indicated:

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 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 kilometer or 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 maneuvering (circling) is prohibited;

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

h) caution notes where required, prominently displayed on the face of the chart.;

i) an indication of “flyover” significant points.

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4.11.10.6.5 The profile view ~~should~~ shall include a ground profile or a minimum altitude/height portrayal as follows:

...

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

4.11.10.8.4 A rate of descent table ~~should~~ shall be shown.

...

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

Note.— ~~See Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II, about additional requirements when glide path angles/elevations exceed 3.5 degrees.~~

...

4.11.10.9 Aeronautical database requirements

Appropriate data to support navigation database coding shall be published in accordance with the *Procedures for Air Navigation Services — Aircraft Operations* (PANS-OPS, Doc 8168), Volume II, Part III, Section 5, Chapter 2, 2.3 for RNAV procedures and Volume II, Part I, Section 4, Chapter 9, 9.4.1.43, for non-RNAV procedures, on the verso of the chart or as a separate, properly referenced sheet.

...

4.12 VISUAL APPROACH CHART — ICAO

...

4.12.3 Scale

...

4.12.3.2 The scale ~~should~~ **may** not be smaller than 1: 500,000.

Note - A scale of 1:250,000 or 1:200,000 is preferred.

4.12.3.3 When an Instrument Approach Chart is available for a given aerodrome, the Visual Approach Chart ~~should~~ **shall** be drawn to the same scale.

4.12.7 Culture and topography

...

4.12.7.1.1 Geographical place names ~~should~~ **shall** be included only when they are required to avoid confusion or ambiguity.

...

4.12.7.4 When shown, spot elevations ~~should~~ **shall** be carefully selected.

...

4.13 AERODROME/HELIPORT CHART — ICAO

...

4.13.6 Aerodrome/heliport data

4.13.6.1 This chart shall show:

...

g) all taxiways, helicopter air and ground taxiways with type of surface, helicopter air transit routes, with designations, width, lighting, markings, (including runway-holding positions and where established, intermediate holding positions), stop bars, other visual guidance and control aids, and bearing strength or aircraft type restrictions where the bearing strength is less than that of the associated runways;

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

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

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

...

4.14 AERODROME GROUND MOVEMENT CHART — ICAO

...

4.14.6 Aerodrome data

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

...

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

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

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

...

4.15 AIRCRAFT PARKING/DOCKING CHART — ICAO

...

4.15.2 Availability

4.15.2.1 The Aircraft Parking/ Docking Chart — ICAO ~~should~~ **shall** be made available in the manner prescribed in 4.1.3.2 where, due to the complexity of the terminal facilities, the information cannot be shown with sufficient clarity on the Aerodrome/Heliport Chart — ICAO or on the Aerodrome Ground Movement Chart — ICAO.

...

4.15.6 Aerodrome data

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

...

d) ~~geographical coordinates in degrees, minutes, seconds and hundredths of seconds for aircraft stands~~ taxiway entries with designations, including runway-holding positions and, where established, intermediate holding positions, and stop bars;

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

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

...

4.16 WORLD AERONAUTICAL CHART — ICAO 1:1 000 000

...

4.16.2 Availability

4.16.2.1 The World Aeronautical Chart — ICAO 1:1 000 000 shall be made available in the manner prescribed in 4.1.3.2 for all areas delineated in Appendix 5.

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

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

...

4.16.4 Format

...

4.16.4.4 Whenever practicable, the sheet lines ~~should~~ shall conform with those shown in the index in Appendix 5.

...

~~4.16.4.5 The sheet lines used shall be notified to ICAO for publication in the ICAO Aeronautical Chart Catalogue (Doc 7101)~~ Overlaps may be provided by extending the chart area on the top and right side beyond the area given on the index. This overlap area should contain all aeronautical, topographical, hydrographical and cultural information. The overlap should extend up to 28 km (15 NM), if possible, but in any case from the limiting parallels and meridians of each chart to the neat line.

...

4.16.5 Projection

...

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

...

4.16.7 Culture and topography

...

4.16.7.1.2 Cities and towns of sufficient size ~~should~~ shall be indicated by the outline of their built-up areas and not of their established city limits.

...

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

...

4.16.7.9.3 The spot elevation of the highest point in any sheet ~~should~~ shall be cleared of hypsometric tinting.

...

4.16.7.12.1 Wooded areas ~~should~~ shall be shown.

...

