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.: +1 514-954-8219 ext. 5872

Ref.: AN 9/1.4-18/21

22 March 2018

Subject: Adoption of Amendment 60 to Annex 4

Action required: a) Notify any disapproval before 16 July 2018; b) Notify any differences and compliance before 8 October 2018 c) Consider the use of the Electronic Filing of Differences (EFOD) System for notification of differences and compliance

Sir/Madam,

1. I have the honour to inform you that Amendment 60 to the *International Standards and Recommended Practices, Aeronautical Charts* (Annex 4 to the Convention on International Civil Aviation) was adopted by the Council at the sixth meeting of its 213th Session on 9 March 2018. 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 16 July 2018 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 60, to the extent it becomes effective, will become applicable on 8 November 2018 unless otherwise indicated.

3. Amendment 60 arises from:

a) recommendations stemming from the twelfth meeting of the Aeronautical Information Service (AIS) to Aeronautical Information Management (AIM) Study Group (AIS-AIMSG/12); and

b) recommendations developed by the thirteenth meeting of the Instrument Flight Procedures Panel (IFPP/13).

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4. The consequential amendment concerning data quality requirements and performance-based data error detection requirements is a result of the restructuring of Annex 15 — *Aeronautical Information Services.*

5. The consequential amendment regarding procedure altitude/height is a result of the revised definition and description of "procedure altitude/height" in the *Procedures for Air Navigation Services — Aircraft Operations*, Volume I — *Flight Procedures* and Volume II — *Construction of Visual and Instrument Flight Procedures* (Doc 8168).

6. The subjects are given in the amendment to the Foreword of Annex 4, a copy of which is in Attachment A.

7. In conformity with the Resolution of Adoption, may I request:

a) that before 16 July 2018 you inform me if there is any part of the adopted Standards amendments in Amendment 60 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 8 October 2018 you inform me of the following, using the Electronic Filing of Differences (EFOD) System or the form in Attachment C for this purpose:

1) any differences that will exist on 8 November 2018 between the national regulations or practices of your Government and the provisions of the whole of Annex 4, as amended by all amendments up to and including Amendment 60, 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 4, as amended by all amendments up to and including Amendment 60.

8. With reference to the request in paragraph 7 a) above, it should be noted that a registration of disapproval of Amendment 60 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 7 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.

9. With reference to the request in paragraph 7 b) above, it should be also noted that the ICAO Assembly, at its 38th Session (24 September to 4 October 2013), resolved that Member States should be encouraged to use the EFOD System when notifying differences (Resolution A38-11 refers). The EFOD System is currently available on the Universal Safety Oversight Audit Programme (USOAP) restricted website (http://www.icao.int/usoap) which is accessible by all Member States. You are invited to consider using this for notification of compliance and differences.

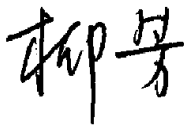
10. Guidance on the determination and reporting of differences is given in the Note on the Notification of Differences in Attachment D. Please note that a detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.

11. I would appreciate it if you would also send a copy of your notifications, referred to in paragraph 7 b) above, to the ICAO Regional Office accredited to your Government.

12. At the fifth meeting of its 204th Session, the Council requested that States, when being advised of the adoption of an Annex amendment, be provided with information on implementation and available guidance material, as well as an impact assessment. This is presented for your information in Attachments E and F, respectively.

13. As soon as practicable after the amendment becomes effective, on 16 July 2018, replacement pages incorporating Amendment 60 will be forwarded to you.

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



Fang Liu
Secretary General

Enclosures:

A — Amendment to the Foreword of Annex 4
B — Form on notification of disapproval of all or part of Amendment 60 to Annex 4
C — Form on notification of compliance with or differences from Annex 4, Amendment 60
D — Note on the Notification of Differences
E — Implementation task list and outline of guidance material in relation to Amendment 60 to Annex 4
F — Impact assessment in relation to Amendment 60 to Annex 4

ATTACHMENT A to State letter AN 9/1.4-18/21

AMENDMENT TO THE FOREWORD OF ANNEX 4

Add the following element at the end of Table A:

