AIR TRAFFIC INSPECTORATE DIVISION
DEPARTMENT OF CIVIL AVIATION
MALAYSIA

AIR TRAFFIC INSPECTORATE DIRECTIVE – AERONAUTICAL INFORMATION SERVICES AND AERONAUTICAL CHARTS

ATID-AIS Chart

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03/2016	2	ICAO Annex 15	Amendment concerning performance-based communication and surveillance (PBCS) and satellite voice communications (SATVOICE); and editorial	1	15 Nov 2016

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FOREWORD

Background

In exercise of the powers conferred by regulation 76 of the Civil Aviation Regulations 2016, the Director General makes this *Air Traffic Inspectorate Directive – Aeronautical Information Services and Aeronautical Charts (ATID-AIS Chart).* This *ATID-AIS Chart* is published by the Director General under *section 24O of Civil Aviation Act 1969 [Act 3].*

This *ATID-AIS Chart* contains the standards, requirements and procedures pertaining to the provision of Aeronautical Information Services (AIS) and Aeronautical Charts (Chart). The standards and requirements in this Directive are based mainly on standards and recommended practices (SARPs) stipulated in *International Civil Aviation Organization (ICAO) Annex 15 to the Chicago Convention – Aeronautical Information Services and Annex 4 – Aeronautical Charts,* including related guidelines stipulated in the following documents:

- *ICAO Annex 19 – Safety Management*;
- *ICAO Doc 8126 – Aeronautical Information Services Manual;* and
- *ICAO Doc 8697 – Aeronautical Chart Manual.*

(Dato' Sri Azharuddin Abdul Rahman)
Director General of Civil Aviation
15th April 2016

Editorial practices

The following practice has been adhered to in order to indicate at a glance the status of each statement:

Standards have been printed in light face roman; and

Notes have been printed in light face italics, the status being indicated by the prefix Note.

Feedback

Readers should forward advice of errors, inconsistencies or suggestions for improvement to this Directive to the addressee below:

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CHAPTER 1. GENERAL

Note 1.— The objective of the aeronautical information service (AIS) is to ensure the flow of aeronautical data and aeronautical information necessary for global air traffic management (ATM) system safety, regularity, economy and efficiency in an environmentally sustainable manner. The role and importance of aeronautical data and aeronautical information changed significantly with the implementation of area navigation (RNAV), performance-based navigation (PBN), airborne computer-based navigation systems, performance-based communication (PBC), performance based surveillance (PBS), data link systems and satellite voice communications (SATVOICE). Corrupt, erroneous, late, or missing aeronautical data and aeronautical information can potentially affect the safety of air navigation.

Note 2.— These Standards and Recommended Practices (SARPs) are to be used in conjunction with the Procedures for Air Navigation Services — ICAO Abbreviations and Codes *(PANS-ABC, Doc 8400).*

Note 3.— Guidance material on the organisation and operation of aeronautical information services is contained in the Aeronautical Information Services Manual *(Doc 8126).*

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

1.1 Requirements

1.1.1 In exercise of the powers conferred by Regulation 76 of the Civil Aviation Regulations 2016, the Director General makes this *Air Traffic Inspectorate Directive – Aeronautical Information Services and Aeronautical Charts (ATID-AIS Chart)* specifying the national standards and requirements to be met by the service providers.

1.1.2 When the service provider or is not able to comply with any standards specified or referenced in this Directive, the service provider shall apply to the DGCA for exemption or deviation from relevant standards. Application shall be submitted in writing supported with the reasons for such exemption or deviation including any safety assessment or other studies undertaken, and an indication of when compliance with the current standards can be expected.

1.1.3 When the service provider is not able to comply with any recommended practices specified or referenced in this Directive, the service provider shall notify the DGCA of the non-compliance or deviation with supporting reasons including any safety assessment or other studies undertaken, and where appropriate an indication of when compliance with the current recommended practices can be expected.

1.1.4 Any exemption or deviation granted to the service provider shall be recorded in the service provider operations manual. The service provider operations manual shall also contain the details of the exemption or deviation including the reason that the exemption or deviation was requested and the limitations or conditions imposed.

1.2 Definitions

Note.— The additional terms used in the SARPs applicable to ICAO Chart are contained in Chapter 12 of this document.

When the following terms are used in the SARPs for AIS, they have the following meanings:

Accuracy. A degree of conformance between the estimated or measured value and the true value.

Note.— For measured positional data the accuracy is normally expressed in terms of a distance from a stated position within which there is a defined confidence of the true position falling.

Aerodrome. A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

Aerodrome mapping data (AMD). Data collected for the purpose of compiling aerodrome mapping information.

Note.— Aerodrome mapping data are collected for purposes that include the improvement of the user's situational awareness, surface navigation operations, training, charting and planning.

Aerodrome mapping database (AMDB). A collection of aerodrome mapping data organized and arranged as a structured data set.

Aeronautical data. A representation of aeronautical facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing.

Aeronautical information. Information resulting from the assembly, analysis and formatting of aeronautical data.

Aeronautical Information Circular (AIC). A notice containing information that does not qualify for the origination of a NOTAM or for inclusion in the AIP, but which relates to flight safety, air navigation, technical, administrative or legislative matters.

Aeronautical information management (AIM). The dynamic, integrated management of aeronautical information through the provision and exchange of quality-assured digital aeronautical data in collaboration with all parties.

Aeronautical Information Publication (AIP). A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

Aeronautical information service (AIS). A service established within the defined area of coverage responsible for the provision of aeronautical data and aeronautical information necessary for the safety, regularity and efficiency of air navigation.

Aeronautical information service provider. The provider of aeronautical information services within the Kuala Lumpur and Kota Kinabalu flight information regions.

AIP Amendment. Permanent changes to the information contained in the AIP.

AIP Supplement. Temporary changes to the information contained in the AIP which are published by means of special pages.

AIRAC. An acronym (aeronautical information regulation and control) signifying a system aimed at advance notification, based on common effective dates, of circumstances that necessitate significant changes in operating practices.

Air defence identification zone (ADIZ). Special designated airspace of defined dimensions within which aircraft are required to comply with special identification and/or reporting procedures additional to those related to the provision of air traffic services (ATS).

Air traffic management (ATM). The dynamic, integrated management of air traffic and airspace (including air traffic services, airspace management and air traffic flow management) — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

AIS product. Aeronautical data and aeronautical information provided in the form of the elements of the Integrated Aeronautical Information Package (except NOTAM and PIB), including aeronautical charts, or in the form of suitable electronic media.

Application. Manipulation and processing of data in support of user requirements (ISO 19104*).

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.

ASHTAM. A special series NOTAM notifying by means of a specific format change in activity of a volcano, a volcanic eruption and/or volcanic ash cloud that is of significance to aircraft operations.

Assemble. A process of merging data from multiple sources into a database and establishing a baseline for subsequent processing.

Note.— The assemble phase includes checking the data and ensuring that detected errors and omissions are rectified.

ATS surveillance service. Term used to indicate a service provided directly by means of an ATS surveillance system.

* All ISO Standards are listed at the end of this chapter.

ATS surveillance system. A generic term meaning variously, ADS-B, PSR, SSR or any comparable ground-based system that enables the identification of aircraft.

Note.— A comparable ground-based system is one that has been demonstrated, by comparative assessment or other methodology, to have a level of safety and performance equal to or better than monopulse SSR.

Automatic dependent surveillance — broadcast (ADS-B). A means by which aircraft, aerodrome vehicles and other objects can automatically transmit and/or receive data such as identification, position and additional data, as appropriate, in a broadcast mode via a data link.

Automatic dependent surveillance — contract (ADS-C). A means by which the terms of an ADS-C agreement will be exchanged between the ground system and the aircraft, via a data link, specifying under what conditions ADS-C reports would be initiated, and what data would be contained in the reports.

Note.— The abbreviated term "ADS contract" is commonly used to refer to ADS event contract, ADS demand contract, ADS periodic contract or an emergency mode.

Automatic terminal information service (ATIS). The automatic provision of current, routine information to arriving and departing aircraft throughout 24 hours or a specified portion thereof:

Data link-automatic terminal information service (D-ATIS). The provision of ATIS via data link.

Voice-automatic terminal information service (Voice-ATIS). The provision of ATIS by means of continuous and repetitive voice broadcasts.

Bare Earth. Surface of the Earth including bodies of water and permanent ice and snow, and excluding vegetation and manmade objects.

Calendar. Discrete temporal reference system that provides the basis for defining temporal position to a resolution of one day (ISO 19108*).

Canopy. Bare Earth supplemented by vegetation height.

Confidence level. The probability that the true value of a parameter is within a certain interval around the estimate of its value.

Note.— The interval is usually referred to as the accuracy of the estimate.

Controller-pilot data link communications (CPDLC). A means of communication between controller and pilot, using data link for ATC communications.

Culture. All man-made features constructed on the surface of the Earth, such as cities, railways and canals.

Cyclic redundancy check (CRC). A mathematical algorithm applied to the digital expression of data that provides a level of assurance against loss or alteration of data.

Danger area. An airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times.

Data product. Data set or data set series that conforms to a data product specification (ISO 19131*).

Data product specification. Detailed description of a data set or data set series together with additional information that will enable it to be created, supplied to and used by another party (ISO 19131*).

Note.— A data product specification provides a description of the universe of discourse and a specification for mapping the universe of discourse to a data set. It may be used for production, sales, end-use or other purpose.

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.

Data set. Identifiable collection of data (ISO 19101*).

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

Datum. Any quantity or set of quantities that may serve as a reference or basis for the calculation of other quantities (ISO 19104*).

Digital Elevation Model (DEM). The representation of terrain surface by continuous elevation values at all intersections of a defined grid, referenced to common datum.

Note.— Digital Terrain Model (DTM) is sometimes referred to as DEM.

Direct transit arrangements. Special arrangements approved by the public authorities concerned by which traffic which is pausing briefly in its passage through the Contracting State may remain under their direct control.

Ellipsoid height (Geodetic height). The height related to the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question.

Feature. Abstraction of real world phenomena (ISO 19101*).

Feature attribute. Characteristic of a feature (ISO 19101*).

Note.— A feature attribute has a name, a data type and a value domain associated with it.

Feature operation. Operation that every instance of a feature type may perform (ISO 19110*).

Note.— An operation upon the feature type dam is to raise the dam. The result of this operation is to raise the level of water in the reservoir.

Feature relationship. Relationship that links instances of one feature type with instances of the same or a different feature type (ISO 19101*).

Feature type. Class of real world phenomena with common properties (ISO 19110*).

Note.— In a feature catalogue, the basic level of classification is the feature type.

Geodesic distance. The shortest distance between any two points on a mathematically defined ellipsoidal surface.

Geodetic datum. A minimum set of parameters required to define location and orientation of the local reference system with respect to the global reference system/frame.

Geoid. The equipotential surface in the gravity field of the Earth which coincides with the undisturbed mean sea level (MSL) extended continuously through the continents. *Note.— The geoid is irregular in shape because of local gravitational disturbances (wind tides, salinity, current, etc.) and the direction of gravity is perpendicular to the geoid at every point.*

Geoid undulation. The distance of the geoid above (positive) or below (negative) the mathematical reference ellipsoid.

Note.— In respect to the World Geodetic System — 1984 (WGS-84) defined ellipsoid, the difference between the WGS-84 ellipsoidal height and orthometric height represents WGS-84 geoid undulation.

Gregorian calendar. Calendar in general use; first introduced in 1582 to define a year that more closely approximates the tropical year than the Julian calendar (ISO 19108*).

Note.— In the Gregorian calendar, common years have 365 days and leap years 366 days divided into twelve sequential months.

Height. The vertical distance of a level, point or an object considered as a point, measured from a specific datum.

Heliport. An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

Human Factors principles. Principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance.

Integrated Aeronautical Information Package. A package in paper, or electronic media which consists of the following elements:

— AIP, including amendment service;

— Supplements to the AIP;

— NOTAM and PIB;

— AIC; and

— checklists and lists of valid NOTAM.

Integrity (aeronautical data). A degree of assurance that an aeronautical data and its value has not been lost or altered since the data origination or authorized amendment.

Integrity classification (aeronautical data). Classification based upon the potential risk resulting from the use of corrupted data. Aeronautical data are classified as:

a) *routine data:* there is a very low probability when using corrupted routine data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe;

b) *essential data:* there is a low probability when using corrupted essential data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe; and

c) *critical data:* there is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe.

International airport. Any airport designated by the Contracting State in whose territory it is situated as an airport of entry and departure for international air traffic, where the formalities incident to customs, immigration, public health, animal and plant quarantine and similar procedures are carried out.

International NOTAM office (NOF). An office designated by a State for the exchange of NOTAM internationally.

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

Manoeuvring area. That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.

Metadata. Data about data (ISO 19115*).

Note.— A structured description of the content, quality, condition or other characteristics of data.

Minimum en-route altitude (MEA). The altitude for an en-route segment that provides adequate reception of relevant navigation facilities and ATS communications, complies with the airspace structure and provides the required obstacle clearance.

Minimum obstacle clearance altitude (MOCA). The minimum altitude for a defined segment of flight that provides the required obstacle clearance.

