



International
Civil Aviation
Organization

Organisation
de l'aviation civile
internationale

Organización
de Aviación Civil
Internacional

Международная
организация
гражданской
авиации

منظمة الطيران
المدني الدولي

国际民用
航空组织

Tel.: +1 (514) 954-6712

Ref.: AN 2/2.3-13/10

18 March 2013

Subject: Adoption of Amendment 37 to Annex 15

Action required: a) Notify any disapproval before 15 July 2013; b) Notify any differences and compliance before 14 October 2013; c) Consider the use of the Electronic Filing of Differences System (EFOD) for notification of differences and compliance

Sir/Madam,

1. I have the honour to inform you that Amendment 37 to the *International Standards and Recommended Practices, Aeronautical Information Services* (Annex 15 to the Convention on International Civil Aviation) was adopted by the Council at the sixth meeting of its 198th Session on 1 March 2013. Copies of the Amendment and the Resolution of Adoption are available as attachments to the electronic version of this State letter on the ICAO-NET (<http://portal.icao.int>) where you can access all other relevant documentation.
2. When adopting the amendment, the Council prescribed 15 July 2013 as the date on which it will become effective, except for any part concerning which a majority of Contracting States have registered their disapproval before that date. In addition, the Council resolved that Amendment 37, to the extent it becomes effective, will become applicable on 14 November 2013.
3. Amendment 37 arises from the work of the Secretariat with assistance from the Aeronautical Information Services to Aeronautical Information Management Study Group (AIS-AIMSG) and the Aerodromes Panel (AP).
4. The subject of the amendment is shown in the amendment to the Foreword of Annex 15, a copy of which is in Attachment A. The objective of the amendment to the Standards and Recommended Practices (SARPs) is to address a number of issues associated with the transition from aeronautical information service (AIS) to aeronautical information management (AIM) and the integrity of aeronautical data.

5. In conformity with the Resolution of Adoption, may I request:
- a) that before 15 July 2013 you inform me if there is any part of the adopted Standards and Recommended Practices (SARPs) amendments in Amendment 37 concerning which your Government wishes to register disapproval, using the form in Attachment B for this purpose. Please note that only statements of disapproval need be registered and if you do not reply it will be assumed that you do not disapprove of the amendment;
 - b) that before 14 October 2013 you inform me of the following, using the form in Attachment C for this purpose:
 - 1) any differences that will exist on 14 November 2013 between the national regulations or practices of your Government and the provisions of the whole of Annex 15, as amended by all amendments up to and including Amendment 37, and thereafter of any further differences that may arise; and
 - 2) the date or dates by which your Government will have complied with the provisions of the whole of Annex 15, as amended by all amendments up to and including Amendment 37.
6. With reference to the request in paragraph 5 a) above, it should be noted that a registration of disapproval of Amendment 37 or any part of it in accordance with Article 90 of the Convention does not constitute a notification of differences under Article 38 of the Convention. To comply with the latter provision, a separate statement is necessary if any differences do exist, as requested in paragraph 5 b) 1). It is recalled in this respect that international Standards in Annexes have a conditional binding force, to the extent that the State or States concerned have not notified any difference thereto under Article 38 of the Convention.
7. With reference to the request in paragraph 5 b) above, it should be also noted that the Council, at the third meeting of its 192nd Session on 4 March 2011, agreed that pending the development of a concrete policy and operational procedures governing the use of EFOD, this system be used as an alternative means for filing of differences to all Annexes, except for Annex 9 — *Facilitation* and Annex 17 — *Security — Safeguarding International Civil Aviation against Acts of Unlawful Interference*. EFOD is currently available on the USOAP restricted website (<http://www.icao.int/usoap>) which is accessible by all Member States (AN 1/1-11/28 refers) and you are invited to consider using this for notification of compliance and differences.
8. Guidance on the determination and reporting of differences is given in the Note on the Notification of Differences in Attachment D.
9. Please note that a detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.
10. I would appreciate it if you would also send a copy of your notifications, referred to in paragraph 5 b) above, to the ICAO Regional Office accredited to your Government.

11. As soon as practicable after the amendment becomes effective, on 15 July 2013, replacement pages incorporating Amendment 37 will be forwarded to you.

Accept, Sir/Madam, the assurances of my highest consideration.



Raymond Benjamin
Secretary General

Enclosures:

- A — Amendment to the Foreword of Annex 15
- B — Form on notification of disapproval of all or part of Amendment 37 to Annex 15
- C — Form on notification of compliance with or differences from Annex 15
- D — Note on the Notification of Differences

ATTACHMENT A to State letter AN 2/2.3-13/10

AMENDMENT TO THE FOREWORD OF ANNEX 15

Add the following at the end of Table A:

<i>Amendment</i>	<i>Source(s)</i>	<i>Subject</i>	<i>Adopted/Approved Effective Applicable</i>
37	Secretariat with assistance from the Aeronautical Information Services to Aeronautical Information Management Study Group (AIS-AIMSG) and the Aerodromes Panel (AP).	Chapter 1-3 restructured; definitions relating to aerodrome mapping data, aeronautical information management, integrity classification; use of the terms “information” and “data”; State and AIS provider responsibilities and functions; information management requirements; data quality; use of automation; aerodrome mapping data; AIP specifications; SNOWTAM; terrain and obstacle data; integrity classifications.	1 March 2013 15 July 2013 14 November 2013

ATTACHMENT B to State letter AN 2/2.3-13/10

NOTIFICATION OF DISAPPROVAL OF ALL OR PART OF
AMENDMENT 37 TO ANNEX 15

To: The Secretary General
International Civil Aviation Organization
999 University Street
Montreal, Quebec
Canada H3C 5H7

(State) _____ hereby wishes to disapprove the following parts of
Amendment 37 to Annex 15

Signature _____

Date _____

NOTES

- 1) If you wish to disapprove all or part of Amendment 37 to Annex 15, please dispatch this notification of disapproval to reach ICAO Headquarters by 15 July 2013. If it has not been received by that date it will be assumed that you do not disapprove of the amendment. **If you approve of all parts of Amendment 37, it is not necessary to return this notification of disapproval.**
- 2) This notification should not be considered a notification of compliance with or differences from Annex 15. Separate notifications on this are necessary. (See Attachment C.)
- 3) Please use extra sheets as required.