4.16.9 Aeronautical data

...

4.16.9.3 Obstacles

4.16.9.3.1 Obstacles shall be shown.

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

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

4.16.9.4 Prohibited, restricted and danger areas

Prohibited, restricted and danger areas shall be shown.

4.16.9.5 Air traffic services system

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

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

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

4.16.9.6 Radio navigation aids

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

4.16.9.7 Supplementary information

4.16.9.7.1 Aeronautical ground lights together with their characteristics or their identifications or both shall be shown.

4.16.9.7.2 Marine lights on outer prominent coastal or isolated features of not less than 28 km (15 NM) visibility range shall be shown:

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;

c) where they are the only lights of significance available.

...

4.17 AERONAUTICAL CHART — ICAO 1:500 000

...

4.17.3 Scales

4.17.3.1 Linear scales for kilometers and nautical miles arranged in the following order:

- kilometers,

- nautical miles,

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

4.17.3.1.1 The length of the linear scale ~~should~~ shall be not less than 200 mm (8 in).

...

4.17.4 Format

...

4.17.4.3 The method of folding ~~should~~ shall be as follows:

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

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

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

...

4.17.5 Projection

...

4.17.5.4.1 The length of the graduation marks ~~should~~ shall be approximately 1.3 mm (0.05 in) for the 1' intervals, and 2 mm (0.08 in) for the 5' intervals and 2 mm (0.08 in) extending on both sides of the graticule line for the 10' intervals.

...

4.17.5.5.1 Each meridian and parallel ~~should~~ shall be numbered within the body of the chart whenever this data is required operationally.

...

4.17.6 Identification

...

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

...

4.17.7 Culture and topography

4.17.7.1 Built-up areas

...

4.17.7.3.2 Roads ~~should~~ shall not be shown in built-up areas unless they can be distinguished from the air as definite landmarks.

...

4.17.7.4 Landmarks

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

...

4.17.7.6.2 The tint covering large open water areas should shall be kept very light.

...

4.17.7.9.3 The spot elevation of the highest point on any sheet should shall be cleared of hypsometric tinting.

...

4.18 AERONAUTICAL NAVIGATION CHART — ICAO SMALL SCALE

...

4.18.3 Coverage and scale

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

...

4.18.6 Culture and topography

...

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

...

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

...

4.18.6.4 Landmarks

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

...

4.18.6.6.1 All water features compatible with the scale of the chart comprising shore lines, lakes, rivers and streams (including those non-perennial in nature), and salt lakes, glaciers and ice caps shall be shown.

4.18.6.6.2 The tint covering large open water areas should shall be kept very light.

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

...

4.18.6.9.3 The spot elevation of the highest point in any sheet should shall be cleared of hypsometric tinting.

...

4.18.8 Aeronautical data

...

4.18.8.4.1 Significant elements of the air traffic services system ~~should~~ shall be shown when considered to be of importance to air navigation.

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

...

4.19 PLOTTING CHART — ICAO

...

4.19.2 Availability

4.19.2.1 This chart ~~should~~ shall be made available, in the manner prescribed in 4.1.3.2, to cover major air routes over oceanic areas and sparsely settled areas used by international civil aviation.

...

4.19.3 Coverage and scale

4.19.3.1 Where practicable, the chart for a particular region ~~should~~ shall cover major air routes and their terminals on a single sheet.

4.19.3.2 The scale ~~should~~ shall be governed by the area to be covered.

...

4.19.4 Format

4.19.4.1 The sheet ~~should~~ shall be of a size that can be adapted for use on a navigator's plotting table.

...

4.20 ELECTRONIC AERONAUTICAL CHART DISPLAY — ICAO

...

4.20.2 Information available for display

4.20.2.1 The Electronic Aeronautical Chart Display — ICAO shall be capable of displaying all aeronautical, cultural and topographic information required by CAR-ANS Part 4, Chapter 4.5 and Chapters 4.7 through 4.19.

~~4.20.2.2 The Electronic Aeronautical Chart Display — ICAO should be capable of displaying all aeronautical, cultural and topographic information recommended by Annex 4, Chapter 5 and Chapters 7 through 19.~~

Note. — The Electronic Aeronautical Chart Display — ICAO may display supplementary information, in addition to that required for the equivalent paper chart, which may be considered useful for safe navigation.

...

4.20.3 Display requirements

...

