



INTERNATIONAL CIVIL AVIATION ORGANIZATION

SECOND MEETING OF THE AFI REGION AIM IMPLEMENTATION TASK FORCE

(Nairobi, Kenya, 17 – 19 December 2012)

Agenda Item 8: Review of the Proposal for Amendment 37 to Annex 15 and Consequential Amendments to Annexes, 11 and 14 Volumes I and II as endorsed by the Air Navigation Commission on 26 June 2012.

(Presented by the Secretariat)

SUMMARY

This paper presents a proposal to amend Annex 15-Aeronautical Information Services with consequential amendments to Annex 4-Aeronautical Charts, Annex 11-Air Traffic Services, and Annex 14 – Aerodromes, Volume I – Aerodrome Design and Operations, and Volume II – Heliports, relating to the quality system, use of automation, electronic AIP, NOTAM format, electronic terrain and obstacle data. Additionally, the paper presents a proposal to re-structure the first three chapters of Annex 15 to strengthen the progress of the transition from aeronautical information service (AIS) to aeronautical information management (AIM).

The proposals have been developed by the Secretariat with the assistance of the Aeronautical Information Services-Aeronautical Information Management Study Group (AIS-AIMSG).

References :

Annex 15

Annex 14, Volumes I and II.

Annex 11

Annex 4

Doc.9750 Global ANP

Roadmap for the transition from AIS to AIM <http://www2.icao.int/en/ais-aimsg/>

This working paper relates to Strategic Objective C of Environment Protection and Sustainable Development of Air Transport.

1 INTRODUCTION

1.1 Since its formation in 2008, the Aeronautical Information Services-Aeronautical Information Management Study Group (AIS-AIMSG) has held six meetings to deal specifically with development issues relating to aeronautical information management (AIM) strategy and requirements, training guidance, and charting. Amendment 36 to Annex 15 which became applicable on 18 November 2010 introduced

certain AIM-related elements such as the operational use of the public internet, requirements for quality management systems, automation enabling digital data exchange, and electronic aeronautical information publications. In addition, the AIS-AIM roadmap, which was developed and published in 2009, has met with wide international acceptance.

1.2 The proposals in this working paper principally address the restructuring of the first three chapters of Annex 15, expanding the provisions concerning information management, add a new chapter on aerodrome mapping database, and remove the integrity classification numerical- requirement values. The proposals also provide clarification with respect to the use of the terms "data" and "information", and propose the transfer of the provisions related to the establishment and designation of prohibited, restricted, and danger areas to Annex 11.

2. PROPOSAL FOR AMENDMENT OF ANNEX 15

2.1 The proposed amendments to Annex 15 developed by the Secretariat with the assistance of AIS-AIMSG are part of a strategy for supporting the migration of the operational focus of aeronautical information services from a product-centered, paper-based and manually-transacted system to a digitally-enabled, network-centered and service-oriented information management system. It concerns the eventual restructuring of the whole Annex 15 to be fully aligned with the transition of AIS to AIM.

Annex 15 document structure

2.2. The present structure of Annex 15 differs somewhat from the other annexes. In particular, Chapter 1 does not follow the usual practice of providing the definitions in the first chapter, but rather, contains text that introduces the annex. To enhance clarity and to achieve commonality with other annexes, the amendment proposes the use of existing text in Chapter 1 as the basis for an introductory note and moves the definitions from Chapter 2 to Chapter 1. An introductory note also allows for the addition of new text outlining the global shift in AIS business processes from a paper product focus to a service-oriented, data-centric AIM focus. Re-titled "General", in addition to definitions, chapter 1 contains the specifications related to horizontal, vertical, and temporal reference systems as well as certain miscellaneous specifications from the Current Chapter 3.

Chapter 2 is re-titled "Responsibilities and Functions".

2.3 Chapter 3 is re-titled "Aeronautical Information Management" to reflect the shift of focus and process from traditional AIS to AIM. This chapter outlines the processes that are applicable to ATM and will in the future provide an appropriate location for AIM-related provisions.

2.4 To accomplish the global transition from traditional AIS provision to AIM-enabled services, it will be necessary to develop sequential and successive changes to Annex 15. The reorganization of the first three chapters is an evolutionary step in this process. It will facilitate a more complete incorporation of AIM-related provisions scheduled for adoption as part of Amendment 38 in 2016.

State and AIS Provider Responsibilities

2.5 Frequent Standards in the annex, that begin with "Each contracting State shall ...", "The State concerned shall ...", "States shall ensure that... ", are redundant considering that in accordance with articles 28, 37, 38 of the Convention, the annexes are primarily addressed to States. Nevertheless, air navigation service providers now provide aeronautical information services formerly provided by governmental departments and agencies. Another factor is that the European Union, as well as a number of States in other regions, has directly incorporated Annex 15 as a regulation. This trend has made it necessary to clarify the provisions which have State applicability as opposed to those that relate directly to the AIS provider as delegated by the State.

2.6 The amendment proposal seeks to provide additional clarity by using Chapter 2 to outline the responsibilities and functions with respect to State responsibilities and AIS provider responsibilities.

Data and Information

2.7 There has been considerable discussion within the AIS-AIMSG with respect to the meaning of the terms "data" and "information". Although Annex 15 does not contain a definition for either term, it makes frequent use of the combined term "information/data". Though in their combined use, "information" and "data" provide reference to the domain under discussion, the terms are not strictly interchangeable. Accordingly, the proposal changes the usage of the term "information/data" to "aeronautical information" and "aeronautical data" or one or the other as appropriate. The proposal also adds definitions for "data" and "information" which is necessary given the subject matter of Annex 15.

Integrity Classification and Levels

2.8 The integrity classifications and levels listed in Aeronautical Data Quality Requirements are associated specified numeric values. The numeric values are associated with target levels of a reduced probability of a transmitted error in information, however the values themselves have proven to be problematic. For States implementing quality management systems (QMS) the expression of a numeric value of integrity has proven to complicate the effort to develop compliance mechanisms. The Secretariat has concluded that the intent of providing integrity classification can be met by providing qualitative descriptions of the three levels (routine, essential, critical) and developing provisions, which would relate to handing of data that would be incorporated in quality management practices. The proposal, therefore, is to delete the numerical expression of integrity classification.

Aeronautical Information Management

2.9 Chapter 3 contains the original provisions relating to information management and adds new ones.

Prohibited, restricted and danger areas

2.10 Since 1957, Annex 15 has contained provisions relating to prohibited, restricted and danger areas. While the need to provide information on those areas is properly specified in Appendix 1, the section dealing with identification and establishment of those areas is outside the scope of Annex 15, and would be more appropriately contained in Annex 11.

Electronic Terrain And Obstacle Data (eTOD)

2.11 Revisions to the electronic terrain and obstacle data provisions promulgated with amendment 36 produced a small number of inconsistencies between Chapter 10 and Appendix 8 of Annex 15. Minor changes to these provisions have been made to improve clarity and accuracy. The collection requirement applicable for 12 November 2015 has been separated into two; one paragraph for obstacles, the second for terrain.

Aerodrome Mapping Data

2.12 New provisions for aerodrome mapping data (AMO) are proposed as an outcome from ongoing work from the joint EUROCAE WG44/RTCA SC217. The proposals for AMD result from the desire to provide a standardized data set meeting quality and integrity requirements. This data set would be established in accordance with set criteria mapping onto a defined operational need. The primary envisioned

use of the data is to support electronic charting used by both ATM and aircraft systems (e.g. cockpit aerodrome map display).

2.13 The proposal would have data made available through the AIS, once the responsible authority has provided it. The need to collect and provide data will be set by individual States, in accordance with an identified need to support on-board aircraft systems where a cockpit aerodrome display will provide a significant benefit, particularly in the application of low visibility procedures. Additionally, States implementing improved A TM systems that require quality assured mapping data at the airport may choose to mandate the collection of the data. The amendment proposal is at Appendix A.

3. PROPOSAL TO AMEND ANNEX 4

3.1 The proposed deletion of the integrity classification numeric values will, as a consequence, require their deletion in Annex 4, Appendix 6. The amendment proposal is at Appendix B.

4. PROPOSAL TO AMEND ANNEX 11

4.1 The proposed removal, in Annex 15, of the section dealing with the identification and delineation of prohibited, restricted and danger areas will require a consequential change to relocate the provisions within Annex 11. The proposed deletion of the integrity classification numeric values will, as a consequence, also require their deletion in Annex I, Appendix 5 with changes to Chapter 2 and the addition of new definitions in Chapter 1. The amendment proposal is at Appendix C.

5. PROPOSAL TO AMEND ANNEX 14, VOLUMES I AND II

5.1 The proposal for aerodrome mapping data will require a consequential change to Annex 14, Volumes 1 and II. The proposal recommends that data be collected and forwarded to the appropriate AIS when deemed relevant by the State. The intent is that data will be made available only when necessary to support a defined operational use and when it has been determined desirable to do so by the State. The proposed deletion of the integrity classification numeric values will, as a consequence, also require their deletion in Annex 14 with changes to Chapter 2 and the addition of new definitions in Chapter 1. The amendment proposals are at Appendices D and E.

6. COST IMPACT

6.1 The cost impact of restructuring the first three chapters of Annex 15 is judged to be minimal since it re-orders existing provisions and arranges for a shift to an information management focus from a product and publication focus. Additionally, the changes clarify the relationship between State responsibilities and AIS providers. Small regulatory changes may be deemed desirable by some States but this should be done at minimal cost.

6.2 The deletion of the numeric values associated with integrity classifications is judged to have a minimal reduction in costs since the effort to try to find a means of compliance with requirements expressed as probabilistic determinations will be eliminated.

6.3 The new Chapter II provisions related to AMD relate only to data provided to the AIS and the cost impact is judged to be minimal based on the additional administrative burden to implement a process to manage the data. The consequential amendment to Annex 14 is designed to allow States the option of providing AMD to the AIS under conditions deemed relevant and desirable. In this context, while the collection of data could have moderate to significant cost, the incremental costs associated with the amendment should be minimal.

7. ACTION BY THE MEETING

7.1 The meeting is invited to:

- a) review the proposals for the amendment of Annex 15, and consequential amendments to Annexes 4, 11, and 14, Volumes I and II, as contained in Appendix- A to this paper;
- b) review the proposed amendment, and provide comments;
- c) agree that the applicability date for the proposed amendment to Annexes 15, consequential amendments to Annexes 4, 11, and 14, Volumes 1 and II be indicated as 14 November 2013; and
- d) assist States to compile the response form to be completed as per Attachment F to State Letter AN2/2.3-12/52 and have it returned to ICAO together with comments on the proposed amendments.

APPENDIX A**DRAFT AMENDMENT 37****Document Change History**

| Version Number | Document Changes | Group | Revision Date |
|-----------------------|---|--------------|----------------------|
| 1.0 | Revised draft | Ad-hoc Group | 18/03/2011 |
| 1.1 | Added list of materials requiring further development | Rapporteur | 22/04/2011 |
| 2.2 | Proposed Changes from AIS-AIMSG/4 SNs 5, 7, 9, 17, and 19 | AIS-AIMSG | 05/27/2011 |

**EDITORIAL PRACTICES AND
MATERIALS REQUIRING FURTHER DEVELOPMENT**

1. EDITORIAL PRACTICES

1.1 The text of the amendment is arranged to show new, deleted or moved text and new text requiring further development or to provide notes on actions required. Text that has been moved is annotated with the new location at the end of the text or paragraph, i.e. (Moved to 3.8.2.2). Moved text in its new location is annotated with the original paragraph number, i.e. (3.2.13). Examples:

New agreed upon text in BLUE

~~Line through deleted or moved text~~

Text requiring further review in RED

Notes on further actions required in RED

~~Moved text with line through and new location~~, i.e. (Moved to 3.8.2.2)

Moved text in its new location is annotated with the original paragraph number, i.e. (3.3.13)

1.2 A document change history of version numbers is listed for new iterations of the draft.

1.3 Changes to the current version during coordination with group members will be shaded as follows:

Changes to agreed upon text in BLUE

~~Line through changes to deleted or moved text~~

Changes to text requiring further review in RED

1.4 Group members will use “track changes” to make annotations and comments. The annotations and comments will be included in a spreadsheet and provided for all members to review as needed.

1.5 The final draft will show deleted text with a line through it and new text highlighted with grey shading in accordance with the ICAO practice.

1.6 The rationale for the revisions will be included in future work on the draft amendments or in a list referencing each Chapter or paragraph affected.

2. MATERIALS REQUIRING FURTHER DEVELOPMENT

2.1 The draft paragraphs concerning the subject areas listed below were considered for inclusion in draft Amendment 37 to Annex 15, section 3.8.1, however, were removed and were determined to require further consideration/development and most likely as guidance materials:

2.1.1 Life cycle management:

Recommendation.— *Information life cycle management policies, processes, practices, and tools should be used to align the quality assurance requirements of aeronautical information and aeronautical data with the most appropriate and cost effective infrastructure from origin through to final disposition. This should include alignment with workflow processes through management policies and service levels associated with applications, metadata, information, and data.*

Action: Possibly change to more simplified text and incorporate as future guidance possibly in the QMS Manual, in Doc 8126 or the new PANS-AIM.

2.1.2 **Data handling:**

2.1.2.1 When processes or parts of processes used in the production, storage, handling, processing, transfer and distribution of aeronautical data are subject to automation, they shall be:

- a) automated to a level commensurate with the context of the data process;
- b) automated to optimize the allocation and interaction of human and machine to achieve a high degree of safety and quality benefits from the process;
- c) designed to avoid the introduction of data errors; and
- d) designed to detect errors in received/input data.

Recommendation.— *Data should be entered systematically, from point of origination to information delivery to meet the integrity of data requirements as specified in X.X.X for routine, critical, and essential data.*

Note: The systematic entry and delivery of data may be achieved by employing automation, standard data exchange formats and system interfaces.

Action: Review and ensure inclusion of concepts that are needed in [Doc 8126](#).

2.1.3 **Evidence of data quality:**

2.1.3.1 Aeronautical information and aeronautical data provided to the AIS shall include evidence of compliance with data quality requirements.

2.1.3.2 Accuracy and resolution requirements shall be achieved at data origination and maintained through to publication to the next intended user, including, whenever the resolution of a data item is reduced or changed, or the data is translated into a different coordinate reference system or unit of measurement.

2.1.3.3 The origin and change history for each data item shall be recorded and shall be made available for audit;

2.1.3.4 The aeronautical data or aeronautical information shall be complete; any missing items shall be declared and resolved;

2.1.3.5 Data origination, production, storage, handling, processing, transfer or distribution processes used for each data item shall be defined and shall be adequate for the assigned level of integrity of the data item;

2.1.3.6 Data validation and verification processes shall be adequate for the assigned integrity level of the data item;

2.1.3.7 Manual or semi-automated data processes shall be performed by trained and qualified staff, with clearly defined roles and responsibilities;

2.1.3.8 Tools and/or software used to support or implement the processes shall be suitable for the purpose;

2.1.3.9 An effective error reporting, measurement and corrective action process shall be in operation.

2.1.3.10 The AIS shall ensure that:

- a) the aeronautical information and aeronautical data provided to them are made available to the next intended user with sufficient quality to meet the intended use;
- b) error reporting, feedback and rectification mechanisms are established and operated;
- c) problems identified during aeronautical information and aeronautical data origination, production, storage, handling and processing, or those identified by users after publication, are recorded and reported;
- d) all problems reported concerning aeronautical information and aeronautical data are analyzed and the necessary corrective actions are determined;
- e) all errors, inconsistencies and anomalies detected in critical and essential aeronautical information and aeronautical data are urgently resolved;
- f) affected data users are warned of errors, taking into account the integrity level of the aeronautical information and aeronautical data; and
- g) error feedback from data users and is facilitated and encouraged.

Action: Review and ensure inclusion of the necessary concepts in the QMS Manual.

2.1.4 **Data protection processes:**

2.1.4.1 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 3.2.10. (3.2.12)

2.1.4.2 Note 1.— This requirement does not apply to the communications systems used for the transfer of data sets. (3.2.12, Note 1)

2.1.4.3 Note 2.— Guidance material 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). (3.2.12, Note 2)

2.1.4.4 Where the physical size of data exceeds that which may be protected at the required level of integrity by a single CRC, multiple CRC values shall be used. (New text)

2.1.4.5 Prior to publication by the AIS, aeronautical data shall be given an appropriate level of security protection during storage and exchange to ensure that the data cannot be accidentally changed or subjected to unauthorised access and/or alteration. (New text)

2.1.4.6 The exchange of aeronautical data shall be protected by a suitable authentication process, such that recipients are able to confirm that the data has been transmitted by an authorised source. (New text)

Action: Review and ensure inclusion in Doc 8126.

**International Standards
and Recommended Practices**



Annex 15
to the Convention on
International Civil Aviation

Aeronautical Information Services

This edition incorporates all amendments adopted by the Council prior to 23 February 2010 and supersedes, on 18 November 2010, all previous editions of Annex 15.

For information regarding the applicability of the Standards and Recommended Practices, see Foreword.

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FOREWORD

Historical background

Standards and Recommended Practices for Aeronautical Information Services were first adopted by the Council on 15 May 1953, pursuant to the provisions of Article 37 of the Convention on International Civil Aviation (Chicago 1944), and were designated as Annex 15 to the Convention.

Annex 15 as now presented has undergone the following development. The first requirements were developed by the Air Navigation Committee as a result of recommendations of Regional Air Navigation Meetings, and were published by authority of the Council as Procedures for International Notices to Airmen (PANS-NOTAM, PICA0 Doc 2713) in January 1947. In 1949, the Special NOTAM Meeting reviewed and proposed amendments to these procedures which were later issued as “Procedures for Air Navigation Services (PANS-AIS, Doc 7106)” and which became applicable on 1 August 1951. In 1952, the PANS-AIS were reviewed by the First Session of the Aeronautical Information Services Division which recommended the adoption of Standards and Recommended Practices. Following consideration by all Contracting States, these recommendations were reviewed by the Air Navigation Commission and the first set of Standards and Recommended Practices was adopted by the Council on 15 May 1953 as Annex 15 to the Convention. This Annex became applicable on 1 April 1954.

Table A shows the origin of subsequent amendments together with a list of the principal subjects involved and the dates on which the Annex and the amendments were adopted by the Council, when they became effective and when they became applicable.

Action by Contracting States

Notification of differences. The attention of Contracting States is drawn to the obligation imposed by Article 38 of the Convention by which Contracting States are required to notify the Organization of any differences between their national regulations and practices and the International Standards contained in this Annex and any amendments thereto. Contracting States are invited to extend such notification to any differences from the Recommended Practices contained in this Annex and any amendments thereto, when the notification of such differences is important for the safety of air navigation. Further, Contracting States are invited to keep the Organization currently informed of any differences which may subsequently occur, or of the withdrawal of any differences previously notified. A specific request for notification of differences will be sent to Contracting States immediately after the adoption of each amendment to this Annex.

Status of Annex components

An Annex is made up of the following component parts, not all of which, however, are necessarily found in every Annex; they have the status indicated:

1.— *Material comprising the Annex proper:*

- a) *Standards and Recommended Practices* adopted by the Council under the provisions of the Convention. They are defined as follows:

Standard: Any specification for physical characteristics, configuration, matériel, performance, personnel or procedure, the uniform application of which is recognized as necessary for the safety or regularity of international

air navigation and to which Contracting States will conform in accordance with the Convention; in the event of impossibility of compliance, notification to the Council is compulsory under Article 38.

Recommended Practice: Any specification for physical characteristics, configuration, matériel, performance, personnel or procedure, the uniform application of which is recognized as desirable in the interest of safety, regularity or efficiency of international air navigation, and to which Contracting States will endeavour to conform in accordance with the Convention.

- b) *Appendices* comprising material grouped separately for convenience but forming part of the Standards and Recommended Practices adopted by the Council.
- c) *Definitions* of terms used in the Standards and Recommended Practices which are not self-explanatory in that they do not have accepted dictionary meanings. A definition does not have independent status but is an essential part of each Standard and Recommended Practice in which the term is used, since a change in the meaning of the term would affect the specification.
- d) *Tables* and *Figures* which add to or illustrate a Standard or Recommended Practice and which are referred to therein, form part of the associated Standard or Recommended Practice and have the same status.

It is to be noted that some Standards in this Annex incorporate, by reference, other specifications having the status of Recommended Practices. In such cases the text of the Recommended Practice becomes part of the Standard.

2.— *Material approved by the Council for publication in association with the Standards and Recommended Practices:*

- a) *Forewords* comprising historical and explanatory material based on the action of the Council and including an explanation of the obligations of States with regard to the application of the Standards and Recommended Practices ensuing from the Convention and the Resolution of Adoption.
- b) *Introductions* comprising explanatory material introduced at the beginning of parts, chapters or sections of the Annex to assist in the understanding of the application of the text.
- c) *Notes* included in the text, where appropriate, to give factual information or references bearing on the Standards or Recommended Practices in question, but not constituting part of the Standards or Recommended Practices.
- d) *Attachments* comprising material supplementary to the Standards and Recommended Practices, or included as a guide to their application.

Selection of language

This Annex has been adopted in six languages — English, Arabic, Chinese, French, Russian and Spanish. Each Contracting State is requested to select one of those texts for the purpose of national implementation and for other effects provided for in the Convention, either through direct use or through translation into its own national language, and to notify the Organization accordingly.

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; *Recommended Practices* have been printed in light face italics, the status being indicated by the prefix **Recommendation**; *Notes* have been printed in light face italics, the status being indicated by the prefix *Note*.

The following editorial practice has been followed in the writing of specifications: for Standards the operative verb “shall” is used, and for Recommended Practices the operative verb “should” is used.

The units of measurement used in this document are in accordance with the International System of Units (SI) as specified in Annex 5 to the Convention on International Civil Aviation. Where Annex 5 permits the use of non-SI alternative units these are shown in parentheses following the basic units. Where two sets of units are quoted it must not be assumed that the pairs of values are equal and interchangeable. It may, however, be inferred that an equivalent level of safety is achieved when either set of units is used exclusively.

Any reference to a portion of this document, which is identified by a number and/or title, includes all subdivisions of that portion.