ATTACHMENT C to State letter AN 2/2.3-13/10

**NOTIFICATION OF COMPLIANCE WITH OR DIFFERENCES FROM
ANNEX 15**

(Including all amendments up to and including Amendment 37)

To: The Secretary General
International Civil Aviation Organization
999 University Street
Montreal, Quebec
Canada H3C 5H7

1. No differences will exist on _____ between the national regulations and/or practices of **(State)** _____ and the provisions of Annex 15, including all amendments up to and including Amendment 37.

2. The following differences will exist on _____ between the regulations and/or practices of **(State)** _____ and the provisions of Annex 15, including Amendment 37 (Please see Note 3) below.)

a) Annex Provision (Please give exact paragraph reference)	b) Difference Category (Please indicate A, B, or C)	c) Details of Difference (Please describe the difference clearly and concisely)	d) Remarks (Please indicate reasons for the difference)
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(Please use extra sheets as required)

3. By the dates indicated below, **(State)** _____ will have complied with the provisions of Annex 15, including all amendments up to and including Amendment 37 for which differences have been notified in 2 above.

a) Annex Provision (Please give exact paragraph reference)	b) Date	c) Comments
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(Please use extra sheets as required)

Signature _____

Date _____

NOTES

- 1) If paragraph 1 above is applicable to you, please complete paragraph 1 and return this form to ICAO Headquarters. If paragraph 2 is applicable to you, please complete paragraphs 2 and 3 and return the form to ICAO Headquarters.
- 2) Please dispatch the form to reach ICAO Headquarters by 14 October 2013.
- 3) A detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.
- 4) Guidance on the notification of differences from Annex 15 is provided in the Note on the Notification of Differences at Attachment D.
- 5) Please send a copy of this notification to the ICAO Regional Office accredited to your Government.

**NOTE ON THE NOTIFICATION OF DIFFERENCES TO ANNEX 15 AND
FORM OF NOTIFICATION**

(Prepared and issued in accordance with instructions of the Council)

1. *Introduction*

1.1 The Assembly and the Council, when reviewing the notification of differences by States in compliance with Article 38 of the Convention, have repeatedly noted that the state of such reporting is not entirely satisfactory.

1.2 With a view to achieving a more comprehensive coverage, this note is issued to facilitate the determination and reporting of such differences and to state the primary purpose of such reporting.

1.3 The primary purpose of reporting of differences is to promote safety and efficiency in air navigation by ensuring that governmental and other agencies, including operators and service providers, concerned with international civil aviation are made aware of all national regulations and practices in so far as they differ from those prescribed in the ICAO Standards.

1.4 Contracting States are, therefore, requested to give particular attention to the notification before 14 October 2013 of differences with respect to Standards in Annex 15. The Council has also urged Contracting States to extend the above considerations to Recommended Practices.

1.5 Contracting States are asked to note further that it is necessary to make an explicit statement of intent to comply where such intent exists, or where such is not the intent, of the difference or differences that will exist. This statement should be made not only to the latest amendment but to the whole Annex, including the amendment.

1.6 If previous notifications have been made in respect of this Annex, detailed repetition may be avoided, if appropriate, by stating the current validity of the earlier notification. States are requested to provide updates of the differences previously notified after each amendment, as appropriate, until the difference no longer exists.

2. *Notification of differences to Annex 15, including Amendment 37*

2.1 Past experience has indicated that the reporting of differences to Annex 15 has in some instances been too extensive since some appear merely to be a different manner of expressing the same intent.

2.2 Guidance to Contracting States in the reporting of differences to Annex 15 can only be given in very general terms. Where the national regulations of States call for compliance with procedures that are not identical but essentially similar to those contained in the Annex, no difference should be reported since the details of the procedures existing are the subject of notification through the medium of aeronautical information publications. Although differences to Recommended Practices are not notifiable under Article 38 of the Convention, Contracting States are urged to notify the Organization of the differences between their national regulations and practices and any corresponding Recommended Practices contained in an Annex. States should categorize each difference notified on the basis of whether the corresponding national regulation is:

- a) ***More exacting or exceeds the ICAO Standard or Recommended Practice (SARP) (Category A)***. This category applies when the national regulation is more demanding than the corresponding SARP, or imposes an obligation within the scope of the Annex which is not covered by a SARP. This is of particular importance where a State requires a higher standard which affects the operation of aircraft of other Contracting States in and above its territory;
- b) ***Different in character or other means of compliance (Category B)****. This category applies when the national regulation is different in character from the corresponding ICAO SARP, or when the national regulation differs in principle, type or system from the corresponding SARP, without necessarily imposing an additional obligation; and
- c) ***Less protective or partially implemented/not implemented (Category C)***. This category applies when the national regulation is less protective than the corresponding SARP; or when no national regulation has been promulgated to address the corresponding SARP, in whole or in part.