4.20.3.5.1 The effective size of the chart presentation shall be sufficient to display the information required by 4.20.2 without excessive scrolling.

...

4.21 ATC SURVEILLANCE MINIMUM ALTITUDE CHART — ICAO

...

4.21.3 Coverage and scale

...

4.21.3.3 The chart ~~should~~ shall be drawn to the same scale as the associated Area Chart — ICAO.

...

4.21.9 Aeronautical data

...

4.21.9.3.2 A textual description of communication failure procedures in relation to radar control ~~should~~ shall be provided and ~~should~~ shall, whenever feasible, be shown on the chart or on the same page that contains the chart.

...

4.22 REPEALING PROVISIONS

All previous ~~Administrative Order~~ CAR-ANS, Memorandum Circulars or part thereof as they pertain to aeronautical ~~information-service~~ charts which are inconsistent with the provisions of this Civil Aviation Regulations-Air Navigation Services Part 4 (CAR-ANS Part 4) are hereby repealed, amended or modified accordingly.

...

APPENDIX 3 – COLOUR GUIDE

...

HYPSONOMETRIC SYMBOLS-TINTS

...

~~APPENDIX 6. AERONAUTICAL DATA QUALITY REQUIREMENTS~~

— END —

AMENDED REGULATION AFTER REVISION:

CAR-ANS PART 4:

...

4.1 DEFINITIONS, APPLICABILITY AND AVAILABILITY

4.1.1 Definitions

The following words and phrases as used in this CAR-ANS shall have the following meanings:

...

Area navigation (RNAV). A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

Note.— Area navigation includes performance-based navigation as well as other operations that do not meet the definition of performance-based navigation.

...

Data quality. A degree or level of confidence that the data provided meet the requirements of the data user in terms of accuracy, resolution and integrity (or equivalent assurance level), traceability, timeliness, completeness and format.

...

Data resolution. A number of units or digits to which a measured or calculated value is expressed and used.

...

Data set series. Collection of data sets sharing the same product specification (ISO 19115*).

...

Displaced threshold. A threshold not located at the extremity of a runway.

Electronic aeronautical chart display. An electronic device by which flight crews are enabled to execute, in a convenient and timely manner, route planning, route monitoring and navigation by displaying required information.

...

Logon address. A specified code used for data link logon to an ATS unit.

...

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

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

Area navigation (RNAV) specification. A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.

Note 1.— The Performance-based Navigation (PBN) Manual (Doc 9613), Volume II, contains detailed guidance on navigation specifications.

Note 2.— The term RNP, previously defined as “a statement of the navigation performance necessary for operation within a defined airspace”, has been removed from this Annex as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this Annex is now solely used in the context of navigation specifications that require performance monitoring and alerting, e.g. RNP 4 refers to the aircraft and operating requirements, including a 4 NM lateral performance with on-board performance monitoring and alerting that are detailed in Doc 9613.

...

Performance-based navigation (PBN). Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

Note.— Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.

...

Procedure altitude/height. A published altitude/height used in defining the vertical profile of a flight procedure, at or above the minimum obstacle clearance altitude/height where established.

...

Reporting point. A specified (named) geographical location in relation to which the position of an aircraft can be reported.

Note.— There are three categories of reporting points: ground-based navigation aid, intersection and waypoint. In the context of this definition, intersection is a significant point expressed as radials, bearings and/or distances from ground-based navigation aids. A reporting point can be indicated as “on request” or as “compulsory”.

...

4.1.3 AVAILABILITY

...

4.1.3.2 *Charts.* The Philippines shall, when so specified, ensure the availability of charts in whichever of the following ways is appropriate for a particular chart or single sheet of a chart series.

Note.— The availability of charts includes specified electronic charts.

...

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

...

4.2 GENERAL SPECIFICATIONS

4.2.1 Operational requirements for charts

Note.— For the purpose of this CAR-ANS, the total flight is divided into the following phases:

...

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

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

...

4.2.1.4 Colors 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.

...

4.2.2 Titles

The title of the chart or chart series prepared in accordance with the specifications contained in this CAR-ANS are intended to satisfy the function of the chart shall be that of relevant chapter heading as modified by application of any Standard contained therein, except that such title shall not include “ICAO” unless the chart conforms with all Standards specified in this Chapter 4.2 and any specified for the particular chart.

4.2.3 Miscellaneous information

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

...