Amendment	***Source(s)***	***Subject***	***Adopted/Approved Effective Applicable***
60	Twelfth meeting of the Aeronautical Information Service (AIS) to Aeronautical Information Management (AIM) Study Group (AIS-AIMSG/12) and the thirteenth meeting of the Instrument Flight Procedures Panel (IFPP/13)	a) amendments as a result of the restructuring of Annex 15 — *Aeronautical Information Services* and the introduction of PANS-AIM concerning data quality requirements and performance-based data error detection requirements; and b) amendments as a result of the revised definition and description of "procedure altitude/height" in the *Procedures for Air Navigation Services — Aircraft Operations*, Volume I — *Flight Procedures* and Volume II — *Construction of Visual and Instrument Flight Procedures* (Doc 8168).	9 March 2018 16 July 2018 8 November 2018

— — — — — — — —

ATTACHMENT B to State letter AN 9/1.4-18/21

NOTIFICATION OF DISAPPROVAL OF ALL OR PART OF AMENDMENT 60 TO ANNEX 4

To: The Secretary General
International Civil Aviation Organization
999 Robert-Bourassa Boulevard
Montréal, Quebec
Canada H3C 5H7

(State) _____ hereby wishes to disapprove the following parts of Amendment 60 to Annex 4:

Signature _____ Date _____

NOTES

1) If you wish to disapprove all or part of Amendment 60 to Annex 4, please dispatch this notification of disapproval to reach ICAO Headquarters by 16 July 2018. 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 60, 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 4. Separate notifications on this are necessary. (See Attachment C.)

3) Please use extra sheets as required.

— — — — — — — —

ATTACHMENT C to State letter AN 9/1.4-18/21

NOTIFICATION OF COMPLIANCE WITH OR DIFFERENCES FROM ANNEX 4

(including all amendments up to and including Amendment 60)

To: The Secretary General
International Civil Aviation Organization
999 Robert-Bourassa Boulevard
Montréal, Quebec
Canada H3C 5H7

1. No differences will exist on _____ between the national regulations and/or practices of **(State)** _____ and the provisions of Annex 4, including all amendments up to and including Amendment 60.

2. The following differences will exist on _____ between the regulations and/or practices of **(State)** _____ and the provisions of Annex 4, including Amendment 60 (Please see Note 2) below.)

a) Annex Provision (Please give exact paragraph reference)	**b) Details of Difference** (Please describe the difference clearly and concisely)	**c) Remarks** (Please indicate reasons for the difference)

(Please use extra sheets as required)

3. By the dates indicated below, **(State)** _____ will have complied with the provisions of Annex 4, including all amendments up to and including Amendment 60 for which differences have been notified in 2 above.

a) **Annex Provision** (Please give exact paragraph reference)	**b)** **Date**	**c)** **Comments**

(Please use extra sheets as required)

Signature _____ Date _____

NOTES

1) If paragraph 1 above is applicable to your State, 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) A detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.

3) Guidance on the notification of differences is provided in the Note on the Notification of Differences and in the *Manual on Notification and Publication of Differences* (Doc 10055).

4) Please send a copy of this notification to the ICAO Regional Office accredited to your Government.

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ATTACHMENT D to State letter AN 9/1.4-18/21

NOTE ON THE NOTIFICATION OF DIFFERENCES
(*Prepared and issued in accordance with instructions of the Council)*

1. *Introduction*

1.1 Article 38 of the *Convention on International Civil Aviation* ("Convention") requires that a Contracting State notify ICAO any time it does not comply with a Standard in all respects, it does not bring its regulations or practices into full accord with any Standard, or it adopts regulations or practices differing in any particular respect from the Standard.

1.2 The Assembly and the Council, when reviewing the notification of differences by Contracting States in compliance with Article 38 of the Convention, have repeatedly noted that the timeliness and currency of such notifications is not entirely satisfactory. Therefore, this note is issued to reiterate the primary purpose of Article 38 of the Convention and to facilitate the determination and notification of differences.

1.3 The primary purpose of the notification of differences is to promote safety, regularity 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 Standards contained in Annexes to the Convention.

1.4 Contracting States are, therefore, requested to give particular attention to the notification of differences with respect to Standards in all Annexes, as described in paragraph 4 b) 1) of the Resolution of Adoption.

1.5 Although differences from Recommended Practices are not notifiable under Article 38 of the Convention, the Assembly has urged Contracting States to extend the above considerations to Recommended Practices contained in Annexes to the Convention, as well.