2.3 When a Contracting State deems an ICAO Standard concerning aircraft, operations, equipment, personnel, or air navigation facilities or services to be not applicable to the existing aviation activities of the State, notification of a difference is not required. For example, a Contracting State that is not a State of Design or Manufacture and that does not have any national regulations on the subject, would not be required to notify differences to Annex 8 provisions related to the design and construction of an aircraft.

2.4 For States that have already fully reported differences from Annex 15 or have reported that no differences exist, the reporting of any further differences occasioned by the amendment should be relatively straightforward; however, attention is called to paragraph 1.5 wherein it is indicated that this statement should be not only to the latest amendment but to the whole Annex, including the amendment.

3. *Form of notification of differences*

3.1 Differences should be notified in the following form:

- a) ***Reference***: The number of the paragraph or subparagraph in Annex 15 as amended which contains the Standard or Recommended Practice to which the difference relates;
- b) ***Category***: Indicate the category of the difference as A, B or C in accordance with paragraph 2.2 above;
- c) ***Description of the difference***: Clearly and concisely describe the difference and its effect; and

* The expression “different in character or other means of compliance” in b) would be applied to a national regulation which achieves, by other means, the same objective as that of the corresponding ICAO SARPs and so cannot be classified under a) or c).

- d) *Remarks:* Under “Remarks” indicate reasons for the difference and intentions including any planned date for implementation.

3.2 The differences notified will be recorded in a Supplement to the Annex, normally in the terms used by the Contracting State when making the notification. In the interest of making the supplement as useful as possible, please make statements as clear and concise as possible and confine remarks to essential points. Comments on implementation, in accordance with paragraph 4 b) 2) of the Resolution of Adoption, should not be combined with those concerning differences. The provision of extracts from national regulations cannot be considered as sufficient to satisfy the obligation to notify differences. General comments that do not relate to specific differences will not be published in Supplements.

— END —

AMENDMENT No. 37

TO THE

**INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

**AERONAUTICAL INFORMATION
SERVICES**

ANNEX 15

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

The amendment to Annex 15 contained in this document was adopted by the Council of ICAO on **1 March 2013**. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before **15 July 2013** will become effective on that date and will become applicable on **14 November 2013** as specified in the Resolution of Adoption. (State letter AN 2/2.3-13/10 refers.)

MARCH 2013

INTERNATIONAL CIVIL AVIATION ORGANIZATION

**AMENDMENT 37 TO THE INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

AERONAUTICAL INFORMATION SERVICES

RESOLUTION OF ADOPTION

The Council

Acting in accordance with the Convention on International Civil Aviation, and particularly with the provisions of Articles 37, 54 and 90 thereof,

1. *Hereby adopts* on 1 March 2013 Amendment 37 to the International Standards and Recommended Practices contained in the document entitled *International Standards and Recommended Practices, Aeronautical Information Services* which for convenience is designated Annex 15 to the Convention;
2. *Prescribes* 15 July 2013 as the date upon which the said amendment shall become effective, except for any part thereof in respect of which a majority of the Contracting States have registered their disapproval with the Council before that date;
3. *Resolves* that the said amendment or such parts thereof as have become effective shall become applicable on 14 November 2013;
4. *Requests the Secretary General:*
 - a) to notify each Contracting State immediately of the above action and immediately after 15 July 2013 of those parts of the amendment which have become effective;
 - b) to request each Contracting State:
 - 1) to notify the Organization (in accordance with the obligation imposed by Article 38 of the Convention) of the differences that will exist on 14 November 2013 between its national regulations or practices and the provisions of the Standards in the Annex as hereby amended, such notification to be made before 14 October 2013, and thereafter to notify the Organization of any further differences that arise;
 - 2) to notify the Organization before 14 October 2013 of the date or dates by which it will have complied with the provisions of the Standards in the Annex as hereby amended;
 - c) to invite each Contracting State to notify additionally any differences between its own practices and those established by the Recommended Practices, when the notification of such differences is important for the safety of air navigation, following the procedure specified in subparagraph b) above with respect to differences from Standards.

NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT

1. The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:
 - a) ~~Text to be deleted is shown with a line through it.~~ text to be deleted
 - b) **New text to be inserted is highlighted with grey shading.** new text to be inserted
 - c) ~~Text to be deleted is shown with a line through it~~ followed by **the replacement text which is highlighted with grey shading.** new text to replace existing text

TEXT OF A PROPOSED AMENDMENT TO THE

INTERNATIONAL STANDARDS

AND RECOMMENDED PRACTICES

AERONAUTICAL INFORMATION SERVICES

ANNEX 15

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

...

CHAPTER 1. INTRODUCTION GENERAL

Note 1.— The object of the aeronautical information service (AIS) is to ensure the flow of aeronautical data and aeronautical information/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 data and aeronautical information/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, late, or missing aeronautical data and aeronautical information/data can potentially affect the safety of air navigation.

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

Note 2.— 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.

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

CHAPTER 2. 1.1 DEFINITIONS Definitions

When the following terms are used in the Standards and Recommended Practices for aeronautical information services, they have the following meanings:

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

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

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

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

...

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

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

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

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

...

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

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

AIS product. Aeronautical ~~data and aeronautical~~ information/~~data~~ 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.

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Canopy. Bare Earth supplemented by vegetation height.

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

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

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

~~**Database.** One or more files of data so structured that appropriate applications may draw from the files and update them.~~

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

...

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

...