Movement area. That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron

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 ICAO Annex 15 as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this document is 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.

NOTAM. A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

Obstacle. All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that:

a) are located on an area intended for the surface movement of aircraft; or

b) extend above a defined surface intended to protect aircraft in flight; or

c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.

Obstacle/terrain data collection surface. A defined surface intended for the purpose of collecting obstacle/terrain data.

Orthometric height. Height of a point related to the geoid, generally presented as an MSL elevation.

Performance-based communication (PBC). Communication based on performance specifications applied to the provision of air traffic services.

Note.— An RCP specification includes communication performance requirements that are allocated to system components in terms of the communication to be provided and associated transaction time, continuity, availability, integrity, safety and functionality needed for the proposed operation in the context of a particular airspace concept.

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.

Performance-based surveillance (PBS). Surveillance based on performance specifications applied to the provision of air traffic services.

Note.— An RSP specification includes surveillance performance requirements that are allocated to system components in terms of the surveillance to be provided and associated data delivery time, continuity, availability, integrity, accuracy of the surveillance data, safety and functionality needed for the proposed operation in the context of a particular airspace concept.

Portrayal. Presentation of information to humans (ISO 19117*).

Position (geographical). Set of coordinates (latitude and longitude) referenced to the mathematical reference ellipsoid which define the position of a point on the surface of the Earth.

Post spacing. Angular or linear distance between two adjacent elevation points.

Precision. The smallest difference that can be reliably distinguished by a measurement process.

Note.— In reference to geodetic surveys, precision is a degree of refinement in performance of an operation or a degree of perfection in the instruments and methods used when taking measurements.

Pre-flight information bulletin (PIB). A presentation of current NOTAM information of operational significance, prepared prior to flight.

Prohibited area. An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited.

Quality. Degree to which a set of inherent characteristics fulfils requirements (ISO 9000*).

Note 1.— The term "quality" can be used with adjectives such as poor, good or excellent.

Note 2.— "Inherent", as opposed to "assigned", means existing in something, especially as a permanent characteristic.

Quality assurance. Part of quality management focused on providing confidence that quality requirements will be fulfilled (ISO 9000*).

Quality control. Part of quality management focused on fulfilling quality requirements (ISO 9000*).

Quality management. Coordinated activities to direct and control an organization with regard to quality (ISO 9000*).

Radio navigation service. A service providing guidance information or position data for the efficient and safe operation of aircraft supported by one or more radio navigation aids.

Required communication performance (RCP) specification. A set of requirements for air traffic service provision and associated ground equipment, aircraft capability, and operations needed to support performance-based communication.

Required surveillance performance (RSP) specification. A set of requirements for air traffic service provision and associated ground equipment, aircraft capability, and operations needed to support performance-based surveillance.

Requirement. Need or expectation that is stated, generally implied or obligatory (ISO 9000*).

Note 1.— "Generally implied" means that it is custom or common practice for the organization, its customers and other interested parties, that the need or expectation under consideration is implied.

Note 2.— A qualifier can be used to denote a specific type of requirement, e.g. product requirement, quality management requirement, customer requirement.

Note 3.— A specified requirement is one which is stated, for example, in a document.

Note 4.— Requirements can be generated by different interested parties.

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

Restricted area. An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions.

Route stage. A route or portion of a route flown without an intermediate landing.

SNOWTAM. A special series NOTAM notifying the presence or removal of hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area, by means of a specific format.

Station declination. An alignment variation between the zero degree radial of a VOR and true north, determined at the time the VOR station is calibrated.

Terrain. The surface of the Earth containing naturally occurring features such as mountains, hills, ridges, valleys, bodies of water, permanent ice and snow, and excluding obstacles.

Note.— In practical terms, depending on the method of data collection used, terrain represents the continuous surface that exists at the bare Earth, the top of the canopy or something in-between, also known as "first reflective surface".

Traceability. Ability to trace the history, application or location of that which is under consideration (ISO 9000*).

Note.— When considering product, traceability can relate to:

— the origin of materials and parts;

— the processing history; and

— the distribution and location of the product after delivery.

Validation. Confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled (ISO 9000*).

Verification. Confirmation, through the provision of objective evidence, that specified requirements have been fulfilled (ISO 9000*).

Note 1.— The term "verified" is used to designate the corresponding status.

Note 2.— Confirmation can comprise activities such as:

— performing alternative calculations;

— comparing a new design specification with a similar proven design specification;

— undertaking tests and demonstrations; and

— reviewing documents prior to issue.

VOLMET. Meteorological information for aircraft in flight.

Data link-VOLMET (D-VOLMET). Provision of current aerodrome routine meteorological reports (METAR) and aerodrome special meteorological reports (SPECI), aerodrome forecasts (TAF), SIGMET, special air-reports not covered by a SIGMET and, where available, AIRMET via data link.

VOLMET broadcast. Provision, as appropriate, of current METAR, SPECI, TAF and SIGMET by means of continuous and repetitive voice broadcasts.

1.3 Common reference systems for air navigation

1.3.1 Horizontal reference system

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

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

Note 2.— Specifications governing the determination and reporting (accuracy of field work and data integrity) of WGS- 84-related aeronautical coordinates for geographical positions established by air traffic services are given in, ATID-ATS Chapter 2, and ICAO Annex 11, Appendix 5, Table 1, and for aerodrome/heliport-related positions, in ICAO Annex 14, Volumes I and II, Chapter 2, and Table A5-1 and Table 1 of Appendices 5 and 1, respectively.

1.3.1.2 In precise geodetic applications and some air navigation applications, temporal changes in the tectonic plate motion and tidal effects on the Earth's crust shall be modelled and estimated where applicable. To reflect the temporal effect, an epoch shall be included with any set of absolute station coordinates.

Note 1.— The epoch of the WGS-84 (G873) reference frame is 1997.0 while the epoch of the latest updated WGS-84 (G1150) reference frame, which includes plate motion model, is 2001.0. (G indicates that the coordinates were obtained through Global Positioning System (GPS) techniques, and the number following G indicates the GPS week when these coordinates were implemented in the United States of America's National Geospatial-Intelligence Agency's (NGA's) precise ephemeris estimation process.)

Note 2.— The set of geodetic coordinates of globally distributed permanent GPS tracking stations for the most recent realization of the WGS-84 reference frame (WGS-84 (G1150)) is provided in Doc 9674. For each permanent GPS tracking station, the accuracy of an individually estimated position in WGS-84 (G1150) has been in the order of 1 cm (1□).

Note 3.— Another precise worldwide terrestrial coordinate system is the International Earth Rotation Service (IERS) Terrestrial Reference System (ITRS), and the realization of ITRS is the IERS Terrestrial Reference Frame (ITRF). Guidance material regarding the ITRS is provided in Appendix C of Doc 9674. The most current realization of the WGS-84 (G1150) is referenced to the ITRF 2000 epoch. The WGS-84 (G1150) is consistent with the ITRF 2000 and in practical realization the difference between these two systems is in the one to two

centimetre range worldwide, meaning WGS-84 (G1150) and ITRF 2000 are essentially identical.

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

1.3.1.4 The order of publication resolution of geographical coordinates shall be that specified in ICAO Annex 15 Appendix 1 and Table A7-1 of Appendix 7 while the order of chart resolution of geographical coordinates shall be that specified in ICAO Annex 4, Appendix 6, Table 1.

1.3.2 Vertical reference system

1.3.2.1 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 for international air navigation.

Note 1.— The geoid globally most closely approximates MSL. It is defined as the equipotential surface in the gravity field of the Earth which 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.

1.3.2.2 The Earth Gravitational Model — 1996 (EGM-96), containing long wavelength gravity field data to degree and order 360, shall be used by international air navigation as the global gravity model.

1.3.2.3 At those geographical positions where the accuracy of EGM-96 does not meet the accuracy requirements for elevation and geoid undulation specified in ICAO Annex 14, Volumes I and II, on the basis of EGM-96 data, regional, national or local geoid models containing high resolution (short wavelength) gravity field data shall be developed and used. When a geoid model other than the EGM-96 model is used, a description of the model used, including the parameters required for height transformation between the model and EGM-96, shall be provided in the Aeronautical Information Publication (AIP).

Note.— Specifications governing determination and reporting (accuracy of field work and data integrity) of elevation and geoid undulation at specific positions at aerodromes/heliports are given in ICAO Annex 14, Volumes I and II, Chapter 2, and Table A5-2 and Table 2 of Appendices 5 and 1, respectively.

1.3.2.4 In addition to elevation referenced to the MSL (geoid), for the specific surveyed ground positions, geoid undulation (referenced to the WGS-84 ellipsoid) for those positions specified in ICAO Annex 15 Appendix 1 shall also be published.

1.3.2.5 The order of publication resolution of elevation and geoid undulation shall be that specified in ICAO Annex 15 Appendix 1 and Table A7-2 of Appendix 7 while the order of chart resolution of elevation and geoid undulation shall be that specified in ICAO Annex 4, Appendix 6, Table 2.

1.3.3 Temporal reference system

1.3.3.1 For international civil aviation, the Gregorian calendar and Coordinated Universal Time (UTC) shall be used as the temporal reference system.

Note 1.— A value in the time domain is a temporal position measured relative to a temporal reference system.

Note 2.— Coordinated Universal Time (UTC) is a time scale maintained by the Bureau International de l'Heure (BIH) and the IERS and forms the basis of a coordinated dissemination of standard frequencies and time signals.

Note 3.— See Attachment D of ICAO Annex 5 for guidance material relating to UTC.

Note 4.— ISO Standard 8601 specifies the use of the Gregorian calendar and 24-hour local or UTC for information interchange while ISO Standard 19108 prescribes the Gregorian calendar and UTC as the primary temporal reference system for use with geographic information.

1.3.3.2 When a different temporal reference system is used for some applications, the feature catalogue, or the metadata associated with an application schema or a data set, as appropriate, shall include either a description of that system or a citation for a document that describes that temporal reference system.

Note.— ISO Standard 19108, Annex D, describes some aspects of calendars that may have to be considered in such a description.

1.4 Miscellaneous specifications

1.4.1 Each element of the Integrated Aeronautical Information Package for international distribution shall include English text for those parts expressed in plain language.

1.4.2 Place names shall be spelt in conformity with local usage, transliterated, when necessary, into the Latin alphabet.

1.4.3 Units of measurement used in the origination, processing and distribution of aeronautical data and aeronautical information shall be consistent with the tables contained in *ICAO Annex 5 — Units of Measurement to be Used in Air and Ground Operations.*

1.4.4 ICAO abbreviations shall be used in the aeronautical information services whenever they are appropriate and their use will facilitate distribution of aeronautical data and aeronautical information.

1.5 Safety management

1.5.1 In accordance with ICAO Annex 11 and Annex 19, air traffic service (ATS) providers shall implement a safety management system (SMS) which commensurate the size and complexity of its services.

1.5.2 The scope of an ATS SMS shall include AIS services under which aspects have direct operational implication to flight safety.

1.5.3 Each AIS provider is responsible for SMS activities including:

a) responding to queries and providing reports including safety related data and records for the ATS providers and regulators; and

b) participate in ATS SMS safety assessments and safety reviews, when required.

Note: * ISO Standard

9000 — Quality Management Systems — Fundamentals and Vocabulary

19101 — Geographic information — Reference model

19104 — Geographic information — Terminology

19108 — Geographic information — Temporal schema

19109 — Geographic information — Rules for application schema

19110 — Geographic information — Feature cataloguing schema

19115 — Geographic information — Metadata

19117 — Geographic information — Portrayal

19131 — Geographic information — Data product specification

CHAPTER 2. RESPONSIBILITIES AND FUNCTIONS

2.1 State responsibilities

2.1.1 The AIS provider shall arrange for the provision of aeronautical data and aeronautical information over the territory of Malaysia and those areas over the high seas for which Malaysia is responsible for the provision of ATS.

2.1.2 The *Air Traffic Management (ATM) Sector* of the *Department of Civil Aviation Malaysia* is designated as the AIS provider by the DGCA for providing such services in accordance with this directive.

Note.— The organisation of the AIS provider consists of the AIS Headquarters, Kuala Lumpur NOTAM Office (NOF) and AIS Units that are established at certain aerodromes listed in Malaysia AIP Part GEN 3.

2.1.3 The aeronautical data and aeronautical information provided by the AIS provider shall clearly indicate that they are provided under the authority of the DGCA.

2.1.4 The AIS provider shall ensure that the aeronautical data and aeronautical information provided are complete, timely and of required quality in accordance with 3.3.

2.1.5 The AIS provider shall establish formal arrangement with the originators of aeronautical data and aeronautical information in relation to the timely and complete provision of aeronautical data and aeronautical information.

2.2 AIS responsibilities and functions

2.2.1 The AIS provider shall ensure that aeronautical data and aeronautical information necessary for the safety, regularity or efficiency of air navigation are made available in a form suitable for the operational requirements of the ATM community, including:

a) those involved in flight operations, including flight crews, flight planning and flight simulators; and

b) the ATS unit responsible for flight information service and the services responsible for pre-flight information.