2. *Notification of differences from Standards and Recommended Practices (SARPs)*

2. 1 Guidance to Contracting States in the notification of differences to Standards and Recommended Practices (SARPs) can only be given in very general terms. Contracting States are further reminded that compliance with SARPs generally extends beyond the issuance of national regulations and requires establishment of practical arrangements for implementation, such as the provision of facilities, personnel and equipment and effective enforcement mechanisms. Contracting States should take those elements into account when determining their compliance and differences. The following categories of differences are provided as a guide in determining whether a notifiable difference exists:

a) ***A Contracting State's requirement is more exacting or exceeds a SARP (Category A)***. This category applies when the national regulation and practices are more demanding than the corresponding SARP, or impose an obligation within the scope of the Annex which is not covered by the SARP. This is of particular importance where a Contracting State requires a higher standard which affects the operation of aircraft of other Contracting States in and above its territory;

b) ***A Contracting State's requirement is different in character or the Contracting State has established other means of compliance (Category B)****. This category applies, in particular, when the national regulation and practices are different in character from the corresponding SARP, or when the national regulation and practices differ in principle, type or system from the corresponding SARP, without necessarily imposing an additional obligation; and

c) ***A Contracting State's requirement is less protective, partially implemented or not implemented (Category C)***. This category applies when the national regulation and practices are less protective than the corresponding SARP; when no national regulation has been promulgated to address the corresponding SARP, in whole or in part; or when the Contracting State has not brought its practices into full accord with the corresponding SARP.

These categories do not apply to Not Applicable SARP. Please see the paragraph below.

2.2 **Not Applicable SARP.** When a Contracting State deems a SARP 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 from Annex 8 provisions related to the design and construction of an aircraft.

2.3 **Differences from appendices, tables and figures.** The material comprising a SARP includes not only the SARP itself, but also the appendices, tables and figures associated with the SARP. Therefore, differences from appendices, tables and figures are notifiable under Article 38. In order to file a difference against an appendix, table or figure, States should file a difference against the SARP that makes reference to the appendix, table or figure.

2.4 **Differences from definitions.** Contracting States should notify differences from definitions. The definition of a term used in a SARP does not have independent status but is an essential part of each SARP in which the term is used. Therefore, a difference from the definition of the term may result in there being a difference from any SARP in which the term is used. To this end, Contracting States should take into consideration differences from definitions when determining compliance or differences to SARPs in which the terms are used.

2.5 The notification of differences should be not only to the latest amendment but to the whole Annex, including the amendment. In other words, Contracting States that have already notified differences are requested to provide regular updates of the differences previously notified until the difference no longer exists.

2.6 Further guidance on the identification and notification of differences, examples of well-defined differences and examples of model processes and procedures for management of the notification of differences can be found in the *Manual on Notification and Publication of Differences* (Doc 10055).

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* The expression "different in character or other means of compliance" in b) would be applied to a national regulation and practice which achieve, by other means, the same objective as that of the corresponding SARPs or for other substantive reasons so cannot be classified under a) or c).

3. *Form of notification of differences*

3.1 Differences can be notified:

a) by sending to ICAO Headquarters a form on notification of compliance or differences; or

b) through the Electronic Filing of Differences (EFOD) System at www.icao.int/usoap.

3.2 When notifying differences, the following information should be provided:

a) the number of the paragraph or subparagraph which contains the SARP to which the difference relates*;

b) the reasons why the State does not comply with the SARP, or considers it necessary to adopt different regulations or practices;

c) a clear and concise description of the difference; and

d) intentions for future compliance and any date by which your Government plans to confirm compliance with and remove its difference from the SARP for which the difference has been notified.

3.3 The differences notified will be made available to other Contracting States, normally in the terms used by the Contracting State when making the notification. In the interest of making the information as useful as possible, Contracting States are requested to ensure that:

a) statements be as clear and concise as possible and be confined to essential points;

b) the provision of extracts from national regulations not be considered as sufficient to satisfy the obligation to notify differences; and

c) general comments, unclear acronyms and references be avoided.

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* This applies only when the notification is made under 3.1 a).