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

- AIP, including amendment service;
- Supplements to the AIP;
- NOTAM and PIB;
- AIC; and
- checklists and lists of valid NOTAM.

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

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

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

...

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.

...

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.~~

...

3.7-1.2 Common reference systems for air navigation

3.7-1.2.1 Horizontal reference system

~~3.7.1.1-1.2.1.1~~ 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.

~~3.7.1.2-1.2.1.2~~ **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 (1σ).

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~~ ~~1.2.1.3~~ 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~~ ~~1.2.1.4~~ 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~~ ~~1.2.2~~ Vertical reference system

~~3.7.2.1~~ ~~1.2.2.1~~ 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~~ ~~1.2.2.2~~ 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~~ ~~1.2.2.3~~ 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~~ ~~1.2.2.4~~ 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~~ ~~1.2.2.5~~ 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.

3.7.3-1.2.3 Temporal reference system

~~3.7.3.1-1.2.3.1~~ 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.

~~3.7.3.2-1.2.3.2~~ 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.

~~3.6-1.3~~ **General Miscellaneous specifications**

~~3.6.1-1.3.1~~ Each element of the Integrated Aeronautical Information Package for international distribution shall include English text for those parts expressed in plain language.

~~3.6.2-1.3.2~~ Place names shall be spelt in conformity with local usage, transliterated, when necessary, into the Latin alphabet.

~~3.6.3-1.3.3~~ **Recommendation.**— *Units of measurement used in the origination, processing and distribution of aeronautical data and aeronautical information/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

~~1.3.4~~ ICAO abbreviations shall be used in the aeronautical information services whenever they are appropriate and their use will facilitate distribution of aeronautical data and aeronautical information/data.

CHAPTER 3-2. GENERAL RESPONSIBILITIES AND FUNCTIONS

3-12.1 State Responsibilities and functions

3-1-1-2.1.1 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.

2.1.2 Each Contracting State shall ensure that the provision of aeronautical data and aeronautical information covers its own territory and those areas over the high seas for which it is responsible for the provision of air traffic services.

~~3-1-1-1-2.1.3~~ 2.1.3 The State concerned shall remain responsible for the aeronautical data and aeronautical information published provided in accordance with 2.1.2. Aeronautical data and aeronautical information published provided for and on behalf of a State shall clearly indicate that it is published provided under the authority of that State.

~~3-1-1-2-2.1.4~~ 2.1.4 Each Contracting State shall ~~take all necessary measures to~~ ensure that the aeronautical data and aeronautical information/data it provides ~~relating to its~~ is complete, timely and of the required quality in accordance with 3.3, ~~own territory, as well as areas in which the State is responsible for air traffic services outside its territory is adequate, of required quality and timely. This shall include arrangements for the timely provision of required information/data to the aeronautical information service by each of the State services associated with aircraft operations.~~

2.1.5 Each contracting State shall ensure that formal arrangements are established between originators of aeronautical data and aeronautical information and the aeronautical information service in relation to the timely and complete provision of aeronautical data and aeronautical information.

2.2 AIS responsibilities and functions

~~3-1-6-2.2.1~~ 2.2.1 An aeronautical information service shall ensure that aeronautical data and aeronautical information/data necessary for the safety, regularity or efficiency of air navigation is made available in a form suitable for the operational requirements of the ATM community, including:

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

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

~~3.1.7-2.2.2~~ An aeronautical information service shall receive ~~and/or originate~~, collate or assemble, edit, format, publish/store and distribute aeronautical ~~data and aeronautical information/data~~ concerning the entire territory of the State as well as ~~those areas over the high seas~~ in which the State is responsible for the provision of air traffic services ~~outside its territory~~. Aeronautical ~~data and aeronautical~~ information shall be ~~published~~ provided as an Integrated Aeronautical Information Package.

Note.— An Aeronautical Information Service may include origination functions.

~~3.1.1.3-2.2.3~~ Where 24-hour service is not provided, service shall be available during the whole period an aircraft is in flight in the area of responsibility of an 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.

~~3.1.2-2.2.4~~ An aeronautical information service shall, in addition, obtain aeronautical data and aeronautical information to enable it to provide pre-flight information service and to meet the need for in-flight information.

- a) from the aeronautical information services of other States;
- b) from other sources that may be available.

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

~~3.1.3-2.2.5~~ Aeronautical ~~data and aeronautical~~ information/~~data~~ obtained under ~~3.1.2-2.2.4~~ a) shall, when distributed, be clearly identified as having the authority of the State of Origin.

~~3.1.4-2.2.6~~ Aeronautical ~~data and aeronautical~~ information/~~data~~ obtained under ~~3.1.2-2.2.4~~ b) shall, if possible, be verified before distribution and if not verified shall, when distributed, be clearly identified as such.

~~3.1.5-2.2.7~~ An aeronautical information service shall promptly make available to the aeronautical information services of other States any aeronautical data and aeronautical information/~~data~~ necessary for the safety, regularity or efficiency of air navigation required by them, to enable them to comply with ~~3.1.6~~ below ~~2.2.1~~.

3.3 2.3 Exchange of aeronautical data and aeronautical information/data

~~3.3.1-2.3.1~~ 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 data and aeronautical information/~~data~~ originated by other States.

~~3.3.2-2.3.2~~ Where a State designates more than one international NOTAM office is designated within a State, it shall define the extent of responsibility and the territory covered by each office shall be defined.

~~3.3.3-2.3.3~~ 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~~ **2.3.4** States shall, wherever practicable, establish direct contact between aeronautical information services shall be established in order to facilitate the international exchange of aeronautical data and aeronautical information/data.