Note.— A description of the ATM community is contained in the Global Air Traffic Management Operational Concept *(Doc 9854).*

2.2.2 The AIS provider shall receive, collate or assemble, edit, format, publish/store and distribute aeronautical data and aeronautical information concerning the entire territory of Malaysia as well as those areas over the high seas in which Malaysia is responsible for the provision of ATS. Aeronautical data and aeronautical information shall be provided as an Integrated Aeronautical Information Package.

Note.— An AIS may include origination functions.

2.2.3 Where 24-hour service is not provided, service shall be available during the whole period an aircraft is in flight in the area of responsibility of an AIS, plus a period of at least two hours before and after such a period. The service shall also be available at such other time as may be requested by an appropriate ground organisation.

Note.— The NOF located at the KL International airport and the AIS Units listed in GEN 3.1 AIP Malaysia have been designated to provide 24 hour AIS.

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

a) from the aeronautical information services of other States;

b) from other sources that may be available.

Note.— One such source is the subject of a provision in 8.3.

2.2.5 Aeronautical data and aeronautical information obtained under 2.2.4 a) shall, when distributed, be clearly identified as having the authority of the State of Origin.

2.2.6 Aeronautical data and aeronautical information obtained under 2.2.4 b) shall, if possible, be verified before distribution and if not verified shall, when distributed, be clearly identified as such.

2.2.7 An AIS shall promptly make available to the aeronautical information services of other States any aeronautical data and aeronautical information necessary for the safety, regularity or efficiency of air navigation required by them, to enable them to comply with 2.2.1.

2.3 Exchange of aeronautical data and aeronautical information

2.3.1 The AIS provider shall designate the office to which all elements of the Integrated Aeronautical Information Package originated by other States shall be addressed. Such ~~an~~ office shall be qualified to deal with requests for aeronautical data and aeronautical information originated by other States.

2.3.2 Where more than one international NOTAM office is designated within a State, the extent of responsibility and the territory covered by each office shall be defined.

2.3.3 An AIS provider shall arrange, as necessary, to satisfy operational requirements for the issuance and receipt of NOTAM distributed by telecommunication.

Note.— The issuance and receipt of NOTAM distributed by telecommunication between the Kuala Lumpur NOF and other NOF are as listed in AIP GEN 3.5.

2.3.4 Wherever practicable, direct contact between AIS shall be established in order to facilitate the international exchange of aeronautical data and aeronautical information.

2.3.5 One copy of each of the elements of the Integrated Aeronautical Information Package that have been requested by the AIS of an ICAO Contracting State shall be made available by the originating State in the mutually-agreed form(s), without charge, even where authority for publication/storage and distribution has been delegated to a non-governmental agency.

2.3.6 The exchange of more than one copy of the elements of the Integrated Aeronautical Information Package and other air navigation documents, including those containing air navigation legislation and regulations, shall be subject to bilateral agreement between ICAO Contracting States.

2.3.7 The procurement of aeronautical data and aeronautical information, including the elements of the Integrated Aeronautical Information Package, and other air navigation documents, including those containing air navigation legislation and regulations, by States other than ICAO Contracting States and by other entities shall be subject to separate agreement with the originating State.

2.4 Copyright

Any product received by the AIS provider which has been granted copyright protection by another State in accordance with 2.3 shall only be made available to a third party on the condition that the third party is made aware that the product is copyright protected and provided that it is appropriately annotated that the product is subject to copyright by the originating State.

CHAPTER 3. AERONAUTICAL INFORMATION MANAGEMENT

3.1 Information management requirements

The information management resources and processes established by an AIS shall be adequate to ensure the timely collection, processing, storing, integration, exchange and delivery of quality-assured aeronautical data and aeronautical information within the ATM system.

3.2 Aeronautical data and aeronautical information validation and verification

3.2.1 Material to be issued as part of the *Integrated Aeronautical Information Package* shall be thoroughly checked before it is submitted to the AIS, in order to make certain that all necessary information has been included and that it is correct in detail prior to distribution.

3.2.2 The AIS provider shall establish verification and validation procedures which ensure that upon receipt of aeronautical data and aeronautical information, quality requirements (accuracy, resolution, integrity and traceability) are met.

Note 1.— Guidance material on the liaison with other related services is contained in Doc 8126.

Note 2.— Guidance material on the aeronautical data quality requirements (accuracy, resolution, integrity, and traceability and protection requirements) may be found in the *World Geodetic System — 1984 (WGS-84) Manual* (Doc 9674). Supporting data quality material in respect of data accuracy, publication resolution, and integrity of aeronautical data, together with guidance material in respect to the rounding convention for aeronautical data, is contained in *RTCA Document DO-201A and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-77 — Standards for Aeronautical* Information (or equivalent).

Note 3.— Guidance material on the management of aeronautical data quality is included in the *Manual on the Quality Management System for Aeronautical Information Services* (Doc 9839).

3.3 Data quality specifications

3.3.1 Accuracy

The order of accuracy for aeronautical data shall be as specified in ATID-ATS, Chapter 2, and *ICAO Annex 14*, Volumes I and II, Chapter 2. In that respect, three types of positional data shall be identified: surveyed points (runway thresholds, navigation aid positions, etc.), calculated points (mathematical calculations from the known surveyed points of points in space/fixes) and declared points (e.g. flight information region boundary points).

Note.— The accuracy requirements for electronic terrain and obstacle data are specified in *ICAO Annex 15 Appendix 8.*

3.3.2 Resolution

3.3.2.1 The order of publication resolution of aeronautical data shall be that as specified in *ICAO Annex 15 Appendices 1 and 7.*

3.3.2.2 The resolution of the data features contained in the database shall be commensurate with the data accuracy requirements.

Note.— The resolution of the data features contained in the database may be the same or finer than the publication resolution.

3.3.3 Integrity

3.3.3.1 The integrity classification related to aeronautical data shall be as provided in *ICAO Annex 15 Tables A7-1 to A7-5 of Appendix 7.*

3.3.3.2 The integrity of aeronautical data shall be maintained throughout the data process from survey/origin to distribution to the next intended user (the entity that receives the aeronautical information from the aeronautical information service provider). Based on the applicable integrity classification, 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 by thorough analysis of the overall system architecture as potential data integrity risks.

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.

Note 3.— Distribution to the next intended user will differ in the delivery method applied which may either be:

Physical distribution. The means by which aeronautical data and aeronautical information distribution is achieved through the delivery of a physical package, such as postal services; or

Direct electronic distribution. The means by which aeronautical data and aeronautical information distribution is achieved automatically through the use of a direct electronic connection between the AIS and the next intended user.

Note 4.— Different delivery methods and data media may require different procedures to ensure the required data quality.

3.4 Metadata

3.4.1 Metadata shall be collected for aeronautical data processes and exchange points. This metadata collection shall be applied throughout the aeronautical information data chain, from survey/origin to distribution to the next intended user.

Note.— ISO Standard 19115 specifies requirements for geographic information metadata.

3.4.2 The metadata to be collected shall include, as a minimum:

a) the name of the organisations or entities performing any action of originating, transmitting or manipulating the data;

b) the action performed; and

c) the date and time the action was performed.

3.5 Data protection

3.5.1 Aeronautical data and data sets shall be protected in accordance with data error detection, security, and authentication techniques.

Note.— The Aeronautical Information Services Manual *(Doc 8126) contains suitable guidance on data error detection, security, and authentication techniques.*

3.5.2 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 the integrity classification of data sets as specified in 3.3.3.

Note 1.— This requirement does not apply to the communications systems used for the transfer of data sets.

Note 2.— Guidance on the use of a 32-bit CRC algorithm to implement a protection of electronic aeronautical data sets is contained in the Aeronautical Information Services Manual *(Doc 8126).*

3.6 Use of automation

3.6.1 Automation shall be introduced with the objective of improving the timeliness, quality, efficiency and cost effectiveness of aeronautical information services.

Note.— Guidance on the development of databases and the establishment of data exchange services may be found in the Aeronautical Information Services Manual *(Doc 8126).*

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

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

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

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

Note.— Guidance on the aeronautical information and data exchange models may be found in the Aeronautical Information Services Manual *(Doc 8126).*

3.6.4 The aeronautical information model used shall encompass the aeronautical data and aeronautical information to be exchanged.

3.6.5 The aeronautical information model used shall:

a) use the Unified Modelling Language (UML) to describe the aeronautical information features and their properties, associations and data types;

b) include data value constraints and data verification rules;

c) include provisions for metadata as specified in 3.4.2; and

d) include a temporality model to enable capturing the evolution of the properties of an aeronautical information feature during its life cycle.

3.6.6 The aeronautical data exchange model used shall*:*

a) apply a commonly used data encoding format;

b) cover all the classes, attributes, data types and associations of the aeronautical information model detailed in 3.6.5; and

c) provide an extension mechanism by which groups of users can extend the properties of existing features and add new features which do not adversely affect global standardization.

Note 1.—The intent of using a commonly used data encoding format is to ensure interoperability of aeronautical data exchange between agencies and organisations involved in the data processing chain.

Note 2.—Examples of commonly used data encoding formats include Extensible Markup Language (XML), Geography Markup Language (GML), and JavaScript Object Notation (JSON).

3.7 Quality management system

3.7.1 Quality management systems shall be implemented and maintained encompassing all functions of an aeronautical information service, as outlined in 2.2. The execution of such quality management systems shall be made demonstrable for each function stage.

Note.— Guidance material is contained in the Manual on the Quality Management System for Aeronautical Information Services *(Doc 9839).*

3.7.2 Quality management shall be applicable to the whole aeronautical information data chain from data origination to distribution to the next intended user, taking into consideration the intended use of data.

Note 1.— Quality management may be provided by a single quality management system or serial quality management systems.

Note 2.— Letters of agreement concerning data quality between originator and distributor and between distributor and next intended user may be used to manage the aeronautical information data chain.

3.7.3 The quality management system established in accordance with 3.7.1 shall follow the International Organization for Standardization (ISO) 9000 series of quality assurance standards, and be certified by an approved organisation.

Note 1.— An ISO 9000 *certificate issued by an accredited certification body would be considered an acceptable means of compliance.*

Note 2.— International Organization for Standardization (ISO) 9000 *series of quality assurance standards provide a basic framework for the development of a quality assurance programme and define the term "accredited certification body".*

The details of a successful programme are to be formulated by each State and in most cases are unique to the State organization.

Note 3.— Supporting material in respect of the processing of aeronautical data is contained in RTCA Document DO-200A and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-76 — *Standards for Processing Aeronautical Data*. *These standards support the development and application of aeronautical databases.*

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

Note.— Guidance material concerning training methodology to ensure the competency of personnel is contained in the Aeronautical Information Management Training Development Manual *(Doc 9991).*

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

3.7.6 The established quality management system shall provide users with the necessary assurance and confidence that distributed aeronautical data and aeronautical information satisfy the aeronautical data quality requirements for accuracy, resolution and integrity as specified in 3.2 and 3.3 and that the data traceability requirements are met through the provision of appropriate metadata as specified in 3.4. The system shall also provide assurance of the applicability period of intended use of aeronautical data as well as that the agreed distribution dates will be met.

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

3.7.8 Demonstration of compliance of the quality management system applied shall be by audit. If nonconformity is identified, initiating action to correct its cause shall be determined and taken without undue delay. All audit observations and remedial actions shall be evidenced and properly documented.

3.8 Human factors considerations

3.8.1 The organisation of the aeronautical information services as well as the design, contents, processing and distribution of aeronautical data and aeronautical information shall take into consideration Human Factors principles which facilitate their optimum utilization.

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

Note.— This may be accomplished through the design of systems, through operating procedures or through improvements in the operating environment.

3.9 Technical personnel

3.9.1 With respect to the qualification and training of AIS personnel in 3.7.4, AIS provider shall establish procedures to ensure that all its personnel possess the skills and competencies required in the provision of aeronautical services.

3.9.2 The AIS provider shall establish a training policy and programme for the AIS technical personnel including, when applicable, initial, recurrent and specialised training.

3.9.3 The AIS provider shall ensure that the AIS technical personnel undergo a suitable period of supervised on-the-job training before being tasked for duties.

3.9.4 A job description shall be developed for the technical staff. Initial and periodic assessment shall be established to demonstrate the required competencies.

3.10 Guidance materials

3.10.1 The AIS provider shall ensure that relevant ICAO documents and other technical and regulatory publications are readily available to all AIS technical staff.

3.10.2 A technical library should be available, to include any method to ensure receipt, control and distribution of the necessary technical documentation. The library shall be kept and maintained to ensure the currency of the documentations.

3.11 Records

The AIS provider shall maintain documents and records of operation and maintenance of the service. These documents shall include, but not limited to:

a) record of malfunction or fault of critical safety facilities and equipment;

b) record of training programme and plan for each AIS technical staff;

c) record and copy of certificates of all related trainings for each staff including where applicable, initial, OJT, recurrent and specialised training;

d) record of initial and periodic assessment for each AIS technical staff.

CHAPTER 4. AERONAUTICAL INFORMATION PUBLICATION (AIP)

Note 1.— AIPs are intended primarily to satisfy international requirements for the exchange of aeronautical information of a lasting character essential to air navigation. When practicable, the form of presentation is designed to facilitate their use in flight.

Note 2.— AIPs constitute the basic information source for permanent information and long duration temporary changes.