4.2.4 Symbols

4.2.4.1 Symbols used shall conform to those shown in Appendix 2 – ICAO Chart Symbols of this CAR-ANS, except that where it was desired to show on an aeronautical chart special features or items of importance to civil aviation for which no 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.

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

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

4.2.4.4 CAAP shall ensure that as of 18 November 2010, symbols are shown in the manner specified in 4.2.4.2, 4.2.4.3 and CAR-ANS Part 4 Appendix 2 — ICAO Chart Symbols, symbol number 121.

...

4.2.11 Colors

4.2.11.1 Colors used on charts shall conform to Appendix 3 - Color guide of this CAR-ANS.

4.2.12 Relief

...

4.2.12.2 Where relief is shown by hypsometric tints, the tints shall be based on those shown in the Hypsometric Tint Guide in Appendix 4 of this CAR-ANS.

...

4.2.14 Air traffic services airspaces

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

...

4.2.15 Magnetic variation

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

...

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

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

...

4.2.17 Aeronautical data

4.2.17.1 CAAP or aeronautical chart producing company 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 CAR-ANS Part 15, 15.3.6. The execution of such quality management shall be made demonstrable for each function stage when required. In addition, CAAP or aeronautical chart producing company shall ensure that established procedures exist in order that aeronautical data at any moment are traceable to its origin so to allow any data anomalies or error, detected during the production/maintenance phases or in the operational use, be corrected.

Note — Specifications governing the quality system are given in CAR-ANS Part 15, 15.3.2.

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

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

4.2.17.3 CAAP shall ensure that integrity of aeronautical data is maintained throughout the data process from origination to distribution to the next intended user.

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

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

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

...

4.2.18 Common reference systems

4.2.18.1 Horizontal reference system

...

4.2.18.1.2 Geographical coordinates which have been transformed into WGS-84 coordinates but whose accuracy of original field work does not meet the requirements in CAR-ANS Part 11, 11.2.1 and CAAP MOS Aerodromes shall be identified by asterisk.

4.2.18.1.3 The chart resolution of geographical coordinates shall be that specified for a particular chart series.

Note 1 — Specifications concerning the determination and reporting (accuracy of field work and data integrity) of WGS-84-related aeronautical coordinates for geographical positions established by Air Traffic Service are given in CAR-ANS Part 11, Chapter 11.2; and for aerodrome/ heliport-related positions, in CAAP MOS Aerodromes.

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

...

4.2.18.2 Vertical reference system

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

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

Note 2.— Gravity-related heights {elevations} are also referred to as orthometric heights

while distances of points above the ellipsoid are referred to as ellipsoidal heights.

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

Note 1 — Specifications concerning the determination and reporting (accuracy of field work and data integrity) of elevation and geoid undulation at specific positions at aerodromes/heliports are given in CAAP MOS Aerodromes.

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

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

Note.— Specifications concerning the chart resolution of elevation and geoid undulation are contained in PANS-AIM (Doc 10066), Appendix 1.

...

4.3 AERODROME OBSTACLE CHART — ICAO TYPE A (OPERATING LIMITATIONS)

4.3.1 Function

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

...

4.3.3 Units of Measurement

...

4.3.3.2 Linear dimensions shall be shown to the nearest half-meter.

...

4.3.5 Format

4.3.5.4 The chart shall include:

- a) a box for recording the operational data specified in 4.3.8.3;
- b) a box for recording amendments and dates thereof.

...

4.3.8 Aeronautical data

...

4.3.8.4 Plan and profile views

...

4.3.9 Accuracy

...

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

...

4.4 AERODROME OBSTACLE CHART — ICAO TYPE B

...

4.4.9 Aeronautical data

4.4.9.1 The chart shall show:

...

1) take-off and approach areas;

Note.— The take-off area is described in 4.3.8.2.1. The approach area consists of an area on the surface of the earth lying directly below the approach surface as specified in CAAP MOS Aerodromes, Chapter 7.

...

4.4.10 Accuracy

...

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

...

4.5 AERODROME TERRAIN AND OBSTACLE CHART — ICAO (ELECTRONIC)

...

4.5.4 Chart coverage

4.5.4.1 The extent of each chart shall be sufficient to cover Area 2 as specified in CAR-ANS Part 15, 15.5.

...

4.5.5 Chart content

...

4.5.5.2 Terrain feature

4.5.5.2.1 The terrain feature, and associated attributes, to be portrayed and database- linked to the chart shall be based on the terrain data sets which satisfy the requirements of CAR-ANS Part 15, 15.5.