~~3.3.5~~ **2.3.5** 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 form(s), without charge, even where authority for publication/storage and distribution has been delegated to a ~~commercial agency~~ non-governmental agency.

~~3.3.6~~ **2.3.6 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~~ **2.3.7 Recommendation.**— *The procurement of aeronautical data and aeronautical information/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.*

3.4.2.4 Copyright

Note.— *In order to protect the investment in the products of a State's AIS as well as to ensure better control of their use, States may wish to apply copyright to those products in accordance with their national laws.*

2.4.1 Any product of a State's AIS which has been granted copyright protection by that State and provided to another State in accordance with ~~3.3~~ **2.3** shall only be made available to a third party on the condition that the third party is made aware that the product is copyright protected and provided that it is appropriately annotated that the product is subject to copyright by the originating State.

3.5.2.5 Cost recovery

2.5.1 Recommendation.— *The overhead cost of collecting and compiling aeronautical data and aeronautical information/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 data and aeronautical information/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, and costs of distribution.*

CHAPTER 3. AERONAUTICAL INFORMATION MANAGEMENT

3.1 Information management requirements

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

3.2 Aeronautical data and aeronautical information validation and verification

~~3.2.13~~ 3.2.1 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 requirements of aeronautical data are met.~~

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

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

Note 2.— *Guidance material on the aeronautical data quality requirements (accuracy, resolution, integrity, ~~protection and traceability~~) and protection requirements is contained may be found in the World Geodetic System — 1984 (WGS-84) Manual (Doc 9674). Supporting data quality material in respect of data accuracy, 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 (or equivalent).*

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

3.3 Data quality specifications

3.3.1 Accuracy

~~3.2.8~~ 3.3.1.1 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).

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

3.3.2 Resolution

~~3.2.9~~ 3.3.2.1 The order of publication resolution of aeronautical data shall be that as specified in Appendices 1 and 7.

3.3.2.2 Recommendation.— *The resolution of the data features contained in the database should be commensurate with the data accuracy requirements.*

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

3.3.3 Integrity

~~3.2.11~~ 3.3.3.1 ~~Aeronautical data quality requirements related to~~ The integrity classification and data integrity related to aeronautical data shall be as provided in Tables A7-1 to A7-5 of Appendix 7.

~~3.2.10~~ 3.3.3.2 The integrity of aeronautical data shall be maintained throughout the data process from survey/origin to distribution to the next intended user (the entity that receives the aeronautical information from the aeronautical information service provider). ~~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~~ Based on the applicable integrity classifications, the validation and verification procedures shall:

- ~~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))~~
- ~~e) —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 e))~~

a) for routine data: avoid corruption throughout the processing of the data;

b) for essential data: assure corruption does not occur at any stage of the entire process and may include additional processes as needed to address potential risks in the overall system architecture to further assure data integrity at this level; and

c) for critical data: assure corruption does not occur at any stage of the entire process and include additional integrity assurance processes to fully mitigate the effects of faults identified by thorough analysis of the overall system architecture as potential data integrity risks.

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

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

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

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

or

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

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

3.8-3.4 Metadata

3.8-3.4.1 Metadata shall be collected for aeronautical data processes and exchange points. This metadata collection shall be applied throughout the aeronautical information data chain, from survey/origin to distribution to the next intended user.

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

3.8-3.4.2 The metadata to be collected shall include, as a minimum:

- a) the name of the organizations or entity entities performing the function—any action of originating, transmitting or manipulating the data;
- b) the function action performed; and
- c) the date and time of operation: the action was performed.

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

3.5 Data protection

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

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

~~3.2.12~~~~3.5.2~~ Electronic aeronautical data sets shall be protected by the inclusion in the data sets of a 32-bit cyclic redundancy check (CRC) implemented by the application dealing with the data sets. This shall apply to the protection of ~~all the~~ integrity levels ~~classification~~ of data sets as specified in ~~3.2.10~~ 3.3.3.

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).

~~3.6.5~~ 3.6 Use of automation

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

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

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

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

- a) enable digital aeronautical data exchange between the parties involved in the data processing chain; and
- b) use aeronautical information exchange models and data exchange models designed to be globally interoperable.

Note.— Guidance material on the aeronautical ~~conceptual~~ information and data exchange models for the development of databases and the establishment of data exchange services is contained may be found in the Aeronautical Information Services Manual (Doc 8126).

3.6.4 **Recommendation.** ~~The aeronautical information model used should encompass the aeronautical data and aeronautical information to be exchanged.~~

3.6.5 **Recommendation.** ~~The aeronautical information model used should:~~

- a) use the Unified Modelling Language (UML) to describe the aeronautical information features and their properties, associations, and data types;
- b) include data value constraints and data verification rules;
- c) include provisions for metadata as specified in section 3.4.2; and
- d) include a temporality model to enable capturing the evolution of the properties of an aeronautical information feature during its life cycle.

3.6.6 **Recommendation.** ~~The aeronautical data exchange model used should:~~

- a) apply a commonly used data encoding format;

- b) cover all the classes, attributes, data types and associations of the aeronautical information model detailed in paragraph 3.6.5; and
- c) provide an extension mechanism, by which groups of users can extend the properties of existing features and add new features which do not adversely affect global standardization.