4.1 Contents

4.1.1 The AIS provider shall publish an AIP for Malaysia containing, in three parts, sections and subsections uniformly referenced to allow for standardized electronic data storage and retrieval, current information relating to, and arranged under, those subjects enumerated in *ICAO Annex 15 Appendix 1*.

4.1.1.1 Where applicable, AIPs shall, in addition, contain current information relating to those subjects enumerated in ICAO Annex 15 Appendix 1 that appear in italic type.

4.1.1.2 The AIP shall be divided into three parts:

a) Part 1 — General (GEN), contains information of an administrative and explanatory nature which is not of such significance that NOTAM need be issued;

b) Part 2 — En-route (ENR), contains information concerning airspace and its use; and

c) Part 3 — Aerodromes (AD), contains information concerning aerodromes/heliports and their use.

Note.— Guidance material on the AIP specifications together with an AIP specimen is contained in the Aeronautical Information Services Manual *(Doc 8126) Chapter 5 and the Appendix to Chapter 5 – Explanatory Notes on the Specimen AIP*.

4.1.2 AIPs shall include in Part 1 — General (GEN):

a) a statement of the competent authority responsible for the air navigation facilities, services or procedures covered by the AIP;

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

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

d) the choice made by Malaysia in each significant case where an alternative course of action is provided for in ICAO SARPs and Procedures.

4.1.3 The aeronautical charts listed alphabetically below shall, when available for designated international aerodromes/ heliports, form part of the AIP, or be distributed separately to recipients of the AIP:

a) Aerodrome/Heliport Chart — ICAO;

b) Aerodrome Ground Movement Chart — ICAO;

c) Aerodrome Obstacle Chart — ICAO Type A;

d) Aerodrome Terrain and Obstacle Chart — ICAO (Electronic);

e) Aircraft Parking/Docking Chart — ICAO;

f) Area Chart — ICAO;

g) ATC Surveillance Minimum Altitude Chart — ICAO;

h) Instrument Approach Chart — ICAO;

i) Precision Approach Terrain Chart — ICAO;

j) Standard Arrival Chart — Instrument (STAR) — ICAO;

k) Standard Departure Chart — Instrument (SID) — ICAO;

l) Visual Approach Chart — ICAO.

Note.— A page pocket may be used in the AIP to include the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) on appropriate electronic media.

4.1.4 Charts, maps or diagrams shall be used, when appropriate, to complement or as a substitute for the tabulations or text of Aeronautical Information Publications.

Note.— Where appropriate, charts produced in conformity with ICAO Annex 4 — Aeronautical Charts, *may be used to fulfil this requirement. Guidance material as to the specifications of index maps and diagrams included in Aeronautical Information Publications is contained in the* Aeronautical Information Services Manual *(Doc 8126).*

4.2 General specifications

4.2.1 Each AIP shall be self-contained and shall include a table of contents.

Note.— If it is necessary by reason of bulk or for convenience, to publish an AIP in two or more parts or volumes, each of them will indicate that the remainder of the information is to be found in the other part(s) or volume(s).

4.2.1.1 Each AIP shall not duplicate information within itself or from other sources.

4.2.1.2 When two or more States combine to issue a joint AIP, this shall be made clear both on the cover and in the table of contents.

4.2.2 AIP shall be published in loose-leaf form unless the complete publication is reissued at frequent intervals.

4.2.3 Each AIP shall be dated. In the case of AIPs issued in loose-leaf form, each page shall be dated. The date, consisting of the day, month (by name) and year, shall be the publication date or the effective date of the information.

4.2.4 A checklist giving the current date of each page in the AIP series shall be reissued frequently to assist the user in maintaining a current publication. The page number/chart title and date of the checklist shall appear on the checklist itself.

4.2.5 Each AIP issued as a bound volume and each page of an AIP issued in loose-leaf form shall be so annotated as to indicate clearly:

a) the identity of the AIP;

b) the territory covered and subdivisions when necessary;

c) the identification of the issuing State (Malaysia) and producing organization (Department of Civil Aviation Malaysia);

d) page numbers/chart titles; and

e) the degree of reliability if the information is doubtful.

4.2.6 The sheet size shall be no larger than 210 × 297 mm, except that larger sheets may be used provided they are folded to the same size.

4.2.7 All changes to the AIP, or new information on a republished page, shall be identified by a distinctive symbol or annotation.

4.2.8 Operationally significant changes to the AIP shall be published in accordance with AIRAC procedures and shall be clearly identified by the acronym — AIRAC.

4.2.9 The AIP shall be amended or reissued at such regular intervals as may be necessary to keep them up to date. Recourse to hand amendments or annotations shall be kept to the minimum. The normal method of amendment shall be by means of replacement sheets.

4.2.9.1 The regular interval referred to in 4.2.9 shall be specified in the AIP, Part 1 — General (GEN).

Note.— Guidance material on the establishment of intervals between publication dates of AIP Amendments is contained in the Aeronautical Information Services Manual *(Doc 8126).*

4.3 Specifications for AIP Amendments

4.3.1 Permanent changes to the AIP shall be published as AIP Amendments.

4.3.2 Each AIP Amendment shall be allocated a serial number, which shall be consecutive.

4.3.3 Each AIP Amendment page, including the cover sheet, shall display a publication date.

4.3.4 Each AIRAC AIP Amendment page, including the cover sheet, shall display an effective date. When an effective time other than 0000 UTC is used, the effective time shall also be displayed on the cover sheet.

4.3.5 When an AIP Amendment is issued, it shall include references to the serial number of those elements, if any, of the Integrated Aeronautical Information Package which have been incorporated into the amendment.

4.3.6 A brief indication of the subjects affected by the amendment shall be given on the AIP Amendment cover sheet.

4.3.7 When an AIP Amendment will not be published at the established interval or publication date, a NIL notification shall be originated and distributed by the monthly plain-language list of valid NOTAM required by 5.2.13.3.

4.4 Specifications for AIP Supplements

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

Note.— Guidance material on the use of AIP Supplements together with examples of such use is contained in the Aeronautical Information Services Manual *(Doc 8126).*

4.4.2 Each AIP Supplement shall be allocated a serial number which shall be consecutive and based on the calendar year.

4.4.3 AIP Supplement pages shall be kept in the AIP as long as all or some of their contents remain valid.

4.4.4 When an error occurs in an AIP Supplement or when the period of validity of an AIP Supplement is changed, a new AIP Supplement shall be published as a replacement.

Note.— The requirements for NOTAM apply when time constraints do not allow sufficient time for the distribution of an AIP Supplement.

4.4.5 When an AIP Supplement is sent in replacement of a NOTAM, it shall include a reference to the serial number of the NOTAM.

4.4.6 A checklist of valid AIP Supplements shall be issued at intervals of not more than one month. This information shall be issued through the medium of the monthly plain-language list of valid NOTAM required by 5.2.13.3.

4.4.7 AIP Supplement pages concerning information relating to WMFC and WBFC shall be coloured yellow and green respectively.

4.4.8 AIP Supplement pages shall be kept as the first item in the AIP parts.

4.5 Distribution

AIP, AIP Amendments and AIP Supplements shall be made available by the most expeditious means.

4.6 Electronic AIP (eAIP)

4.6.1 The AIP, AIP Amendment, AIP Supplement and AIC shall also be published in a format that allows for displaying on a computer screen and printing on paper.

Note 1.— This composite electronic document is named "Electronic AIP" (eAIP) and may be based on a format that allows for digital data exchange.

Note 2.— Guidance material for the production and provision of the eAIP is contained in Doc 8126.

4.6.2 When provided, the information content of the eAIP and the structure of chapters, sections and sub-sections shall follow the content and structure of the paper AIP. The eAIP shall include files that allow for printing a paper AIP.

4.6.3 When provided, the eAIP shall be available on a physical distribution medium (CD, DVD, etc.) and/or online on the Internet.

Note.— Guidance material on the use of the Internet is contained in Guidelines on the Use of the Public Internet for Aeronautical Applications *(Doc 9855)*.

4.7 Other information

4.7.1 Where appropriate, information on runway end safety areas **(**RESA) in conformity with ICAO Annex 14 shall be presented in column 6 of AD2.13 under PART 3 — AERODROMES (AD) of AIP Malaysia and shall also be shown in the aerodrome chart and where applicable, in the aerodrome ground movement chart.

4.7.1 Where appropriate, the details of contingency ATS routes and flight level allocation scheme as agreed under the *Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG)* shall be publish in Part 2 — En-route (ENR).

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CHAPTER 5. NOTAM

5.1 Origination

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

Note 1.— Operationally significant changes concerning circumstances listed in ICAO Annex 15 Appendix 4, Part 1, are issued under the Aeronautical Information Regulation and Control (AIRAC) system specified in Chapter 6.

Note 2.— Information of short duration containing extensive text and/or graphics is published as an AIP Supplement (see Chapter 4, 4.4).

5.1.1.1 A NOTAM shall be originated and issued concerning the following information:

a)establishment, closure or significant changes in operation of aerodrome(s)/heliport(s) or runways;

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

c) establishment, withdrawal and significant changes in operational capability of radio navigation and air-ground communication services. This includes: interruption or return to operation, change of frequencies, change in notified hours of service, change of identification, change of orientation (directional aids), change of location, power increase or decrease amounting to 50 per cent or more, change in broadcast schedules or contents, or irregularity or unreliability of operation of any radio navigation and air-ground communication services;

d) establishment, withdrawal or significant changes made to visual aids;

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

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

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

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

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

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

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

l) presence of hazards which affect air navigation (including obstacles, military exercises, displays, races and major parachuting events outside promulgated sites);

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

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

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

p) allocation, cancellation or change of location indicators;

q) significant changes in the level of protection normally available at an aerodrome/heliport for rescue and firefighting purposes. NOTAM shall be originated only when a change of category is involved and such change of category shall be clearly stated (see ICAO Annex 14, Volume I, Chapter 9, and Attachment A, Section 18);

r) presence or removal of, or significant changes in, hazardous conditions due to snow, slush, ice, radioactive material, toxic chemicals, volcanic ash deposition or water on the movement area;

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

t) forecasts of solar cosmic radiation, where provided;

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

v) release into the atmosphere of radioactive materials or toxic chemicals following a nuclear or chemical incident, the location, date and time of the incident, the flight levels and routes or portions thereof which could be affected and the direction of movement;

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

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

Note.— See, ATID-ATS Chapter 2.30 and Attachment C to ICAO Annex 11.

5.1.1.2 Where appropriate, the need for origination of a NOTAM shall be considered in any other circumstance which may affect the operation of aircraft.

5.1.1.3 The following information shall not be notified by NOTAM:

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

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

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

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

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

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

g) the unserviceability of location, destination or other instruction signs on the aerodrome movement area;

h) parachuting when in uncontrolled airspace under VFR (see 5.1.1.1 l)), when controlled, at promulgated sites or within danger or prohibited areas; and

i) other information of a similar temporary nature.

5.1.1.4 At least seven days' advance notice shall be given of the activation of established danger, restricted or prohibited areas and of activities requiring temporary airspace restrictions other than for emergency operations.

5.1.1.4.1 Notice of any subsequent cancellation of the activities or any reduction of the hours of activity or the dimensions of the airspace shall be given as soon as possible.

Note.— Whenever possible, at least 24 hours' advance notice is desirable, to permit timely completion of the notification process and to facilitate airspace utilization planning.

5.1.1.5 NOTAM notifying unserviceability of aids to air navigation, facilities or communication services shall give an estimate of the period of unserviceability or the time at which restoration of service is expected.

5.1.1.6 When an AIP Amendment or an AIP Supplement is published in accordance with AIRAC procedures, a NOTAM shall be originated giving a brief description of the contents, the effective date and time, and the reference number of the amendment or supplement. This NOTAM shall come into force on the same effective date and time as the amendment or supplement and shall remain valid in the pre-flight information bulletin for a period of fourteen days.

Note.— Guidance material for the origination of NOTAM announcing the existence of AIRAC AIP Amendments or AIP Supplements ("Trigger NOTAM") is contained in the Aeronautical Information Services Manual *(Doc 8126).*

5.1.2 The AIS Headquarters shall issue guidelines on the process for the issuance and origination of NOTAM from ATS Units and other relevant agencies.

5.1.3 ATS Unit and other relevant agencies that are designated as NOTAM originator shall keep and maintain a NOTAM register for all NOTAM originated from its station.

5.2 General specifications

5.2.1 Except as otherwise provided in 5.2.3 and 5.2.4, each NOTAM shall contain the information in the order shown in the NOTAM Format in *ICAO Annex 15 Appendix 6.*

5.2.2 Text of NOTAM shall be composed of the significations/uniform abbreviated phraseology assigned to the ICAO NOTAM Code complemented by ICAO abbreviations, indicators, identifiers, designators, call signs, frequencies, figures and plain language.

Note.— Detailed guidance material covering NOTAM, SNOWTAM, ASHTAM and PIB production is contained in Doc 8126.

5.2.2.1 When NOTAM is selected for international distribution, English text shall be included for those parts expressed in plain language.

Note.— The ICAO NOTAM Code together with significations/uniform abbreviated phraseology, and ICAO Abbreviations are those contained in the PANS-ABC (Doc 8400).