ATTACHMENT E to State letter AN 9/1.4-18/21

IMPLEMENTATION TASK LIST AND OUTLINE OF GUIDANCE MATERIAL IN RELATION TO AMENDMENT 60 TO ANNEX 4

1. IMPLEMENTATION TASK LIST

1.1 Essential steps to be followed by a State in order to implement the proposed amendment to Annex 4:

a) identification of the rule-making process necessary to transpose the modified ICAO provisions into the national regulations;

b) establishment of a national implementation plan that takes into account the modified ICAO provisions;

c) drafting of the modification to the national regulations and means of compliance;

d) official adoption of the national regulations and means of compliance; and

e) filing of State differences with ICAO, if necessary.

2. STANDARDIZATION PROCESS

2.1 Effective date: 16 July 2018

2.2 Applicability date: 8 November 2018

2.3 Embedded applicability date (s): N/A

3. SUPPORTING DOCUMENTATION

3.1 **ICAO documentation:**

Title/Doc no.	**Type (PANS/TI/Manual/Circ.)**	**Publication date**
Doc 8168, *Procedures for Air Navigation Services — Aircraft Operations*, Volume I — *Flight Procedures* and Volume II — *Construction of Visual and Instrument Flight Procedures*	PANS	November 2018

Title/Doc no.	Type (PANS/TI/Manual/Circ.)	Publication date
Doc 10066, *Procedures for Air Navigation Services — Aeronautical Information Management*	PANS	November 2018
Doc 8126, *Aeronautical Information Services Manual*	Manual	November 2018

3.2 **External documentation:**

Title	External Organization	Publication date
Nil		

4. IMPLEMENTATION ASSISTANCE TASKS

Type	Global	Regional
Workshops		PIRGs
		AIM Conferences/workshops

5. UNIVERSAL SAFETY OVERSIGHT AUDIT PROGRAMME (USOAP)

5.1 Changes are envisaged in the protocol questions due to the modification of references to Annex 15 and the new PANS-AIM.

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ATTACHMENT F to State letter AN 9/1.4-18/21

IMPACT ASSESSMENT IN RELATION TO AMENDMENT 60 TO ANNEX 4

1. INTRODUCTION

1.1 Amendment 60 to Annex 4 is intended to:

a) address the proposals developed as a result of the restructuring of Annex 15 — *Aeronautical Information Services* concerning data quality requirements and performance-based data error detection requirements; and

b) address the revised definition and description of "procedure altitude/height" in the *Procedures for Air Navigation Services — Aircraft Operations*, Volume I — *Flight Procedures* and Volume II — *Construction of Visual and Instrument Flight Procedures* (Doc 8168).

2. IMPACT ASSESSMENT

2.1 Consequential amendment as a result of the restructuring of Annex 15 and proposed new PANS-AIM (Doc 10066)

2.1.1 *Safety impact:* Positive. The proposed amendment ensures alignment among requirements, as contained in Annex 4, Annex 15 and the PANS-AIM (Doc 10066), and avoids misinterpretation. Additionally, the introduction of performance-based requirements for data error detection allows for greater flexibility in terms of implementation techniques, leading to more efficient processes and allowing an enhanced output in terms of quality. This results in a reduced risk of providing erroneous data and increases safety.

2.1.2 *Financial impact:* Minimal financial impact with the implementation of this proposal.

2.1.3 *Security impact:* No security impact is envisaged with the implementation of this proposal.

2.1.4 *Environmental impact:* No environmental impact is envisaged with the implementation of this proposal.

2.1.5 *Efficiency impact:* Positive. The proposed amendment ensures alignment among requirements, as contained in Annex 4, Annex 15 and the PANS-AIM (Doc 10066), and are retrieved in a more efficient way as they are cross-referenced. Therefore, the change is considered beneficial.

2.1.6 *Expected implementation time:* Up to one year from the applicability date.

2.2 Consequential amendment to address the revised definition and description of “procedure altitude/height”

2.2.1 *Safety impact:* The proposed amendment expands the application of procedure altitude/height beyond the intermediate and final approach segments. It also provides for a more consistent use of the term “procedure altitude/height” across the ICAO documentation. This will have a positive impact on the safety of operations.

2.2.2 *Financial impact:* Negligible financial impact with the implementation of this proposal.

2.2.3 *Security impact:* There is no apparent impact on security.