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

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

3.6.6 Identification and delineation of prohibited, restricted and danger areas

~~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.~~

3.2.3.7 Quality management system

~~3.2.1-3.7.1~~ 3.7.1 Quality management systems shall be implemented and maintained encompassing all functions of an aeronautical information service, as outlined in 3.1.7.2.2. The execution of such quality management systems shall be made demonstrable for each function stage, ~~when required~~

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

~~3.2.2-3.7.2~~ **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~~ **3.7.3 Recommendation.**— *The quality management system established in accordance with ~~3.2.1~~ 3.7.1 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~~ **3.7.4** Within the context of the established quality management system, the ~~skills~~ **competencies** and the associated knowledge, skills and abilities required for each function shall be identified, and personnel assigned to perform those functions shall be appropriately trained. ~~States shall~~ **Processes shall be in place to** 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 Aeronautical Information Management Training Development Manual (Doc 9991).

~~3.2.5~~ **3.7.5** Each quality management system shall include the necessary policies, processes and procedures, including those for the use of metadata, to ensure and verify that aeronautical data 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~~ **3.7.6** The established quality management system shall provide users with the necessary assurance and confidence that distributed aeronautical data and aeronautical information/data satisfy the aeronautical data quality requirements for accuracy, resolution and integrity as specified in 3.2 and 3.3 ~~Appendix 7,~~ **and that the data traceability requirements are met** through the provision of appropriate metadata as specified in ~~3.8.1~~ **3.4**. The system shall also provide assurance of the applicability period of intended use of aeronautical data as well as that the agreed distribution dates will be met.

~~3.2.7~~ **3.7.7** All necessary measures shall be taken to monitor compliance with the quality management system in place.

~~3.2.14~~ **3.7.8** Demonstration of compliance of the quality management system applied shall be by audit. If nonconformity is identified, initiating action to correct its cause shall be determined and taken without undue delay. All audit observations and remedial actions shall be evidenced and properly documented.

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 is contained in RTCA Document DO-201A and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-77 Industry Requirements for Aeronautical Information.

~~3.6.7~~ **3.8 Human Factors considerations**

~~3.6.7.1~~ **3.8.1** The organization of the aeronautical information services as well as the design, contents, processing and distribution of aeronautical ~~data and aeronautical~~ information/data shall take into consideration Human Factors principles which facilitate their optimum utilization.

~~3.6.7.2~~ **3.8.2** Due consideration shall be given to the integrity of information where human interaction is required and mitigating steps taken where risks are identified.

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

CHAPTER 4. AERONAUTICAL INFORMATION PUBLICATIONS (AIP)

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

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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.

...

4.4.6 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.

CHAPTER 5. NOTAM

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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.

CHAPTER 6. AERONAUTICAL INFORMATION REGULATION AND CONTROL (AIRAC)

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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~~ provided 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.*

6.3 Provision of information ~~in~~ **as electronic form media**

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~~ **as electronic form media**, 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~~ **as electronic form media** 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)

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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 aeronautical information service 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.

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

~~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).~~

~~7.2.25~~ A checklist of AIC currently in force shall be issued at least once a year, with distribution as for the AIC.

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

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

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

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

...

8.2.3 Automated pre-flight information systems for the supply of aeronautical data and aeronautical information/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 data and aeronautical information/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 data and aeronautical information/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 9.4.3 of Annex 3.

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

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

CHAPTER 10. ELECTRONIC TERRAIN AND OBSTACLE DATA

10.1.5 From 12 November 2015, at aerodromes regularly used by international civil aviation, electronic terrain data shall be provided for:

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

10.1.6 From 12 November 2015, at aerodromes regularly used by international civil aviation, electronic terrain and obstacle data shall be provided 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—Objects in the take-off flight path area which project above a plane surface having a 1.2 per cent slope and having a common origin with the take-off flight path area; and
- c) penetrations of the aerodrome obstacle limitation surfaces.

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

10.1.67 **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 terrain and 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.

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 supplements surface navigation, thereby increasing safety margins and operational efficiency. Aerodrome mapping data sets with appropriate data element accuracy support requirements for collaborative decision making, common situational awareness, and aerodrome guidance applications are intended to be used, among others, in the following air navigation applications:

- a) *Position and route awareness including moving maps with own ship position, surface guidance and navigation (such as A-SMGCS);*
- b) *traffic awareness including surveillance and runway incursion detection and alerting;*
- c) *facilitation of aerodrome related aeronautical information, including 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 is organized and arranged in aerodrome mapping databases (AMDBs) for ease of electronic storage and usage by appropriate applications.

11.1 Aerodrome mapping data — requirements for provision

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

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

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

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

11.2 Aerodrome mapping data product specification

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

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

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

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

11.3 Aerodrome mapping database — data set content and structure

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

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

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

Note 1. — *Aerodrome features consist of attributes and geometries, which are characterized as points, lines or polygons. Examples include runway thresholds, taxiway guidance lines and parking stand areas.*

Note 2. — *Aerodrome mapping data feature definitions, constraints and rules applicable to aerodrome mapping data are contained in RTCA Document DO-272B / European Organization for Civil Aviation Equipment (EUROCAE) Document ED-99B — User Requirements for Aerodrome Mapping Information. These constraints ensure the connectivity between features on a spatial and functional level in accordance with the connections observed in the real world.*

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

11.3.3 Aerodrome mapping metadata shall comply with ISO 19115.

Note 1. — *Metadata elements applicable to Aerodrome mapping data are contained in RTCA Document DO-291 and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-119 — Interchange Standards for Terrain, Obstacle, and Aerodrome Mapping Data.*

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 Parts 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) publication media (i.e. printed, online or other electronic media)
- 34) the AIP structure and established regular amendment interval; and
- 5) copyright policy, if applicable; and
- 6)4) service to contact in case of detected AIP errors or omissions.