5.2.3 Information concerning snow, slush, ice and standing water on aerodrome/heliport pavements shall, when reported by means of a SNOWTAM, contain the information in the order shown in the SNOWTAM Format in *ICAO Annex 15 Appendix 2.*

5.2.4 Information concerning an operationally significant change in volcanic activity, a volcanic eruption and/or volcanic ash cloud shall, when reported by means of an ASHTAM, contain the information in the order shown in the ASHTAM Format in Appendix 3.

5.2.5 The NOTAM originator shall allocate to each NOTAM a series identified by a letter and a four-digit number followed by a stroke and a two-digit number for the year. The four-digit number shall be consecutive and based on the calendar year.

Note.— Letters A to Z, with the exception of S and T, may be used to identify a NOTAM series.

5.2.6 When errors occur in a NOTAM, a NOTAM with a new number to replace the erroneous NOTAM shall be issued or the erroneous NOTAM shall be cancelled and a new NOTAM issued.

5.2.7 When a NOTAM is issued which cancels or replaces a previous NOTAM, the series and number of the previous NOTAM shall be indicated. The series, location indicator and subject of both NOTAM shall be the same. Only one NOTAM shall be cancelled or replaced by a NOTAM.

5.2.8 Each NOTAM shall deal with only one subject and one condition of the subject.

Note.— Guidance concerning the combination of a subject and a condition of the subject in accordance with the NOTAM Selection Criteria is contained in the Aeronautical Information Services Manual *(Doc 8126).*

5.2.9 Each NOTAM shall be as brief as possible and so compiled that its meaning is clear without the need to refer to another document.

5.2.10 Each NOTAM shall be transmitted as a single telecommunication message.

5.2.11 A NOTAM containing permanent or temporary information of long duration shall carry appropriate AIP or AIP Supplement references.

5.2.12 Location indicators included in the text of a NOTAM shall be those contained in *Location Indicators* (Doc 7910).

5.2.12.1 In no case shall a curtailed form of such indicators be used.

5.2.12.2 Where no ICAO location indicator is assigned to the location, its place name spelt in accordance with 1.3.2 shall be entered in plain language.

5.2.13 A checklist of valid NOTAM shall be issued as a NOTAM over the Aeronautical Fixed Service (AFS) at intervals of not more than one month using the NOTAM Format specified in ICAO Annex 15 Appendix 6. One NOTAM shall be issued for each series.

Note.— Omitting a NOTAM from the checklist does not serve to cancel a NOTAM.

5.2.13.1 A checklist of NOTAM shall refer to the latest AIP Amendments, AIP Supplements and at least the internationally distributed AIC.

5.2.13.2 A checklist of NOTAM shall have the same distribution as the actual message series to which they refer and shall be clearly identified as a checklist.

5.2.13.3 A monthly plain-language list of valid NOTAM, including indications of the latest AIP Amendments, AIC issued and a checklist of AIP Supplements shall be prepared with a minimum of delay and forwarded by the most expeditious means to recipients of the Integrated Aeronautical Information Package.

5.3 Distribution

5.3.1 NOTAM shall be distributed on the basis of a request.

5.3.2 NOTAM shall be prepared in conformity with the relevant provisions of the ICAO communication procedures.

5.3.2.1 The AFS shall, whenever practicable, be employed for NOTAM distribution.

5.3.2.2 When a NOTAM exchanged as specified in 5.3.4 is sent by means other than the AFS, a six-digit date-time group indicating the date and time of NOTAM origination, and the identification of the originator shall be used, preceding the text.

5.3.3 The originating State shall select the NOTAM that are to be given international distribution.

5.3.3.1 Selective distribution lists should be used when practicable.

Note.— These lists are intended to obviate superfluous distribution of information. Guidance material relating to this is contained in the Aeronautical Information Services Manual *(Doc 8126).*

5.3.4 International exchange of NOTAM shall take place only as mutually agreed between the international NOTAM offices concerned. The international exchange of ASHTAM (see 5.2.4), and NOTAM where States continue to use NOTAM for distribution of information on volcanic activity, shall include volcanic ash advisory centres and the centres designated by regional air navigation agreement for the operation of AFS satellite distribution systems (satellite distribution system for information relating to air navigation (SADIS) and international satellite communications system (ISCS)), and shall take account of the requirements of long-range operations.

Note.— Arrangements may be made for direct exchange of SNOWTAM (see ICAO Annex 15 Appendix 2) between aerodromes/heliports.

5.3.4.1 These exchanges of NOTAM between international NOTAM offices shall, as far as practicable, be limited to the requirements of the receiving States concerned by means of separate series providing for at least international and domestic flights.

5.3.4.2 A predetermined distribution system for NOTAM transmitted on the AFS in accordance with ICAO Annex 15 Appendix 5 shall be used whenever possible, subject to the requirements of 5.3.4.

CHAPTER 6. AERONAUTICAL INFORMATIONREGULATION AND CONTROL (AIRAC)

6.1 General specifications

6.1.1 Information concerning the circumstances listed in ICAO Annex 15 Appendix 4, Part 1, shall be distributed under the regulated system (AIRAC), i.e. basing establishment, withdrawal or significant changes upon a series of common effective dates at intervals of 28 days, including 14 January 2010. The information notified therein shall not be changed further for at least another 28 days after the effective date, unless the circumstance notified is of a temporary nature and would not persist for the full period.

Note.— Guidance material on the procedures applicable to the AIRAC system is contained in the Aeronautical Information Services Manual *(Doc 8126).*

6.1.2 The regulated system (AIRAC) shall also be used for the provision of information relating to the establishment and withdrawal of, and premeditated significant changes in, the circumstances listed in ICAO Annex 15 Appendix 4, Part 2.

6.1.3 When information has not been submitted by the AIRAC date, a NIL notification shall be originated and distributed by NOTAM or other suitable means, not later than one cycle before the AIRAC effective date concerned.

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

6.1.5 The use of the date in the AIRAC cycle which occurs between 21 December and 17 January inclusive shall be avoided as an effective date for the introduction of significant changes under the AIRAC system.

6.2 Provision of information in paper copy form

6.2.1 Information provided under the AIRAC system in paper copy form shall be distributed by the AIS unit at least 42 days in advance of the effective date with the objective of reaching recipients at least 28 days in advance of the effective date.

6.2.2 Whenever major changes are planned and where advance notice is desirable and practicable, information provided in paper copy form shall be distributed by the AIS unit at least 56 days in advance of the effective date. This should be applied to the establishment of, and premeditated major changes in, the circumstances listed in ICAO Annex 15 Appendix 4, Part 3, and other major changes if deemed necessary.

Note.— Guidance on what constitutes a major change is included in Doc 8126.

6.3 Provision of information as electronic media

6.3.1 AIS providers that have established an aeronautical database shall, when updating its contents concerning the circumstances listed in ICAO Annex 15 Appendix 4, Part 1, ensure that the effective dates of data coincide with the established AIRAC effective dates.

6.3.2 Information provided as electronic media, concerning the circumstances listed in ICAO Annex 15 Appendix 4, Part 1, shall be distributed/made available by the AIS unit so as to reach recipients at least 28 days in advance of the AIRAC effective date.

6.3.3 Whenever major changes are planned and where advance notice is desirable and practicable, information provided as electronic media shall be distributed/made available at least 56 days in advance of the effective date. This should be applied to the establishment of, and premeditated major changes in, the circumstances listed in ICAO Annex 15 Appendix 4, Part 3, and other major changes if deemed necessary.

Note.— Guidance on what constitutes a major change is included in Doc 8126.

CHAPTER 7. AERONAUTICAL INFORMATION CIRCULARS (AIC)

7.1 Origination

7.1.1 The AIS provider shall originate an AIC whenever it is necessary to promulgate aeronautical information which does not qualify:

a) under the specifications in 4.1 for inclusion in an AIP; or

b) under the specifications in 5.1 for the origination of a NOTAM.

7.1.1.1 An AIC shall be originated whenever it is desirable to promulgate:

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

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

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

This shall include:

1) forecasts of important changes in the air navigation procedures, services and facilities provided;

2) forecasts of implementation of new navigation systems;

3) significant information arising from aircraft accident/incident investigation which has a bearing on flight safety;

4) information on regulations relating to the safeguarding of international civil aviation against acts of unlawful interference;

5) advice on medical matters of special interest to pilots;

6) warnings to pilots concerning the avoidance of physical hazards;

7) effect of certain weather phenomena on aircraft operations;

8) information on new hazards affecting aircraft handling techniques;

9) regulations relating to the carriage of restricted articles by air;

10) reference to the requirements of, and publication of changes in, national legislation;

11) aircrew licensing arrangements;

12) training of aviation personnel;

13) application of, or exemption from, requirements in national legislation;

14) advice on the use and maintenance of specific types of equipment;

15) actual or planned availability of new or revised editions of aeronautical charts;

16) carriage of communication equipment;

17) explanatory information relating to noise abatement;

18) selected airworthiness directives;

19) changes in NOTAM series or distribution, new editions of AIP or major changes in their contents, coverage or format;

20) advance information on the snow plan (see 7.1.1.2); and

21) other information of a similar nature.

Note.— The publication of an AIC does not remove the obligations set forth in Chapters 4 and 5.

7.2 General specifications

7.2.1 The originating aeronautical information service shall select the AIC that are to be given international distribution.

* This information, or any part of it, may be included in the AIP, if so desired.

7.2.2 Each AIC shall be allocated a serial number which shall be consecutive and based on the calendar year.

7.2.3 When AIC are distributed in more than one series, each series shall be separately identified by a letter.

Note.— Both text and diagrams may be included in an AIC.

7.2.4 Differentiation and identification of AIC topics according to subjects using colour coding shall be practised where the numbers of AIC in force are sufficient to make identification in this form necessary.

Note.— Guidance on colour coding of AIC by subject can be found in the Aeronautical Information Services Manual *(Doc 8126).*

7.2.5 A checklist of AIC currently in force shall be issued at least once a year, with distribution as for the AIC.

7.3 Distribution

AIC selected for international distribution shall be given the same distribution as for the AIP.

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CHAPTER 8. PRE-FLIGHT AND POST-FLIGHT INFORMATION

8.1 Pre-flight information

8.1.1 At any aerodrome/heliport normally used for international air operations, aeronautical information essential for the safety, regularity and efficiency of air navigation and relative to the route stages originating at the aerodrome/heliport shall be made available by the AIS provider to flight operations personnel, including flight crews and services responsible for pre-flight information.

8.1.2 Aeronautical information provided for pre-flight planning purposes at the aerodromes/heliports referred to in 8.1.1 shall include relevant:

a) elements of the *Integrated Aeronautical Information Package*;

b) maps and charts.

Note.— The documentation listed in a) and b) may be limited to national publications and when practicable, those of immediately adjacent States, provided a complete library of aeronautical information is available at a central location and means of direct communications are available between the aerodrome AIS unit and that library.

8.1.2.1 Additional current information relating to the aerodrome of departure shall be provided concerning the following:

a) construction or maintenance work on or immediately adjacent to the manoeuvring area;

b) rough portions of any part of the manoeuvring area, whether marked or not, e.g. broken parts of the surface of runways and taxiways;

c) presence and depth of snow, ice or water on runways and taxiways, including their effect on surface friction;

d) snow drifted or piled on or adjacent to runways or taxiways;

e) parked aircraft or other objects on or immediately adjacent to taxiways;

f) presence of other temporary hazards;

g) presence of birds constituting a potential hazard to aircraft operations;

h) failure or irregular operation of part or all of the aerodrome lighting system including approach, threshold, runway, taxiway, obstruction and manoeuvring area unserviceability lights and aerodrome power supply;

i) failure, irregular operation and changes in the operational status of SSR, ADS-B, ADS-C, CPDLC, D-ATIS, D-VOLMET, radio navigation services, VHF aeromobile channels, RVR observing system, and secondary power supply; and

j) presence and operation of humanitarian relief missions, such as those undertaken under the auspices of the United Nations, together with any associated procedures and/or limitations applied thereof.

8.1.3 A recapitulation of valid NOTAM of operational significance and other information of urgent character shall be made available to flight crews in the form of plain-language pre-flight information bulletins (PIB).

Note.— Guidance on the preparation of PIB is contained in the Aeronautical Information Services Manual *(Doc 8126).*

8.2 Automated pre-flight information systems

8.2.1 Automated pre-flight information systems shall be used to make aeronautical data and aeronautical information available to operations personnel including flight crew members for self-briefing, flight planning and flight information service purposes. The aeronautical data and aeronautical information made available shall comply with the provisions of 8.1.2 and 8.1.3.

8.2.2 Self-briefing facilities of an automated pre-flight information system shall provide access to operations personnel, including flight crew members and other aeronautical personnel concerned, for consultation as necessary with the aeronautical information service by telephone or other suitable telecommunications means. The human/machine interface of such facilities shall ensure easy access in a guided manner to all relevant information/data.