Table A. Amendments to Annex 15

| <i>Amendment</i> | <i>Source(s)</i> | <i>Subject(s)</i> | <i>Adopted Effective Applicable</i> |
|------------------|---|---|--|
| 1st Edition | First Session of the Aeronautical Information Services Division | | 15 May 1953 1 September 1953 1 April 1954 |
| 1 | Consultation with States | Editorial amendments for consistency in terminology. | 27 May 1955 1 October 1955 1 October 1955 |
| 2 | Consultation with States | Editorial amendments for consistency in terminology. | 15 May 1956 15 September 1956 1 December 1956 |
| 3 | Consultation with States | Definition and identification of prohibited, restricted and danger areas. | 16 April 1957 1 September 1957 1 December 1957 |
| 4 | Consultation with States | Guidance material on the application of the definitions of danger area, prohibited area and restricted area. | 14 November 1958 — 14 November 1958 |
| 5 | Consultation with States | Editorial amendments for consistency in terminology; establishment of worldwide application of location indicators instead of place name abbreviations. | 24 March 1959 1 September 1959 1 October 1959 |
| 6 | Aeronautical Information Services and Aeronautical Charts Division | Contents of Aeronautical Information Publications (AIP); specifications for Aeronautical Information Circulars, and the NOTAM Code. | 20 June 1960 1 October 1960 1 January 1961 |
| 7 | Aeronautical Information Services and Aeronautical Charts Division | Deletion of guidance material. | 2 December 1960 — 1 January 1961 |
| 8 | Correspondence and Council Action to approve new <i>ABC — ICAO Abbreviations and Codes</i> (Doc 8400) | Regulated system (AIRAC); deletion of “NOTAM Code” and “Abbreviations for use by aeronautical information services”; minor amendments to Appendix 1. | 25 March 1964 1 August 1964 1 November 1964 |
| 9 | Rules of the Air and Air Traffic Services/Operations Divisional Meeting | Definitions for danger area, prohibited area, and restricted area. | 10 December 1965 10 April 1966 25 August 1966 |

| <i>Amendment</i> | <i>Source(s)</i> | <i>Subject(s)</i> | <i>Adopted Effective Applicable</i> |
|------------------|--|---|--|
| 10 | Aeronautical Information Services and Aeronautical Charts Division (1966) | Specifications for Snowplan; definition and <i>pro forma</i> for SNOWTAM; NOTAM Class I text; content of AIP; identification and delineation of restricted airspace; Aeronautical Information Circulars. | 13 June 1967 8 October 1967 8 February 1968 |
| 11 | Fifth Air Navigation Conference | Pre-flight information service; information on runway visual range systems. | 23 January 1969 23 May 1969 18 September 1969 |
| 12 | Sixth Air Navigation Conference, and transfer from Regional Supplementary Procedures | Publication of information on air traffic services systems, i.e. on reporting points and minimum flight altitudes; NOTAM information on the conduct of search and rescue operations. | 15 May 1970 15 September 1970 4 February 1971 |
| 13 | Aeronautical Information Services and Aeronautical Charts Division; Sixth Air Navigation Conference | Predetermined distribution system of NOTAM Class I; composition of NOTAM; information on aeronautical meteorological facilities and services available for international air navigation. | 19 March 1971 6 September 1971 6 January 1972 |
| 14 | Regional Air Navigation Meeting Recommendations of worldwide applicability. Recommendation 19/29 of CAR IV RAN Meeting (1966); Recommendation 19/10 of SAM/SAT/III RAN Meeting (1967); Recommendations 19/4 and 19/5 of MID/SEA RAN Meeting (1968); Recommendation 17/5 of NAT/V RAN Meeting (1970) | Availability of Aeronautical Information Service in cases where 24-hour service is not provided; decoding of NOTAM for pre-flight planning; promulgation of information that no NOTAM Class II have been issued; provision of information to the aeronautical information service by each of the State services associated with aircraft operations; publication in AIP of the coordinates of the antennae of stations providing aeronautical mobile and/or aeronautical navigation services, to an accuracy of at least one-tenth of a minute. | 15 December 1971 15 April 1972 7 December 1972 |
| 15 | Amendment 43 to Annex 4 — <i>Aeronautical Charts</i> ; Amendment 1 to 10th edition of PANS-RAC (Doc 4444); Recommendations 16/3, 16/8, 16/10 b) and 16/15 of the 6th EUM RAN Meeting; Amendment 28 to Annex 14 — <i>Aerodromes</i> ; Amendment 51 to Annex 10 — <i>Aeronautical Telecommunications</i> | Publication in AIP of the locations at aerodromes of VOR and INS check-points; publication in AIP of names, coded designators and geographical coordinates of significant points defining air traffic services routes, and of information on bird concentrations in the vicinity of aerodromes and bird migrations; listing of types of information inappropriate to NOTAM; type of information appropriate to Aeronautical Information Circulars; alignment of the terminology with the definition in Annex 14 for snow on the ground. | 19 March 1973 30 July 1973 23 May 1974 |
| 16 | Council's request (78-14) to consult States on publication in AIP of differences from Annexes and PANS; Amendment 6 to the PANS-RAC | Publication in AIP of differences between the national regulations and practices of a State and the related ICAO Standards, Recommended Practices and Procedures; elimination of inconsistencies between requirements in Appendix 1 and parent provisions in the Annex; transfer of requirements for information concerning ATIS from the MET to the RAC part of the AIP. | 25 June 1974 25 October 1974 27 February 1975 |
| 17 | Recommendation 2/6 of the Fourth Meeting of the Technical Panel on Supersonic Transport Operations; study by the Air Navigation Commission concerning interception of aircraft | Dissemination by NOTAM of forecasts of solar cosmic radiation where provided; publication in AIP of interception procedures and visual signals to be used. | 4 February 1975 4 June 1975 9 October 1975 |

| <i>Amendment</i> | <i>Source(s)</i> | <i>Subject(s)</i> | <i>Adopted Effective Applicable</i> |
|------------------|---|--|---|
| 18 | Recommendations of Regional Air Navigation Meetings (EUM 6 Rec 9/4, AFI/5 Rec 6/2 c), d) and ASIA/PAC Rec 6/3 c) and request by IATA to amend Annex 14; general review of Annex 14 | Publication in AIP of information concerning operations for the removal of disabled aircraft at aerodromes; notification of the status of rescue and firefighting services available at an aerodrome in terms of significant changes in the level of protection; definitions for manoeuvring area and movement area; substitution of expression “altimeter check location” for “altimeter checkpoint”. | 5 February 1976 5 June 1976 30 December 1976 |
| 19 | Recommendation 3/16 of the 7th Air Navigation Conference; revision (Amendment No. 60) of Annex 3 — <i>Meteorological Service for International Air Navigation</i> | Publication in AIP, in the case of ILS installations, the extent of compliance with the provisions in Annex 10 regarding localizer and glide path beam structure and of the height of the ILS reference datum; realignment of Part 4 — Meteorology with the new specifications and terminology introduced by Amendment 60 to Annex 3. | 27 June 1977 27 October 1977 23 February 1978 |
| 20 | 9th Air Navigation Conference | Publication in the AIP of description of ATS routes; North reference (magnetic, true or grid) for tracks or bearings. | 9 December 1977 9 April 1978 10 August 1978 |
| 21 | Proposals submitted by the Federal Republic of Germany (also on behalf of the United Kingdom) and the Union of Soviet Socialist Republics | NOTAM Class I format and the publication of amendments to the AIP. | 31 March 1980 31 July 1980 27 November 1980 |
| 22 | Proposal arising from a study by the Air Navigation Commission and proposal submitted by the Secretariat | Activities which constitute a potential hazard to flights of civil aircraft and receipt of AIRAC NOTAM 28 days in advance of the effective date. | 13 March 1981 13 July 1981 26 November 1981 |
| 23 | Proposals submitted by the Secretariat and the United Kingdom | Plain-language pre-flight information bulletins, interception of civil aircraft and “Nil Notification” of AIRAC NOTAM. | 2 April 1982 2 August 1982 25 November 1982 |
| 24 | Recommendations 7/5, 7/8 and 10/2 of the Aerodromes, Air Routes and Ground Aids Divisional Meeting (1981) | Revised SNOWTAM format; publication in the AIP of wet runway surface friction and of the existence of an obstacle-free zone. | 17 November 1982 17 March 1983 24 November 1983 |
| 25 | Recommendation 7/7 of the Aerodromes, Air Routes and Ground Aids Divisional Meeting (1981) | Method of referencing date/time. | 25 March 1985 29 July 1985 21 November 1985 |
| 26 | Various sources, including Conclusions 22/24 and 24/20 of the European Air Navigation Planning Group (EANPG); Recommendation 9 of All Weather Operations Panel (AWOP); Recommendation 1/4 of the Obstacle Clearance Panel (OCP); Amendments 64, 47 and 38 to Annexes 3, 4 and 14 respectively; proposals submitted by the United Kingdom and by the Secretariat | Updating of the provisions relating to the use of A-4 sheet size paper in the AIP; origination and distribution of NOTAM and AIC; adequacy and authenticity of aeronautical information and the regulated system (AIRAC); changes to predetermined distribution system for NOTAM Class I; introduction of an abbreviated heading and changes to the SNOWTAM format and the guidance for its completion; publication in the AIP of the location of the DME zero-range indication point; updating of the list of charts forming part of the AIP; publication in the AIP of additional operational data concerning standard routes for taxiing aircraft, highest elevation of the touchdown zone of a precision approach runway, and geographical coordinates of thresholds and aircraft stands; inclusion of references to the seventh and eighth letters in the address indicators in the predetermined distribution system; and volcanic ash cloud warnings. | 6 March 1987 27 July 1987 22 October 1987 |

| <i>Amendment</i> | <i>Source(s)</i> | <i>Subject(s)</i> | <i>Adopted Effective Applicable</i> |
|-----------------------|---|--|---|
| 27 | Various sources, including Conclusion 30/15 of the European Air Navigation Planning Group (EANPG); Air Navigation Commission's review of the Annexes; Recommendation 3/3 of the Visual Flight Rules Operations Panel (VFOP); proposal submitted by some European States; and Amendment 39 to Annex 14 | Introduction of Integrated Aeronautical Information Package and revised NOTAM Format; promulgation of information on areas or routes where the possibility of interception exists and information relating to safeguarding international civil aviation against acts of unlawful interference; introduction of new ATS airspace classification; bird hazard reduction; updating of terminology and list of friction devices associated with measuring of paved surfaces; introduction of heliport data. | 4 March 1991 28 July 1991 14 November 1991 |
| 28 | Various sources, including Conclusion 34/12 of the European Air Navigation Planning Group (EANPG); adoption by the Council of WGS-84 as the standard geodetic reference system for international aviation; proposal by RGCSP/8; and the Secretariat | Introduction in Chapter 2 of new and revised definitions relating to heliport and Integrated Aeronautical Information Package; amendments to Chapter 3 related to the exchange of aeronautical information and introduction of new provisions concerning the promulgation of WGS-84 related geographical coordinates; amendments and rearrangements of Chapter 4 concerning the restructured contents and general specifications of AIP, AIP Amendment and AIP Supplement specifications and their distribution; amendments to Chapter 5 concerning NOTAM origination and distribution and introduction of a new provision governing the promulgation of information on the release into the atmosphere of radioactive materials and toxic chemicals; upgrading in Chapter 6 to a Standard, of a provision concerning the use of AIRAC dates for the promulgation of changes requiring cartographic work and for updating of navigation databases; deletion in Chapter 8 of a Recommended Practice relating to the format of pre-flight information bulletins; substitution, in Chapter 9, of the specific term "aeronautical fixed telecommunication network (AFTN)" by the general term "aeronautical fixed service (AFS)"; introduction in Appendix 1 of completely restructured contents of AIP. | 28 February 1994 28 June 1994 10 November 1994; 25 April 1996; 1 January 1998 |
| 29 (Tenth Edition) | Air Navigation Commission and Volcanic Ash Warnings Study Group (VAWSG) | Aeronautical databases, humanitarian flights, a special series NOTAM for volcanic activity and vertical component of the World Geodetic System — 1984 (WGS-84). | 20 March 1997 21 July 1997 6 November 1997; 1 January 1998; 5 November 1998 |
| 30 | Recommendations 1.2/1, 3.3/2 and 4.1/2 of the Aeronautical Information Services/ Aeronautical Charts (AIS/MAP) Divisional Meeting (1998); Air Navigation Commission | Introduction into Chapter 2 of new definitions for aeronautical data, aeronautical information, aeronautical information service, air defence identification zone (ADIZ), AIS product, Human Factors principles, and quality management; new provisions in Chapter 3 concerning the quality system, exchange of aeronautical information/data, copyright, cost recovery, and Human Factors considerations; restructured and new provisions in Chapter 6 dealing with the provision of AIRAC information in electronic form; and introduction into Appendix 1 of new provisions concerning ADIZ. | 21 February 2000 17 July 2000 2 November 2000 |
| 31 | Secretariat | New provisions in Chapter 8 concerning automated aeronautical information systems and harmonized AIS/MET pre-flight briefing and revision of Appendix 1 concerning the provision of information on activities of a dangerous nature and other potential hazards. | 7 March 2001 16 July 2001 1 November 2001 |

| <i>Amendment</i> | <i>Source(s)</i> | <i>Subject(s)</i> | <i>Adopted Effective Applicable</i> |
|-------------------------------|--|--|--|
| 32 (Eleventh Edition) | Various sources, including Conclusion 40/51 b) of the European Air Navigation Planning Group (EANPG); Conclusion 13/51 of the AFI Planning and Implementation Regional Group (APIRG); Air Navigation Commission; and the Secretariat | Introduction in Chapter 2 of a revised definition for Integrated Aeronautical Information Package; upgrading to a Standard of a provision in Chapter 3 concerning the use of English text; amendments to Chapter 4 concerning specifications for AIP Amendments and Supplements; restructuring and amending of provisions in Chapter 5 and Appendix 6; promulgation by NOTAM of contingency measures; new provisions in Chapter 8 concerning collection of information on the presence of bird hazards to aircraft operations at aerodromes/heliports; and alignment of Appendix 1 with the provisions of Annex 3. | 28 February 2003 14 July 2003 27 November 2003 |
| 33 (Twelfth Edition) | Recommendation 4/6 of OCP/12; Recommendation 5.3/2 of OCP/13; Recommendation 3/1 of GNSSP/4; Air Navigation Commission; and the Secretariat | New provisions concerning definitions; the vertical reference system and the temporal reference system for international civil aviation; electronic terrain and obstacle data; aeronautical data quality requirements; inclusion of GNSS-related elements in aeronautical information; and the Radar Minimum Altitude Chart — ICAO; and updating of existing provisions related to the World Geodetic System — 1984 (WGS-84) and the Aeronautical Information Publication (AIP). | 23 February 2004 12 July 2004 25 November 2004; 20 November 2008; 18 November 2010 |
| 34 | Various sources, including EANPG Conclusion 44/19, Recommendation 2.3/2 of the AIS/MAP Divisional Meeting (1998), and recommendations of the IAWVOPSG/1, OCP/14 and OPLINKP/1 meetings | Definitions and introduction of a new Aerodrome Terrain and Obstacle Chart — ICAO (Electronic). Updating of existing provisions related to the distribution of NOTAM on volcanic activity; use of the AIRAC system; information included in pre-flight briefings; and information to be included in the AIP. | 2 March 2007 16 July 2007 22 November 2007 |
| 35 | Proposals by the Navigation Systems Panel third working group of the whole (NSP/WG/WHL/3); the Secretariat with the assistance of the Required Navigation Performance and Special Operational Requirements Study Group (RNPSORSG); proposals by the Aerodromes Panel (AP/1); and Recommendation 9/3 of the Instrument Flight Procedures Panel first working group of the whole (IFPP/WG/WHL/1) | Definitions and new provisions relating to the provision of information on the status of navigations aids; performance-based navigation terminology; promulgation in the AIP of the status of aerodrome certification; and instrument flight procedures terminology. | 4 March 2009 20 July 2009 19 November 2009 |
| 36 (Thirteenth Edition) | The Secretariat with the assistance of the Aviation Use of the Public Internet Study Group (AUPISG) and the Aeronautical Information Services-Aeronautical Information Management Study Group (AIS-AIMSG); recommendations of the fourth meeting of the International Airways Volcano Watch Operations Group (IAVWOPSG/4) | New provisions relating to the operational use of the public Internet; the reporting of volcanic ash deposition; quality management systems; the use of automation enabling digital data exchange; electronic aeronautical information publications; the NOTAM Format; and electronic terrain and obstacle data. | 22 February 2010 12 July 2010 18 November 2010; 12 November 2015 |

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

CHAPTER 1. INTRODUCTION

The object of the aeronautical information service (AIS) is to ensure the flow of aeronautical information and aeronautical data necessary for the global air traffic management (ATM) system safety, regularity, economy and efficiency in an environmentally sustainable manner of international air navigation. The role and importance of aeronautical information and aeronautical data changed significantly with the implementation of area navigation (RNAV), performance-based navigation (PBN), airborne computer-based navigation systems and data link systems. Corrupt or erroneous aeronautical information and aeronautical data can potentially affect the safety of air navigation.

The establishment of aeronautical information management (AIM) is necessary to transition from the product-centric support of ATM to a data-centric environment. The data-centric environment requires that both aeronautical information and aeronautical data processes be clearly defined and managed to enable the *Global Air Traffic Management Operational Concept* (Doc 9854) vision for an integrated, harmonized and globally interoperable ATM system. The provision of timely, relevant, accurate, and quality-assured information for ATM processes and services is needed system-wide. The exchange and management of aeronautical information and aeronautical data used by the different processes and services in the system will ensure cohesion and linkage between the ATM components. A performance based approach to aeronautical information and aeronautical data management processes provides a means for meeting the ATM system requirements.

To satisfy the uniformity and consistency in the system-wide provision of aeronautical information and aeronautical data that is required for the operational use by the components of the global ATM computer-based navigation systems, States shall, as far as practicable, avoid standards and procedures other than those established for international use.

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

It is recognized that Supplementary Procedures may be required in certain cases in order to meet particular requirements of the ICAO Regions.

Guidance material: ~~on the e~~

- a) Organization and operation of aeronautical information services: ~~is contained in the~~ *Aeronautical Information Services Manual* (Doc 8126).
- b) Performance based approach: *Manual on Global Performance of the Air Navigation System* (Doc 9883).
- c) ATM system requirements: *Manual on Air Traffic Management System Requirements* (Doc 9882).

CHAPTER 2. DEFINITIONS

When the following terms are used in the Standards and Recommended Practices for aeronautical information services, 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.

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 services — safely, economically and efficiently — 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 information and aeronautical data necessary for the safety, regularity and efficiency of air navigation.

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. Air traffic management is the dynamic, integrated management of air traffic and airspace — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties.

AIS product. 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.

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 man-made objects.

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

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. 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. A representation of fact, concept, or instruction represented in a formalized form suitable for communication, interpretation or processing either by human and/or by automated systems.

Note. — This is the lowest level of abstraction, compared to information and knowledge.

Database. ~~One or more files of data so structured that appropriate applications may draw from the files and update them.~~ A collection of data stored in structured digital format so that appropriate applications may retrieve and update it.

Note.— This primarily refers to **digital data** ~~stored electronically and~~ (accessed by computers) rather than ~~in~~ files of physical records.

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 meets 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. A description of data as a sequence of discrete values stored or transmitted in automation and communication systems.

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.*

Fix formation. The reference of a geographical location in respect to a radio navigation aid expressed by bearing and distance. (Requires review.)

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.

Information. Data that (1) has been verified to be accurate and timely, (2) is specific and organized for a purpose, (3) is presented within a context that gives it meaning and relevance, and which (4) leads to increase in understanding and decrease in uncertainty. The value of information lies solely in its ability to affect a behaviour, decision, or outcome.

Information management. The management of resources and processes for the timely collection, integration, exchange and delivery of quality-assured data, information and services.

Integrated Aeronautical Information Package. A package 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.

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.— ~~Data that describes and documents data.~~ 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(s).

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

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

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

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

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

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 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.

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.

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

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.

* 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 3. GENERAL

3.1 Responsibilities and functions

3.1.1 Each Contracting State shall:

- a) provide an aeronautical information service; or
- b) agree with one or more other Contracting State(s) for the provision of a joint service; or
- c) delegate the authority for the provision of the service to a non-governmental agency, provided the Standards and Recommended Practices of this Annex are adequately met.

3.1.1.1 The State concerned shall remain responsible for the ~~aeronautical information and aeronautical data provided published~~ aeronautical information and aeronautical data provided published for and on behalf of a State shall clearly indicate that it is ~~provided published~~ under the authority of that State.

3.1.1.2 Each Contracting State shall take all necessary measures to ensure that the aeronautical information/ and aeronautical data it provides relating to its own territory, as well as areas in which the State is responsible for air traffic services outside its territory, is ~~adequate,~~ relevant, complete, of the required quality and timely. This shall include arrangements for the timely provision of required aeronautical information/ and aeronautical data to the aeronautical information service by each of the State services associated with ~~the components of the global ATM system aircraft operations~~.

3.1.1.3 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 aeronautical information service, 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 organization.

3.1.2 An aeronautical information service shall, in addition, obtain aeronautical information and aeronautical data 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.

3.1.3 Aeronautical information/ and aeronautical data obtained under 3.1.2 a) shall, when distributed, be clearly identified as having the authority of the State of Origin.

3.1.4 Aeronautical information/ and aeronautical data obtained under 3.1.2 b) shall, if possible, be verified before distribution and if not verified shall, when distributed, be clearly identified as such.

3.1.5 An aeronautical information service shall promptly make available to the aeronautical information services of other States any aeronautical information/ and aeronautical data necessary for the safety, regularity or efficiency of air navigation required by them, to enable them to comply with 3.1.6 below.

3.1.6 An aeronautical information service shall ensure that aeronautical information/ and aeronautical data necessary for the safety, regularity or efficiency of air navigation is made available in a form suitable for the operational requirements of all

components of the global ATM system, including:

- a) those involved in flight operations, including flight crews, flight planning and flight simulators; and
- b) the air traffic services unit responsible for flight information service and the services responsible for pre-flight information.

3.1.7 An aeronautical information service shall receive and/or originate, collate or assemble, edit, format, publish/store and distribute aeronautical information/ and aeronautical data concerning the entire territory of the State as well as areas in which the State is responsible for air traffic services outside its territory. Aeronautical information shall be provided as an Integrated Aeronautical Information Package.

3.2 Quality management system

3.2.1 Quality management systems shall be implemented and maintained encompassing all functions of an aeronautical information service, as outlined in 3.1.7. The execution of such quality management systems shall be made demonstrable for each function stage, when required.

3.2.2 **Recommendation.**— *Quality management should 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.

3.2.3 **Recommendation.**— *The quality management system established in accordance with 3.2.1 should follow the International Organization for Standardization (ISO) 9000 series of quality assurance standards, and be certified by an approved organization.*

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.

3.2.4 Within the context of the established quality management system, the ~~competencies—skills~~ 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. States shall ensure that personnel possess the ~~skills and~~ competencies required to perform specific assigned functions. ~~and a~~ 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 ~~skills and~~ 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 AIM Training Development Manual (Doc XXXX).

3.2.5 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 is 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.

3.2.6 The established quality management system shall provide users with the necessary assurance and confidence that distributed aeronautical information/ and aeronautical data satisfy the aeronautical data quality requirements for accuracy, resolution and integrity as specified in Appendix 7, and the data traceability requirements through the provision of appropriate metadata as specified in 3.8.4.4. 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.

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

~~3.2.8 The order of accuracy for aeronautical data, based upon a 95 per cent confidence level, shall be as specified in Annex 11, Chapter 2, and 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). (Moved to 3.8.4.1)~~

~~3.2.9 The order of publication resolution of aeronautical data shall be that as specified in Appendices 1 and 7. (Moved to 3.8.4.2)~~

~~3.2.10 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). Aeronautical data integrity requirements shall be based upon the potential risk resulting from the corruption of data and upon the use to which the data item is put. Consequently, the following classifications and data integrity levels shall apply: (Moved to 3.8.4.3.1)~~

- ~~a) critical data, integrity level 1×10^{-8} : 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;~~
- ~~b) essential data, integrity level 1×10^{-5} : 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) routine data, integrity level 1×10^{-3} : 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.~~

~~Note 1. Distribution to the next intended user will differ in the delivery method applied which may either be:~~

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

~~or~~

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

~~Note 2. Different delivery methods and data media may require different procedures to ensure the required data quality.~~

~~3.2.11 Aeronautical data quality requirements related to classification and data integrity shall be as provided in Tables A7-1 to A7-5 of Appendix 7. (Moved to 3.8.4.3.2)~~

~~3.2.12 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 3.2.10. (Deleted – to be included in guidance materials)

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

— *Note 2.*— *Guidance material 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).*

~~3.2.13~~ Material to be issued as part of the Integrated Aeronautical Information Package shall be thoroughly checked and coordinated with the services responsible before it is submitted to the aeronautical information service, in order to make certain that all necessary information has been included and that it is correct in detail prior to distribution. Validation and verification procedures shall be established which ensure that quality requirements (accuracy, resolution, integrity) and traceability of aeronautical data are met.

— *Note.*— *Guidance material on the liaison with other related services is contained in Doc 8126.* (Moved to 3.8.2.2)

3.2.448 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.

Note.— *Guidance material concerning internal and external audit processes is contained in the Manual on the Quality Management System for Aeronautical Information Management (Doc XXXX).*

— *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 Appendices I and 7 related to publication 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.* (Moved under 3.8.4.5 - applicable to the 3.8.4 Data quality section)

3.3 Exchange of aeronautical information/ and aeronautical data

3.3.1 Each State 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 information/ and aeronautical** data originated by other States.

3.3.2 Where a State designates more than one international NOTAM office, it shall define the extent of responsibility and the territory covered by each office.

3.3.3 An aeronautical information service shall arrange, as necessary, to satisfy operational requirements for the issuance and receipt of NOTAM distributed by telecommunication.

3.3.4 States shall, wherever practicable, establish direct contact between aeronautical information services in order to facilitate the international exchange of aeronautical information/ and aeronautical data.

3.3.5 One copy of each of the elements of the Integrated Aeronautical Information Package, ~~in paper, or electronic form or both,~~ that have been requested by the aeronautical information service of an ICAO Contracting State shall be made available by the originating State in the mutually-agreed format(s), without charge, even where authority for publication/storage and distribution has been delegated to a ~~commercial agency~~ **non-governmental agency**.

3.3.6 **Recommendation.**— *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, whether in paper and/or electronic form, should be subject to bilateral agreement between ICAO Contracting*

States.

3.3.7 **Recommendation.**— *The procurement of aeronautical information ~~and aeronautical data~~, including the elements of the Integrated Aeronautical Information Package, and other air navigation documents, including those containing air navigation legislation and regulations, ~~whether in paper and/or electronic form~~, by States other than ICAO Contracting States and by other entities should be subject to separate agreement with the originating State.*

3.4 Copyright

Note.— *In order to protect the investment in the products [and/or data sets](#) of a State's AIS as well as to ensure better control of their use, States may wish to apply copyright to those products [and/or data sets](#) in accordance with their national laws.*

Any product [and/or data set](#) of a State's AIS which has been granted copyright protection by that State and provided to another State in accordance with 3.3 shall only be made available to a third party on the condition that the third party is made aware that the product [and/or data set](#) is copyright protected and provided that it is appropriately annotated that the product [and/or data set](#) is subject to copyright by the originating State.

3.5 Cost recovery

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

Note.— *When costs of collection and compilation of aeronautical information ~~and aeronautical data~~ are recovered through airports and air navigation services charges, the charge to an individual customer for the supply of a particular AIS product, ~~either in paper or electronic form~~, may be based on the costs of printing paper copies, ~~or~~ production of electronic media [or data sets](#), and costs of distribution.*

PARK: Study notion of AIS deliverable/data set.

3.6 General specifications

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

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

3.6.3 **Recommendation.**— *Units of measurement used in the [origination, processing and distribution](#) of aeronautical information ~~and aeronautical data~~ should be consistent with the decision taken by the State in respect of the use of the tables contained in Annex 5 — Units of Measurement to be Used in Air and Ground Operations.*

3.6.4 Use of ICAO abbreviations

ICAO abbreviations shall be used in the aeronautical information services whenever they are appropriate and their use will facilitate distribution of [aeronautical](#) information ~~and aeronautical~~ data.