2.2.4 *Environmental impact:* The application of procedure altitude/height outside the intermediate and final approach segments results in a more standardized, repeatable vertical profile in other phases of flight. With well-defined vertical profiles for arrival routes, aircraft may be kept higher for a longer time, thus reducing the noise footprint and enhancing efficiency.

2.2.5 *Efficiency impact:* Well defined vertical flight profiles can aid in airspace planning utilization, especially in the terminal area. This has a positive impact on the efficiency of operations.

2.2.6 *Expected implementation time:* It is expected that developing policies for implementing the application of procedure altitudes/heights to other than the intermediate and final approach segment will require two to five years. Industry will be able to implement this as soon as States develop policy.

— END —

AMENDMENT No. 60

TO THE

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

AERONAUTICAL CHARTS

ANNEX 4

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

The amendment to Annex 4 contained in this document was adopted by the Council of ICAO on **9 March 2018**. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before **16 July 2018** will become effective on that date and will become applicable on **8 November 2018** as specified in the Resolution of Adoption. (State letter AN 9/1.4-18/21 refers.)

MARCH 2018

INTERNATIONAL CIVIL AVIATION ORGANIZATION

AMENDMENT 60 TO THE INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

ANNEX 4 — AERONAUTICAL CHARTS

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 9 March Amendment 60 to the International Standards and Recommended Practices contained in the document entitled *International Standards and Recommended Practices, Aeronautical Charts* which for convenience is designated Annex 4 to the Convention;

2. *Prescribes* 16 July 2018 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 8 November 2018;

4. *Requests the Secretary General*:

a) to notify each Contracting State immediately of the above action and immediately after 16 July 2018 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 8 November 2018 between its national regulations or practices and the provisions of the Standards in the Annex as hereby amended, such notification to be made before 8 October 2018, and thereafter to notify the Organization of any further differences that arise;

2) to notify the Organization before 8 October 2018 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.

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NOTES ON THE PRESENTATION OF THE AMENDMENT 60 TO ANNEX 4

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:

1. ~~Text to be deleted is shown with a line through it.~~	text to be deleted
2. New text to be inserted is highlighted with grey shading.	new text to be inserted
3. ~~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 AMENDMENT 60

TO THE INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

AERONAUTICAL CHARTS

ANNEX 4
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

. . .

TABLE OF CONTENTS

~~APPENDIX 6. Aeronautical data quality requirements . . . . . .APP 6-1~~

. . .

CHAPTER 1. DEFINITIONS, APPLICABILITY AND AVAILABILITY

1.1 Definitions

. . .

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

. . .

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

. . .

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

. . .

CHAPTER 2. GENERAL SPECIFICATIONS

. . .

2.17 Aeronautical data

2.17.1 Each Contracting State shall take all necessary measures to introduce a properly organized quality system containing procedures, processes and resources necessary to implement quality management at each function stage as outlined in Annex 15, 3.~~1.7~~6. The execution of such quality management shall be made demonstrable for each function stage, when required. In addition, States shall ensure that established procedures exist in order that aeronautical data at any moment is traceable to its origin so to allow any data anomalies or errors, detected during the production/maintenance phases or in the operational use, to be corrected.

Note.— Specifications governing the quality system are given in Annex 15, Chapter 3.

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

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

2.17.3 Contracting States shall ensure that integrity of aeronautical data is maintained throughout the data process from ~~survey/origin~~ origination to distribution to the next intended user.

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

~~Based on the applicable integrity classification, the validation and verification procedures shall:~~

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

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

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

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

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

~~2.17.4 Aeronautical data quality requirements related to the integrity and data classification shall be as provided in Tables 1 to 6 in Appendix 6.~~

Editorial Note.— Renumber subsequent paragraphs.

. . .

2.18 Common reference systems

2.18.1 Horizontal reference system

. . .

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

Note 1.— Specifications ~~governing~~ concerning the determination and reporting (accuracy of field work and data integrity) of WGS-84-related aeronautical coordinates for geographical positions established by air traffic 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 in Table A5-1 of Appendix 5 and Table A1-1 of Appendix 1, respectively~~.

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

. . .

2.18.2 Vertical reference system

. . .

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

Note 1.— Specifications ~~governing~~ concerning the determination and reporting (accuracy of field work and data integrity) of elevation and geoid undulation at specific positions at aerodromes/heliports are given in Annex 14, Volumes I and II, Chapter 2~~, and in Table A5-2 of Appendix 5 and Table A1-2 of Appendix 1, respectively~~.