8.2.3 Automated pre-flight information systems for the supply of aeronautical data and aeronautical information for self-briefing, flight planning and flight information service shall:

a) provide for continuous and timely updating of the system database and monitoring of the validity and quality of the aeronautical data stored;

b) permit access to the system by operations personnel including flight crew members, aeronautical personnel concerned and other aeronautical users through suitable telecommunications means;

c) ensure provision, in paper copy form, of the aeronautical data and aeronautical information accessed, as required;

d) use access and interrogation procedures based on abbreviated plain language and ICAO location indicators, as appropriate, or based on a menu-driven user interface or other appropriate mechanism as agreed between the civil aviation authority and operator concerned; and

e) provide for rapid response to a user request for information.

Note.— ICAO abbreviations and codes and location indicators are given respectively in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes (*PANS-ABC, Doc 8400*) *and* Location Indicators (*Doc 7910*).

8.2.4 Automated pre-flight information systems providing a harmonized, common point of access by operations personnel, including flight crew members and other aeronautical personnel concerned, to aeronautical information in accordance with 8.2.1 and meteorological information in accordance with 9.4.1 of the ATID-MET, shall be established by an agreement between the civil aviation authority or the agency to which the authority to provide service has been delegated in accordance with 2.1.1 c) and the relevant meteorological authority.

8.2.5 Where automated pre-flight information systems are used to provide the harmonized, common point of access by operations personnel, including flight crew members and other aeronautical personnel concerned, to aeronautical data, aeronautical information and meteorological information, the civil aviation authority or the agency to which the authority to provide service has been delegated in accordance with 2.1.1 c) shall remain responsible for

the quality and timeliness of the aeronautical data and aeronautical information provided by means of such a system.

Note.— The meteorological authority concerned remains responsible for the quality of the meteorological information provided by means of such a system in accordance with 9.4.3 of ATID-MET.

8.3 Post-flight information

8.3.1 The AIS provider shall ensure that arrangement be made to receive at aerodromes/heliports information concerning the state and operation of air navigation facilities or services noted by aircrews and shall ensure that such information is made available to the aeronautical information service for such distribution as the circumstances necessitate.

8.3.2 Arrangements shall be made to receive at aerodromes/heliports information concerning the presence of birds observed by aircrews and shall ensure that such information is made available to the aeronautical information service for such distribution as the circumstances necessitate.

Note.— See ICAO Annex 14, Volume I, Chapter 9, Section 9.4.

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CHAPTER 9. TELECOMMUNICATION REQUIREMENTS

9.1 International NOTAM offices shall be connected to the aeronautical fixed service (AFS).

9.1.1 The connections shall provide for printed communications.

9.2 Each international NOTAM office shall be connected, through the aeronautical fixed service (AFS), to the following points within the territory for which it provides service:

a) area control centres and flight information centres;

b) aerodromes/heliports at which an information service is established in accordance with Chapter 8.

9.3 Subject to availability, satisfactory operation and bilateral/multilateral and/or regional air navigation agreements, the use of the public Internet shall be permitted for exchange of non-time critical types of aeronautical information.

Note.— Guidance material on non-time critical types of aeronautical information and relevant aspects of the public Internet is provided in the Guidelines on the Use of the Public Internet for Aeronautical Applications *(Doc 9855).*

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CHAPTER 10. ELECTRONIC TERRAIN AND OBSTACLE DATA

Note.— Electronic terrain and obstacle data are intended to be used in the following air navigation applications:

a) ground proximity warning system with forward looking terrain avoidance function and minimum safe altitude warning (MSAW) system;

b) determination of contingency procedures for use in the event of an emergency during a missed approach or take-off;

c) aircraft operating limitations analysis;

d) instrument procedure design (including circling procedure);

e) determination of en-route "drift-down" procedure and en-route emergency landing location;

f) advanced surface movement guidance and control system (A-SMGCS); and

g) aeronautical chart production and on-board databases.

The data may also be used in other applications such as flight simulator and synthetic vision systems, and may assist in determining the height restriction or removal of obstacles that pose a hazard to air navigation.

10.1 Coverage areas and requirements for data provision

10.1.1 The coverage areas for sets of electronic terrain and obstacle data shall be specified as:

— Area 1: the entire territory of Malaysia;

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

— Area 2a: a rectangular area around a runway that comprises the runway strip plus any clearway that exists.

Note.— See ICAO Annex 14, Volume I, Chapter 3, for dimensions for runway strip.

— Area 2b: an area extending from the ends of Area 2a in the direction of departure, with a length of 10 km and a splay of 15 per cent to each side;

— Area 2c: an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a; and

— Area 2d: an area outside the Areas 2a, 2b and 2c up to a distance of 45 km from the aerodrome reference point, or to an existing TMA boundary, whichever is nearest;

— Area 3: the area bordering an aerodrome movement area that extends horizontally from the edge of a runway to 90 m from the runway centreline and 50 m from the edge of all other parts of the aerodrome movement area.

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

Note.— See ICAO Annex 15 Appendix 8 for descriptions and graphical illustrations of the coverage areas.

10.1.2 Where the terrain at a distance greater than 900 m (3 000 ft) from the runway threshold is mountainous or otherwise significant, the length of Area 4 shall be extended to a distance not exceeding 2 000 m (6 500 ft) from the runway threshold.

10.1.3 Electronic terrain data shall be provided for Area 1. The obstacle data shall be provided for obstacles in Area 1 higher than 100 m above ground.

10.1.4 At aerodromes regularly used by international civil aviation, electronic obstacle data shall be provided for all obstacles within Area 2 that are assessed as being a hazard to air navigation.

10.1.5 At aerodromes regularly used by international civil aviation, electronic terrain data shall be provided for:

a) Area 2a;

b) the take-off flight path area; and

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

10.1.6 At aerodromes regularly used by international civil aviation, electronic obstacle data shall be provided for:

a) Area 2a , for those obstacles that penetrate the relevant obstacle data collection surface specified in ICAO Annex 15 Appendix 8;

b) objects in the take-off flight path area which project above a plane surface having a 1.2 per cent slope and having a common origin with the take-off flight path area; and

c) penetrations of the aerodrome obstacle limitation surfaces.

Note.— Take-off flight path areas are specified in ICAO Annex 4, 3.8.2. Aerodrome obstacle limitation surfaces are specified in ICAO Annex 14, Volume 1, Chapter 4.

10.1.7 At aerodromes regularly used by international civil aviation, electronic terrain and obstacle data shall be provided for Areas 2b, 2c and 2d for obstacles and terrain that penetrate the relevant terrain and obstacle data collection surface specified in ICAO Annex 15 Appendix 8, except that data need not be collected for obstacles less than a height of 3 m above ground in Area 2b and less than a height of 15 m above ground in Area 2c.

10.1.8 At aerodromes regularly used by international civil aviation, electronic terrain and obstacle data shall be provided for Area 3 for terrain and obstacles that penetrate the relevant obstacle data collection surface specified in ICAO Annex 15 Appendix 8, Figure A8-3.

10.1.9 At aerodromes regularly used by international civil aviation, electronic terrain and obstacle data shall be provided for Area 4 for terrain and obstacles that penetrate the relevant obstacle data collection surface specified in ICAO Annex 15 Appendix 8, for all runways where precision approach Category II or III operations have been established and where detailed terrain information is required by operators to enable them to assess the effect of terrain on decision height determination by use of radio altimeters.

Note.— Area 4 terrain data and Area 2 obstacle data are normally sufficient to support the production of the Precision Approach Terrain Chart — ICAO. When more detailed obstacle data are required for Area 4, these may be provided in accordance with the Area 4 obstacle data requirements specified in ICAO Annex 15 Appendix 8, Table A8-2. Guidance on appropriate obstacles for this chart is given in the Aeronautical Chart Manual *(Doc 8697).*

10.1.10 Where additional electronic obstacle or terrain data are collected to meet other aeronautical requirements, the obstacle and terrain data sets shall be expanded to include these additional data.

10.1.11 Arrangements shall be made for the coordination of providing Area 2 electronic terrain and obstacle data for adjacent aerodromes where their respective coverage areas overlap to assure that the data for the same obstacle or terrain are correct.

10.1.12 At those aerodromes located near territorial boundaries, arrangements shall be made among States concerned to share Area 2 electronic terrain and obstacle data.

10.2 Terrain data set — content, numerical specification and structure

10.2.1 A terrain data set shall contain digital sets of data representing terrain surface in the form of continuous elevation values at all intersections (points) of a defined grid, referenced to common datum. A terrain grid shall be angular or linear and shall be of regular or irregular shape.

Note.— In regions of higher latitudes, latitude grid spacing may be adjusted to maintain a constant linear density of measurement points.

10.2.2 Sets of electronic terrain data shall include spatial (position and elevation), thematic and temporal aspects for the surface of the Earth containing naturally occurring features such as mountains, hills, ridges, valleys, bodies of water, permanent ice and snow, and excluding obstacles. In practical terms, depending on the acquisition method used, this shall represent the continuous surface that exists at the bare Earth, the top of the canopy or something in-between, also known as “first reflective surface”.

10.2.3 In terrain data sets, only one feature type, i.e. terrain, shall be provided. Feature attributes describing terrain shall be those listed in ICAO Annex 15 Table A8-3. The terrain feature attributes listed in ICAO Annex 15 Table A8-3 represent the minimum set of terrain attributes, and those annotated as mandatory shall be recorded in the terrain data set.

10.2.4 Electronic terrain data for each area shall conform to the applicable numerical requirements in ICAO Annex 15 Appendix 8, Table A8-1.

10.3 Obstacle data set — content, numerical specification and structure

10.3.1 Obstacle data shall comprise the digital representation of the vertical and horizontal extent of the obstacle. Obstacles shall not be included in terrain data sets. Obstacle data elements are features that shall be represented in the data sets by points, lines or polygons.

10.3.2 In an obstacle data set, all defined obstacle feature types shall be provided and each of them shall be described according to the list of mandatory attributes provided in ICAO Annex 15 Appendix 8, Table A8-4.

Note.— By definition, obstacles can be fixed (permanent or temporary) or mobile. Specific attributes associated with mobile (feature operations) and temporary types of obstacles are annotated in ICAO Annex 15 Appendix 8, Table A8-4, as optional attributes.

If these types of obstacles are to be provided in the data set, appropriate attributes describing such obstacles are also required.

10.3.3 Electronic obstacle data for each area shall conform to the applicable numerical requirements in ICAO Annex 15 Appendix 8, Table A8-2.

10.4 Terrain and obstacle data product specifications

10.4.1 To allow and support the interchange and use of sets of electronic terrain and obstacle data among different data providers and data users, the ISO 19100 series of standards for geographic information shall be used as a general data modelling framework.

10.4.2 A comprehensive statement of available electronic terrain and obstacle data sets shall be provided in the form of terrain data product specifications as well as obstacle data product specifications on which basis air navigation users will be able to evaluate the products and determine whether they fulfil the requirements for their intended use (application).

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

10.4.3 Each terrain data product specification shall include an overview, a specification scope, data product identification, data content and structure, reference system, data quality, data capture, data maintenance, data portrayal, data product delivery, additional information, and metadata.

10.4.4 The overview of terrain data product specifications or obstacle data product specifications shall provide an informal description of the product and shall contain general information about the data product. Specification of terrain data may not be homogenous across the whole data product but may vary for different parts of the data sets. For each such subset of data, a specification scope shall be identified. Identification information concerning both terrain and obstacle data products shall include the title of the product; a brief narrative summary of the content, purpose, and spatial resolution if appropriate (a general statement about the density of spatial data); the geographic area covered by the data product; and supplemental information.

10.4.5 Content information of feature-based terrain data sets or of feature-based obstacle data sets shall each be described in terms of an application schema and a feature catalogue. Application schema shall provide a formal description of the data structure and content of data sets while the feature catalogue shall provide the semantics of all feature types together with their attributes and attribute value domains, association types between feature types and feature operations, inheritance relations and constraints. Coverage is considered a subtype of a feature and can be derived from a collection of features that have common attributes. Both terrain and obstacle data product specifications shall identify clearly the coverage and/or imagery they include and shall provide a narrative description of each of them.

Note 1.— ISO Standard 19109 contains rules for application schema while ISO Standard 19110 describes feature cataloguing methodology for geographic information.

Note 2.— ISO Standard 19123 contains schema for coverage geometry and functions.

10.4.6 Both terrain data product specifications and obstacle data product specifications shall include information that identifies the reference system used in the data product. This shall include the spatial reference system and temporal reference system. Additionally, both data product specifications shall identify the data quality requirements for each data product. This shall include a statement on acceptable conformance quality levels and corresponding data quality measures. This statement shall cover all the data quality elements and data quality sub-elements, even if only to state that a specific data quality element or sub-element is not applicable.

Note.— ISO Standard 19113 contains quality principles for geographic information while ISO Standard 19114 covers quality evaluation procedures.

10.4.7 Terrain data product specifications shall include a data capture statement which shall be a general description of the sources and of processes applied for the capture of terrain data. The principles and criteria applied in the maintenance of terrain data sets and obstacle data sets shall also be provided with the data specifications, including the frequency with which data products are updated. Of particular importance shall be the maintenance information of obstacle data sets and an indication of the principles, methods and criteria applied for obstacle data maintenance.

10.4.8 Terrain data product specifications shall contain information on how data held with data sets are presented, i.e. as a graphic output, as a plot or as an image. The product specifications for both terrain and obstacles shall also contain data product delivery information which shall include delivery formats and delivery medium information.