3.6.5— Use of automation (Moved to 3.8.3)

~~— **Recommendation.**— Automation enabling digital data exchange should be introduced with the objective of improving the speed, quality, efficiency and cost effectiveness of aeronautical information services.~~

~~— **Note.**— Guidance material on an aeronautical conceptual and data exchange model for the development of databases and the establishment of data exchange services is contained in Doc 8126.~~

3.6.6— Identification and delineation of prohibited, restricted and danger areas (Recommend move to Annex 11)

~~— 3.6.6.1— Each prohibited area, restricted area, or danger area established by a State shall, upon initial establishment, be given an identification and full details shall be promulgated (see ENR 5.1 of Appendix 1).~~

~~— 3.6.6.2— The identification so assigned shall be used to identify the area in all subsequent notifications pertaining to that area.~~

~~— 3.6.6.3— The identification shall be composed of a group of letters and figures as follows:~~

~~— a) nationality letters for location indicators assigned to the State or territory which has established the airspace;~~

~~— b) a letter P for prohibited area, R for restricted area and D for danger area as appropriate;~~

~~— c) a number, unduplicated within the State or territory concerned.~~

~~— **Note.**— Nationality letters are those contained in Location Indicators (Doc 7910).~~

~~— 3.6.6.4— To avoid confusion, identification numbers shall not be reused for a period of at least one year after cancellation of the area to which they refer.~~

~~— 3.6.6.5 **Recommendation.**— When a prohibited, restricted or danger area is established, the area should be as small as practicable and be contained within simple geometrical limits, so as to permit ease of reference by all concerned.~~

3.6.75 Human Factors considerations

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

3.6.7.2 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.

3.7 Common reference systems for air navigation

3.7.1 Horizontal reference system

3.7.1.1 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 Annex 11, Chapter 2, and Appendix 5, Table 1, and for aerodrome/heliport-related positions, in Annex 14, Volumes I and II, Chapter 2, and Table A5-1 and Table 1 of Appendices 5 and 1, respectively.

3.7.1.2 Recommendation.— *In precise geodetic applications and some air navigation applications, temporal changes in the tectonic plate motion and tidal effects on the Earth's crust should be modelled and estimated. To reflect the temporal effect, an epoch should 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 σ).

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.

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

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

3.7.2 Vertical reference system

3.7.2.1 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.

3.7.2.2 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.

Note.— Guidance material concerning EGM-96 is contained in Doc 9674.

3.7.2.3 At those geographical positions where the accuracy of EGM-96 does not meet the accuracy requirements for elevation and geoid undulation specified in 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 Annex 14, Volumes I and II, Chapter 2, and Table A5-2 and Table 2 of Appendices 5 and 1, respectively.

3.7.2.4 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 Appendix 1 shall also be published.

3.7.2.5 The order of publication resolution of elevation and geoid undulation shall be that specified in 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 Annex 4, Appendix 6, Table 2.

3.7.3 Temporal reference system

3.7.3.1 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 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.

3.7.3.2 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.

3.8 — Metadata (Moved to 3.8.4.4)

~~3.8.1 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. (Moved to 3.8.4.4.1)~~

~~3.8.2 The metadata to be collected shall include, as a minimum: (Moved to 3.8.4.4.2)~~

- ~~a) the name of the organization or entity performing the function;~~
- ~~b) the function performed; and~~
- ~~c) the date and time of operation.~~

~~Note.—The function performed indicates any action of originating, transmitting or manipulating the data.~~

3.8 Aeronautical information management

3.8.1 Information management requirements

Information management resources and processes shall be established to ensure the timely collection, integration, exchange and delivery of quality-assured aeronautical information and aeronautical data within the ATM system to enable informed decision making.

3.8.2 Aeronautical information and aeronautical data origination

3.8.2.1 The State shall ensure that arrangements, including validation and verification procedures, are in place between AIS and originators of aeronautical information and aeronautical data to ensure that quality requirements (accuracy, resolution, integrity) and traceability requirements are met.

Note.— Guidance material on the liaison with other related services is contained in Doc 8126). (3.2.13 Note) Edit: Check if services can be originators.

3.8.2.2 The same aeronautical information and aeronautical data sources used to support the IAIP and to provide digital aeronautical data shall be used to support aeronautical chart production. *Edit: Correct for consistency throughout the Annex.*

3.8.3 Use of automation (3.6.5)

3.8.3.1 Recommendation.— ~~Automation enabling digital data exchange should~~ **shall** be introduced with the objective of improving the ~~,timeliness, speed,~~ quality, efficiency and cost-effectiveness of aeronautical information services.

3.8.3.2 Recommendation.— *The Integrated Aeronautical Information Package should be made available in a printed format and in an electronic format suitable for delivery online or via other electronic media. Edit: Use the term “format” throughout the Annex as appropriate.*

3.8.3.3 Where the elements of the Integrated Aeronautical Information Package are provided in multiple formats processes shall be implemented to ensure the aeronautical information and aeronautical data are consistent.

Note Multiple formats include at least printed, electronic and digital media.

3.8.3.4 In order to meet the data quality requirements as provided in Tables A7-1 to A7-5 of Appendix 7 ~~automation~~ :shall

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

- (b) use common aeronautical information conceptual and data exchange models to ensure global interoperability to ensure

3.8.3.5 The common aeronautical information conceptual model shall comply with the following minimum performance requirements

- a) use the Unified Modeling Language (UML) to describe the aeronautical information features and their properties, associations, values and validation rules;
- b) cover the data contained in the Integrated Aeronautical Information Package; and Edit: “Cover” and cross check “data” provided by way of ETOD and AMDB specification.
- c) include a temporality model to enable capturing the evolution of the properties of an aeronautical information feature over time, from the start of its life until its permanent withdrawal.

3.8.3.6 The common aeronautical data exchange model shall comply with the following minimum performance requirements

- a) use a data Encoding Specification (Extensible Markup Language / Geography Markup Language [XML/GML] Schema), which implements all the classes defined in the conceptual UML model; and
- b) provide an extension mechanism, by which groups of users can extend the properties of existing features and add new features which are not relevant for global standardization.

Note.— Guidance material on ~~an~~ aeronautical information conceptual and data exchange models for the development of databases and the establishment of data exchange services is contained in Doc 8126.

3.8.4 Data quality

Note.- Guidance material on aeronautical data quality is included in the Manual on the Quality Management System for Aeronautical Information Management (Doc XXXX). Additionally, guidance material on managing data quality underlying the processes of the performance based approach is contained in the Manual on Global Performance of the Air Navigation System (Doc 9883).

3.8.4.1 Order of accuracy

The order of accuracy for aeronautical data, ~~based upon a 95 per cent confidence level,~~ shall be as specified in Annex 11, Chapter 2, and 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). (3.2.8)

3.8.4.2 Publication resolution

The order of publication resolution of aeronautical data shall be that as specified in Appendices 1 and 7. (3.2.9)

Note.- The database resolution should be commensurate with the data accuracy requirements and may differ from the publication resolution.

3.8.4.3 Integrity of data (Edit: Further develop to eliminate the numerical values.)

3.8.4.3.1 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). Aeronautical data integrity requirements shall be based upon the potential risk resulting from the corruption of data and upon the use to which the data item is put. Consequently, the following classifications and data integrity levels shall apply: (3.2.10)

- a) critical data, integrity level 1×10^{-8} : 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; (3.2.10 a))
- b) essential data, integrity level 1×10^{-5} : 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 (3.2.10 b))
- c) routine data, integrity level 1×10^{-3} : 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. (3.2.10 c))

Note 1.— Distribution to the next intended user will differ in the delivery method applied which may either be:

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

or

Direct electronic distribution. The means by which aeronautical information and aeronautical data distribution is achieved automatically through the use of a direct electronic connection between the AIS and the next intended user. (3.2.10 Note 1)

Note 2.— Different delivery methods and data media may require different procedures to ensure the required data quality. (3.2.10 Note 2)

3.8.4.3.2 Aeronautical data quality requirements related to classification and data integrity shall be as provided in Tables A7-1 to A7-5 of Appendix 7. (3.2.11)

3.8.4.4 Metadata (3.8)

3.8.4.4.1 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. (3.8.1)

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

3.8.4.4.2 The metadata to be collected shall include, as a minimum: (3.8.2)

- a) the name of the organization or ~~entity~~ entities performing the function;
- b) the function performed; ~~and~~
- c) the date and time of ~~operation.~~ function; and

d) a quality statement. (Edit: This is intended to be a declaration of data quality, i.e. accuracy, resolution, etc.)

Note.— The function performed indicates any action of originating, transmitting or manipulating the data.

3.8.4.5 Data protection

The aeronautical data from the point of origination to the point of distribution to the next intended user shall be protected in accordance with the requirements specified in Doc 8126.

*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 Appendices 1 and 7 related to 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 — Industry Requirements for Aeronautical Information. (Note under 3.2.14)*

CHAPTER 4. AERONAUTICAL INFORMATION PUBLICATIONS (AIP)

Note 1.— AIP 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.— AIP constitute the basic information source for permanent information and long duration temporary changes.

4.1 Contents

4.1.1 An Aeronautical Information Publication shall contain, 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 Appendix 1 that appear in Roman type, except that when the AIP, or volume of the AIP, is designed basically to facilitate operational use in flight, the precise format and arrangement may be left to the discretion of the State provided that an adequate table of contents is included.

4.1.1.1 **Recommendation.**— *Aeronautical Information Publications should, in addition, contain current information relating to those subjects enumerated in Appendix 1 that appear in italic type.*

4.1.2 Aeronautical Information Publications 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 the State and the related ICAO Standards, Recommended Practices and Procedures, given in a form that would enable a user to differentiate readily between the requirements of the State and the related ICAO provisions;
- d) the choice made by a State in each significant case where an alternative course of action is provided for in ICAO Standards, Recommended Practices 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 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 Aeronautical Information Publication 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 **Recommendation.**— AIP should be published in loose-leaf form unless the complete publication is reissued at frequent intervals.

4.2.3 Each Aeronautical Information Publication shall be dated. In the case of Aeronautical Information Publications 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 Aeronautical Information Publication 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 Aeronautical Information Publication issued as a bound volume and each page of an Aeronautical Information Publication issued in loose-leaf form shall be so annotated as to indicate clearly:

- a) the identity of the Aeronautical Information Publication;
- b) the territory covered and subdivisions when necessary;
- c) the identification of the issuing State and producing organization (authority);
- d) page numbers/chart titles;
- e) the degree of reliability if the information is doubtful.

4.2.6 **Recommendation.**— *The sheet size should 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 reprinted 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 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 printed 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 printed plain-language list of valid NOTAM required by 5.2.13.3.

4.4.7 **Recommendation.**— *AIP Supplement pages should be coloured in order to be conspicuous, preferably in yellow.*

4.4.8 **Recommendation.**— *AIP Supplement pages should 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 **Recommendation.**— *The AIP, AIP Amendment, AIP Supplement and AIC should 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 **Recommendation.**— *When provided, the eAIP should 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).*

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 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 Annex 14, Volume I, Chapter 9, and Attachment A, Section 17);
- 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 Annex 11, 2.28 and Attachment D to that Annex.

5.1.1.2 **Recommendation.**— *The need for origination of a NOTAM should be considered in any other circumstance which may affect the operations 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;
- 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 **Recommendation.**— *Notice of any subsequent cancellation of the activities or any reduction of the hours of activity or the dimensions of the airspace should 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).*

5.2 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 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 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 3.6.2 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 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 checklist.

5.2.13.3 A monthly printed 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 **Recommendation.**— *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 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 Appendix 5 shall be used whenever possible, subject to the requirements of 5.3.4.

CHAPTER 6. AERONAUTICAL INFORMATION REGULATION AND CONTROL (AIRAC)

6.1 General specifications

6.1.1 Information concerning the circumstances listed in 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 **Recommendation.**— *The regulated system (AIRAC) should also be used for the provision of information relating to the establishment and withdrawal of, and premeditated significant changes in, the circumstances listed in 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 **Recommendation.**— *The use of the date in the AIRAC cycle which occurs between 21 December and 17 January inclusive should 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 In all instances, information provided under the AIRAC system shall be published in paper copy form and 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 **Recommendation.**— *Whenever major changes are planned and where advance notice is desirable and practicable, information published in paper copy form should 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 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 in electronic form

6.3.1 States that have established an aeronautical database shall, when updating its contents concerning the circumstances listed in Appendix 4, Part 1, ensure that the effective dates of data coincide with the established AIRAC effective dates used for the provision of information in paper copy form.

6.3.2 Information provided in electronic form, concerning the circumstances listed in 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 **Recommendation.**— *Whenever major changes are planned and where advance notice is desirable and practicable, information provided in electronic form should 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 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 An AIC shall be originated 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 navigational 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);
- 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.*

7.1.1.2 The snow plan published under AD 1.2.2 of Appendix 1 shall be supplemented by seasonal information, to be issued well in advance of the beginning of each winter — not less than one month before the normal onset of winter conditions — and shall contain information such as that listed below:

- a) a list of aerodromes/heliports where snow clearance is expected to be performed during the coming winter:
 - *1) in accordance with the runway and taxiway systems; or
 - *2) planned snow clearing, deviating from the runway system (length, width and number of runways, affected taxiways and aprons or portions thereof);
- *b) information concerning any centre designated to coordinate information on the current state of progress of clearance and on the current state of runways, taxiways and aprons;
- c) a division of the aerodromes/heliports into SNOWTAM distribution lists in order to avoid excessive NOTAM distribution;
- *d) an indication, as necessary, of minor changes to the standing snow plan;
- *e) a descriptive list of clearance equipment;
- *f) a listing of what will be considered as the minimum critical snow bank to be reported at each aerodrome/heliport at which reporting will commence.

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

7.2 General specifications

7.2.1 AIC shall be issued in printed form.

Note.— Both text and diagrams may be included.

7.2.1.1 The originating State shall select the AIC that are to be given international distribution.

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

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

7.2.1.4 **Recommendation.**— *Differentiation and identification of AIC topics according to subjects using colour coding should 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).

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

7.3 Distribution

States shall give AIC selected for international distribution the same distribution as for the AIP.

CHAPTER 8. PRE-FLIGHT AND POST-FLIGHT INFORMATION/DATA

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 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 current NOTAM 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 aeronautical information systems

8.2.1 The civil aviation authority or the agency to which the authority to provide service has been delegated in accordance with 3.1.1 c) shall use automated pre-flight information systems to make aeronautical information/ and aeronautical data available to operations personnel including flight crew members for self-briefing, flight planning and flight information service purposes. The information/data 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 information/ and aeronautical data 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 information/ and aeronautical data 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 **Recommendation.**— *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 9.5.1 of Annex 3 — Meteorological Service for International Air Navigation, should 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 3.1.1 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 information/ data and meteorological information, the civil aviation authority or the agency to which the authority to provide service has been delegated in accordance with 3.1.1 c) shall remain responsible for the quality and timeliness of the aeronautical information/ and aeronautical data 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 9.5.1 of Annex 3.*

8.3 Post-flight information

8.3.1 States shall ensure that arrangements are 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 States shall ensure that arrangements are 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 Annex 14, Volume I, Chapter 9, Section 9.4.

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 **Recommendation.**— *Subject to availability, satisfactory operation and bilateral/multilateral and/or regional air navigation agreements, the use of public Internet should 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).*

CHAPTER 10. ELECTRONIC TERRAIN AND OBSTACLE DATA

Note.— Electronic terrain and obstacle data is 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 a State;
- Area 2: within the vicinity of an aerodrome, sub-divided as follows;
- Area 2a: a rectangular area around a runway ~~that comprises~~ extending to 250 m either side of the runway strip extended centre line and extending before the threshold and beyond the end of the runway or stopway for a distance of ~~at least~~ 250 m. Area 2a shall be extended so as to fully include ~~plus~~ any clearway that exists.

Note.— ~~See 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 150 km and a splay of 15 per cent to each side;

Note.— *Where, for example as a result of terrain, flight operations are required to turn and do not operate along the extended centre line of the runway, Area 2b may be aligned such that it follows the planned flight paths.*

- 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 centre line and 50 m from the edge of all other parts of the aerodrome movement area.
- Area 4: The area extending 900 m prior to the runway threshold and 60 m each side of the extended runway centre line in the direction of the approach on a precision approach runway, Category II or III.

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

10.1.2 **Recommendation.** — *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 should 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 From 12 November 2015, 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 From 12 November 2015, at aerodromes regularly used by international civil aviation, electronic ~~terrain and~~ obstacle data shall be provided **in accordance with Appendix 8, Figure A8-2**, for:

- a) Area 2a, for those obstacles that penetrate the relevant obstacle data collection surface specified in Appendix 8;
- b) penetrations of the take-off flight path area obstacle identification surfaces; and
- c) penetrations of the aerodrome obstacle limitation surfaces.

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

10.1.6 From 12 November 2015, at aerodromes regularly used by international civil aviation, **electronic terrain data shall be provided in accordance with Appendix 8, Figure A8-1** for:

- a) **Area 2a;**
- b) **The take-off flight path area; and**
- c) **An area bounded by the lateral extents of the aerodrome obstacle limitation surfaces.**

10.1.67 **Recommendation.**— *At aerodromes regularly used by international civil aviation, electronic terrain and obstacle data should be provided for Areas 2b, 2c and 2d for obstacles and terrain that penetrate the relevant ~~obstacle~~ data collection surface specified in 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.*

10.1.78 **Recommendation.**— *At aerodromes regularly used by international civil aviation, electronic terrain and obstacle data should be provided for Area 3 for terrain and obstacles that penetrate the relevant obstacle data collection surface specified in Appendix 8, **Figure A8-3**.*

10.1.89 At aerodromes regularly used by international civil aviation, electronic terrain and obstacle data shall be provided for Area 4, **in accordance with Figure A8-4**, ~~for terrain and obstacles that penetrate the relevant obstacle data collection surface specified in 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 is required for Area 4, this may be provided in accordance with the Area 4 obstacle data requirements specified in Appendix 8, Table A8-2. Guidance on appropriate obstacles to be provided through aeronautical information for this chart is given in the Aeronautical Chart Manual (Doc 8697).~~

10.1.910 Recommendation.— Where additional electronic obstacle or terrain data is collected to meet other aeronautical requirements, the obstacle and terrain data sets should be expanded to include these additional data.

10.1.110 Recommendation.— Arrangements should 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 is correct.

10.1.124 Recommendation.— At those aerodromes located near territorial boundaries, arrangements should 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 Table A8-3. The terrain feature attributes listed in 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 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 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 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 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 specification or obstacle data product specification 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 is 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.
-

CHAPTER 11. AERODROME MAPPING DATA

Note 1.— Aerodrome mapping data include aerodrome geographic information that support applications which improve the user's situational awareness or supplement 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, aerodrome guidance applications and are intended to be used in the following air navigation applications:

- a) Position and route awareness including moving maps with own ship position, surface guidance and navigation;*
- b) traffic awareness including surveillance and runway incursion detection and alerting;*
- c) facilitation of aerodrome related aeronautical information, including NOTAMs*
- 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 data bases for ease of electronic storage and usage by appropriate applications. These data bases are referred to as aerodrome mapping data bases (AMDBs).

11.1 Aerodrome mapping data — requirements for provision

11.1.1 **Recommendation.**— *Aerodrome mapping data should be provided at aerodromes regularly used by international civil aviation where safety and/or performance-based operations suggest possible benefits.*

11.1.2 When provided, aerodrome mapping data shall be in accordance with the requirements set forth in 11.1.2, 11.2 and 11.3.

11.1.3 The numerical quality requirements for data elements in AMDBs shall be in accordance with Annex 14 — *Aerodromes, Volume I — Aerodrome Design and Operations, Appendix 5.*

11.1.4 **Recommendation.**— *Aerodrome mapping data should be supported by electronic terrain and obstacle data (eTOD) for Area 3 in order to ensure consistency and quality of all geographical data related to the aerodrome.*

Note 1.— eTOD Area 3 data and aerodrome mapping data may be originated using common acquisition techniques and managed within a single geographic information system (GIS).

Note 2.— Supporting material in respect to the processing of eTOD 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.

11.1.5 **Recommendation.**— *The maintenance of AMDBs should be established according to the following factors: user requirements, changes at the surface of the aerodrome, update frequency of eTOD for Area 3 when provided.*

11.2 Aerodrome mapping data product specification

11.2.1 To allow and support the interchange and use of sets of aerodrome mapping 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.

11.2.2 Each aerodrome mapping data product shall be specified following the ISO 19131 data product specification standard in order to include 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.

11.2.3 The content and structure of aerodrome mapping data sets shall be defined in terms of an application schema and a feature catalogue as described in section 10.5.5 and following the provisions of section 11.3.

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

11.3 Aerodrome mapping data base — content and structure

11.3.1 An AMDB shall contain a digital set of aerodrome data consisting of vectors and attributes representing aerodrome features. Feature geometries are characterized as points, lines or polygons. Examples include runway thresholds, taxiway guidance lines and parking stand areas.

11.3.2 Aerodrome mapping data shall be collected following defined constraints and rules as specified in RTCA Document DO-272 () and EUROCAE Document ED-99 (). The constraints ensure the connectivity between features on a spatial and functional level in accordance with the connections observed in the real world.

11.3.3 The AMDB features shall be compliant with the feature catalogue specified by EUROCAE ED119() / RTCA DO291(). A feature catalogue provides a list of feature types and associated attributes which together define the AMDB.

11.3.4 The ISO 19115 compliant AMDB metadata elements shall be provided together with the aerodrome mapping data as specified by EUROCAE ED119() / RTCA DO291().

APPENDIX 1. CONTENTS OF AERONAUTICAL INFORMATION PUBLICATION (AIP)

(see Chapter 4)

PART 1 — GENERAL (GEN)

When the AIP is produced as one volume, the Preface, Record of Amendments, Record of Supplements, Checklist of AIP pages and List of current hand amendments appear only in Part 1 – GEN and the annotation ‘not applicable’ must be entered against each of these subsections in Part 2 and 3.

If an AIP is produced and made available in more than one volume with each having a separate amendment and supplement service, a separate preface, record of AIP Amendments, record of AIP Supplements, checklist of AIP pages and list of current hand amendments must be included in each volume.

GEN 0.1 Preface

Brief description of the Aeronautical Information Publication (AIP), including:

- 1) name of the publishing authority;
- 2) applicable ICAO documents;
- 3) the AIP structure and established regular amendment interval; ~~and~~
- 4) **copyright policy**; and
- 4) 5) service to contact in case of detected AIP errors or omissions.

GEN 0.2 Record of AIP Amendments

A record of AIP Amendments and AIRAC AIP Amendments (published in accordance with the AIRAC system) containing:

- 1) amendment number;
- 2) publication date;
- 3) date inserted (for the AIRAC AIP Amendments, effective date); and
- 4) initials of officer who inserted the amendment.

GEN 0.3 Record of AIP Supplements

A record of issued AIP Supplements containing:

- 1) Supplement number;
- 2) Supplement subject;
- 3) AIP section(s) affected;
- 4) period of validity; and
- 5) cancellation record.

GEN 0.4 Checklist of AIP pages

A checklist of AIP pages containing:

- 1) page number/chart title; and
- 2) publication or effective date (day, month by name and year) of the aeronautical information.

GEN 0.5 List of hand amendments to the AIP

A list of current hand amendments to the AIP containing:

- 1) AIP page(s) affected;
- 2) amendment text; and
- 3) AIP Amendment number by which a hand amendment was introduced.

GEN 0.6 Table of contents to Part 1

A list of **all** sections, **and** subsections **and sub-subsections** contained in Part 1 — General (GEN).

Note.— Subsections may be listed alphabetically.

GEN 1. NATIONAL REGULATIONS AND REQUIREMENTS

GEN 1.1 Designated authorities

The addresses of designated authorities concerned with the facilitation of international air navigation (civil aviation, meteorology, customs, immigration, health, en-route and aerodrome/heliport charges, agricultural quarantine and aircraft accident investigation) containing, for each authority:

- 1) designated authority;
- 2) name of the authority;
- 3) postal address;

- 4) telephone number;
- 5) telefax number;
- 6) e-mail address;
- 7) aeronautical fixed service (AFS) address; and
- 8) website address, if available.

GEN 1.2 Entry, transit and departure of aircraft

Regulations and requirements for advance notification and applications for permission concerning entry, transit and departure of aircraft on international flights.

GEN 1.3 Entry, transit and departure of passengers and crew

Regulations (including customs, immigration and quarantine, and requirements for advance notification and applications for permission) concerning entry, transit and departure of non-immigrant passengers and crew.

GEN 1.4 Entry, transit and departure of cargo

Regulations (including customs, and requirements for advance notification and applications for permission) concerning entry, transit and departure of cargo.

Note.— Provisions for facilitating entry and departure for search, rescue, salvage, investigation, repair or salvage in connection with lost or damaged aircraft are detailed in section GEN 3.6, Search and rescue.

GEN 1.5 Aircraft instruments, equipment and flight documents

Brief description of aircraft instruments, equipment and flight documents, including:

- 1) instruments, equipment (including aircraft communication, navigation and surveillance equipment) and flight documents to be carried on aircraft, including any special requirement in addition to the provisions specified in Annex 6, Part I, Chapters 6 and 7; and
- 2) emergency locator transmitter (ELT), signalling devices and life-saving equipment as presented in Annex 6, Part I, 6.6 and Part II, 6.4 where so determined by regional air navigation meetings, for flights over designated land areas.

GEN 1.6 Summary of national regulations and international agreements/conventions

A list of titles and references and, where applicable, summaries of national regulations affecting air navigation, together with a list of international agreements/conventions ratified by State.

GEN 1.7 Differences from ICAO Standards, Recommended Practices and Procedures

A list of significant differences between national regulations and practices of the State and related ICAO provisions, including:

- 1) provision affected (Annex and edition number, paragraph); and

- 2) difference in full text.

All significant differences must be listed under this subsection. All Annexes must be listed in numerical order even if there is no difference to an Annex, in which case a NIL notification must be provided. National differences or the degree of non-application of the regional supplementary procedures (SUPPS) must be notified immediately following the Annex to which the supplementary procedure relates.