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

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

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

. . .

CHAPTER 5. AERODROME TERRAIN AND OBSTACLE CHART — ICAO (ELECTRONIC)

. . .

5.4 Chart coverage

The extent of each chart shall be sufficient to cover Area 2 as specified in Annex 15, ~~10.1~~Chapter 5.

. . .

5.5 Chart content

. . .

5.5.2 Terrain feature

5.5.2.1 The terrain feature, and associated attributes, to be portrayed and database-linked to the chart shall be based on the ~~electronic~~ terrain data sets which satisfy the requirements of Annex 15, Chapter ~~10~~5 ~~and Appendix 8~~.

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

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

Note.— In accordance with Annex 15, Chapter ~~10~~5 ~~and Appendix 8~~ and PANS-AIM (Doc 10066), Chapter 5 and Appendices 1 and 8, the DEM for Area 2 post spacing (grid) is specified at 1 arc second (approximately 30 m).

5.5.2.3 **Recommendation**.— *Representation of terrain surface should be provided as a selectable layer of contour lines in addition to the DEM.*

5.5.2.4 **Recommendation.—** *An ortho-rectified image which matches the features on the DEM with features on the overlying image should be used to enhance the DEM. The image should be provided as a separate selectable layer.*

5.5.2.5 The portrayed terrain feature shall be linked to the following associated attributes in the database(s):

a) horizontal positions of grid points in geographic coordinates and elevations of the points;

b) surface type;

c) contour line values, if provided; and

d) names of cities, towns and other prominent topographic features.

5.5.2.6 **Recommendation.**— ~~*Other*~~ *Additional terrain attributes ~~specified in Annex 15, Appendix 8, Table A8-3, and~~ provided in the database(s) should be linked to the portrayed terrain feature.*

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

5.5.3 Obstacle features

5.5.3.1 Obstacle features, and associated attributes, portrayed or database-linked to the chart shall be based on ~~electronic~~ obstacle data sets which satisfy the requirements of Annex 15, Chapter ~~10~~5 ~~and Appendix 8~~.

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

5.5.3.2 Each obstacle shall be portrayed by an appropriate symbol and obstacle identifier.

5.5.3.3 The portrayed obstacle feature shall be linked to the following associated attributes in the database(s):

a) horizontal position in geographic coordinates and associated elevation;

b) obstacle type; and

c) obstacle extent, if appropriate.

5.5.3.4 **Recommendation.**— *~~Other~~ Additional obstacle attributes ~~specified in Annex 15, Appendix 8, Table A8-4, and~~ provided in the database(s) should be linked to the portrayed obstacle feature.*

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

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5.5.4 Aerodrome features

5.5.4.1 Aerodrome features, and associated attributes, portrayed and database-linked to the chart shall be based on aerodrome data which satisfy the requirements of ~~Annex 14, Volume I, Appendix 5 and Annex 15, Appendix 7~~ Annex 15, Chapter 5.

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

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5.6 Accuracy and resolution

5.6.1 The order of accuracy of aeronautical, terrain and obstacle data shall be in accordance with its intended use ~~as specified in Annex 11, Appendix 5, and Annex 14, Volume I, Appendix 5, and Volume II, Appendix 1. The order of accuracy of terrain and obstacle data shall be as specified in Annex 15, Appendix 8.~~

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

5.6.2 The aeronautical, terrain and obstacle data resolution shall be commensurate with the actual data accuracy ~~be as specified in Annex 15, Appendix 7, while the resolution for terrain and obstacle data shall be as specified in Annex 15, Appendix 8~~.

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

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~~APPENDIX 6. AERONAUTICAL DATA QUALITY REQUIREMENTS~~

Editorial Note.— Delete Appendix 6 in total.

CHAPTER 2. GENERAL SPECIFICATIONS

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2.17 Aeronautical data

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2.17.5~~4~~ ~~Electronic aeronautical data sets shall be protected by the inclusion in the data sets of a 32-bit cyclic redundancy check (CRC) implemented by the application dealing with the data sets. This shall apply to the protection of all integrity levels of data sets as specified in 2.17.3~~ Digital data error detection techniques shall be used during the transmission and/or storage of aeronautical data and digital data sets.

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

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

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