Note.— ISO Standard 19117 contains a definition of the schema describing the portrayal of geographic information including the methodology for describing symbols and mapping of the schema to an application schema.

10.4.9 The core terrain and obstacle metadata elements shall be included in the data product specifications. Any additional metadata items required to be supplied shall be stated in each product specification together with the format and encoding of the metadata.

Note.— ISO Standard 19115 specifies requirements for geographic information metadata.

10.4.10 The obstacle data product specification, supported by geographical coordinates for each aerodrome included within the dataset, shall describe the following areas:

— Areas 2a, 2b, 2c, 2d;

— the take-off flight path area; and

— the obstacle limitation surfaces.

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CHAPTER 11. AERODROME MAPPING DATA

Note 1.— Aerodrome mapping data include aerodrome geographic information that supports applications which improve the user's situational awareness or supplements surface navigation, thereby increasing safety margins and operational efficiency. Aerodrome mapping data sets with appropriate data element accuracy support requirements for collaborative decision making, common situational awareness, and aerodrome guidance applications are intended to be used, among others, in the following air navigation applications:

a) position and route awareness including moving maps with own ship position, surface guidance and navigation (such as A-SMGCS);

b) traffic awareness including surveillance and runway incursion detection and alerting;

c) facilitation of aerodrome-related aeronautical information, including NOTAM;

d) resource and aerodrome facility management; and

e) aeronautical chart production.

The data may also be used in other applications such as training/flight simulator and synthetic vision systems.

Note 2.— Aerodrome mapping data are organized and arranged in aerodrome mapping databases (AMDBs) for ease of electronic storage and usage by appropriate applications.

11.1 Aerodrome mapping data — requirements for provision

11.1.1 Aerodrome mapping data shall be supported by electronic terrain and obstacle data for Area 3 in order to ensure consistency and quality of all geographical data related to the aerodrome.

Note 1.— Accuracy and integrity requirements for aerodrome mapping data are contained in ICAO Annex 14, Volume I, Appendix 5.

Note 2.— Electronic terrain and obstacle data pertaining to Area 3 and aerodrome mapping data may be originated using common acquisition techniques and managed within a single geographic information system (GIS).

Note 3.— Supporting material with respect to the processing of electronic terrain and obstacle data and aerodrome mapping data is contained in RTCA Document DO-200A and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-76 — Standards for Processing Aeronautical Data.

11.2 Aerodrome mapping data product specification

11.2.1 The ISO 19100 series of standards for geographic information shall be used as a reference framework.

Note.— This is intended to facilitate and support the use and exchange of aerodrome mapping data between data providers and data users.

11.2.2 Aerodrome mapping data products shall be described following the ISO 19131 data product specification standard.

Note.— This includes an overview, specification scope, data product identification, data content and structure, reference system, data quality, data capture, data maintenance, data portrayal, data product delivery, additional information, and metadata.

11.3 Aerodrome mapping database — data set content and structure

11.3.1 The content and structure of aerodrome mapping data sets shall be defined in terms of an application schema and a feature catalogue.

Note.— ISO Standard 19109 contains rules for application schema while ISO Standard 19110 describes the feature cataloguing methodology for geographic information.

11.3.2 Aerodrome mapping data sets shall contain aerodrome mapping data consisting of aerodrome features.

Note 1.— Aerodrome features consist of attributes and geometries, which are characterized as points, lines or polygons.

Examples include runway thresholds, taxiway guidance lines and parking stand areas.

Note 2.— Aerodrome mapping data feature definitions, constraints and rules applicable to aerodrome mapping data are contained in RTCA Document DO-272C/European Organization for Civil Aviation Equipment (EUROCAE) *Document*

ED-99C — User Requirements for Aerodrome Mapping Information*. These constraints ensure the connectivity between features on a spatial and functional level in accordance with the connections observed in the real world.*

Note 3.— An application schema applicable to aerodrome mapping data feature definitions may be found in RTCA Document DO-291B and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-119B — Interchange Standards for Terrain, Obstacle, and Aerodrome Mapping Data*. This application schema contains a feature catalogue which specifies the feature types and associated attributes.*

11.3.3 Aerodrome mapping metadata shall comply with ISO 19115.

Note.— Metadata elements applicable to aerodrome mapping data are contained in RTCA Document DO-291B and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-119B — Interchange Standards for Terrain, Obstacle, and Aerodrome Mapping Data.

CHAPTER 12. AERONAUTICAL CHARTS

Note.— The SARPs contained in this chapter are applicable to all ICAO aeronautical charts unless otherwise stated in the specifications of the chart concerned.

12.1 Definitions

In addition to the definitions in Chapter 1, when the following terms are used in the SARPs for aeronautical charts, they have the following meanings:

Aerodrome elevation. The elevation of the highest point of the landing area.

Aerodrome operating minima. The limits of usability of an aerodrome for:

a) take-off, expressed in terms of runway visual range and/or visibility and, if necessary, cloud conditions;

b) landing in precision approach and landing operations, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H) as appropriate to the category of the operation;

c) landing in approach and landing operations with vertical guidance, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H); and

d) landing in non-precision approach and landing operations, expressed in terms of visibility and/or runway visual range, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions.

Aerodrome reference point. The designated geographical location of an aerodrome.

Aeronautical chart. A representation of a portion of the Earth, its culture and relief, specifically designated to meet the requirements of air navigation.

Aircraft stand. A designated area on an apron intended to be used for parking an aircraft.

Air defence identification zone. Special designated airspace of defined dimensions within which aircraft are required to comply with special identification and/or reporting procedures additional to those related to the provision of air traffic services (ATS).

Air traffic service. A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).

Air transit route. A defined route for the air transiting of helicopters.

Airway. A control area or portion thereof established in the form of a corridor.

Altitude. The vertical distance of a level, a point or an object considered as a point, measured from mean sea level (MSL).

Apron. A defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fueling, parking or maintenance.

Area minimum altitude (AMA). The minimum altitude to be used under instrument meteorological conditions (IMC), that provides a minimum obstacle clearance within a specified area, normally formed by parallels and meridians.

Arrival routes. Routes identified in an instrument approach procedure by which aircraft may proceed from the en-route phase of flight to an initial approach fix.

ATS route. A specified route designed for channeling the flow of traffic as necessary for the provision of air traffic services.

Note 1.— The term ATS route is used to mean variously, airway, advisory route, controlled or uncontrolled route, arrival or departure route, etc.

Note 2.— An ATS route is defined by route specifications that include an ATS route designator, the track to or from significant points (waypoints), distance between significant points, reporting requirements and, as determined by the appropriate ATS authority, the lowest safe altitude.

Change-over point. The point at which an aircraft navigating on an ATS route segment defined by reference to very high frequency omnidirectional radio ranges is expected to transfer its primary navigational reference from the facility behind the aircraft to the next facility ahead of the aircraft.

Note.— Change-over points are established to provide the optimum balance in respect of signal strength and quality between facilities at all levels to be used and to ensure a common source of azimuth guidance for all aircraft operating along the same portion of a route segment.

Clearway. A defined rectangular area on the ground or water under the control of the appropriate authority, selected or prepared as a suitable area over which an aeroplane may make a portion of its initial climb to a specified height.

Contour line. A line on a map or chart connecting points of equal elevation.

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.

Elevation. The vertical distance of a point or a level, on or affixed to the surface of the earth, measured from mean sea level.

Final approach. That part of an instrument approach procedure which commences at the specified final approach fix or point, or where such a fix or point is not specified,

a) at the end of the last procedure turn, base turn or inbound turn of a racetrack procedure, if specified; or

b) at the point of interception of the last track specified in the approach procedure; and ends at a point in the vicinity of an aerodrome from which:

1) a landing can be made; or

2) a missed approach procedure is initiated.

Final approach and take-off area (FATO). A defined area over which the final phase of the approach manoeuvre to hover or landing is completed and from which the take-off manoeuvre is commenced. Where the FATO is to be used by performance Class 1 helicopters, the defined area includes the rejected take-off area available.

Final approach fix or point. That fix or point of an instrument approach procedure where the final approach segment commences.

Final approach segment. That segment of an instrument approach procedure in which alignment and descent for landing are accomplished.

Flight information region. An airspace of defined dimensions within which flight information service and alerting service are provided.

Flight level. A surface of constant atmospheric pressure which is related to a specific pressure datum, 1 013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals.

Note 1.— A pressure type altimeter calibrated in accordance with the Standard Atmosphere:

a) when set to a QNH altimeter setting, will indicate altitude;

b) when set to a QFE altimeter setting, will indicate height above the QFE reference datum;

c) when set to a pressure of 1 013.2 hPa, may be used to indicate flight levels.

Note 2.— The terms "height" and "altitude", used in Note 1 above, indicate altimetric rather than geometric heights and altitudes.

Glide path. A descent profile determined for vertical guidance during a final approach.

Helicopter stand. An aircraft stand which provides for parking a helicopter and where ground taxi operations are completed or where the helicopter touches down and lifts off for air taxi operations.

Heliport reference point (HRP). The designated location of a heliport or a landing location.

Holding procedure. A predetermined manoeuvre which keeps an aircraft within a specified airspace while awaiting further clearance.

Hot spot. A location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary.

Hypsometric tints. A succession of shades or colour gradations used to depict ranges of elevation.

Initial approach segment. That segment of an instrument approach procedure between the initial approach fix and the intermediate approach fix or, where applicable, the final approach fix or point.

Instrument approach procedure. A series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply.

Intermediate approach segment. That segment of an instrument approach procedure between either the intermediate approach fix and the final approach fix or point, or between the end of a reversal, racetrack or dead reckoning track procedure and the final approach fix or point, as appropriate.

Intermediate holding position. A designated position intended for traffic control at which taxiing aircraft and vehicles shall stop and hold until further cleared to proceed, when so instructed by the aerodrome control tower.

Isogonal. A line on a map or chart on which all points have the same magnetic variation for a specified epoch.

Isogriv. A line on a map or chart which joins points of equal angular difference between the North of the navigation grid and Magnetic North.

Landing area. That part of a movement area intended for the landing or take-off of aircraft.

Landing direction indicator. A device to indicate visually the direction currently designated for landing and for take-off.

Level. A generic term relating to the vertical position of an aircraft in flight and meaning variously, height, altitude or flight level.

Magnetic variation. The angular difference between True North and Magnetic North.

Note.— The value given indicates whether the angular difference is East or West of True North.

Marking. A symbol or group of symbols displayed on the surface of the movement area in order to convey aeronautical information.

Minimum sector altitude (MSA). The lowest altitude which may be used which will provide a minimum clearance of 300 m (1 000 ft) above all objects located in an area contained within a sector of a circle of 46 km (25 NM) radius centred on a significant point, the aerodrome reference point (ARP) or the heliport reference point (HRP).

Missed approach point (MAPt). That point in an instrument approach procedure at or before which the prescribed missed approach procedure must be initiated in order to ensure that the minimum obstacle clearance is not infringed.

Missed approach procedure. The procedure to be followed if the approach cannot be continued.

Obstacle. All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that:

a) are located on an area intended for the surface movement of aircraft; or

b) extend above a defined surface intended to protect aircraft in flight; or

c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.

Note.— The term obstacle is used in this document solely for the purpose of specifying the charting of objects that are considered a potential hazard to the safe passage of aircraft in the type of operation for which the individual chart series is designed.

Obstacle clearance altitude (OCA) or obstacle clearance height (OCH). The lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable, used in establishing compliance with appropriate obstacle clearance criteria.

Note 1.— Obstacle clearance altitude is referenced to mean sea level and obstacle clearance height is referenced to the threshold elevation or in the case of non-precision approaches to the aerodrome elevation or the threshold elevation if that is more than 2 m (7 ft) below the aerodrome elevation. An obstacle clearance height for a circling approach is referenced to the aerodrome elevation.

Note 2.— For convenience when both expressions are used they may be written in the form "obstacle clearance altitude/height" and abbreviated "OCA/H".

Note 3.— See Procedures for Air Navigation Services — Aircraft Operations *(Doc 8168), Volume I, Part I, Section 4, Chapter 1, 1.5, and Volume II, Part I, Section 4, Chapter 5, 5.4, for specific applications of this definition.*

Obstacle free zone (OFZ). The airspace above the inner approach surface, inner transitional surfaces, and balked landing surface and that portion of the strip bounded by these surfaces, which is not penetrated by any fixed obstacle other than a low-mass and frangibly mounted one required for air navigation purposes.

Point light. A luminous signal appearing without perceptible length.

Position (geographical). Set of coordinates (latitude and longitude) referenced to the mathematical reference ellipsoid which define the position of a point on the surface of the Earth.

Precision approach procedure. An instrument approach procedure utilizing azimuth and glide path information provided by ILS or PAR.

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.

Procedure turn. A manoeuvre in which a turn is made away from a designated track followed by a turn in the opposite direction to permit the aircraft to intercept and proceed along the reciprocal of the designated track.

Note 1.— Procedure turns are designated "left" or "right" according to the direction of the initial turn.

Note 2.— Procedure turns may be designated as being made either in level flight or while descending, according to the circumstances of each individual procedure.

Relief. The inequalities in elevation of the surface of the Earth represented on aeronautical charts by contours, hypsometric tints, shading or spot elevations.