GEN 2. TABLES AND CODES

GEN 2.1 Measuring system, aircraft markings, holidays

GEN 2.1.1 Units of measurement

Description of units of measurement used including table of units of measurement.

GEN 2.1.2 Temporal reference system

Description of the temporal reference system (calendar and time system) employed, together with an indication of whether or not daylight saving hours are employed and how the temporal reference system is presented throughout the AIP.

GEN 2.1.3 Horizontal reference system

Brief description of the horizontal (geodetic) reference system used, including:

- 1) name/designation of the reference system;
- 2) identification of the projection;
- 3) identification of the ellipsoid used;
- 4) identification of the datum used;
- 5) area(s) of application; and
- 6) an explanation, if applicable, of the asterisk used to identify those coordinates that do not meet Annex 11 and 14 accuracy requirements.

GEN 2.1.4 Vertical reference system

Brief description of the vertical reference system used, including:

- 1) name/designation of the reference system;
- 2) description of the geoid model used including the parameters required for height transformation between the model used and EGM-96; and

- 3) an explanation, if applicable, of the asterisk used to identify those elevations/geoid undulations that do not meet Annex 14 accuracy requirements.

GEN 2.1.5 Aircraft nationality and registration marks

Indication of aircraft nationality and registration marks adopted by the State.

GEN 2.1.6 Public holidays

A list of public holidays with indication of services being affected.

GEN 2.2 Abbreviations used in ~~AIS publications~~ the Integrated Aeronautical Information Package (IAIP)

A list of alphabetically arranged abbreviations and their respective significations used by the State ~~in its IAIP AIP and in the distribution of aeronautical information/data~~ with appropriate annotation for those national abbreviations that are different from those contained in the *Procedures for Air Navigation Services — ICAO Abbreviations and Codes* (PANS-ABC, Doc 8400). ~~The annotated abbreviations shall not be used in NOTAM Item E.~~

Note.— A list of alphabetically arranged definitions/glossary of terms may also be added.

GEN 2.3 Chart symbols

A list of chart symbols arranged according to the chart series where symbols are applied.

GEN 2.4 Location indicators

A list of alphabetically arranged location indicators assigned to the locations of aeronautical fixed stations to be used for encoding and decoding purposes. An annotation to locations not connected to the Aeronautical Fixed Service (AFS) must be provided.

GEN 2.5 List of radio navigation aids

A list of radio navigation aids arranged alphabetically, containing:

- 1) identifier;
- 2) name of the station;
- 3) type of facility/aid; and
- 4) indication whether aid serves en-route (E), aerodrome (A) or dual (AE) purposes.

GEN 2.6 Conversion tables

Tables for conversion between:

- 1) nautical miles and kilometres and vice versa;
- 2) feet and metres and vice versa;
- 3) decimal minutes of arc and seconds of arc and vice versa; and
- 4) other conversion tables, as appropriate.

Note - Conversion formulae may be used as an alternative to conversion tables.

GEN 2.7 Sunrise/sunset tables

Brief description of criteria used for determination of the times given in the sunrise/sunset tables, together with an alphabetical list of locations for which the times are given with a reference to the related page in the table and the sunrise/sunset tables for the selected stations/locations. ~~including:~~

Note - A State may, as an alternative to the listing of times applicable to specific locations, elect to provide a simple formulae or table from which times may be calculated for any location within its territory/area of responsibility.

The sunrise/sunset tables should include:

- 1) station name;
- 2) ICAO location indicator;
- 3) geographical coordinates in degrees and minutes;
- 4) date(s) for which times are given;
- 5) time for the beginning of morning civil twilight;
- 6) time for sunrise;
- 7) time for sunset; and
- 8) time for the end of evening civil twilight.

GEN 3. SERVICES

GEN 3.1 Aeronautical information services

GEN 3.1.1 Responsible service

Description of the Aeronautical Information Service (AIS) provided and its major components, including:

- 1) service/unit name;
- 2) postal address;

- 3) telephone number;
- 4) telefax number;
- 5) e-mail address;
- 6) AFS address;
- 7) website address, if available;
- 8) a statement concerning the ICAO documents on which the service is based and a reference to the AIP location where differences, if any, are listed; and
- 9) an indication if service is not H24.

GEN 3.1.2 Area of responsibility

The area of responsibility for the aeronautical information service.

GEN 3.1.3 Aeronautical publications

Description of the elements of the Integrated Aeronautical Information Package, including:

- 1) AIP and related amendment service;
- 2) AIP Supplements;
- 3) AIC;
- 4) NOTAM and pre-flight information bulletins (PIB);
- 5) checklists and lists of valid NOTAM; ~~and~~
- 6) how they may be obtained; ~~and~~
- 7) **copyright policy.**

When an AIC is used to promulgate publication prices, that must be indicated in this section of the AIP.

GEN 3.1.4 AIRAC system

Brief description of the AIRAC system provided including a table of present and near future AIRAC dates.

GEN 3.1.5 Pre-flight information service at aerodromes/heliports

A list of aerodromes/heliports at which pre-flight information is routinely available, including an indication of relevant:

- 1) elements of the Integrated Aeronautical Information Packages held;
- 2) maps and charts held; and
- 3) general area of coverage of such data.

GEN 3.1.6 Electronic terrain and obstacle data

Details of how electronic terrain and obstacle data may be obtained, containing:

- 1) name of the individual, service or organization responsible;
- 2) street address and e-mail address of the individual, service or organization responsible;
- 3) telefax number of the individual, service or organization responsible;
- 4) contact telephone number of the individual, service or organization responsible;
- 5) hours of service (time period including time zone when contact can be made);
- 6) online information that can be used to contact the individual, service or organization; and
- 7) supplemental information, if necessary, on how and when to contact the individual, service or organization.

GEN 3.2 Aeronautical charts

GEN 3.2.1 Responsible service(s)

Description of service(s) responsible for the production of aeronautical charts, including:

- 1) service name;
- 2) postal address;
- 3) telephone number;
- 4) telefax number;
- 5) e-mail address;
- 6) AFS address;
- 7) website address, if available;
- 8) a statement concerning the ICAO documents on which the service is based and a reference to the AIP location where **chart symbols or any** differences, if any, are listed; and
- 9) an indication if service is not H24.

GEN 3.2.2 Maintenance of charts

Brief description of how aeronautical charts are revised and amended.

GEN 3.2.3 Purchase arrangements

Details of how charts may be obtained, containing:

- 1) service/sales agency(ies);

- 2) postal address;
- 3) telephone number;
- 4) telefax number;
- 5) e-mail address;
- 6) AFS address; and
- 7) website address, if available.

GEN 3.2.4 Aeronautical chart series available

A list of aeronautical chart series available followed by a general description of each series and an indication of the intended use.

GEN 3.2.5 List of aeronautical charts available

A list of aeronautical charts available, including:

- 1) title of series;
- 2) scale of series;
- 3) name and/or number of each chart or each sheet in a series;
- 4) price per sheet; and
- 5) date of latest revision.

GEN 3.2.6 Index to the World Aeronautical Chart (WAC) — ICAO 1:1 000 000

An index chart showing coverage and sheet layout for the WAC 1:1 000 000 produced by a State. If Aeronautical Chart — ICAO 1:500 000 is produced instead of WAC 1:1 000 000, index charts must be used to indicate coverage and sheet layout for the Aeronautical Chart — ICAO 1:500 000.

GEN 3.2.7 Topographical charts

Details of how topographical charts may be obtained, containing:

- 1) name of service/agency(ies);
- 2) postal address;
- 3) telephone number;
- 4) telefax number;

- 5) e-mail address;
- 6) AFS address; and
- 7) website address, if available.

GEN 3.2.8 Corrections to charts not contained in the AIP

A list of corrections to aeronautical charts not contained in the AIP, or an indication where such information can be obtained.

GEN 3.3 Air traffic services

GEN 3.3.1 Responsible service

Description of the air traffic service and its major components, including:

- 1) service name;
- 2) postal address;
- 3) telephone number;
- 4) telefax number;
- 5) e-mail address;
- 6) AFS address;
- 7) website address, if available;
- 8) a statement concerning the ICAO documents on which the service is based and a reference to the AIP location where differences, if any, are listed; and
- 9) an indication if service is not H24.

GEN 3.3.2 Area of responsibility

Brief description of area of responsibility for which air traffic services are provided.

GEN 3.3.3 Types of services

Brief description of main types of air traffic services provided.

GEN 3.3.4 Coordination between the operator and ATS

General conditions under which coordination between the operator and air traffic services is effected.

GEN 3.3.5 Minimum flight altitude

The criteria used to determine minimum flight altitudes.

GEN 3.3.6 ATS units address list

A list of ATS units and their addresses arranged alphabetically, containing:

- 1) unit name;
- 2) postal address;
- 3) telephone number;
- 4) telefax number;
- 5) e-mail address;
- 6) AFS address; and
- 7) website address, if available.

GEN 3.4 Communication services**GEN 3.4.1 Responsible service**

Description of the service responsible for the provision of telecommunication and navigation facilities, including:

- 1) service name;
- 2) postal address;
- 3) telephone number;
- 4) telefax number;
- 5) e-mail address;
- 6) AFS address;
- 7) website address, if available;
- 8) a statement concerning the ICAO documents on which the service is based and a reference to the AIP location where differences, if any, are listed; and
- 9) an indication if service is not H24.

GEN 3.4.2 Area of responsibility

Brief description of area of responsibility for which telecommunication service is provided.

GEN 3.4.3 Types of service

Brief description of the main types of service and facilities provided, including:

- 1) radio navigation services;
- 2) voice and/or data link services;
- 3) broadcasting service;
- 4) language(s) used; and
- 5) an indication of where detailed information can be obtained.

GEN 3.4.4 Requirements and conditions

Brief description concerning the requirements and conditions under which the communication service is available.

GEN 3.4.5 Miscellaneous

Brief description of additional information on communication services (e.g. selected radio broadcasting stations, telecommunications diagram, etc).

GEN 3.5 Meteorological services**GEN 3.5.1 Responsible service**

Brief description of the meteorological service responsible for the provision of meteorological information, including:

- 1) service name;
- 2) postal address;
- 3) telephone number;
- 4) telefax number;
- 5) e-mail address;
- 6) AFS address;
- 7) website address, if available;
- 8) a statement concerning the ICAO documents on which the service is based and a reference to the AIP location where differences, if any, are listed; and

- 9) an indication if service is not H24.

GEN 3.5.2 Area of responsibility

Brief description of area and/or air routes for which meteorological service is provided.

GEN 3.5.3 Meteorological observations and reports

Detailed description of the meteorological observations and reports provided for international air navigation, including:

- 1) name of the station and the ICAO location indicator;
- 2) type and frequency of observation including an indication of automatic observing equipment;
- 3) types of meteorological reports (e.g. METAR) and availability of a trend forecast;
- 4) specific type of observation system and number of observation sites used to observe and report surface wind, visibility, runway visual range, cloud base, temperature and, where applicable, wind shear (e.g. anemometer at intersection of runways, transmissometer next to touchdown zone, etc.);
- 5) hours of operation; and
- 6) indication of aeronautical climatological information available.

GEN 3.5.4 Types of services

Brief description of the main types of service provided, including details of briefing, consultation, display of meteorological information, flight documentation available for operators and flight crew members, and of the methods and means used for supplying the meteorological information.

GEN 3.5.5 Notification required from operators

Minimum amount of advance notice required by the meteorological authority from operators in respect of briefing, consultation and flight documentation and other meteorological information they require or change.

GEN 3.5.6 Aircraft reports

As necessary, requirements of the meteorological authority for the making and transmission of aircraft reports.

GEN 3.5.7 VOLMET service

Description of VOLMET and/or D-VOLMET service, including:

- 1) name of transmitting station;
- 2) call sign or identification and abbreviation for the radio communication emission;
- 3) frequency or frequencies used for broadcast;

- 4) broadcasting period;
- 5) hours of service;
- 6) list of aerodromes/heliports for which reports and/or forecasts are included; and
- 7) reports, forecasts and SIGMET information included and remarks.

GEN 3.5.8 SIGMET and AIRMET service

Description of the meteorological watch provided within flight information regions or control areas for which air traffic services are provided, including a list of the meteorological watch offices with:

- 1) name of the meteorological watch office, ICAO location indicator;
- 2) hours of service;
- 3) flight information region(s) or control area(s) served;
- 4) SIGMET validity periods;
- 5) specific procedures applied to SIGMET information (e.g. for volcanic ash and tropical cyclones);
- 6) procedures applied to AIRMET information (in accordance with relevant regional air navigation agreements);
- 7) the air traffic services unit(s) provided with SIGMET and AIRMET information; and
- 8) additional information (e.g. concerning any limitation of service, etc.).

GEN 3.5.9 Other automated meteorological services

Description of available automated services for the provision of meteorological information (e.g. automated pre-flight information service accessible by telephone and/or computer modem) including:

- 1) service name;
- 2) information available;
- 3) areas, routes and aerodromes covered; and
- 4) telephone and telefax number(s), e-mail address, and, if available, website address.

GEN 3.6 Search and rescue

GEN 3.6.1 Responsible service(s)

Brief description of service(s) responsible for the provision of search and rescue (SAR), including:

- 1) service/unit name;

- 2) postal address;
- 3) telephone number;
- 4) telefax number;
- 5) e-mail address;
- 6) AFS address;
- 7) website address, if available; and
- 8) a statement concerning the ICAO documents on which the service is based and a reference to the AIP location where differences, if any, are listed.

GEN 3.6.2 Area of responsibility

Brief description of area of responsibility within which search and rescue services are provided. **A chart may be included to supplement the description of the area.**

GEN 3.6.3 Types of service

Brief description and geographical portrayal, where appropriate, of the type of service and facilities provided including indications where SAR aerial coverage is dependent upon significant deployment of aircraft.

GEN 3.6.4 SAR agreements

Brief description of SAR agreements in force, including provisions for facilitating entry and departure of other States' aircraft for search, rescue, salvage, repair or salvage in connection with lost or damaged aircraft, either with airborne notification only or after flight plan notification.

GEN 3.6.5 Conditions of availability

Brief description of provisions for search and rescue, including the general conditions under which the service and facilities are available for international use, including an indication of whether a facility available for search and rescue is specialized in SAR techniques and functions, or is specially used for other purposes but adapted for SAR purposes by training and equipment, or is only occasionally available and has no particular training or preparation for SAR work.

GEN 3.6.6 Procedures and signals used

Brief description of the procedures and signals employed by rescue aircraft and a table showing the signals to be used by survivors.

GEN 4. CHARGES FOR AERODROMES/HELIPORTS AND AIR NAVIGATION SERVICES

Reference may be made to where details of actual charges may be found, if not itemized in this chapter.

GEN 4.1 Aerodrome/heliport charges

Brief description of type of charges which may be applicable at aerodromes/heliports available for international use, including:

- 1) landing of aircraft;
- 2) parking, hangarage and long-term storage of aircraft;
- 3) passenger service;
- 4) security;
- 5) noise-related items;
- 6) other (customs, health, immigration, etc.);
- 7) exemptions/reductions; and
- 8) methods of payment.

GEN 4.2 Air navigation services charges

Brief description of charges which may be applicable to air navigation services provided for international use, including:

- 1) approach control;
- 2) route air navigation services;
- 3) cost basis for air navigation services and exemptions/reductions; and
- 4) methods of payment.

PART 2 — EN-ROUTE (ENR)

If an AIP is produced and made available in more than one volume with each having a separate amendment and supplement service, a separate preface, record of AIP Amendments, record of AIP Supplements, checklist of AIP pages and list of current hand amendments must be included in each volume. In the case of an AIP being published as one volume, the annotation “not applicable” must be entered against each of the above subsections.

~~Reference must be made in the appropriate subsection to indicate that differences between national regulations and ICAO SARPs and procedures exist and that they are detailed in GEN 1.7.~~

ENR 0.6 Table of contents to Part 2

A list of all sections, ~~and~~ subsections and sub-subsections contained in Part 2 – En-route (ENR).

Note.— Subsections may be listed alphabetically.

ENR 1. GENERAL RULES AND PROCEDURES

ENR 1.1 General rules

The requirement is for publication of the general rules as applied within the State.

Note - The section should not duplicate texts published at GEN 1.7. The rules set out in this section should consider the requirements of Annex 2 Rules of the Air.

ENR 1.2 Visual flight rules

The requirement is for publication of the visual flight rules as applied within the State.

Note - The section should not duplicate texts published at GEN 1.7. The rules set out in this section should consider the requirements of Annex 2 Rules of the Air.

ENR 1.3 Instrument flight rules

The requirement is for publication of the instrument flight rules as applied within the State.

Note - The section should not duplicate texts published at GEN 1.7. The rules set out in this section should consider the requirements of Annex 2 Rules of the Air.

ENR 1.4 ATS airspace **description and classification**

ENR 1.4.1 ATS airspace description

ATS airspace description, including general textual descriptions such as those required for Conditional Routes (CDR), Flexible Use of Airspace (FUA) or other types of Airspace.

ENR 1.4.2 ATS airspaces classification

The description of ATS airspace classes in the form of the ATS airspace classification table in Annex 11, Appendix 4, appropriately annotated to indicate those airspace classes not used by the State.

ENR 1.5 Holding, approach and departure procedures

ENR 1.5.1 General

The requirement is for a statement concerning the criteria on which holding, approach and departure procedures are established. If different from ICAO provisions, the requirement is for presentation of criteria used in a tabular form.

ENR 1.5.2 Arriving flights

The requirement is to present procedures (conventional or area navigation or both) for arriving flights which are common to flights into or within the same type of airspace. If different procedures apply within a terminal airspace, a note to this effect must be given together with a reference to where the specific procedures can be found.

ENR 1.5.3 Departing flights

The requirement is to present procedures (conventional or area navigation or both) for departing flights which are common to flights departing from any aerodrome/heliport.

ENR 1.5.4 Other relevant information and procedures

Brief description of additional information e.g. entry procedures, final approach alignment, holding procedures and patterns, etc.

ENR 1.6 ATS surveillance services and procedures

ENR 1.6.1 Primary radar

Description of primary radar services and procedures, including:

- 1) supplementary services;
- 2) the application of radar control service;
- 3) radar and air-ground communication failure procedures;
- 4) voice and CPDLC position reporting requirements; and
- 5) graphic portrayal of area of radar coverage.

ENR 1.6.2 Secondary surveillance radar (SSR)

Description of secondary surveillance radar (SSR) operating procedures, including:

- 1) emergency procedures;
- 2) air-ground communication failure and unlawful interference procedures;
- 3) the system of SSR code assignment;
- 4) voice and CPDLC position reporting requirements; and
- 5) graphic portrayal of area of SSR coverage.

Note.— The SSR description is of particular importance in areas or routes where the possibility of interception exists.

ENR 1.6.3 Automatic dependent surveillance — broadcast (ADS-B)

Description of automatic dependent surveillance — broadcast (ADS-B) operating procedures, including:

- 1) emergency procedures;
- 2) air-ground communication failure and unlawful interference procedures;

- 3) aircraft identification requirements;
- 4) voice and CPDLC position reporting requirements; and
- 5) graphic portrayal of area of ADS-B coverage.

Note.— The ADS-B description is of particular importance in areas or routes where the possibility of interception exists.

ENR 1.6.4 Other relevant information and procedures

Brief description of additional information and procedures e.g. radar failure procedures, transponder failure, timetable for maintenance of radar equipment, etc.

ENR 1.7 Altimeter setting procedures

The requirement is for a statement of altimeter setting procedures in use, containing:

- 1) brief introduction with a statement concerning the ICAO documents on which the procedures are based together with differences to ICAO provisions, if any;

- 2) basic altimeter setting procedures;
- 3) description of altimeter setting region(s);
- 4) procedures applicable to operators (including pilots); and
- 5) table of cruising levels.

ENR 1.8 Regional supplementary procedures

The requirement is for presentation of regional supplementary procedures (SUPPS) affecting the State's entire area of responsibility, ~~with properly annotated national differences, if any.~~

Note: The procedures set out in this section should combine the details published in ICAO Doc 7030 - Regional Supplementary Procedures - with reference to the State's published differences, if any, but the section should not duplicate texts published at GEN 1.7 Differences from ICAO Standards, Recommended Practices and Procedures.

ENR 1.9 Air traffic flow management (ATFM)/ airspace management

Brief description of air traffic flow management (ATFM) system ~~and airspace management~~, including:

- 1) ATFM structure, service area, service provided, location of unit(s), ~~and~~ hours of operation ~~and documentation~~;
- 2) types of flow messages and descriptions of the formats; and
- 3) procedures applicable for departing flights, containing:
 - a) service responsible for provision of information on applied ATFM measures;
 - b) flight plan requirements; and
 - c) slot allocations.
- 4) Information on overall responsibility regarding airspace management within FIR, Airspace Management Cell (AMC) location, contact information, AMC responsibilities, structure of manageable airspace (allocation and changes to allocation) and general operating procedures.

ENR 1.10 Flight planning

The requirement is to indicate any restriction, limitation or advisory information related to the flight planning stage which may assist the user in the presentation of the intended flight operation, including:

- 1) procedures for the submission of a flight plan;
- 2) repetitive flight plan system; and
- 3) changes to the submitted flight plan.

ENR 1.11 Addressing of flight plan messages

The requirement is for an indication, in tabular form, of the addresses allocated to flight plans, showing:

- 1) category of flight (IFR, VFR or both);
- 2) route (into or via FIR and/or TMA); and
- 3) message address.

ENR 1.12 Interception of civil aircraft

The requirement is for a complete statement of interception procedures and visual signals to be used with a clear indication of whether ICAO provisions are applied and if not, ~~a complete presentation of differences~~ that differences exist.

Note - The procedures set out in this section should combine the ICAO provisions with reference to the State's published differences, if any. The section should not duplicate texts published at GEN 1.7 Differences from ICAO Standards, Recommended Practices and Procedures.

ENR 1.13 Unlawful interference

The requirement is for presentation of appropriate procedures to be applied in case of unlawful interference.

ENR 1.14 Air traffic incidents

Description of air traffic incidents reporting system, including:

- 1) definition of air traffic incidents;
- 2) use of the “Air Traffic Incident Reporting Form” (a copy of the Form may be included for reference);
- 3) reporting procedures (including in-flight procedures); and
- 4) purpose of reporting and handling of the form.

ENR 2. AIR TRAFFIC SERVICES AIRSPACE

ENR 2.1 FIR, UIR, TMA and CTA

Detailed description of flight information regions (FIR), upper flight information regions (UIR), ~~and~~ terminal control areas (TMA) and control areas (CTA) including:

- 1) name, geographical coordinates in degrees and minutes of the FIR/UIR lateral limits and in degrees, minutes and seconds of the TMA and CTA lateral limits, vertical limits and class of airspace;
- 2) identification of unit providing the service;
- 3) call sign of aeronautical station serving the unit and language(s) used, specifying the area and conditions, when and where to be used, if applicable;
- 4) frequencies supplemented by indications for specific purposes; and

5) remarks.

Control zones around military air bases not otherwise described in the AIP must be included in this subsection. Where the requirements of Annex 2 concerning flight plans, two-way communications and position reporting apply to all flights in order to eliminate or reduce the need for interceptions and/or where the possibility of interception exists and the maintenance of guard on the VHF emergency channel 121.5 MHz is required, a statement to this effect must be included for the relevant area(s) or portion(s) thereof.

A description of designated areas over which the carriage of an emergency locator transmitter (ELT) is required and where aircraft shall continuously guard the VHF emergency frequency 121.5 MHz, except for those periods when aircraft are carrying out communications on other VHF channels or when airborne equipment limitations or cockpit duties do not permit simultaneous guarding of two channels.

Note.— Other types of airspace around civil aerodromes/heliports such as control zones and aerodrome traffic zones are described in the relevant aerodrome or heliport section.

ENR 2.2 Other regulated airspace

Where established, a detailed description of other types of regulated airspace and airspace classification.

ENR 3. ATS ROUTES

Note 1.— Bearings, tracks and radials are normally magnetic. In areas of high latitude, where it is determined by the appropriate authority that reference to Magnetic North is impractical, another suitable reference, i.e. True North or Grid North, may be used.

Note 2.— Changeover points established at the midpoint between two radio navigation aids, or at the intersection of the two radials in the case of a route which changes direction between the navigation aids, need not be shown for each route segment if a general statement regarding their existence is made.

ENR 3.1 Lower ATS routes

Detailed description of lower ATS routes, including:

- 1) route designator, designation of the navigation specification(s) applicable to a specified segment(s), names, coded designators or name-codes and the geographical coordinates in degrees, minutes and seconds of all significant points defining the route including “compulsory” or “on-request” reporting points;
- 2) tracks or VOR radials to the nearest degree, geodesic distance to the nearest tenth of a kilometre or tenth of a nautical mile between each successive designated significant point and, in the case of VOR radials, changeover points;
- 3) upper and lower limits or minimum en-route altitudes, to the nearest higher 50 m or 100 ft, and airspace classification;
- 4) lateral limits and minimum obstacle clearance altitudes;
- 5) direction of cruising levels; and
- 6) remarks, including an indication of the controlling unit, its operating channel and, if applicable, its logon address, and any navigation specification(s) limitations.

Note.— In relation to Annex 11, Appendix 1, and for flight planning purposes, the defined navigation specification is not considered to be an integral part of the route designator.