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

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

Note.— In accordance with CAR-ANS Part 15, 15.5 and PANS-AIM (Doc 10066), Chapter 5 and Appendices 1 and 8, the DEM for Area 2 post spacing (grid) is specified at 1 arc second (approximately 30 m).

...

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

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

4.5.5.3 Obstacle features

4.5.5.3.1 Obstacle features, and associated attributes, portrayed or database-linked to the chart shall be based on obstacle data sets which satisfy the requirements of CAR-ANS Part 15, 15.5.

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

...

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

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

4.5.5.4 Aerodrome features

4.5.5.4.1 Aerodrome features, and associated attributes, portrayed and database-linked to the chart shall be based on aerodrome data which satisfy the requirements of CAR-ANS Part 15, 15.5.

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

...

4.5.6 Accuracy and resolution

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

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

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

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

...

4.7 ENROUTE CHART — ICAO

4.7.1 Function

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

...

4.7.8 Bearings, tracks and radials

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

...

4.7.9 Aeronautical data

...

4.7.9.3.1.1 The components shall include the following:

...

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

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

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

...

10) minimum en-route altitudes and minimum obstacle clearance altitudes, on ATS routes to the nearest higher 50 meters or 100 feet (see CAR-ANS Part 11, 11.2.22);

...

4.8 AREA CHART — ICAO

...

4.8.6 Culture and topography

...

4.8.6.2 To improve situational awareness in areas where significant relief exists, all relief exceeding 300 m (1 000 ft) above the elevation of the primary aerodrome shall be shown by smoothed contour lines, contour values and layer tints printed in brown. Appropriate spot elevations, including the highest elevation within each top contour line, shall be shown printed in black. Obstacles shall also be shown.

...

4.8.8 Bearings, tracks and radials

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

...

4.8.9 Aeronautical data

...

4.8.9.2 Prohibited, restricted and danger areas

...

4.9 STANDARD DEPARTURE CHART — INSTRUMENT (SID) — ICAO

4.9.1 Function

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

Note 1.— Provisions governing the identification of standard departure routes are in CAR-ANS Part 11, Appendix 11.3; guidance material relating to the establishment of such routes is contained in the Air Traffic Services Planning Manual (Doc 9426).

...

4.9.3 Coverage and Scale

...

4.9.3.2 The chart may be drawn to scale.

...

4.9.8 Bearings, tracks and radials

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

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

...

4.9.9 Aeronautical data

...

4.9.9.4.1.1 The components shall comprise the following:

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

...

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

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

Note 2.— Where excessive chart clutter will result, an ATC Surveillance Minimum Altitude Chart — ICAO may be provided (see Chapter 4.21), in which case the elements indicated by 4.9.9.4.1.1, 1) f), need not be duplicated on the Standard Departure Chart — Instrument (SID) — ICAO.

...

k) an indication of “flyover” significant points.

...

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

...

4.10 STANDARD ARRIVAL CHART — INSTRUMENT (STAR) — ICAO

4.10.1 Function

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

...

Note 2.— Provisions governing the identification of standard arrival routes are in CAR-ANS Part 11, Appendix 11.3; guidance material relating to the establishment of such routes is contained in the Air Traffic Services Planning Manual (Doc 9426).

...

4.10.4 Projection

...

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

...

4.10.5 Identification

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

...

4.10.8 Bearings, tracks and radials

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

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

...

4.10.9 Aeronautical data

4.10.9.4.1.1 The components shall comprise the following:

...

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

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

Note 2.— Where excessive chart clutter will result, an ATS Surveillance Minimum Altitude Chart — ICAO may be provided (see Chapter 4.21), in which case the elements indicated by 4.10.9.4.1.1, 1) f), need not be duplicated on the Standard Arrival Chart — Instrument (STAR) — ICAO.

...

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

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

...

4.11 INSTRUMENT APPROACH CHART — ICAO

...

4.11.3 Coverage and Scale

...

4.11.3.5 A distance scale shall be shown directly below the profile.

...

4.11.4 Format

4.11.4.1 The sheet size may be 210 x 148 mm (8.27 x 5.82 in).

...

4.11.5 Projection

...

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

...

4.11.8 Magnetic variation

4.11.8.1 The magnetic variation shall be shown.

4.11.8.2 The value of the variation, indicated to the nearest degree, shall agree with that used in determining magnetic bearings, tracks and radials.