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".

Reversal procedure. A procedure designed to enable aircraft to reverse direction during the initial approach segment of an instrument approach procedure. The sequence may include procedure turns or base turns.

Runway. A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

Runway-holding position. A designated position intended to protect a runway, an obstacle limitation surface, or an ILS/MLS critical/sensitive area at which taxiing aircraft and vehicles shall stop and hold, unless otherwise authorized by the aerodrome control tower.

Note.— In radiotelephony phraseologies, the expression "holding point" is used to designate the runway-holding position.

Runway strip. A defined area including the runway and stopway, if provided, intended:

a) to reduce the risk of damage to aircraft running off a runway; and

b) to protect aircraft flying over it during take-off or landing operations.

Runway visual range (RVR). The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

Shoulder. An area adjacent to the edge of a pavement so prepared as to provide a transition between the pavement and the adjacent surface.

Significant point. A specified geographical location used in defining an ATS route or the flight path of an aircraft and for other navigation and ATS purposes.

Note.— There are three categories of significant 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.

Stopway. A defined rectangular area on the ground at the end of take-off run available prepared as a suitable area in which an aircraft can be stopped in the case of an abandoned take-off.

Taxiing. Movement of an aircraft on the surface of an aerodrome under its own power, excluding take-off and landing.

Taxi-route. A defined path established for the movement of helicopters from one part of a heliport to another. A taxi-route includes a helicopter air or ground taxiway which is centred on the taxi-route.

Taxiway. A defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including:

a) *Aircraft stand taxilane.* A portion of an apron designated as a taxiway and intended to provide access to aircraft stands only.

b) *Apron taxiway.* A portion of a taxiway system located on an apron and intended to provide a through taxi route across the apron.

c) *Rapid exit taxiway.* A taxiway connected to a runway at an acute angle and designed to allow landing aeroplanes to turn off at higher speeds than are achieved on other exit taxiways thereby minimizing runway occupancy times.

Terminal arrival altitude (TAA). The lowest altitude that will provide a minimum clearance of 300 m (1 000 ft) above all objects located in an arc of a circle defined by a 46 km (25 NM) radius centred on the initial approach fix (IAF), or where there is no IAF on the intermediate approach fix (IF), delimited by straight lines joining the extremity of the arc to the IF.

The combined TAAs associated with an approach procedure shall account for an area of 360 degrees around the IF.

Threshold. The beginning of that portion of the runway usable for landing.

Touchdown and lift-off area (TLOF). A load bearing area on which a helicopter may touch down or lift off.

Touchdown zone. The portion of a runway, beyond the threshold, where it is intended landing aeroplanes first contact the runway.

Track. The projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from North (true, magnetic or grid).

Transition altitude. The altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes.

Vectoring. Provision of navigational guidance to aircraft in the form of specific headings, based on the use of an ATS surveillance system.

Visual approach procedure. A series of predetermined manoeuvres by visual reference, from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, a go-around procedure can be carried out.

Waypoint. A specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation. Waypoints are identified as either:

Fly-by waypoint. A waypoint which requires turn anticipation to allow tangential interception of the next segment of a route or procedure; or

Flyover waypoint. A waypoint at which a turn is initiated in order to join the next segment of a route or procedure.

12.2 Applicability

12.2.1 The specifications in this document are applicable on all charts published in Malaysia AIP.

12.2.2 All charts published within the scope of this Chapter and bearing the aeronautical information date of 19 November 2009 or later shall conform to the Standards relevant to the particular chart.

12.2.3 The service provider/s shall ensure that all aeronautical charts coming within the scope of this Chapter which are produced for *Malaysia Aeronautical Information Package* are in conformity with this document and the relevant Chapter in *ICAO Annex 4*.

1.2.2.4 **Recommendation.—** *All such charts should in addition conform to the Recommended Practices relevant to the document particular chart.*

12.3 Availability

12.3.1 The service provider/s shall ensure the availability of World Aeronautical Chart – ICAO sheets number WAC 2858, WAC 2859 and WAC 2861 are produced as arranged under the APANPIRG.

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

12.3.2 For any chart or single sheet of a chart series entirely contained within the territory of a Contracting State, the State having jurisdiction over the territory shall either:

a) produce the chart or sheet itself; or

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

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

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

12.4 Operational requirements for charts

Note.— For the purposes of this document, the total flight is divided into the following phases:

- *Phase 1 — Taxi from aircraft stand to take-off point*
- *Phase 2 — Take-off and climb to en-route ATS route structure*
- *Phase 3 — En-route ATS route structure*
- *Phase 4 — Descent to approach*
- *Phase 5 — Approach to land and missed approach*
- *Phase 6 — Landing and taxi to aircraft stand.*

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

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

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

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

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

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

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

12.4.7 The charts shall be True North orientated except for Aerodrome Obstacle Chart– ICAO, Aerodrome Ground Movement Chart – ICAO and Aircraft Parking/Docking Chart – ICAO.

12.4.8 The basic sheet size of the charts shall be 210 x 148 mm (8.27 x 5.82 in) (A5) except for Aerodrome Obstacle Chart– ICAO and World Aeronautical Chart – ICAO.

12.5 Titles

The title of a chart or chart series prepared in accordance with the specifications contained in this document and intended to satisfy the function of the chart shall be that of the relevant chapter heading as modified by application of any Standard contained therein, except that such title shall not include “ICAO” unless the chart conforms with all Standards specified in this Chapter 12 and any specified ICAO standards for the particular chart.

12.6 Miscellaneous information

12.6.1 The marginal note layout shall be as given in ICAO Annex 4 Appendix 1, except as otherwise specified for a particular chart. 2.3.2 The following information shall be shown on the face of each chart unless otherwise stated in the specification of the chart concerned:

a) designation or title of the chart series;

Note.— The title may be abbreviated.

b) name and reference of the sheet;

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

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

12.6.4 The name and adequate address of the producing agency shall be shown in the margin of the chart except that, where the chart is published as part of an aeronautical document, this information may be placed in the front of that document.

12.7 Symbols

12.7.1 Symbols used shall conform to those shown in *ICAO Annex 4 Appendix 2 — ICAO Chart Symbols*, except that where it is desired to show on an aeronautical chart special features or items of importance to civil aviation for which no ICAO symbol is at present provided, any appropriate symbol may be chosen for this purpose, provided that it does not cause confusion with any existing ICAO chart symbol or impair the legibility of the chart.

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

12.7.2 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.

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

12.7.4 The service provider/s shall ensure that, symbols are shown in the manner specified in 2.4.2, 2.4.3 and *ICAO Annex 4 Appendix 2 — ICAO Chart Symbols, symbol number 121.*

12.7.5 The service provide/s shall ensure that symbols are shown in the manner specified in 2.4.2, 2.4.3 and ICAO Annex 4 Appendix 2 — ICAO Chart Symbols, symbol number 121.

12.8 Units of measurement

12.8.1 Distances shall be derived as geodesic distances.

12.8.2 Distances shall be expressed in either kilometres or nautical miles or both, provided the units are clearly differentiated.

12.8.3 Altitudes, elevations and heights shall be expressed in either metres or feet or both, provided the units are clearly differentiated.

12.8.4 Linear dimensions on aerodromes and short distances shall be expressed in metres.

12.8.5 The order of resolution of distances, dimensions, elevations and heights shall be that as specified for a particular chart.

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

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

12.9 Scale and projection

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

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

12.10 Date of validity of aeronautical information

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

12.11 Spelling of geographical names

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

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

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

12.12 Abbreviations

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

12.12.2 Where applicable, abbreviations shall be selected from the *Procedures for Air Navigation Services — ICAO Abbreviations and Codes (Doc 8400).*

12.13 Political boundaries

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

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

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

12.14 Colours

Where applicable, colours used on charts should conform to ICAO Annex 4 Appendix 3 — Colour Guide.

12.15 Relief

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

a) orientation and identification;

b) safe terrain clearance;

c) clarity of aeronautical information when shown;

d) planning.

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

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

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

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

12.16 Prohibited, restricted and danger areas

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

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

12.17 Air traffic services (ATS) airspaces

12.17.1 When ATS airspace is shown on a chart, the class of airspace, the type, name or call sign, the vertical limits and the radio frequency(ies) to be used shall be indicated and the horizontal limits depicted in accordance with *ICAO Annex 4 Appendix 2 — ICAO Chart Symbols.*

12.17.2 On charts used for visual flight, those parts of the ATS Airspace Classes table (Appendix 4)in ICAO Annex 11 applicable to the airspace depicted on the chart shall be on the face or reverse of each chart.

12.18 Magnetic variation

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

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

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

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

12.18.4 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.

12.19 Typography

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

12.20 Aeronautical data

12.20.1 The service provider/s 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 *ICAO Annex 4 Chapter 3.1.7.* The execution of such quality management shall be made demonstrable for each function stage, when required. In addition, the service provider/s shall ensure that established procedures exist in order that aeronautical data at any moment is traceable to its origin so to allow any data anomalies or errors, detected during the production/maintenance phases or in the operational use, to be corrected.

Note.— Specifications governing the quality system are given in, Chapter 3.

12.20.2 The service provider/s shall ensure that the order of chart resolution of aeronautical data shall be that as specified for a particular chart and as presented in a tabular form in *ICAO Annex 4 Appendix 6.*

12.20.3 The service provider/s shall ensure that integrity of aeronautical data is maintained throughout the data process from survey/origin to the next intended user. Based on the applicable integrity classification, 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 thorough analysis of the overall system architecture as potential data integrity risks.

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.

12.20.4 Aeronautical data quality requirements related to the integrity and data classification shall be as provided in *Tables 1 to 6 in ICAO Annex 4 Appendix 6.*

12.20.5 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 12.20.3.

Note.— Guidance material on the 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 of the provisions 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.

12.21 Common reference systems

12.21.1 Horizontal reference system

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

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

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

12.21.1.3 The order of chart resolution of geographical coordinates shall be that specified for a particular chart series and in accordance with ICAO Annex 4 Appendix 6, Table 1.

Note.— Specifications governing the determination and reporting (accuracy of field work and data integrity) of WGS-84-related aeronautical coordinates for geographical positions established by ATS are given in ATID-ATS, Chapter 2, and ICAO Annex 11–Appendix 5, Table 1; and for aerodrome/heliport-related positions, in ICAO Annex 14, Volumes I and II, Chapter 2, and in Table A5-1 of Appendix 5 and Table A1-1 of Appendix 1, respectively.

12.21.2 Vertical reference system

12.21.2.1 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 the equipotential surface in the gravity field of the Earth that coincides with the undisturbed MSL extended continuously through the continents.

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

12.21.2.2 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.— Specifications governing 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 ICAO Annex 14, Volumes I and II, Chapter 2, and in Table A5-2 of Appendix 5 and Table A1-2 of Appendix 1, respectively.

12.21.2.3 The order of chart resolution of elevation and geoid undulation shall be that specified for a particular chart series and in accordance with *ICAO Annex 4 Appendix 6, Table 2.*

12.21.3 Temporal reference system

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

12.21.3.2 When a different temporal reference system is used for charting, this shall be indicated in GEN 2.1.2 of the AIP.

12.22 Publications

Note.— The list of aeronautical charts published are listed in the AIP page GEN 3.2.

With effect from 12 November 2015, the AIS provider shall make available Aerodrome Terrain and Obstacle Chart – ICAO (Electronic) for aerodromes regularly used by international civil aviation in Malaysia as specified in *ICAO Annex 4 Chapter 5.*

12.23 Technical personnel

3.9.1 The service provider shall establish procedures to ensure that all its personnel including the cartographic technical staff possess the skills and competencies required in the provision of aeronautical services.

3.9.2 The service provider shall establish a training policy and programme for the cartographic technical personnel including, when applicable, initial, recurrent and specialised training.

3.9.3 The service provider shall ensure that the cartographic technical personnel undergo a suitable period of supervised on-the-job training before being tasked for duties.

3.9.4 A job description shall be developed for the technical staff. Initial and periodic assessment shall be established to demonstrate the required competencies.

12.24 Guidance materials

3.10.1 The service provider shall ensure that relevant ICAO documents and other technical and regulatory publications are readily available to all cartographic technical staff.

3.10.2 A technical library shall be available, to include any method to ensure receipt, control and distribution of the necessary technical documentation. The library shall be kept and maintained to ensure the currency of the documentations.

12.25 Records

The service provider shall maintain documents and records of operation and maintenance of the service. These documents shall include, but not limited to:

a) record of malfunction or fault of critical safety facilities and equipment;

b) record of training programme and plan for each cartographic technical staff;

c) record and copy of certificates of all related trainings for each staff including where applicable, initial, OJT, recurrent and specialised training; and

d) record of initial and periodic assessment for each cartographic technical staff.

CHAPTER 13. SPECIFIC CHARTING REQUIREMENTS

Note.— The SARPs contained in this chapter are applicable to the specified ICAO aeronautical charts concerned in addition to those specified in Chapter 12 of this Directive and the relevant chapters in ICAO Annex 4*.*

13.1 Instrument Approach Chart – ICAO

13.1.1 Aerodrome operating minima when established shall be shown in the Instrument Approach Chart - ICAO.

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

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