ENR 3.2 Upper ATS routes

Detailed description of upper ATS routes, including:

- 1) route designator, designation of the navigation specification(s) applicable to a specified segment(s), names, coded designators or name-codes and the geographical coordinates in degrees, minutes and seconds of all significant points defining the route including “compulsory” or “on-request” reporting points;
- 2) tracks or VOR radials to the nearest degree, geodesic distance to the nearest tenth of a kilometre or tenth of a nautical mile between each successive designated significant point and, in the case of VOR radials, changeover points;
- 3) upper and lower limits and airspace classification;
- 4) lateral limits;
- 5) direction of cruising levels; and
- 6) remarks, including an indication of the controlling unit, its operating channel and, if applicable, its logon address, and any navigation specification(s) limitations.

Note.— In relation to Annex 11, Appendix 1, and for flight planning purposes, defined navigation specification is not considered to be an integral part of the route designator.

ENR 3.3 Area navigation routes

Detailed description of area navigation (RNAV) routes, including:

- 1) route designator, designation of the navigation specification(s) applicable to a specified segment(s), names, coded designators or name-codes and the geographical coordinates in degrees, minutes and seconds of all significant points defining the route including “compulsory” or “on-request” reporting points;
- 2) in respect of waypoints defining an ~~VOR/DME~~ area navigation route, additionally:
 - a) station identification of the reference VOR/DME;
 - b) bearing to the nearest degree and the distance to the nearest tenth of a kilometre or tenth of a nautical mile from the reference VOR/DME, if the waypoint is not collocated with it; and
 - c) elevation of the transmitting antenna of DME to the nearest 30 m (100 ft);
- 3) geodesic distance to the nearest tenth of a kilometre or tenth of a nautical mile between defined end-points and distance between each successive designated significant point;
- 4) upper and lower limits and airspace classification;
- 5) direction of cruising levels; and
- 6) remarks, including an indication of the controlling unit, its operating channel and, if applicable, its logon address, and any navigation specification(s) limitations.

Note.— In relation to Annex 11, Appendix 1, and for flight planning purposes, defined navigation specification is not considered to be an integral part of the route designator.

ENR 3.4 Helicopter routes

Detailed description of helicopter routes, including:

- 1) route designator, designation of the navigation specification(s) applicable to a specified segment(s), names, coded designators or name-codes and the geographical coordinates in degrees, minutes and seconds of all significant points defining the route including “compulsory” or “on-request” reporting points;
- 2) tracks or VOR radials to the nearest degree, geodesic distance to the nearest tenth of a kilometre or tenth of a nautical mile between each successive designated significant point and, in the case of VOR radials, changeover points;
- 3) upper and lower limits and airspace classification;
- 4) minimum flight altitudes to the nearest higher 50 m or 100 ft; and
- 5) remarks, including an indication of the controlling unit and its operating frequency, and any navigation specification(s) limitations.

Note.— In relation to Annex 11, Appendix I, and for flight planning purposes, defined navigation specification is not considered to be an integral part of the route designator.

ENR 3.5 Other routes

The requirement is to describe other specifically designated routes which are compulsory within specified area(s).

Note.— Arrival, transit and departure routes which are specified in connection with procedures for traffic to and from aerodromes/heliports need not be described since they are described in the relevant section of Part 3 — Aerodromes.

ENR 3.6 En-route holding

The requirement is for a detailed description of en-route holding procedures, containing:

- 1) holding identification (if any) and holding fix (navigation aid) or waypoint with geographical coordinates in degrees, minutes and seconds;
- 2) inbound track;
- 3) direction of the procedure turn;
- 4) maximum indicated airspeed;
- 5) minimum and maximum holding level;
- 6) time/distance outbound; and
- 7) indication of the controlling unit and its operating frequency.

Note.— Obstacle clearance criteria related to holding procedures are contained in Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volumes I and II.

ENR 4. RADIO NAVIGATION AIDS/SYSTEMS**ENR 4.1 Radio navigation aids — en-route**

A list of stations providing radio navigation services established for en-route purposes and arranged alphabetically by name of the station, including:

- 1) name of the station and magnetic variation to the nearest degree and for VOR, station declination to the nearest degree used for technical line-up of the aid;
- 2) identification;
- 3) frequency/channel for each element;
- 4) hours of operation;
- 5) geographical coordinates in degrees, minutes and seconds of the position of the transmitting antenna;
- 6) elevation of the transmitting antenna of DME to the nearest 30 m (100 ft); and
- 7) remarks.

If the operating authority of the facility is other than the designated governmental agency, the name of the operating authority must be indicated in the remarks column. Facility coverage must be indicated in the remarks column.

ENR 4.2 Special navigation systems

Description of stations associated with special navigation systems (DECCA, LORAN, etc.), including:

- 1) name of station or chain;
- 2) type of service available (master signal, slave signal, colour);
- 3) frequency (channel number, basic pulse rate, recurrence rate, as applicable);
- 4) hours of operation;
- 5) geographical coordinates in degrees, minutes and seconds of the position of the transmitting station; and
- 6) remarks.

If the operating authority of the facility is other than the designated governmental agency, the name of the operating authority must be indicated in the remarks column. Facility coverage must be indicated in the remarks column.

ENR 4.3 Global navigation satellite system (GNSS)

A list and description of elements of the global navigation satellite system (GNSS) providing the navigation service established for en-route purposes and arranged alphabetically by name of the element, including:

- 1) the name of the GNSS element (GPS, GLONASS, EGNOS, MSAS, WAAS, etc.);
- 2) frequency(ies), as appropriate;
- 3) geographical coordinates in degrees, minutes and seconds of the nominal service area and coverage area; and
- 4) remarks.

If the operating authority of the facility is other than the designated governmental agency, the name of the operating authority must be indicated in the remarks column.

ENR 4.4 Name-code designators for significant points

An alphabetically arranged list of name-code designators (five-letter pronounceable “name-code”) established for significant points at positions not marked by the site of radio navigation aids, including:

- 1) name-code designator;
- 2) geographical coordinates in degrees, minutes and seconds of the position; ~~and~~
- 3) reference to ATS or other routes where the point is located; ~~and~~
- 4) **remarks, including supplementary definition of positions where required.**

ENR 4.5 Aeronautical ground lights — en-route

A list of aeronautical ground lights and other light beacons designating geographical positions which are selected by the State as being significant, including:

- 1) name of the city or town or other identification of the beacon;
- 2) type of beacon and intensity of the light in thousands of candelas;
- 3) characteristics of the signal;
- 4) operational hours; and
- 5) remarks.

ENR 5. NAVIGATION WARNINGS

ENR 5.1 Prohibited, restricted and danger areas

Description, supplemented by graphic portrayal where appropriate, of prohibited, restricted and danger areas together with information regarding their establishment and activation, including:

- 1) identification, name and geographical coordinates of the lateral limits in degrees, minutes and seconds if inside and in

degrees and minutes if outside control area/control zone boundaries;

- 2) upper and lower limits; and
- 3) remarks, including time of activity.

Type of restriction or nature of hazard and risk of interception in the event of penetration must be indicated in the remarks column.

ENR 5.2 Military exercise and training areas and air defence identification zone (ADIZ)

Description, supplemented by graphic portrayal where appropriate, of established military training areas and military exercises taking place at regular intervals, and established air defence identification zone (ADIZ), including:

- 1) geographical coordinates of the lateral limits in degrees, minutes and seconds if inside and in degrees and minutes if outside control area/control zone boundaries;
- 2) upper and lower limits and system and means of activation announcements together with information pertinent to civil flights and applicable ADIZ procedures; and
- 3) remarks, including time of activity and risk of interception in the event of penetration of ADIZ.

ENR 5.3 Other activities of a dangerous nature and other potential hazards

ENR 5.3.1 Other activities of a dangerous nature

Description, supplemented by charts where appropriate, of activities, **aerial or ground-based that constitute a specific or obvious danger to aircraft operation and that** could affect flights including:

- 1) geographical coordinates in degrees and minutes of centre of area and range of influence;
- 2) vertical limits;
- 3) advisory measures;
- 4) authority responsible for the provision of information; and
- 5) remarks, including time of activity.

ENR 5.3.2 Other potential hazards

Description, supplemented by charts where appropriate, of other potential hazards that could affect flights / **operation of aircraft** (e.g. active volcanoes, nuclear power stations, etc.) including:

- 1) geographical coordinates in degrees and minutes of location of potential hazard;
- 2) vertical limits;

- 3) advisory measures;
- 4) authority responsible for the provision of information; and
- 5) remarks.

ENR 5.4 Air navigation obstacles

The list of obstacles affecting air navigation in Area 1 (the entire State territory), including:

- 1) obstacle identification or designation;
- 2) type of obstacle;
- 3) obstacle position, represented by geographical coordinates in degrees, minutes and seconds;
- 4) obstacle elevation and height to the nearest metre or foot;
- 5) type and colour of obstacle lighting (if any); and
- 6) if appropriate, an indication that the list of obstacles is available in electronic form, and a reference to GEN 3.1.6.

Note 1.— An obstacle whose height above the ground is 100 m and higher is considered an obstacle for Area 1.

Note 2.— Specifications governing the determination and reporting (accuracy of field work and data integrity) of positions (latitude and longitude) and elevations/heights for obstacles in Area 1 are given in Annex 11, Appendix 5, Tables 1 and 2, respectively.

ENR 5.5 Aerial sporting and recreational activities

Brief description, supplemented by graphic portrayal where appropriate, of intensive aerial sporting and recreational activities together with conditions under which they are carried out, including:

- 1) designation and geographical coordinates of the lateral limits in degrees, minutes and seconds if inside and in degrees and minutes if outside control area/control zone boundaries;
- 2) vertical limits;
- 3) operator/user telephone number; and
- 4) remarks, including time of activity.

Note.— This paragraph may be subdivided into different sections for each different category of activity, giving the indicated details in each case.

ENR 5.6 Bird migration and areas with sensitive fauna

Description, supplemented by charts where practicable, of movements of birds associated with migration, including migration routes and permanent resting areas and areas with sensitive fauna.

ENR 6. EN-ROUTE CHARTS

The requirement is for the En-route Chart — ICAO and index charts to be included in this section.

PART 3 — AERODROMES (AD)

If an AIP is produced and made available in more than one volume with each having a separate amendment and supplement service, a separate preface, record of AIP Amendments, record of AIP Supplements, checklist of AIP pages and list of current hand amendments must be included in each volume. In the case of an AIP being published as one volume, the annotation “not applicable” must be entered against each of the above subsections.

AD 0.6 Table of contents to Part 3

A list of **all** sections, ~~and~~ subsections **and sub-subsections** contained in Part 3 — Aerodromes (AD).

Note.— Subsections may be listed alphabetically.

AD 1. AERODROMES/HELIPORTS — INTRODUCTION

AD 1.1 Aerodrome/heliport availability **and conditions of use**

AD 1.1.1 General conditions

Brief description of the State’s designated authority responsible for aerodromes and heliports, including:

- 1) the general conditions under which aerodromes/heliports and associated facilities are available for use; ~~and:~~
- 2) a statement concerning the ICAO documents on which the services are based and a reference to the AIP location where differences, if any, are listed~~;~~.

AD 1.1.2 Use of Military air bases

~~3) —~~ Regulations, if any, concerning civil use of military air bases~~;~~.

AD 1.1.3 Low visibility procedures (LVP)

~~4) —~~ The general conditions under which the low visibility procedures applicable to Cat II/III operations at aerodromes, if any, are applied~~;~~.

AD 1.1.4 Aerodrome operating minima

Details of aerodrome operating minima applied by the State.

AD 1.1.5 Runway friction measuring

~~5) —~~ Friction measuring device used and the runway friction level below which the State will declare the runway to be slippery when wet.~~;~~ ~~and~~

AD 1.1.6 Other information of a similar nature

~~6) other information of a similar nature.~~ If no such additional information is available, insert NIL.

AD 1.2 Rescue and firefighting services and snow plan**AD 1.2.1 Rescue and firefighting services**

Brief description of rules governing the establishment of rescue and firefighting services at aerodromes and heliports available for public use together with an indication of rescue and firefighting categories established by a State.

AD 1.2.2 Snow plan

Brief description of general snow plan considerations for aerodromes/heliports available for public use at which snow conditions are normally liable to occur, including:

- 1) organization of the winter service;
- 2) surveillance of movement areas;
- 3) measuring methods and measurements taken;
- 4) actions taken to maintain the usability of movement areas;
- 5) system and means of reporting;
- 6) the cases of runway closure; and
- 7) distribution of information about snow conditions.

Note.— Where different snow plan considerations apply at aerodromes/heliports, this subparagraph may be subdivided accordingly.

AD 1.3 Index to aerodromes and heliports

A list, supplemented by graphic portrayal, of aerodromes and heliports within a State, including:

- 1) aerodrome/heliport name and ICAO location indicator;
- 2) type of traffic permitted to use the aerodrome/heliport (international/national, IFR/VFR, scheduled/non-scheduled, **private general aviation, military and other**); and
- 3) reference to AIP, Part 3 subsection in which aerodrome/heliport details are presented.

AD 1.4 Grouping of aerodromes/heliports

Brief description of the criteria applied by the State in grouping aerodromes/heliports for the production/distribution/provision of information purposes (e.g. international/national; primary/secondary; major/other; civil/military; etc.).

AD 1.5 Status of certification of aerodromes

A list of aerodromes in the State, indicating the status of certification, including:

- 1) aerodrome name and ICAO location indicator;
- 2) date and, if applicable, validity of certification; and
- 3) remarks, if any.

AD 2. AERODROMES

| |
|--|
| <i>Note.</i> — **** is to be replaced by the relevant ICAO location indicator. |
|--|

**** AD 2.1 Aerodrome location indicator and name

The requirement is for the ICAO location indicator allocated to the aerodrome and the name of aerodrome. An ICAO location indicator must be an integral part of the referencing system applicable to all subsections in section AD 2.

**** AD 2.2 Aerodrome geographical and administrative data

The requirement is for aerodrome geographical and administrative data including:

- 1) aerodrome reference point (geographical coordinates in degrees, minutes and seconds) and its site;
- 2) direction and distance of aerodrome reference point from centre of the city or town which the aerodrome serves;
- 3) aerodrome elevation to the nearest metre or foot, and reference temperature;
- 4) geoid undulation at the aerodrome elevation position to the nearest metre or foot, (where appropriate);
- 5) magnetic variation to the nearest degree, date of information and annual change;
- 6) name of aerodrome operator, address, telephone and telefax numbers, e-mail address, AFS address and, if available, website address;
- 7) types of traffic permitted to use the aerodrome (IFR/VFR); and
- 8) remarks.

**** AD 2.3 Operational hours

Detailed description of the hours of operation of services at the aerodrome, including:

- 1) aerodrome operator;

- 2) customs and immigration;
- 3) health and sanitation;
- 4) AIS briefing office;
- 5) ATS reporting office (ARO);
- 6) MET briefing office;
- 7) air traffic service;
- 8) fuelling;
- 9) handling;
- 10) security;
- 11) de-icing; and
- 12) remarks.

****** AD 2.4 Handling services and facilities**

Detailed description of the handling services and facilities available at the aerodrome, including:

- 1) cargo-handling facilities;
- 2) fuel and oil types;
- 3) fuelling facilities and capacity;
- 4) de-icing facilities;
- 5) hangar space for visiting aircraft;
- 6) repair facilities for visiting aircraft; and
- 7) remarks.

****** AD 2.5 Passenger facilities**

Brief description of passenger facilities available at the aerodrome. ~~including:~~

Note: Reference to other information sources (e.g. airport's website) may be used as an alternative to detailed listing of facilities and their limitations.

Information should include:

- 1) *hotel(s) at or in the vicinity of aerodrome;*
- 2) *restaurant(s) at or in the vicinity of aerodrome;*
- 3) *transportation possibilities;*

- 4) medical facilities;
- 5) *bank and post office at or in the vicinity of aerodrome;*
- 6) *tourist office;* and
- 7) remarks.

****** AD 2.6 Rescue and firefighting services**

Detailed description of the rescue and firefighting services and equipment available at the aerodrome, including:

- 1) aerodrome category for firefighting;
- 2) rescue equipment;
- 3) *capability for removal of disabled aircraft;* and
- 4) remarks.

****** AD 2.7 Seasonal availability — clearing**

Detailed description of the equipment and operational priorities established for the clearance of aerodrome movement areas, including:

- 1) type(s) of clearing equipment;
- 2) clearance priorities; and
- 3) remarks.

****** AD 2.8 Aprons, taxiways and check locations/positions data**

Details related to the physical characteristics of aprons, taxiways and locations/positions of designated checkpoints, including:

- 1) **designation**, surface and strength of aprons;
- 2) **designation**, width, surface and strength of taxiways;
- 3) location and elevation to the nearest metre or foot of altimeter checkpoints;
- 4) location of VOR checkpoints;
- 5) position of INS checkpoints in degrees, minutes, seconds and hundredths of seconds; and
- 6) remarks.

If check locations/positions are presented on an aerodrome chart, a note to that effect must be provided under this subsection.

****** AD 2.9 Surface movement guidance and control system and markings**

Brief description of the surface movement guidance and control system and runway and taxiway markings, including:

- 1) use of aircraft stand identification signs, taxiway guide lines and visual docking/parking guidance system at aircraft stands;
- 2) runway and taxiway markings ~~and lights~~; and
- ~~3) stop bars (if any); and~~
- 3) ~~4)~~ remarks.

****** AD 2.10 Aerodrome obstacles**

Detailed description of obstacles, including:

- 1) obstacles in Area 2:
 - a) obstacle identification or designation;

- b) type of obstacle;
- c) obstacle position, represented by geographical coordinates in degrees, minutes, seconds and tenths of seconds;
- d) obstacle elevation and height to the nearest metre or foot;
- e) obstacle marking, and type and colour of obstacle lighting (if any);
- f) if appropriate, an indication that the list of obstacles is available in electronic form, and a reference to GEN 3.1.6; and
- g) NIL indication, if appropriate.

Note 1.— Chapter 10, 10.1.1, provides a description of Area 2 while Appendix 8, Figure A8-2, contains graphical illustrations of obstacle data collection surfaces and criteria used to identify obstacles in Area 2.

Note 2.— Specifications governing the determination and reporting (accuracy of field work and data integrity) of positions (latitude and longitude) and elevations for obstacles in Area 2 are given in Annex 11, Appendix 5, Tables 1 and 2, and in Annex 14, Volume I, Appendix 5, Tables A5-1 and A5-2, respectively.

- 2) the absence of an Area 2 data set for the aerodrome is to be clearly stated and obstacle data are to be provided for:
 - a) obstacles that penetrate the obstacle limitation surfaces;
 - b) obstacles that penetrate the take-off flight path area obstacle identification surface; and
 - c) other obstacles assessed as being hazardous to air navigation.
- 3) indication that information on obstacles in Area 3 is not provided, or if provided:
 - a) obstacle identification or designation;
 - b) type of obstacle;
 - c) obstacle position, represented by geographical coordinates in degrees, minutes, seconds and tenths of seconds;
 - d) obstacle elevation and height to the nearest **tenth of metre** or **tenth of foot**;
 - e) obstacle marking, and type and colour of obstacle lighting (if any);
 - f) if appropriate, an indication that the list of obstacles is available in electronic form, and a reference to GEN 3.1.6; and
 - g) NIL indication, if appropriate.

Note 1.— Chapter 10, 10.1.1, provides a description of Area 3 while Appendix 8, Figure A8-3, contains graphical illustrations of obstacle data collection surfaces and criteria used to identify obstacles in Area 3.

Note 2.— Specifications governing the determination and reporting (accuracy of field work and data integrity) of positions (latitude and longitude) and elevations for obstacles in Area 3 are given in Annex 14, Volume I, Appendix 5, Tables A5-1 and A5-2, respectively.

****** AD 2.11 Meteorological information provided**

Detailed description of meteorological information provided at the aerodrome and an indication of which meteorological office

is responsible for the service enumerated, including:

- 1) name of the associated meteorological office;
- 2) hours of service and, where applicable, the designation of the responsible meteorological office outside these hours;
- 3) office responsible for preparation of TAFs and periods of validity and interval of issuance of the forecasts;
- 4) availability of the trend forecasts for the aerodrome, and interval of issuance;
- 5) information on how briefing and/or consultation is provided;
- 6) types of flight documentation supplied and language(s) used in flight documentation;
- 7) charts and other information displayed or available for briefing or consultation;
- 8) supplementary equipment available for providing information on meteorological conditions, e.g. weather radar and receiver for satellite images;
- 9) the air traffic services unit(s) provided with meteorological information; and
- 10) additional information (e.g. concerning any limitation of service, etc.).

****** AD 2.12 Runway physical characteristics**

Detailed description of runway physical characteristics, for each runway, including:

- 1) designations;
- 2) true bearings to one-hundredth of a degree;
- 3) dimensions of runways to the nearest metre or foot;
- 4) strength of pavement (PCN and associated data) and surface of each runway and associated stopways;
- 5) geographical coordinates in degrees, minutes, seconds and hundredths of seconds for each threshold and runway end, and geoid undulation (*where appropriate*) of:
 - thresholds of a non-precision approach runway to the nearest metre or foot; and
 - thresholds of a precision approach runway to the nearest tenth of a metre or tenth of a foot;
- 6) elevations of:
 - thresholds of a non-precision approach runway to the nearest metre or foot; and
 - thresholds and the highest elevation of the touchdown zone of a precision approach runway to the nearest tenth of a metre or tenth of a foot;
- 7) slope of each runway and associated stopways;
- 8) dimensions of stopway (if any) to the nearest metre or foot;

- 9) dimensions of clearway (if any) to the nearest metre or foot;
- 10) dimensions of strips;
- 11) the existence of an obstacle-free zone; and
- 12) remarks.

**** AD 2.13 Declared distances

Detailed description of declared distances to the nearest metre or foot for each direction of each runway. ~~including:~~

Note: Where alternative reduced declared distances are authorised for use during the take-off these shall be listed in the table. Such listings shall clearly indicate the runway entry or start point in Remarks item 6.

The descriptions shall include:

- 1) runway designator;
- 2) take-off run available;
- 3) take-off distance available;
- 4) accelerate-stop distance available;
- 5) landing distance available; and
- 6) remarks.

If a runway direction cannot be used for take-off or landing, or both, because it is operationally forbidden, then this must be declared and the words “not usable” or the abbreviation “NU” entered (Annex 14, Volume I, Attachment A, Section 3).

**** AD 2.14 Approach and runway lighting

Detailed description of approach and runway lighting, including:

- 1) runway designator;
- 2) type, length and intensity of approach lighting system;
- 3) runway threshold lights, colour and wing bars;
- 4) type of visual approach slope indicator system;
- 5) length of runway touchdown zone lights;
- 6) length, spacing, colour and intensity of runway centre line lights;
- 7) length, spacing, colour and intensity of runway edge lights;
- 8) colour of runway end lights and wing bars;

- 9) length and colour of stopway lights; and
- 10) remarks.

****** AD 2.15 Other lighting, secondary power supply**

Description of other lighting and secondary power supply, including:

- 1) location, characteristics and hours of operation of aerodrome beacon/identification beacon (if any);
- 2) location and lighting (if any) of anemometer/landing direction indicator;
- 3) taxiway edge lights, ~~and taxiway~~ centre line lights and stop bars (if any);
- 4) secondary power supply including switch-over time; and
- 5) remarks.

****** AD 2.16 Helicopter landing area**

Detailed description of helicopter landing area provided at the aerodrome, including:

- 1) geographical coordinates in degrees, minutes, seconds and hundredths of seconds and geoid undulation (where appropriate) of the geometric centre of touch-down and lift-off (TLOF) or of each threshold of final approach and take-off (FATO) area (where appropriate):
 - for non-precision approaches, to the nearest metre or foot; and
 - for precision approaches, to the nearest tenth of a metre or tenth of a foot;
- 2) TLOF and/or FATO area elevation:
 - for non-precision approaches, to the nearest metre or foot; and
 - for precision approaches, to the nearest tenth of a metre or tenth of a foot;
- 3) TLOF and FATO area dimensions to the nearest metre or foot, surface type, bearing strength and marking;
- 4) true bearings to one-hundredth of a degree of FATO;
- 5) declared distances available, to the nearest metre or foot;
- 6) approach and FATO lighting; and
- 7) remarks.

****** AD 2.17 Air traffic services airspace**

Detailed description of air traffic services (ATS) airspace organized at the aerodrome, including:

- 1) airspace designation and geographical coordinates in degrees, minutes and seconds of the lateral limits;
- 2) vertical limits;

- 3) airspace classification;
- 4) call sign and language(s) of the ATS unit providing service;
- 5) transition altitude; ~~and~~
- 6) hours of applicability (or activation); and
- ~~6~~7) remarks.

****** AD 2.18 Air traffic services communication facilities**

Detailed description of air traffic services communication facilities established at the aerodrome, including:

- 1) service designation;
- 2) call sign;
- 3) channel(s);
- 4) logon address, as appropriate;
- 5) hours of operation; and
- 6) remarks.

****** AD 2.19 Radio navigation and landing aids**

Detailed description of radio navigation and landing aids associated with the instrument approach and the terminal area procedures at the aerodrome, including:

- 1) type of aids, magnetic variation to the nearest degree, as appropriate, and type of supported operation for ILS/MLS, basic GNSS, SBAS, and GBAS and for VOR/ILS/MLS also station declination to the nearest degree used for technical line-up of the aid;
- 2) identification, if required;
- 3) frequency(ies), as appropriate;
- 4) hours of operation, as appropriate;
- 5) geographical coordinates in degrees, minutes, seconds and tenths of seconds of the position of the transmitting antenna, as appropriate;
- 6) elevation of the transmitting antenna of DME to the nearest 30 m (100 ft) and of DME/P to the nearest 3 m (10 ft); and
- 7) remarks.