...

4.11.9 Bearings, tracks and radials

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

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

...

4.11.10 Aeronautical data

...

4.11.10.2.4 The heights of obstacles above a datum other than mean sea level (see 4.11.10.2.3) shall be shown. When shown, they shall be given in parentheses on the chart.

...

4.11.10.4.3 The final approach fix (or final approach point for an ILS approach procedure) may be identified with its distance (in nautical miles) from the DME.

...

4.11.10.6.1 The plan view shall show the following information in the manner indicated:

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 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 kilometer or 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 maneuvering (circling) is prohibited;

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

h) caution notes where required, prominently displayed on the face of the chart;

i) an indication of “flyover” significant points.

...

4.11.10.6.5 The profile view shall include a ground profile or a minimum altitude/height portrayal as follows:

...

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

4.11.10.8.4 A rate of descent table shall be shown.

...

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

...

4.11.10.9 Aeronautical database requirements

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

...

4.12 VISUAL APPROACH CHART — ICAO

...

4.12.3 Scale

...

4.12.3.2 The scale may not be smaller than 1: 500,000.

Note - A scale of 1:250,000 or 1:200,000 is preferred.

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

...

4.12.7 Culture and topography

...

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

...

4.12.7.4 When shown, spot elevations shall be carefully selected.

...

4.13 AERODROME/HELIPORT CHART — ICAO

...

4.13.6 Aerodrome/heliport data

4.13.6.1 This chart shall show:

...

g) all taxiways, helicopter air and ground taxiways with type of surface, helicopter air transit routes, with designations, width, lighting, markings, (including runway-holding positions and where established, intermediate holding positions), stop bars, other visual guidance and control aids, and bearing strength or aircraft type restrictions where the bearing strength is

less than that of the associated runways;

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

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

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

...

4.14 AERODROME GROUND MOVEMENT CHART — ICAO

...

4.14.6 Aerodrome data

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

...

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

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

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

...

4.15 AIRCRAFT PARKING/DOCKING CHART — ICAO

...

4.15.2 Availability

4.15.2.1 The Aircraft Parking/ Docking Chart — ICAO shall be made available in the manner prescribed in 4.1.3.2 where, due to the complexity of the terminal facilities, the information cannot be shown with sufficient clarity on the Aerodrome/Heliport Chart — ICAO or on the Aerodrome Ground Movement Chart — ICAO.

...

4.15.6 Aerodrome data

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

...

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

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

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

...

4.16 WORLD AERONAUTICAL CHART — ICAO 1:1 000 000

...

4.16.2 Availability

4.16.2.1 The World Aeronautical Chart — ICAO 1:1 000 000 shall be made available in the manner prescribed in 4.1.3.2 for all areas delineated in Appendix 5.

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

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

...

4.16.4 Format

...

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

...

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

...

4.16.5 Projection

...

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

...

4.16.7 Culture and topography

...

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

...

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

...

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

...

4.16.7.12.1 Wooded areas shall be shown.

...

4.16.9 Aeronautical data

...

4.16.9.3 Obstacles

4.16.9.3.1 Obstacles shall be shown.

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

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

4.16.9.4 Prohibited, restricted and danger areas

Prohibited, restricted and danger areas shall be shown.

4.16.9.5 Air traffic services system

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

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

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

4.16.9.6 Radio navigation aids

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

4.16.9.7 Supplementary information

4.16.9.7.1 Aeronautical ground lights together with their characteristics or their identifications or both shall be shown.

4.16.9.7.2 Marine lights on outer prominent coastal or isolated features of not less than 28 km (15 NM) visibility range shall be shown:

- 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;
- c) where they are the only lights of significance available.

...

4.17 AERONAUTICAL CHART — ICAO 1:500 000

...

4.17.3 Scales

4.17.3.1 Linear scales for kilometers and nautical miles arranged in the following order:

- kilometers,

- nautical miles,

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

4.17.3.1.1 The length of the linear scale shall be not less than 200 mm (8 in).

...

4.17.4 Format

...

4.17.4.3 The method of folding shall be as follows:

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

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

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

...

4.17.5 Projection

...

4.17.5.4.1 The length of the graduation marks shall be approximately 1.3 mm (0.05 in) for the 1' intervals, and 2 mm (0.08 in) for the 5' intervals and 2 mm (0.08 in) extending on both sides of the graticule line for the 10' intervals.