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 and parameters 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 2.2 Abbreviations used in AIS publications

A list of alphabetically arranged abbreviations and their respective significations used by the State in its AIP and in the distribution of aeronautical data and 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).

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

GEN 2.6 Conversions tables of units of measurement

Tables for conversion or alternately conversion formulae 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 conversions tables, as appropriate.

GEN 2.7 Sunrise/sunset tables

Information on the time of sunrise and sunset including a brief description of criteria used for determination of the times given in the sunrise/sunset tables, together with an and either a simple formulae or table from which times may be calculated for any location within its territory/area of responsibility, or an alphabetical list of locations for which the times are given in a table with a reference to the related page in the table and the sunrise/sunset tables for the selected stations/locations, including:

...

GEN 3.4.5 Miscellaneous

Any additional information (e.g. selected radio broadcasting stations, telecommunications diagram).

GEN 3.6.2 Area of responsibility

Brief description of area of responsibility within which search and rescue services are provided.

Note.— A chart may be included to supplement the description of the area.

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 1. GENERAL RULES AND PROCEDURES

ENR 1.4 ATS airspace classification and description

ENR 1.4.1 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 1.4.2 ATS airspace description

Other ATS airspace descriptions as applicable, including general textual descriptions.

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.

ENR 1.6.4 Other relevant information and procedures

Brief description of additional information and procedures, e.g. radar failure procedures, and transponder failure procedures.

...

ENR 1.8 Regional supplementary procedures

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

ENR 1.9 Air traffic flow management and 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;
- 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(s), details of civil/military airspace allocation and management coordination, structure of manageable airspace (allocation and changes to allocation) and general operating procedures.*

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. — A list of significant differences between national regulations and practices of the State and related ICAO provisions is found in Gen 1.7.

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”;
- 3) reporting procedures (including in-flight procedures); and
- 4) purpose of reporting and handling of the form.

Note. — A copy of the “Air Traffic Incident Report Form” (PANS ATM, Doc 4444 Appendix 4) may be included for reference.

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 specific CTA such as TMA), 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.

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) the navigation accuracy requirement for each PBN (RNAV or RNP) route segment; and
- 67) 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) the navigation accuracy requirement for each PBN (RNAV or RNP) route segment; and.
- 67) 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 **as applicable:**
 - 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) **the navigation accuracy requirement for each PBN (RNAV or RNP) route segment; 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;

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- 3) upper and lower limits and airspace classification;
- 4) minimum flight altitudes to the nearest higher 50 m or 100 ft; ~~and~~
- 5) the navigation accuracy requirement for each PBN (RNAV or RNP) route segment; ~~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 1, and for flight planning purposes, defined navigation specification is not considered to be an integral part of the route designator.

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 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 that constitute a specific or obvious danger to aircraft operation and ~~that~~ could affect flights including:

...

PART 3 — AERODROMES (AD)

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; ~~and~~

AD 1.1.2 Use of military air bases

- 3) ~~Regulations, and procedures~~ 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.

- 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 1.1.5 Other information

- 5) **If applicable,** other information of a similar nature.

...

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
- 2) reference to AIP, Part 3 subsection in which aerodrome/heliport details are presented.

...

AD 2. AERODROMES

...

****** 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;

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- 3) aerodrome elevation to the nearest metre or foot, and reference temperature;
 - 4) **where appropriate**, geoid undulation at the aerodrome elevation position to the nearest metre or foot;
 - 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 2.5 Passenger facilities**

~~Brief description of p~~Passenger facilities available at the aerodrome, **provided as a brief description or a reference to other information sources such as a website** including:

- 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 2.8 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;
- 3) stop bars (if any); and
- 4) remarks.

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

Detailed description of obstacles, including:

...

- 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;

...

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

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

...

- 5) geographical coordinates in degrees, minutes, seconds and hundredths of seconds for each threshold and runway end, and **where appropriate**, geoid undulation 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;

****** AD 2.13 Declared distances**

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

- 1) runway designator;
 - 2) take-off run available;
 - 3) take-off distance available, and if applicable, alternative reduced declared distances;
 - 4) accelerate-stop distance available;
 - 5) landing distance available; and
 - 6) remarks, including runway entry or start point where alternative reduced declared distances have been declared .
- ...

****** 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, where appropriate, geoid undulation 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):

****** 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; and
 - 7) 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 traffic aerodrome regulations

Detailed description of regulations applicable to the traffic 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 2.22 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 3. HELIPORTS

**** 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) where appropriate, geoid undulation at the heliport elevation position to the nearest metre or foot;
- 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 3.5 Passenger facilities

~~Brief description of passenger facilities available at the heliport~~ provided as a brief description or a reference to other information sources such as a website, including:

- 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 3.8 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~~ 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 3.12 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, **where appropriate**, geoid undulation 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;

**** AD 3.13 Declared distances

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

- 1) take-off distance available **and, if applicable, alternative reduced declared distances**;
- 2) rejected take-off distance available;
- 3) landing distance available; and

- 4) remarks, including entry or start point where alternative reduced declared distances have been declared.

****** 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; and
- 7) remarks.

****** 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 3.21 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.

INSTRUCTIONS FOR THE COMPLETION OF THE SNOWTAM FORMAT

1. General

- a) When reporting on ~~two or three runways~~ more than one runway, repeat Items ~~C~~^B to P inclusive.

...