When the same aid is used for both en-route and aerodrome purposes, a description must also be given in section ENR 4. If the ground-based augmentation system (GBAS) serves more than one aerodrome, description of the aid must be provided under each aerodrome. If the operating authority of the facility is other than the designated governmental agency, the name of the operating authority must be indicated in the remarks column. Facility coverage must be indicated in the remarks column.

****** AD 2.20 Local ~~traffie~~ aerodrome regulations**

Detailed description of regulations applicable to the ~~traffie at use of~~ the aerodrome including ~~standard routes for taxiing aircraft, parking regulations, school and training flights and similar~~ the acceptability of training flights, non-radio and microlight aircraft and similar, and to ground manoeuvring and parking but excluding flight procedures.

****** AD 2.21 Noise abatement procedures**

Detailed description of noise abatement procedures established at the aerodrome.

****** AD 2.22 Flight procedures**

Detailed description of the conditions and flight procedures, including radar and/or ADS-B procedures, established on the basis of airspace organization at the aerodrome. When established, detailed description of the low visibility procedures at the aerodrome, including:

- 1) runway(s) and associated equipment authorized for use under low visibility procedures;
- 2) defined meteorological conditions under which initiation, use and termination of low visibility procedures would be made;
~~and~~
- 3) description of ground marking/lighting for use under low visibility procedures-~~;~~and
- 4) remarks.

****** AD 2.23 Additional information**

Additional information at the aerodrome, such as an indication of bird concentrations at the aerodrome, together with an indication of significant daily movement between resting and feeding areas, to the extent practicable.

****** AD 2.24 Charts related to an aerodrome**

The requirement is for charts related to an aerodrome to be included in the following order:

- 1) Aerodrome/Heliport Chart — ICAO;
- 2) Aircraft Parking/Docking Chart — ICAO;
- 3) Aerodrome Ground Movement Chart — ICAO;
- 4) Aerodrome Obstacle Chart — ICAO Type A (for each runway);
- 5) Aerodrome Terrain and Obstacle Chart — ICAO (Electronic);
- 6) Precision Approach Terrain Chart — ICAO (precision approach Cat II and III runways);
- 7) Area Chart — ICAO (departure and transit routes);
- 8) Standard Departure Chart — Instrument — ICAO;

- 9) Area Chart — ICAO (arrival and transit routes);
- 10) Standard Arrival Chart — Instrument — ICAO;
- 11) ATC Surveillance Minimum Altitude Chart — ICAO;
- 12) Instrument Approach Chart — ICAO (for each runway and procedure type);
- 13) Visual Approach Chart — ICAO; and
- 14) bird concentrations in the vicinity of the aerodrome.

If some of the charts are not produced, a statement to this effect must be given in section GEN 3.2, Aeronautical charts.

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

AD 3. HELIPORTS

When a helicopter landing area is provided at the aerodrome, associated data must be listed only under **** AD 2.16.

Note.— ** is to be replaced by the relevant ICAO location indicator.**

**** AD 3.1 Heliport location indicator and name

The requirement is for the ICAO location indicator assigned to the heliport and the name of heliport. An ICAO location indicator must be an integral part of the referencing system applicable to all subsections in section AD 3.

**** AD 3.2 Heliport geographical and administrative data

The requirement is for heliport geographical and administrative data, including:

- 1) heliport reference point (geographical coordinates in degrees, minutes and seconds) and its site;
- 2) direction and distance of heliport reference point from centre of the city or town which the heliport serves;
- 3) heliport elevation to the nearest metre or foot, and reference temperature;
- 4) geoid undulation at the heliport elevation position to the nearest metre or foot, (where appropriate);
- 5) magnetic variation to the nearest degree, date of information and annual change;
- 6) name of heliport operator, address, telephone and telefax numbers, e-mail address, AFS address and, if available, website address;

- 7) types of traffic permitted to use the heliport (IFR/VFR); and
- 8) remarks.

****** AD 3.3 Operational hours**

Detailed description of the hours of operation of services at the heliport, including:

- 1) heliport operator;
- 2) customs and immigration;
- 3) health and sanitation;
- 4) AIS briefing office;
- 5) ATS reporting office (ARO);
- 6) MET briefing office;
- 7) air traffic service;
- 8) fuelling;
- 9) handling;
- 10) security;
- 11) de-icing; and
- 12) remarks.

****** AD 3.4 Handling services and facilities**

Detailed description of the handling services and facilities available at the heliport, including:

- 1) cargo-handling facilities;
- 2) fuel and oil types;
- 3) fuelling facilities and capacity;
- 4) de-icing facilities;
- 5) hangar space for visiting helicopter;
- 6) repair facilities for visiting helicopter; and
- 7) remarks.

****** AD 3.5 Passenger facilities**

Brief description of passenger facilities available at the heliport. ~~, including:~~

Note: Reference to other information sources (e.g. airport's website) may be used as an alternative to detailed listing of facilities and their limitations.

Information should include:

- 1) *hotel(s) at or in the vicinity of the heliport;*
- 2) *restaurant(s) at or in the vicinity of the heliport;*
- 3) *transportation possibilities;*
- 4) *medical facilities;*
- 5) *bank and post office at or in the vicinity of the heliport;*
- 6) *tourist office;* and
- 7) *remarks.*

**** AD 3.6 Rescue and firefighting services

Detailed description of the rescue and firefighting services and equipment available at the heliport, including:

- 1) *heliport category for firefighting;*
- 2) *rescue equipment;*
- 3) *capability for removal of disabled helicopter; and*
- 4) *remarks.*

**** AD 3.7 Seasonal availability — clearing

Detailed description of the equipment and operational priorities established for the clearance of heliport movement areas, including:

- 1) *type(s) of clearing equipment;*
- 2) *clearance priorities; and*
- 3) *remarks.*

**** AD 3.8 Aprons, taxiways and check locations/positions data

Details related to the physical characteristics of aprons, taxiways and locations/positions of designated checkpoints, including:

- 1) **designation**, surface and strength of aprons, helicopter stands;

- 2) **designation**, width, **and** surface type ~~and designation~~ and designation of helicopter ground taxiways;
- 3) width and designation of helicopter air taxiway and air transit route;
- 4) location and elevation to the nearest metre or foot of altimeter checkpoints;
- 5) location of VOR checkpoints;

- 6) position of INS checkpoints in degrees, minutes, seconds and hundredths of seconds; and
- 7) remarks.

If check locations/positions are presented on a heliport chart, a note to that effect must be provided under this subsection.

**** AD 3.9 Markings and markers

Brief description of final approach and take-off area and taxiway markings and markers, including:

- 1) final approach and take-off markings;
- 2) taxiway markings, air taxiway markers and air transit route markers; and
- 3) remarks.

**** AD 3.10 Heliport obstacles

Detailed description of obstacles, including:

- a) obstacle identification or designation;
- b) type of obstacle;
- c) obstacle position, represented by geographical coordinates in degrees, minutes, seconds and tenths of seconds;
- d) obstacle elevation and height to the nearest metre or foot;
- e) obstacle marking, and type and colour of obstacle lighting (if any);
- f) if appropriate, an indication that the list of obstacles is available in electronic form, and a reference to GEN 3.1.6; and
- g) NIL indication, if appropriate.

**** AD 3.11 Meteorological information provided

Detailed description of meteorological information provided at the heliport and an indication of which meteorological office is responsible for the service enumerated, including:

- 1) name of the associated meteorological office;
- 2) hours of service and, where applicable, the designation of the responsible meteorological office outside these hours;
- 3) office responsible for preparation of TAFs, and periods of validity of the forecasts;
- 4) availability of the trend forecasts for the heliport, and interval of issuance;
- 5) information on how briefing and/or consultation is provided;

- 6) type of flight documentation supplied and language(s) used in flight documentation;
- 7) charts and other information displayed or available for briefing or consultation;
- 8) supplementary equipment available for providing information on meteorological conditions, e.g. weather radar and receiver for satellite images;
- 9) the air traffic services unit(s) provided with meteorological information; and
- 10) additional information (e.g. concerning any limitation of service, etc.).

****** AD 3.12 Heliport data**

Detailed description of heliport dimensions and related information, including:

- 1) heliport type — surface-level, elevated or helideck;
- 2) touchdown and lift-off (TLOF) area dimensions to the nearest metre or foot;
- 3) true bearings to one-hundredth of a degree of final approach and take-off (FATO) area;
- 4) dimensions to the nearest metre or foot of FATO, and surface type;
- 5) surface and bearing strength in tonnes (1 000 kg) of TLOF;
- 6) geographical coordinates in degrees, minutes, seconds and hundredths of seconds and geoid undulation (where appropriate) of the geometric centre of TLOF or of each threshold of FATO (where appropriate):
 - for non-precision approaches, to the nearest metre or foot; and
 - for precision approaches, to the nearest tenth of a metre or tenth of a foot;
- 7) TLOF and/or FATO slope and elevation:
 - for non-precision approaches, to the nearest metre or foot; and
 - for precision approaches, to the nearest tenth of a metre or tenth of a foot;
- 8) dimensions of safety area;
- 9) dimensions, to the nearest metre or foot, of helicopter clearway;
- 10) the existence of an obstacle-free sector; and
- 11) remarks.

****** AD 3.13 Declared distances**

Detailed description of declared distances to the nearest metre or foot, where relevant for a heliport. ~~, including:~~

Note: Where alternative reduced declared distances are authorised for use during the take-off these shall be listed in the table. Such listings shall clearly indicate the runway entry or start point in Remarks item 4.

The descriptions shall include:

- 1) take-off distance available;
- 2) rejected take-off distance available;
- 3) landing distance available; and
- 4) remarks.

****** AD 3.14 Approach and FATO lighting**

Detailed description of approach and FATO lighting, including:

- 1) type, length and intensity of approach lighting system;
- 2) type of visual approach slope indicator system;
- 3) characteristics and location of FATO area lights;
- 4) characteristics and location of aiming point lights;
- 5) characteristics and location of TLOF lighting system; and
- 6) remarks.

****** AD 3.15 Other lighting, secondary power supply**

Description of other lighting and secondary power supply, including:

- 1) location, characteristics and hours of operation of heliport beacon;
- 2) location and lighting of wind direction indicator (WDI);
- 3) taxiway edge and taxiway centre line lights;
- 4) secondary power supply including switch-over time; and
- 5) remarks.

****** AD 3.16 Air traffic services airspace**

Detailed description of air traffic services (ATS) airspace organized at the heliport, including:

- 1) airspace designation and geographical coordinates in degrees, minutes and seconds of the lateral limits;
- 2) vertical limits;
- 3) airspace classification;

- 4) call sign and language(s) of ATS unit providing service;
- 5) transition altitude; ~~and~~
- 6) hours of applicability (or activation); and
- 67) remarks.

****** AD 3.17 Air traffic services communication facilities**

Detailed description of air traffic services communication facilities established at the heliport, including:

- 1) service designation;
- 2) call sign;
- 3) frequency(ies);
- 4) hours of operation; and
- 5) remarks.

****** AD 3.18 Radio navigation and landing aids**

Detailed description of radio navigation and landing aids associated with the instrument approach and the terminal area procedures at the heliport, including:

- 1) type of aids, magnetic variation (for VOR, station declination used for technical line-up of the aid) to the nearest degree, and type of operation for ILS, MLS, basic GNSS, SBAS, and GBAS;
- 2) identification, if required;
- 3) frequency(ies), as appropriate;
- 4) hours of operation, as appropriate;
- 5) geographical coordinates in degrees, minutes, seconds and tenths of seconds of the position of the transmitting antenna, as appropriate;
- 6) elevation of the transmitting antenna of DME to the nearest 30 m (100 ft) and of DME/P to the nearest 3 m (10 ft); and
- 7) remarks.

When the same aid is used for both en-route and heliport purposes, a description must also be given in section ENR 4. If the ground-based augmentation system (GBAS) serves more than one heliport, description of the aid must be provided under each heliport. If the operating authority of the facility is other than the designated governmental agency, the name of the operating authority must be indicated in the remarks column. Facility coverage must be indicated in the remarks column.

****** AD 3.19 Local ~~traffic~~ heliport regulations**

Detailed description of regulations applicable to ~~the traffic at use of~~ the heliport, including ~~standard routes for taxiing~~

~~helicopters, parking regulations, school and training flights and similar~~ the acceptability of training flights, non-radio and microlight aircraft and similar, and to ground manoeuvring and parking but excluding flight procedures.

****** AD 3.20 Noise abatement procedures**

Detailed description of noise abatement procedures established at the heliport.

****** AD 3.21 Flight procedures**

Detailed description of the conditions and flight procedures, including radar and/or ADS-B procedures, established on the basis of airspace organization established at the heliport. When established, detailed description of the low visibility procedures at the heliport, including:

- 1) touchdown and lift-off (TLOF) area(s) and associated equipment authorized for use under low visibility procedures;
- 2) defined meteorological conditions under which initiation, use and termination of low visibility procedures would be made;
~~and~~
- 3) description of ground marking/lighting for use under low visibility procedures- ~~;and~~
- 4) ~~remarks.~~

****** AD 3.22 Additional information**

Additional information about the heliport, such as an indication of bird concentrations at the heliport together with an indication of significant daily movement between resting and feeding areas, to the extent practicable.

****** AD 3.23 Charts related to a heliport**

The requirement is for charts related to a heliport to be included in the following order:

- 1) Aerodrome/Heliport Chart — ICAO;
- 2) Area Chart — ICAO (departure and transit routes);
- 3) Standard Departure Chart — Instrument — ICAO;
- 4) Area Chart — ICAO (arrival and transit routes);
- 5) Standard Arrival Chart — Instrument — ICAO;
- 6) ATC Surveillance Minimum Altitude Chart — ICAO;
- 7) Instrument Approach Chart — ICAO (for each procedure type);
- 8) Visual Approach Chart — ICAO; and
- 9) bird concentrations in the vicinity of heliport.

If some of the charts are not produced, a statement to this effect must be given in section GEN 3.2, Aeronautical charts.

APPENDIX 2. SNOWTAM FORMAT

(see Chapter 5, 5.2.3)

| | | | | | | | | |
|-----------------------|---------------------------|--------------------------|---|---|----------------------|--------------------------|------------------|------|
| (COM heading) | (PRIORITY INDICATOR) | (ADDRESSES) | | | << ≡ | | | |
| | (DATE AND TIME OF FILING) | (ORIGINATOR'S INDICATOR) | | | << ≡ | | | |
| (Abbreviated heading) | (SWAA* SERIAL NUMBER) | | | | (LOCATION INDICATOR) | DATE-TIME OF OBSERVATION | (OPTIONAL GROUP) | <<≡(|
| | S | W | * | * | | | | |

| | | |
|---|-------------------|-------|
| SNOWTAM | (Serial number) → | |
| (AERODROME LOCATION INDICATOR) | A) | → |
| (DATE-TIME OF OBSERVATION (<i>Time of completion of measurement in UTC</i>)) | B) | → |
| (RUNWAY DESIGNATORS) | C) | → |
| (CLEARED RUNWAY LENGTH, IF LESS THAN PUBLISHED LENGTH (<i>m</i>)) | D) | → |
| (CLEARED RUNWAY WIDTH, IF LESS THAN PUBLISHED WIDTH (<i>m</i> ; if offset left or right of centre line add "L" or "R")) | E) | → |
| (DEPOSITS OVER TOTAL RUNWAY LENGTH (<i>Observed on each third of the runway, starting from threshold having the lower runway designation number</i>) NIL — CLEAR AND DRY 1 — DAMP 2 — WET or water patches 3 — RIME OR FROST COVERED (<i>depth normally less than 1 mm</i>) 4 — DRY SNOW 5 — WET SNOW 6 — SLUSH 7 — ICE 8 — COMPACTED OR ROLLED SNOW 9 — FROZEN RUTS OR RIDGES) | F) | → |
| (MEAN DEPTH (<i>mm</i>) FOR EACH THIRD OF TOTAL RUNWAY LENGTH) | G) | → |
| (FRICTION MEASUREMENTS ON EACH THIRD OF RUNWAY AND FRICTION MEASURING DEVICE MEASURED OR CALCULATED COEFFICIENT or ESTIMATED SURFACE FRICTION 0.40 and above GOOD — 5 0.39 to 0.36 MEDIUM/GOOD — 4 0.35 to 0.30 MEDIUM — 3 0.29 to 0.26 MEDIUM/POOR — 2 0.25 and below POOR — 1 9 — unreliable UNRELIABLE — 9 (<i>When quoting a measured coefficient, use the observed two figures, followed by the abbreviation of the friction measuring device used. When quoting an estimate, use single digit</i>) | H) | → |
| (CRITICAL SNOWBANKS (<i>If present, insert height (cm)/distance from the edge of runway (m) followed by "L", "R" or "LR" if applicable</i>)) | J) | → |
| (RUNWAY LIGHTS (<i>If obscured, insert "YES" followed by "L", "R" or both "LR" if applicable</i>)) | K) | → |
| (FURTHER CLEARANCE (<i>If planned, insert length (m)/width (m) to be cleared or if to full dimensions, insert "TOTAL"</i>)) | L) | → |
| (FURTHER CLEARANCE EXPECTED TO BE COMPLETED BY . . . (<i>UTC</i>)) | M) | → |
| (TAXIWAY (<i>If no appropriate taxiway is available, insert "NO"</i>)) | N) | → |
| (TAXIWAY SNOWBANKS (<i>If more than 60 cm, insert "YES" followed by distance apart, m</i>)) | P) | → |
| (APRON (<i>If unusable insert "NO"</i>)) | R) | → |
| (NEXT PLANNED OBSERVATION/MEASUREMENT IS FOR) (<i>month/day/hour in UTC</i>) | S) | → |
| (PLAIN-LANGUAGE REMARKS (<i>Including contaminant coverage and other operationally significant information, e.g. sanding, de-icing</i>)) | T) |) <<≡ |
| NOTES: 1. *Enter ICAO nationality letters as given in ICAO Doc 7910, Part 2. 2. Information on other runways, repeat from C to P. 3. Words in brackets () not to be transmitted. | | |

SIGNATURE OF ORIGINATOR (*not for transmission*)

INSTRUCTIONS FOR THE COMPLETION OF THE SNOWTAM FORMAT

1. *General*

- a) When reporting on two or three runways, repeat Items C to P inclusive.
- b) Items together with their indicator must be dropped completely, where no information is to be included.
- c) Metric units must be used and the unit of measurement not reported.
- d) The maximum validity of SNOWTAM is 24 hours. New SNOWTAM must be issued whenever there is a significant change in conditions. The following changes relating to runway conditions are considered as significant:
 - 1) a change in the coefficient of friction of about 0.05;
 - 2) changes in depth of deposit greater than the following: 20 mm for dry snow, 10 mm for wet snow, 3 mm for slush;
 - 3) a change in the available length or width of a runway of 10 per cent or more;
 - 4) any change in the type of deposit or extent of coverage which requires reclassification in Items F or T of the SNOWTAM;
 - 5) when critical snow banks exist on one or both sides of the runway, any change in the height or distance from centre line;
 - 6) any change in the conspicuity of runway lighting caused by obscuring of the lights;
 - 7) any other conditions known to be significant according to experience or local circumstances.
- e) The abbreviated heading “TTAAiiii CCCC MMYGGg (BBB)” is included to facilitate the automatic processing of SNOWTAM messages in computer data banks. The explanation of these symbols is:

TT = data designator for SNOWTAM = SW;

AA = geographical designator for States, e.g. LF = FRANCE, EG = United Kingdom (see *Location Indicators* (Doc 7910), Part 2, Index to Nationality Letters for Location Indicators);

iiii = SNOWTAM serial number in a four-figure group;

CCCC = four-letter location indicator of the aerodrome to which the SNOWTAM refers (see *Location Indicators* (Doc 7910));

MMYYGGg = date/time of observation/measurement, whereby:

MM = month, e.g. January = 01,

December = 12

YY = day of the month

GGg = time in hours (GG) and

minutes (g) UTC;

(BBB) = optional group for:

Correction to SNOWTAM message previously disseminated with the same serial number = COR.

Note.— Brackets in (BBB) are used to indicate that this group is optional.

Example: Abbreviated heading of SNOWTAM No. 149 from Zurich, measurement/observation of 7 November at 0620 UTC:

SWLS0149 LSZH 11070620

2. *Item A* — Aerodrome location indicator (four-letter location indicator).
3. *Item B* — Eight-figure date/time group — giving time of observation as month, day, hour and minute in UTC; this item must always be completed.
4. *Item C* — Lower runway designator number.
5. *Item D* — Cleared runway length in metres, if less than published length (see Item T on reporting on part of runway not cleared).
6. *Item E* — Cleared runway width in metres, if less than published width; if offset left or right of centre line, add “L” or “R”, as viewed from the threshold having the lower runway designation number.
7. *Item F* — Deposit over total runway length as explained in SNOWTAM Format. Suitable combinations of these numbers may be used to indicate varying conditions over runway segments. If more than one deposit is present on the same portion of the runway, they should be reported in sequence from the top to the bottom. Drifts, depths of deposit appreciably greater than the average values or other significant characteristics of the deposits may be reported under Item T in plain language.

Note.— *Definitions for the various types of snow are given at the end of this Appendix.*

8. *Item G* — Mean depth in millimetres deposit for each third of total runway length, or “XX” if not measurable or operationally not significant; the assessment to be made to an accuracy of 20 mm for dry snow, 10 mm for wet snow and 3 mm for slush.
9. *Item H* — Friction measurements on each third of the runway and friction measuring device. Measured or calculated coefficient (two digits) or, if not available, estimated surface friction (single digit) in the order from the threshold having the lower runway designation number. Insert a code 9 when surface conditions or available friction measuring device do not permit a reliable surface friction measurement to be made. Use the following abbreviations to indicate the type of friction measuring device used:

| | |
|-----|--|
| BRD | Brakemeter-Dynamometer |
| GRT | Grip tester |
| MUM | Mu-meter |
| RFT | Runway friction tester |
| SFH | Surface friction tester (high-pressure tire) |
| SFL | Surface friction tester (low-pressure tire) |
| SKH | Skiddometer (high-pressure tire) |
| SKL | Skiddometer (low-pressure tire) |
| TAP | Tapley meter |

If other equipment is used, specify in plain language.

10. *Item J* — Critical snowbanks. If present insert height in centimetres and distance from edge of runway in metres, followed by left (“L”) or right (“R”) side or both sides (“LR”), as viewed from the threshold having the lower runway designation number.

11. *Item K* — If runway lights are obscured, insert “YES” followed by “L”, “R” or both “LR”, as viewed from the threshold having the lower runway designation number.
12. *Item L* — When further clearance will be undertaken, enter length and width of runway or “TOTAL” if runway will be cleared to full dimensions.
13. *Item M* — Enter the anticipated time of completion in UTC.
14. *Item N* — The code for Item F may be used to describe taxiway conditions; enter “NO” if no taxiways serving the associated runway are available.
15. *Item P* — If applicable, enter “YES” followed by the lateral distance in metres.
16. *Item R* — The code for Item F may be used to describe apron conditions; enter “NO” if the apron is unusable.
17. *Item S* — Enter the anticipated time of next observation/measurement in UTC.
18. *Item T* — Describe in plain language any operationally significant information but always report on length of uncleared runway (Item D) and extent of runway contamination (Item F) for each third of the runway (if appropriate) in accordance with the following scale:

Runway contamination — 10% — if less than 10% of runway contaminated

Runway contamination — 25% — if 11–25% of runway contaminated

Runway contamination — 50% — if 26–50% of runway contaminated

Runway contamination — 100% — if 51–100% of runway contaminated.

EXAMPLE OF COMPLETED SNOWTAM FORMAT

GG EHAMZQZX EDDFZQZX EKCHZQZX

070645 LSZHNYX

SWLS0149 LSZH 11070620

(SNOWTAM 0149

A) LSZH B) 11070620 C) 02 D) ... P)

C) 09 D) ... P)

C) 12 D) ... P)

R) NO S) 11070920 T) DEICING)

Definitions of the various types of snow

Slush. Water-saturated snow which with a heel-and-toe slap-down motion against the ground will be displaced with a splatter; specific gravity: 0.5 up to 0.8.

Note.— Combinations of ice, snow and/or standing water may, especially when rain, rain and snow, or snow is falling, produce substances with specific gravities in excess of 0.8. These substances, due to their high water/ice content, will have a transparent rather than a cloudy appearance and, at the higher specific gravities, will be readily distinguishable from slush.

Snow (on the ground).