...

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

...

4.17.6 Identification

...

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

...

4.17.7 Culture and topography

4.17.7.1 Built-up areas

...

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

...

4.17.7.4 Landmarks

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

...

4.17.7.6.2 The tint covering large open water areas shall be kept very light.

...

4.17.7.9.3 The spot elevation of the highest point on any sheet shall be cleared of hypsometric tinting.

...

4.18 AERONAUTICAL NAVIGATION CHART — ICAO SMALL SCALE

...

4.18.3 Coverage and scale

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

...

4.18.6 Culture and topography

...

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

...

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

...

4.18.6.4 Landmarks

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

...

4.18.6.6.1 All water features compatible with the scale of the chart comprising shore lines, lakes, rivers and streams (including those non-perennial in nature) and salt lakes shall be shown.

4.18.6.6.2 The tint covering large open water areas shall be kept very light.

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

...

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

...

4.18.8 Aeronautical data

...

4.18.8.4.1 Significant elements of the air traffic services system shall be shown when considered to be of importance to air navigation.

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

...

4.19 PLOTTING CHART — ICAO

...

4.19.2 Availability

4.19.2.1 This chart shall be made available, in the manner prescribed in 4.1.3.2, to cover major air routes over oceanic areas and sparsely settled areas used by international civil aviation.

...

4.19.3 Coverage and scale

4.19.3.1 Where practicable, the chart for a particular region shall cover major air routes and their terminals on a single sheet.

4.19.3.2 The scale shall be governed by the area to be covered.

...

4.19.4 Format

4.19.4.1 The sheet shall be of a size that can be adapted for use on a navigator's plotting table.

...

4.20 ELECTRONIC AERONAUTICAL CHART DISPLAY — ICAO

...

4.20.2 Information available for display

4.20.2.1 The Electronic Aeronautical Chart Display — ICAO shall be capable of displaying all aeronautical, cultural and topographic information required by CAR-ANS Part 4, Chapter 4.5 and Chapters 4.7 through 4.19.

...

4.20.3 Display requirements

4.20.3.5.1 The effective size of the chart presentation shall be sufficient to display the information required by 4.20.2 without excessive scrolling.

...

4.21 ATC SURVEILLANCE MINIMUM ALTITUDE CHART — ICAO

...

4.21.3 Coverage and scale

4.21.3.3 The chart shall be drawn to the same scale as the associated Area Chart — ICAO.

...

4.21.9 Aeronautical data

4.21.9.3.2 A textual description of communication failure procedures in relation to radar control shall be provided and shall, whenever feasible, be shown on the chart or on the same page that contains the chart.

...

4.22 REPEALING PROVISIONS

All previous CAR-ANS, Memorandum Circulars or part thereof as they pertain to aeronautical charts which are inconsistent with the provisions of this Civil Aviation Regulations-Air Navigation Services Part 4 (CAR-ANS Part 4) are hereby repealed, amended

or modified accordingly.

...

APPENDIX 3 – COLOUR GUIDE

...

APPENDIX 3-2

HYPSONOMETRIC TINTS

— END —

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- i. **Separability Clause.** - If, for any reason, any provision of this Memorandum Circular is declared invalid or unconstitutional, the other part or parts thereof which are not affected thereby shall continue to be in full force and effect.
 - ii. **Repealing Clause.** - All orders, rules, regulations and issuances, or parts thereof which are inconsistent with this Memorandum Circular are hereby repealed, superseded or modified accordingly.
 - iii. **Determination of changes.** – To highlight the amendments and/or revisions in the Memorandum Circular, the deleted text shall be shown with strikethrough and the new inserted text shall be highlighted with grey shading, as illustrated below:
 1. Text deleted: ~~Text to be deleted is shown with a line through it.~~
 2. New text inserted: New text is highlighted with grey shading.
 3. New text replacing existing text: ~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading.
 - iv. **Effectivity Clause.** - This Memorandum Circular shall take effect fifteen (15) days after publication in a requisite single newspaper of general circulation or the Official Gazette and a copy filed with the U.P. Law Center - Office of the National Administrative Register.

So Ordered. Signed this 19th day of OCT. 2018, at the Civil Aviation Authority of the Philippines, MIA Road, Pasay City, Metro Manila, 1301.


CAPTAIN JIM C. SYDIONGCO