- e) The abbreviated heading “TTAAiiii CCCC MMYYGg (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 digit group;

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

MMYYGg = 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 1.— Brackets in (BBB) are used to indicate that this group is optional.

Note 2.— When reporting on more than one runway and individual dates/times of observation/measurement are indicated by repeated Item B, the latest date/time of observation/measuring is inserted in the abbreviated heading (MMYYGg).

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

SWLS0149 LSZH 11070620

Note. — *The information groups are separated by a space, as illustrated above.*

- f) The text “SNOWTAM” in the SNOWTAM Format and the SNOWTAM serial number in a four-digit group shall be separated by a space. *Example:* SNOWTAM 0124

- g) For readability purposes for the SNOWTAM message, include a line feed after the SNOWTAM serial number, after Item A, after the last item referring to the runway (e.g. Item P) and after Item S.

...

6. *Item E* — Cleared runway width in metres, if less than published width; if offset left or right of centre line, add (without space) “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 (closest to the sky) to the bottom (closest to the runway). 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. The values for each third of the runway shall be separated by an oblique stroke (/), without space between the deposit values and the oblique stroke. For example: 47/47/47

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. The values for each third of the runway shall be separated by an oblique stroke (/), without space between the values and the oblique stroke. For example: 20/20/20.
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, e~~Estimated surface friction on each third of the runway (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.~~

Friction measurement devices can be used as part of the overall runway surface assessment. Some States may have developed procedures for runway surface assessment which may include the use of information obtained from friction measuring devices and the reporting of quantitative values. In such cases, these procedures should be published in the AIP and the reporting made in Item (T) of the SNOWTAM format.

The values for each third of the runway are separated by an oblique stroke (/), without space between the values and the oblique stroke. For example: 5/5/5.

10. *Item J* — Critical snowbanks. If present insert height in centimetres and distance from edge of runway in metres, followed (without space) 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 (without space) 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 (and combination of codes) 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, snow banks are higher than 60 cm, enter “YES” followed by the lateral distance parting the snow banks (the distance between) in metres.
16. *Item R* — The code (and combination of codes) 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:

RWY CONTAMINATION 10 PERCENT ~~Runway contamination — 10 % — if 10% or less less than 10% of runway contaminated~~

RWY CONTAMINATION 25 PERCENT ~~Runway contamination — 25 % — if 11–25% of runway contaminated~~

RWY CONTAMINATION 50 PERCENT ~~Runway contamination — 50 % — if 26–50% of runway contaminated~~

RWY CONTAMINATION 100 PERCENT ~~Runway contamination — 100 % — if 51–100% of runway contaminated.~~

EXAMPLE OF COMPLETED SNOWTAM FORMAT

~~GG EHAMZQZX EDDFZQZX EKCHZQZX~~

~~070645 LSZHYNXX~~

~~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)~~

GG EHAMZQZX EDDFZQZX EKCHZQZX

070645 LSZHYNXX

SWLS0149 LSZH 11070700

(SNOWTAM 0149

A)LSZH

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

B)11070600 C)09 D)...P)

B)11070700 C)12 D)...P)

R)NO S)11070920

T)DEICING

Note.— See the Aeronautical Information Service Manual (Doc 8126), for additional SNOWTAM examples incorporating different runway conditions.

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~~ ~~AFS~~ 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~~ ~~AFS~~ communication centre associated with the relevant international NOTAM office of the receiving country.

...

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~~ ~~AFS~~ centre.

...

APPENDIX 6. NOTAM FORMAT

INSTRUCTIONS FOR THE COMPLETION OF THE NOTAM FORMAT

3. Qualifiers (Item Q)

...

3) NOTAM CODE

...

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

Note 1.— As Q - - AO = Operational is used for NOTAM cancellation, NOTAM promulgating new equipment or services use the following fourth and fifth letters Q - - CS = Installed.

Note 2.— Q - - CN = CANCELLED shall be used to cancel planned activities e.g. navigation warnings, as well as Q - - HV = WORK COMPLETED is used to cancel work in progress.

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 flight crew members

B = NOTAM of operational significance 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 B Θ or NB Θ . Guidance concerning the combination of PURPOSE qualifiers with subject and conditions in accordance with the compiled NOTAM Selection Criteria qualifiers is contained in Doc 8126.

APPENDIX 7. AERONAUTICAL DATA QUALITY REQUIREMENTS PUBLICATION RESOLUTION AND INTEGRITY CLASSIFICATION

...

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
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
Obstacles in Area 1 (the entire State territory)	1 m or 1 ft	1 × 10 ⁻³ routine

Elevation/altitude/height	Publication resolution	Integrity Classification
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
Minimum altitudes.....	50 m or 100 ft	1×10^{-3} routine

...

Table A7-4. Bearing

Bearing	Publication resolution	Integrity Classification
Airway segments	1 degree	1×10^{-3} routine
En route and terminal fix formations Bearing used for the formation of an en route and of a terminal fix	1/10 degree	1×10^{-3} routine
Terminal arrival/departure route segments	1 degree	1×10^{-3} routine
Instrument approach procedure fix formations Bearing used for the formation of an instrument approach procedure fix	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 Distance used for the formation of an en-route fix.....	1/10 km or 1/10 NM	1×10^{-3} routine
Terminal and instrument approach procedure fix formation distance Distance used for the formation of a terminal and instrument approach procedure fix.....	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

APPENDIX 8. TERRAIN AND OBSTACLE DATA REQUIREMENTS

...

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

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 the runway strip 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 10 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 10 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

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 Integrity 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 Integrity 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 —