- a) *Dry snow.* Snow which can be blown if loose or, if compacted by hand, will fall apart again upon release; specific

- gravity: up to but not including 0.35.
- b) *Wet snow*. Snow which, if compacted by hand, will stick together and tend to or form a snowball; specific gravity: 0.35 up to but not including 0.5.
 - c) *Compacted snow*. Snow which has been compressed into a solid mass that resists further compression and will hold together or break up into lumps if picked up; specific gravity: 0.5 and over.
-

APPENDIX 3. ASHTAM FORMAT

(see Chapter 5, 5.2.4)

| | | | | | | | | | | | | | | |
|-----------------------|----------------------------------|---------------------------------------|----|----|--|--------------------------|--|--|-----------------------|--|--|------------------|--|--|
| (COM heading) | (PRIORITY INDICATOR) | (ADDRESSEE INDICATOR(S)) ¹ | | | | | | | | | | | | |
| | (DATE AND TIME OF FILING) | | | | | (ORIGINATOR'S INDICATOR) | | | | | | | | |
| (Abbreviated heading) | (VA* ² SERIAL NUMBER) | | | | | (LOCATION INDICATOR) | | | DATE/TIME OF ISSUANCE | | | (OPTIONAL GROUP) | | |
| | V | A | *2 | *2 | | | | | | | | | | |

| | |
|---|-----------------|
| ASHTAM | (SERIAL NUMBER) |
| (FLIGHT INFORMATION REGION AFFECTED) | A) |
| (DATE/TIME (UTC) OF ERUPTION) | B) |
| (VOLCANO NAME AND NUMBER) | C) |
| (VOLCANO LATITUDE/LONGITUDE OR VOLCANO RADIAL AND DISTANCE FROM NAVAID) | D) |
| (VOLCANO LEVEL OF ALERT COLOUR CODE, INCLUDING ANY PRIOR LEVEL OF ALERT COLOUR CODE) ³ | E) |
| (EXISTENCE AND HORIZONTAL/VERTICAL EXTENT OF VOLCANIC ASH CLOUD) ⁴ | F) |
| (DIRECTION OF MOVEMENT OF ASH CLOUD) ⁴ | G) |
| (AIR ROUTES OR PORTIONS OF AIR ROUTES AND FLIGHT LEVELS AFFECTED) | H) |
| (CLOSURE OF AIRSPACE AND/OR AIR ROUTES OR PORTIONS OF AIR ROUTES, AND ALTERNATIVE AIR ROUTES AVAILABLE) | I) |
| (SOURCE OF INFORMATION) | J) |
| (PLAIN-LANGUAGE REMARKS) | K) |
| <p>NOTES:</p> <ol style="list-style-type: none"> 1. See also Appendix 5 regarding addressee indicators used in predetermined distribution systems. 2. *Enter ICAO nationality letter as given in ICAO Doc 7910, Part 2. 3. See paragraph 3.5 below. 4. Advice on the existence, extent and movement of volcanic ash cloud G) and H) may be obtained from the Volcanic Ash Advisory Centre(s) responsible for the FIR concerned. 5. Item titles in brackets () not to be transmitted. | |

SIGNATURE OF ORIGINATOR (not for transmission)

INSTRUCTIONS FOR THE COMPLETION OF THE ASHTAM FORMAT

1. *General*

1.1 The ASHTAM provides information on the status of activity of a volcano when a change in its activity is, or is expected to be of operational significance. This information is provided using the volcano level of alert colour code given in 3.5 below.

1.2 In the event of a volcanic eruption producing ash cloud of operational significance, the ASHTAM also provides information on the location, extent and movement of the ash cloud and the air routes and flight levels affected.

1.3 Issuance of an ASHTAM giving information on a volcanic eruption, in accordance with section 3 below, should **not** be delayed until complete information A) to K) is available but should be issued immediately following receipt of notification that an eruption has occurred or is expected to occur, or a change in the status of activity of a volcano of operational significance has occurred or is expected to occur, or an ash cloud is reported. In the case of an expected eruption, and hence no ash cloud evident at that time, items A) to E) should be completed and items F) to I) indicated as “not applicable”. Similarly, if a volcanic ash cloud is reported, e.g. by special air-report, but the source volcano is not known at that time, the ASHTAM should be issued initially with items A) to E) indicated as “unknown”, and items F) to K) completed, as necessary, based on the special air-report, pending receipt of further information. In other circumstances, if information for a specific field A) to K) is not available indicate “NIL”.

1.4 The maximum period of validity of ASHTAM is 24 hours. New ASHTAM must be issued whenever there is a change in the level of alert.

2. *Abbreviated heading*

2.1 Following the usual AFTN communications header, the abbreviated heading “TT AAiiii CCCC MMYGGg (BBB)” is included to facilitate the automatic processing of ASHTAM messages in computer data banks. The explanation of these symbols is:

TT = data designator for ASHTAM = VA;

AA = geographical designator for States, e.g. NZ = New Zealand (see *Location Indicators* (Doc 7910), Part 2, Index to Nationality Letters for Location Indicators);

iiii = ASHTAM serial number in a four-figure group;

CCCC = four-letter location indicator of the flight information region concerned (see *Location Indicators* (Doc 7910), Part 5, addresses of centres in charge of FIR/UIR);

MMYYGGg = date/time of report, whereby:

MM = month, e.g. January = 01, December = 12

YY = day of the month

GGg = time in hours (GG) and minutes (g) UTC;

(BBB) = Optional group for correction to an ASHTAM message previously disseminated with the same serial number = COR.

Note.— Brackets in (BBB) are used to indicate that this group is optional.

Example: Abbreviated heading of ASHTAM for Auckland Oceanic FIR, report on 7 November at 0620 UTC:

VANZ0001 NZZO 11070620

3. Content of ASHTAM

3.1 *Item A* — Flight information region affected, plain-language equivalent of the location indicator given in the abbreviated heading, in this example “Auckland Oceanic FIR”.

3.2 *Item B* — Date and time (UTC) of first eruption.

3.3 *Item C* — Name of volcano, and number of volcano as listed in the ICAO *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (Doc 9691), Appendix H, and on the World Map of Volcanoes and Principal Aeronautical Features.

3.4 *Item D* — Latitude/Longitude of the volcano in whole degrees or radial and distance of volcano from NAVAID (as listed in the ICAO *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (Doc 9691), Appendix H, and on the World Map of Volcanoes and Principal Aeronautical Features).

3.5 *Item E* — Colour code for level of alert indicating volcanic activity, including any previous level of alert colour code as follows:

| Level of alert colour code | Status of activity of volcano |
|----------------------------|---|
| GREEN ALERT | Volcano is in normal, non-eruptive state. <i>or, after a change from a higher alert level:</i> Volcanic activity considered to have ceased, and volcano reverted to its normal, non-eruptive state. |
| YELLOW ALERT | Volcano is experiencing signs of elevated unrest above known background levels. <i>or, after a change from higher alert level:</i> Volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase. |
| ORANGE ALERT | Volcano is exhibiting heightened unrest with increased likelihood of eruption. <i>or,</i> Volcanic eruption is underway with no or minor ash emission [<i>specify ash-plume height if possible</i>]. |
| RED ALERT | Eruption is forecasted to be imminent with significant emission of ash into the atmosphere likely. <i>or,</i> Eruption is underway with significant emission of ash into the atmosphere [<i>specify ash-plume height if possible</i>]. |

Note.— The colour code for the level of alert indicating the status of activity of the volcano and any change from a previous status of activity should be provided to the area control centre by the responsible vulcanological agency in the State concerned, e.g. “RED ALERT FOLLOWING YELLOW” OR “GREEN ALERT FOLLOWING ORANGE”.

3.6 *Item F* — If volcanic ash cloud of operational significance is reported, indicate the horizontal extent and base/top of the ash cloud using latitude/longitude (in whole degrees) and altitudes in thousands of metres (feet) and/or radial and distance from source volcano. Information initially may be based only on special air-report, but subsequent information may be more detailed based on advice from the responsible meteorological watch office and/or volcanic ash advisory centre.

3.7 *Item G* — Indicate forecast direction of movement of the ash cloud at selected levels based on advice from the responsible meteorological watch office and/or volcanic ash advisory centre.

3.8 *Item H* — Indicate air routes and portions of air routes and flight levels affected, or expected to become affected.

3.9 *Item I* — Indicate closure of airspace, air routes or portions of air routes, and availability of alternative routes.

3.10 *Item J* — Source of the information, e.g. “special air-report” or “vulcanological agency”, etc. The source of information should always be indicated, whether an eruption has actually occurred or ash cloud reported, or not.

3.11 *Item K* — Include in plain language any operationally significant information additional to the foregoing.

APPENDIX 4. INFORMATION TO BE NOTIFIED BY AIRAC

(see Chapter 6, 6.1.1)

PART 1

1. The establishment and withdrawal of, and premeditated significant changes (including operational trials) to:

1.1 Limits (horizontal and vertical), regulations and procedures applicable to:

- a) flight information regions;
- b) control areas;
- c) control zones;
- d) advisory areas;
- e) ATS routes;
- f) permanent danger, prohibited and restricted areas (including type and periods of activity when known) and ADIZ;
- g) permanent areas or routes or portions thereof where the possibility of interception exists.

1.2 Positions, frequencies, call signs, identifiers, known irregularities and maintenance periods of radio navigation aids, and communication and surveillance facilities.

1.3 Holding and approach procedures, arrival and departure procedures, noise abatement procedures and any other pertinent ATS procedures.

1.4 Transition levels, transition altitudes and minimum sector altitudes.

1.5 Meteorological facilities (including broadcasts) and procedures.

1.6 Runways and stopways.

1.7 Taxiways and aprons.

1.8 Aerodrome ground operating procedures (including low visibility procedures).

1.9 Approach and runway lighting.

1.10 Aerodrome operating minima if published by a State.

PART 2

2. The establishment and withdrawal of, and premeditated significant changes to:
 - 2.1 Position, height and lighting of navigational obstacles.
 - 2.2 Hours of service of aerodromes, facilities and services.
 - 2.3 Customs, immigration and health services.
 - 2.4 Temporary danger, prohibited and restricted areas and navigational hazards, military exercises and mass movements of aircraft.
 - 2.5 Temporary areas or routes or portions thereof where the possibility of interception exists.

PART 3

3. The establishment of, and premeditated major changes to:
 - 3.1 New aerodromes for international IFR operations.
 - 3.2 New runways for IFR operations at international aerodromes.
 - 3.3 Design and structure of the air traffic services route network.
 - 3.4 Design and structure of a set of terminal procedures (including change of procedure bearings due to magnetic variation change).
 - 3.5 Circumstances listed in Part 1 if the entire State or any significant portion thereof is affected or if cross-border coordination is required.
-

APPENDIX 5. PREDETERMINED DISTRIBUTION SYSTEM FOR NOTAM

(see Chapter 5, 5.3.4.2 and Annex 10, Volume II, Chapter 4, 4.4.14)

1. The predetermined distribution system provides for incoming NOTAM (including SNOWTAM and ASHTAM) to be channelled through the AFTN direct to designated addressees predetermined by the receiving country concerned while concurrently being routed to the international NOTAM office for checking and control purposes.

2. The addressee indicators for those designated addressees are constituted as follows:

1) *First and second letters:*

The first two letters of the location indicator for the AFTN communication centre associated with the relevant international NOTAM office of the receiving country.

2) *Third and fourth letters:*

The letters “ZZ” indicating a requirement for special distribution.

3) *Fifth letter:*

The fifth letter differentiating between NOTAM (letter “N”), SNOWTAM (letter “S”), and ASHTAM (letter “V”).

4) *Sixth and seventh letters:*

The sixth and seventh letters, each taken from the series A to Z and denoting the national and/or international distribution list(s) to be used by the receiving AFTN centre.

Note.— The fifth, sixth and seventh letters replace the three-letter designator YNY which, in the normal distribution system, denotes an international NOTAM office.

5) *Eighth letter:*

The eighth position letter shall be the filler letter “X” to complete the eight-letter addressee indicator.

3. States are to inform the States from which they receive NOTAM of the sixth and seventh letters to be used under different circumstances to ensure proper routing.

APPENDIX 6. NOTAM FORMAT

(see Chapter 5, 5.2.1)

| | | | | | | | | | | | | |
|---|---|------------|---------|---------|-------|-------------|-------------|---------------------|--|---------------|-----|-----|
| Priority Indicator | | | | | | | | | | | → | |
| Address | | | | | | | | | | | | |
| | | | | | | | | | | | ≡ | |
| Date and time of filing | | | | | | | | | | | → | |
| Originator's Indicator | | | | | | | | | | | ≡ (| |
| Message Series, Number and Identifier | | | | | | | | | | | | |
| NOTAM containing new information | NOTAMN (series and number/year) | | | | | | | | | | | |
| NOTAM replacing a previous NOTAM | NOTAMR..... (series and number/year) (series and number/year of NOTAM to be replaced) | | | | | | | | | | | |
| NOTAM cancelling a previous NOTAM | NOTAMC..... (series and number/year) (series and number/year of NOTAM to be cancelled) | | | | | | | | | ≡ | | |
| Qualifiers | | | | | | | | | | | | |
| | FIR | NOTAM Code | Traffic | Purpose | Scope | Lower Limit | Upper Limit | Coordinates, Radius | | | | |
| Q) | | | | | | | | | | | ≡ | |
| Identification of ICAO location indicator in which the facility, airspace or condition reported on is located | | | | | | | | A) | | | | → |
| Period of Validity | | | | | | | | | | | | |
| From (date-time group) | | | | B) | | | | | | | → | |
| To (PERM or date-time group) | | | | C) | | | | | | EST* PERM* | ≡ | |
| Time Schedule (if applicable) | | | | D) | | | | | | | → | |
| | | | | | | | | | | | ≡ | |
| Text of NOTAM; Plain-language Entry (using ICAO Abbreviations) | | | | | | | | | | | | |
| E) | | | | | | | | | | | ≡ | |
| Lower Limit | | | | F) | | | | | | | | → |
| Upper Limit | | | | G) | | | | | | | |) ≡ |
| Signature | | | | | | | | | | | | |

*Delete as appropriate

INSTRUCTIONS FOR THE COMPLETION OF THE NOTAM FORMAT

1. General

The qualifier line (Item Q) and all identifiers (Items A) to G) inclusive) each followed by a closing parenthesis, as shown in the format, shall be transmitted unless there is no entry to be made against a particular identifier.

2. NOTAM numbering

Each NOTAM shall be allocated a series identified by a letter and a four-digit number followed by a stroke and a two-digit number for the year (e.g. A0023/03). Each series shall start on 1 January with number 0001.

3. Qualifiers (Item Q)

Item Q) is divided in eight fields, each separated by a stroke. An entry shall be made in each field. Examples of how fields are to be filled are shown in the *Aeronautical Information Services Manual* (Doc 8126). The definition of the field is as follows:

1) FIR

- a) If the subject of the information is located geographically within one FIR, the ICAO location indicator shall be that of the FIR concerned. When an aerodrome is situated within the overlying FIR of another State, the first field of Item Q) shall contain the code for that overlying FIR (e.g. Q) LFRR/...A) EGJJ);

or,

if the subject of the information is located geographically within more than one FIR, the FIR field shall be composed of the ICAO nationality letters of the State originating the NOTAM followed by “XX”. (The location indicator of the overlying UIR shall not be used). The ICAO location indicators of the FIRs concerned shall then be listed in Item A) or indicator of State or non-governmental agency which is responsible for provision of a navigation service in more than one State.

- b) If one State issues a NOTAM affecting FIRs in a group of States, the first two letters of the ICAO location indicator of the issuing State plus “XX” shall be included. The location indicators of the FIRs concerned shall then be listed in Item A) or indicator of State or non-governmental agency which is responsible for provision of a navigation service in more than one State.

2) NOTAM CODE

All NOTAM Code groups contain a total of five letters and the first letter is always the letter Q. The second and third letters identify the subject, and the fourth and fifth letters denote the status or condition of the subject reported upon. The two-letter codes for subjects and conditions are those contained in the PANS-ABC (Doc 8400). For combinations of second and third, and fourth and fifth letters, refer to the NOTAM Selection Criteria contained in Doc 8126 or insert one of the following combinations, as appropriate:

- a) If the subject is not listed in the NOTAM Code (Doc 8400) or in the NOTAM Selection Criteria (Doc 8126), insert “XX” as the second and third letters (e.g. QXXAK);
- b) If the condition of the subject is not listed in the NOTAM Code (Doc 8400) or in the NOTAM Selection Criteria (Doc 8126), insert “XX” as the fourth and fifth letters (e.g. QFAXX);

- c) When a NOTAM containing operationally significant information is issued in accordance with Appendix 4 and Chapter 6 and when it is used to announce the existence of AIRAC AIP Amendments or Supplements, insert “TT” as the fourth and fifth letters of the NOTAM Code;
- d) When a NOTAM is issued containing a checklist of valid NOTAM, insert “KKKK” as the second, third, fourth and fifth letters; and
- e) The following fourth and fifth letters of the NOTAM Code shall be used in NOTAM cancellations:

AK = RESUMED NORMAL OPERATION
 AL = OPERATIVE (OR RE-OPERATIVE) SUBJECT TO PREVIOUSLY PUBLISHED
 LIMITATIONS/CONDITIONS
 AO = OPERATIONAL
 CC = COMPLETED
 CN = CANCELLED
 HV = WORK COMPLETED
 XX = PLAIN LANGUAGE

3) TRAFFIC

I = IFR
 V = VFR
 K = NOTAM is a checklist

Note.— Depending on the NOTAM subject and content, the qualifier field TRAFFIC may contain combined qualifiers. Guidance concerning the combination of TRAFFIC qualifiers with subject and conditions in accordance with the NOTAM Selection Criteria is contained in Doc 8126.

4) PURPOSE

N = NOTAM selected for the immediate attention of aircraft operators
 B = NOTAM selected for PIB entry
 O = NOTAM concerning flight operations
 M = Miscellaneous NOTAM; not subject for a briefing, but it is available on request
 K = NOTAM is a checklist

Note.— Depending on the NOTAM subject and content, the qualifier field PURPOSE may contain the combined qualifiers BO or NBO. Guidance concerning the combination of PURPOSE qualifiers with subject and conditions in accordance with the NOTAM Selection Criteria is contained in Doc 8126.

5) SCOPE

A = Aerodrome
 E = En-route
 W = Nav Warning
 K = NOTAM is a checklist

Note.— Depending on the NOTAM subject and content, the qualifier field SCOPE may contain combined qualifiers. Guidance concerning the combination of SCOPE qualifiers with subject and conditions in accordance with the NOTAM Selection Criteria is contained in Doc 8126. If the subject is qualified AE, the aerodrome location indicator must be reported in Item A).

6) and 7) LOWER/UPPER

LOWER and UPPER limits shall only be expressed in flight levels (FL) and shall express the actual vertical limits of the area of influence without the addition of buffers. In the case of navigation warnings and airspace restrictions, values entered shall be consistent with those provided under Items F) and G).

If the subject does not contain specific height information, insert “000” for LOWER and “999” for UPPER as default values.

8) COORDINATES, RADIUS

The latitude and longitude accurate to one minute, as well as a three-digit distance figure giving the radius of influence in NM (e.g. 4700N01140E043). Coordinates present approximate centre of circle whose radius encompasses the whole area of influence, and if the NOTAM affects the entire FIR/UIR or more than one FIR/UIR, enter the default value “999” for radius.

4. Item A)

Insert the location indicator as contained in ICAO Doc 7910 of the aerodrome or FIR in which the facility, airspace, or condition being reported on is located. More than one FIR/UIR may be indicated when appropriate. If there is no available ICAO location indicator, use the ICAO nationality letter as given in ICAO Doc 7910, Part 2, plus “XX” and followed up in Item E) by the name, in plain language.

If information concerns GNSS, insert the appropriate ICAO location indicator allocated for a GNSS element or the common location indicator allocated for all elements of GNSS (except GBAS).

Note.— In the case of GNSS, the location indicator may be used when identifying a GNSS element outage (e.g. KNMH for a GPS satellite outage).

5. Item B)

For date-time group use a ten-figure group, giving year, month, day, hours and minutes in UTC. This entry is the date-time at which the NOTAMN comes into force. In the cases of NOTAMR and NOTAMC, the date-time group is the actual date and time of the NOTAM origination. The start of a day shall be indicated by “0000”.

6. Item C)

With the exception of NOTAMC, a date-time group (a ten-figure group giving year, month, day, hours and minutes in UTC) indicating duration of information shall be used unless the information is of a permanent nature in which case the abbreviation “PERM” is inserted instead. The end of a day shall be indicated by “2359” (i.e. do not use “2400”). If the information on timing is uncertain, the approximate duration shall be indicated using a date-time group followed by the abbreviation “EST”. Any NOTAM which includes an “EST” shall be cancelled or replaced before the date-time specified in Item C).

7. Item D)

If the hazard, status of operation or condition of facilities being reported on will be active in accordance with a specific time and date schedule between the dates-times indicated in Items B) and C), insert such information under Item D). If Item D) exceeds 200 characters, consideration shall be given to providing such information in a separate, consecutive NOTAM.

Note.— Guidance concerning a harmonized definition of Item D) content is provided in Doc 8126.

8. Item E)

Use decoded NOTAM Code, complemented where necessary by ICAO abbreviations, indicators, identifiers, designators, call signs, frequencies, figures and plain language. When NOTAM is selected for international distribution, English text shall be included for those parts expressed in plain language. This entry shall be clear and concise in order to provide a suitable PIB entry. In the case of NOTAMC, a subject reference and status message shall be included to enable accurate plausibility checks.

9. Items F) and G)

These items are normally applicable to navigation warnings or airspace restrictions and are usually part of the PIB entry. Insert both lower and upper height limits of activities or restrictions, clearly indicating only one reference datum and unit of measurement. The abbreviations GND or SFC shall be used in Item F) to designate ground and surface respectively. The abbreviation UNL shall be used in Item G) to designate unlimited.

Note.— For NOTAM examples see Doc 8126 and the PANS-ABC (Doc 8400).

APPENDIX 7. AERONAUTICAL DATA QUALITY REQUIREMENTS

Table A7-1. Latitude and longitude

| Latitude and longitude | Publication resolution | Integrity Classification |
|--|------------------------|---------------------------------|
| Flight information region boundary points | 1 min | 1×10^{-3} routine |
| P, R, D area boundary points (outside CTA/CTR boundaries) | 1 min | 1×10^{-3} routine |
| P, R, D area boundary points (inside CTA/CTR boundaries)..... | 1 sec | 1×10^{-5} essential |
| CTA/CTR boundary points..... | 1 sec | 1×10^{-5} essential |
| En-route NAVAIDS, intersections and waypoints, and holding, and STAR/SID points | 1 sec | 1×10^{-5} essential |
| Obstacles in Area 1 (the entire State territory) | 1 sec | 1×10^{-3} routine |
| Aerodrome/heliport reference point | 1 sec | 1×10^{-3} routine |
| NAVAIDS located at the aerodrome/heliport..... | 1/10 sec | 1×10^{-5} essential |
| Obstacles in Area 3..... | 1/10 sec | 1×10^{-5} essential |
| Obstacles in Area 2..... | 1/10 sec | 1×10^{-5} essential |
| Final approach fixes/points and other essential fixes/points comprising the instrument approach procedure..... | 1/10 sec | 1×10^{-5} essential |
| Runway threshold..... | 1/100 sec | 1×10^{-8} critical |
| Runway end | 1/100 sec | 1×10^{-8} critical |
| Runway holding position | 1/100 sec | 1×10^{-8} critical |
| Taxiway centre line/parking guidance line points..... | 1/100 sec | 1×10^{-5} essential |
| Taxiway intersection marking line | 1/100 sec | 1×10^{-5} essential |

| | Publication resolution | Integrity Classification |
|--|------------------------|---------------------------------|
| Latitude and longitude | | |
| Exit guidance line | 1/100 sec | 1×10^{-5} essential |
| Aircraft stand points/INS checkpoints | 1/100 sec | 1×10^{-3} routine |
| Geometric centre of TLOF or FATO thresholds, heliports | 1/100 sec | 1×10^{-8} critical |
| Apron boundaries (polygon) | 1/10 sec | 1×10^{-3} routine |
| De-icing/anti-icing facility (polygon)..... | 1/10 sec | 1×10^{-3} routine |

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

Table A7-2. Elevation/altitude/height

| Elevation/altitude/height | Publication resolution | Integrity Classification |
|--|--|--|
| Aerodrome/heliport elevation | 1 m or 1 ft | 1×10^{-5} essential |
| WGS-84 geoid undulation at aerodrome/heliport elevation position | 1 m or 1 ft | 1×10^{-5} essential |
| Runway or FATO threshold, non-precision approaches | 1 m or 1 ft | 1×10^{-5} essential |
| WGS-84 geoid undulation at runway or FATO threshold, TLOF geometric centre, non-precision approaches | 1 m or 1 ft | 1×10^{-5} essential |
| Runway or FATO threshold, precision approaches..... | 0.1 m or 0.1 ft | 1×10^{-8} critical |
| WGS-84 geoid undulation at runway or FATO threshold, TLOF geometric centre, precision approaches | 0.1 m or 0.1 ft | 1×10^{-8} critical |
| Threshold crossing height (Reference Datum Height), precision approaches..... | 0.1 m or 0.1 ft | 1×10^{-8} critical |
| Obstacle clearance altitude/height (OCA/H) | as specified in PANS-OPS (Doc 8168) | 1×10^{-5} essential |
| Obstacles in Area 2..... | 1 m or 1 ft | 1×10^{-5} essential |
| Obstacles in Area 3..... | 0.1 m or 0.1 ft | 1×10^{-5} essential |

| Elevation/altitude/height | Publication resolution | Integrity Classification |
|--|---|---------------------------------|
| Obstacles in Area 1 (the entire State territory) | 1 m or 1 ft | 1×10^{-3} routine |
| Distance measuring equipment/precision (DME/P) | 3 m (10 ft) | 1×10^{-5} essential |
| Distance measuring equipment (DME)..... | 30 m (100 ft) | 1×10^{-5} essential |
| Instrument approach procedures altitude | as specified in PANS-OPS (Doc 8168) | 1×10^{-5} essential |
| Minimum altitudes..... | 50 m or 100 ft | 1×10^{-3} routine |

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

Table A7-3. Declination and magnetic variation

| Declination/variation | Publication resolution | Integrity Classification |
|---|------------------------|---------------------------------|
| VHF NAVAID station declination used for technical line-up | 1 degree | 1×10^{-5} essential |
| NDB NAVAID magnetic variation | 1 degree | 1×10^{-3} routine |
| Aerodrome/heliport magnetic variation | 1 degree | 1×10^{-5} essential |
| ILS localizer antenna magnetic variation..... | 1 degree | 1×10^{-5} essential |
| MLS azimuth antenna magnetic variation | 1 degree | 1×10^{-5} essential |

Table A7-4. Bearing

| Bearing | Publication resolution | Integrity Classification |
|---|------------------------|-------------------------------|
| Airway segments | 1 degree | 1×10^{-3} routine |
| En-route and terminal fix formations | 1/10 degree | 1×10^{-3} routine |
| Terminal arrival/departure route segments | 1 degree | 1×10^{-3} routine |

| Bearing | Publication resolution | Integrity Classification |
|---|------------------------|-----------------------------------|
| Instrument approach procedure fix formations..... | 1/100 degree | 1 × 10 ⁻⁵ essential |
| ILS localizer alignment (True)..... | 1/100 degree | 1 × 10 ⁻⁵ essential |
| MLS zero azimuth alignment (True)..... | 1/100 degree | 1 × 10 ⁻⁵ essential |
| Runway and FATO bearing (True) | 1/100 degree | 1 × 10 ⁻³ routine |

Table A7-5. Length/distance/dimension

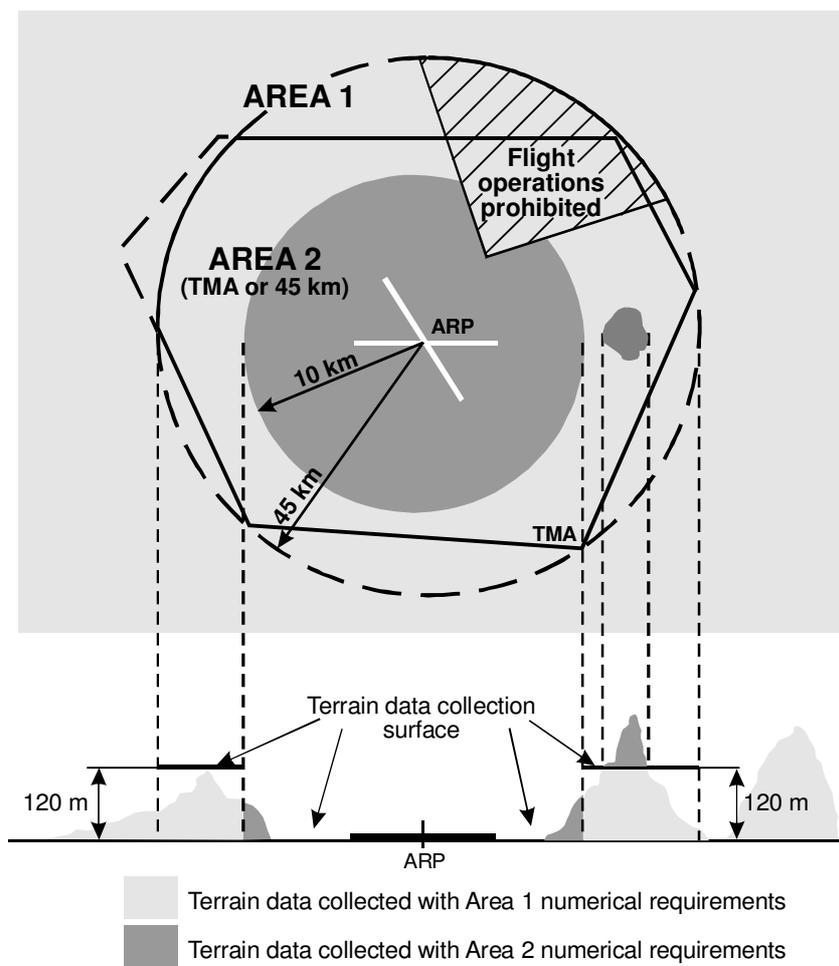
| Length/distance/dimension | Publication resolution | Integrity Classification |
|---|---|-----------------------------------|
| Airway segment length..... | 1/10 km or 1/10 NM | 1 × 10 ⁻³ routine |
| En-route fix formation distance | 1/10 km or 1/10 NM | 1 × 10 ⁻³ routine |
| Terminal arrival/departure route segment length | 1/100 km or 1/100 NM 1 km or 1 NM | 1 × 10 ⁻⁵ essential |
| Terminal and instrument approach procedure fix formation distance | 1/100 km or 1/100 NM | 1 × 10 ⁻⁵ essential |
| Runway and FATO length, TLOF dimensions..... | 1 m or 1 ft | 1 × 10 ⁻⁸ critical |
| Runway width..... | 1 m or 1 ft | 1 × 10 ⁻⁵ essential |
| Displaced threshold distance..... | 1 m or 1 ft | 1 × 10 ⁻³ routine |
| Clearway length and width..... | 1 m or 1 ft | 1 × 10 ⁻⁵ essential |
| Stopway length and width..... | 1 m or 1 ft | 1 × 10 ⁻⁸ critical |
| Landing distance available..... | 1 m or 1 ft | 1 × 10 ⁻⁸ critical |
| Take-off run available | 1 m or 1 ft | 1 × 10 ⁻⁸ critical |
| Take-off distance available | 1 m or 1 ft | 1 × 10 ⁻⁸ critical |
| Accelerate-stop distance available..... | 1 m or 1 ft | 1 × 10 ⁻⁸ critical |

| Length/distance/dimension | Publication resolution | Integrity Classification |
|--|------------------------|-----------------------------------|
| Runway shoulder width..... | 1 m or 1 ft | 1 × 10 ⁻⁵ essential |
| Taxiway width | 1 m or 1 ft | 1 × 10 ⁻⁵ essential |
| Taxiway shoulder width..... | 1 m or 1 ft | 1 × 10 ⁻⁵ essential |
| ILS localizer antenna-runway end, distance | 1 m or 1 ft | 1 × 10 ⁻³ routine |
| ILS glide slope antenna-threshold, distance along centre line..... | 1 m or 1 ft | 1 × 10 ⁻³ routine |
| ILS marker-threshold distance..... | 1 m or 1 ft | 1 × 10 ⁻⁵ essential |
| ILS DME antenna-threshold, distance along centre line..... | 1 m or 1 ft | 1 × 10 ⁻⁵ essential |
| MLS azimuth antenna-runway end, distance..... | 1 m or 1 ft | 1 × 10 ⁻³ routine |
| MLS elevation antenna-threshold, distance along centre line | 1 m or 1 ft | 1 × 10 ⁻³ routine |
| MLS DME/P antenna-threshold, distance along centre line..... | 1 m or 1 ft | 1 × 10 ⁻⁵ essential |

APPENDIX 8. TERRAIN AND OBSTACLE DATA REQUIREMENTS

(see Chapter 10)

DELETE CURRENT FIGURE A8-1 BELOW



DELETE CURRENT FIGURE A8-1 ABOVE

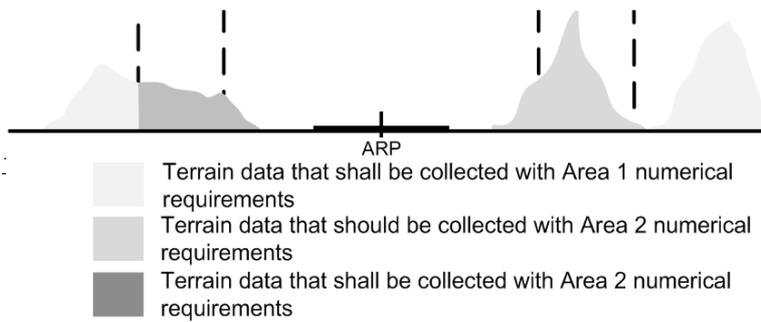


Figure A8-1. Terrain data collection surfaces — Area 1 and Area 2

1. Within the area covered by a 10 km radius from the ARP, terrain data shall comply with the Area 2 numerical requirements.
2. In the area between 10 km and the enclosed by the TMA boundary or 45-km radius from the ARP (whichever is smaller), data on terrain data that penetrates the horizontal plane 120 m above the lowest runway elevation shall comply with the Area 2 numerical requirements.
3. In the area between 10 km and the TMA boundary or 45 km radius (whichever is smaller), data on terrain that does not penetrate the horizontal plane 120 m above the lowest runway elevation shall comply with the Area 1 numerical requirements.
4. In those portions of Area 2 where flight operations are prohibited due to very high terrain or other local restrictions and/or regulations, terrain data shall comply with the Area 1 numerical requirements.

Note.— Terrain data numerical requirements for Areas 1 and 2 are specified in Table A8-1.

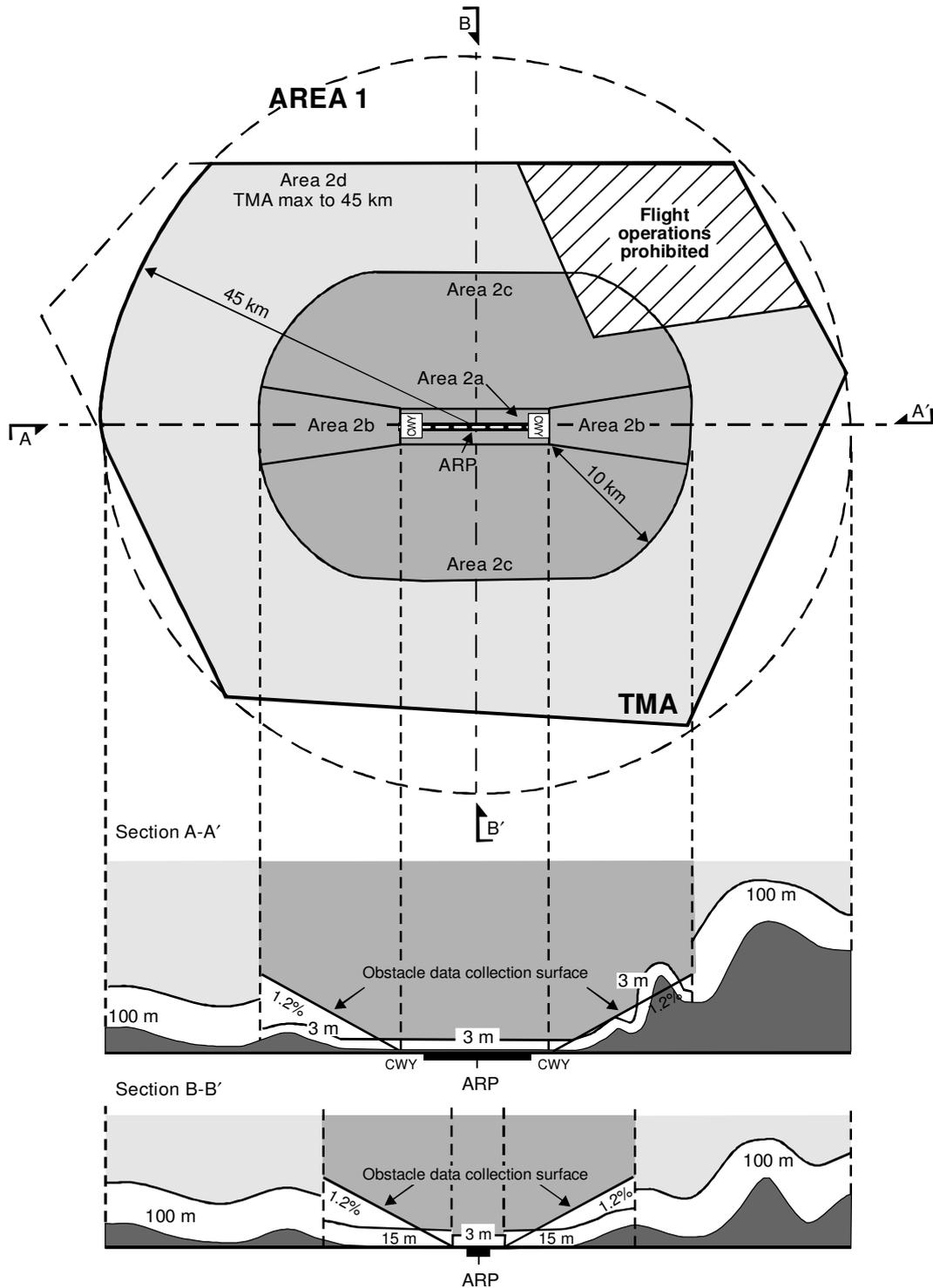


Figure A8-2. Obstacle data collection surfaces — Area 1 and Area 2

Edit Note: Figure A8-2 needs to be revised to reflect the changes to Area 2b but we do not have the source available to make the necessary changes.

1. Obstacle data shall be collected and recorded in accordance with the Area 2 numerical requirements specified in Table A8-2:
 - a) Area 2a: a rectangular area around a runway ~~that comprises~~ extending to 250 m either side of the runway strip centre line and extending before the threshold and beyond the end of the runway or stopway for a distance of 250 m Area 2a shall be extended so as to fully include ~~plus~~ any clearway that exists. The Area 2a obstacle collection surface shall have height of 3 m above the nearest runway elevation measured along the runway centre line, and for those portions related to a clearway, if one exists, at the elevation of the nearest runway end;
 - b) Area 2b: an area extending from the ends of Area 2a in the direction of departure, with a length of 150 km and a splay of 15% to each side. The Area 2b ~~obstacle~~ collection surface has a 1.2% slope extending from the ends of Area 2a at the elevation of the runway end in the direction of departure, with a length of 150 km and a splay of 15% to each side. ~~Obstacles less than 3 m in height above ground need not be collected;~~
 - c) Area 2c: an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a. The Area 2c ~~obstacle~~ collection surface has a 1.2% slope extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a. The initial elevation of Area 2c shall be the elevation of the point of Area 2a at which it commences. ~~Obstacles less than 15 m in height above ground need not be collected;~~ and
 - d) 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. The Area 2d obstacle collection surface has a height of 100 m above ground.
2. In those portions of Area 2 where flight operations are prohibited due to very high terrain or other local restrictions and/or regulations, obstacle data shall be collected and recorded in accordance with the Area 1 requirements.
3. Data on every obstacle within Area 1 whose height above the ground is 100 m or higher shall be collected and recorded in the database in accordance with the Area 1 numerical requirements specified in Table A8-2.

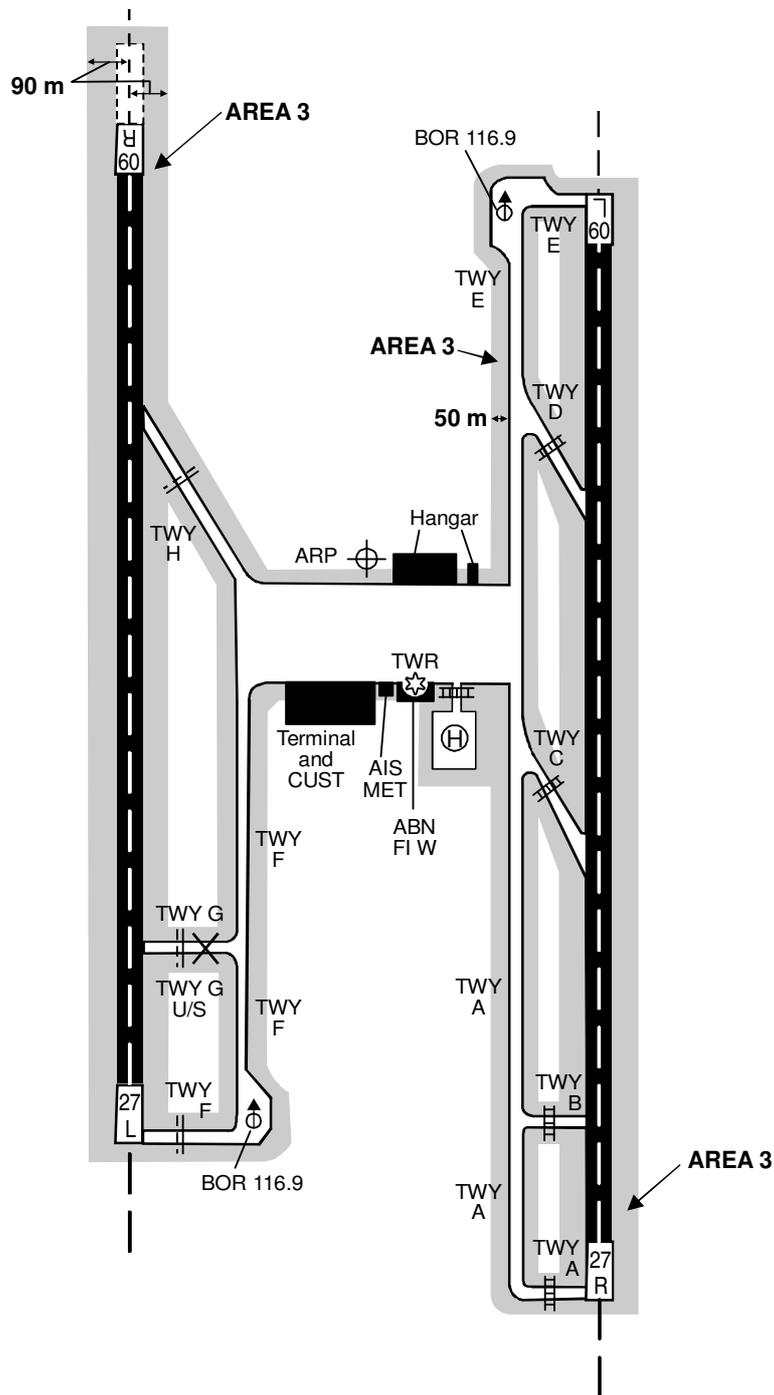


Figure A8-3. Terrain and obstacle data collection surface — Area 3

1. The data collection surface for terrain and obstacles extends a half-metre (0.5 m) above the horizontal plane passing through the nearest point on the aerodrome movement area.
2. Terrain and obstacle data in Area 3 shall comply with the numerical requirements specified in Table A8-1 and Table A8-2, respectively.

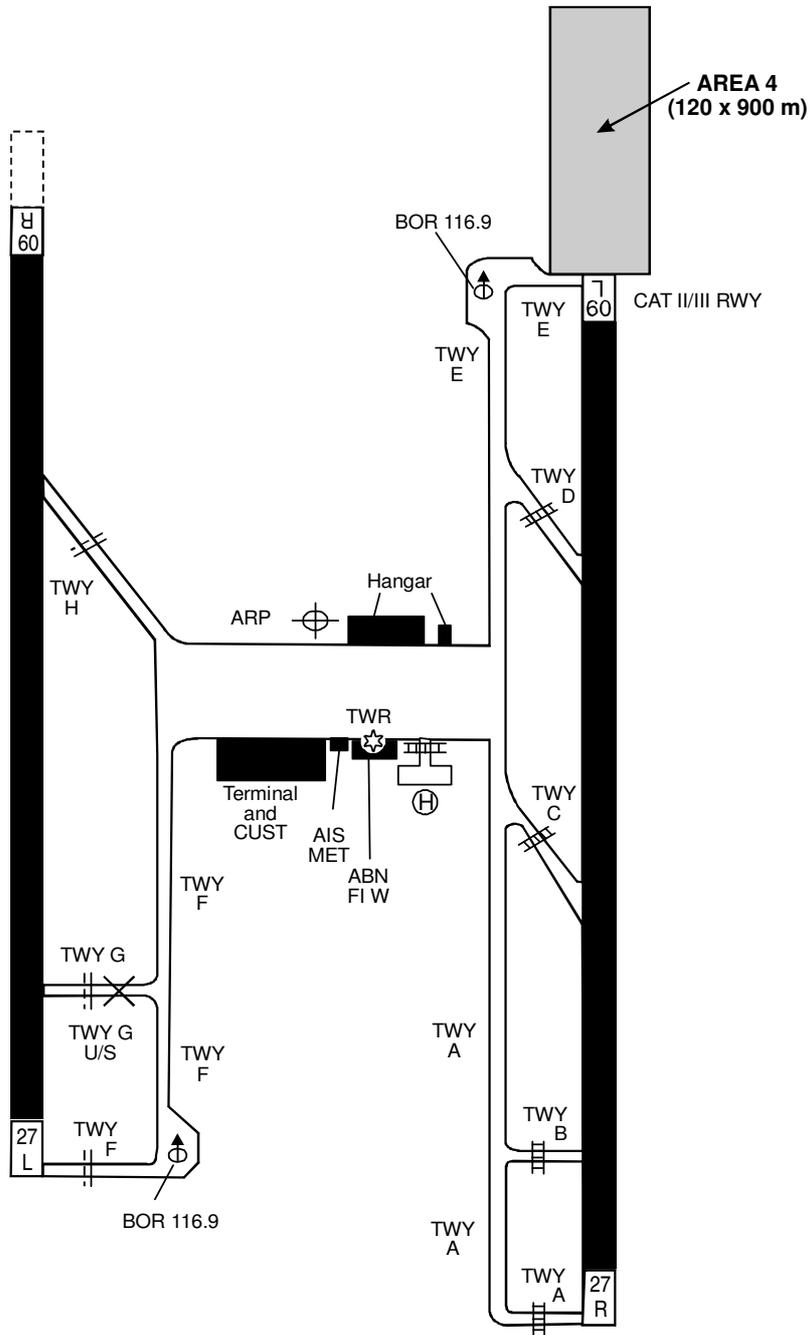


Figure A8-4. Terrain and obstacle data collection surface — Area 4

Terrain and obstacle data in Area 4 shall comply with the numerical requirements specified in Table A8-1 and Table A8-2 respectively.

Note 1.— The horizontal extent of Area 2 covers Area 4. More detailed obstacle data may be collected in Area 4 in accordance with Area 4 numerical requirements for obstacle data specified in Table A8-2. (See 10.1.8.).

Note 2.— Area 4 may be extended in accordance with 10.1.2.

Table A8-1. Terrain data numerical requirements

| | Area 1 | Area 2 | Area 3 | Area 4 |
|---------------------|---------------------------------|--------------------------------|-----------------------------------|----------------------------------|
| Post spacing | 3 arc seconds (approx. 90 m) | 1 arc second (approx. 30 m) | 0.6 arc seconds (approx. 20 m) | 0.3 arc seconds (approx. 9 m) |
| Vertical accuracy | 30 m | 3 m | 0.5 m | 1 m |
| Vertical resolution | 1 m | 0.1 m | 0.01 m | 0.1 m |
| Horizontal accuracy | 50 m | 5 m | 0.5 m | 2.5 m |
| Confidence level | 90% | 90% | 90% | 90% |
| Data classification | routine | essential | essential | essential |
| Integrity level | 1×10^{-3} | 1×10^{-5} | 1×10^{-5} | 1×10^{-5} |
| Maintenance period | as required | as required | as required | as required |

Table A8-2. Obstacle data numerical requirements

| | Area 1 | Area 2 | Area 3 | Area 4 |
|---------------------|--------------------|--------------------|--------------------|--------------------|
| Vertical accuracy | 30 m | 3 m | 0.5 m | 1 m |
| Vertical resolution | 1 m | 0.1 m | 0.01 m | 0.1 m |
| Horizontal accuracy | 50 m | 5 m | 0.5 m | 2.5 m |
| Confidence level | 90% | 90% | 90% | 90% |
| Data classification | routine | essential | essential | essential |
| Integrity level | 1×10^{-3} | 1×10^{-5} | 1×10^{-5} | 1×10^{-5} |
| Maintenance period | as required | as required | as required | as required |

Table A8-3. Terrain attributes

| Terrain attribute | Mandatory/Optional |
|-----------------------------|--------------------|
| Area of coverage | Mandatory |
| Data originator identifier | Mandatory |
| Data source identifier | Mandatory |
| Acquisition method | Mandatory |
| Post spacing | Mandatory |
| Horizontal reference system | Mandatory |
| Horizontal resolution | Mandatory |
| Horizontal accuracy | Mandatory |
| Horizontal confidence level | Mandatory |
| Horizontal position | Mandatory |
| Elevation | Mandatory |
| Elevation reference | Mandatory |
| Vertical reference system | Mandatory |
| Vertical resolution | Mandatory |
| Vertical accuracy | Mandatory |
| Vertical confidence level | Mandatory |
| Surface type | Optional |
| Recorded surface | Mandatory |
| Penetration level | Optional |
| Known variations | Optional |
| Integrity | Mandatory |
| Date and time stamp | Mandatory |
| Unit of measurement used | Mandatory |

Table A8-4. Obstacle attributes

| Obstacle attribute | Mandatory/Optional |
|-----------------------------|--------------------|
| Area of coverage | Mandatory |
| Data originator identifier | Mandatory |
| Data source identifier | Mandatory |
| Obstacle identifier | Mandatory |
| Horizontal accuracy | Mandatory |
| Horizontal confidence level | Mandatory |
| Horizontal position | Mandatory |
| Horizontal resolution | Mandatory |
| Horizontal extent | Mandatory |
| Horizontal reference system | Mandatory |
| Elevation | Mandatory |
| Height | Optional |
| Vertical accuracy | Mandatory |
| Vertical confidence level | Mandatory |
| Elevation reference | Mandatory |
| Vertical resolution | Mandatory |
| Vertical reference system | Mandatory |
| Obstacle type | Mandatory |
| Geometry type | Mandatory |
| Integrity | Mandatory |
| Date and time stamp | Mandatory |
| Unit of measurement used | Mandatory |
| Operations | Optional |
| Effectivity | Optional |
| Lighting | Mandatory |
| Marking | Mandatory |

— END —