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Commission Regulation (EU) No 73/2010

of 26 January 2010

laying down requirements on the quality of aeronautical data and aeronautical information for the single European sky

(Text with EEA relevance)

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Commission Regulation (EU) No 73/2010

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laying down requirements on the quality of aeronautical data and aeronautical information for the single European sky

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EC) No 552/2004 of the European Parliament and of the Council of 10 March 2004 on the interoperability of the European Air Traffic Management network (the interoperability Regulation) and in particular Article 3(5) thereof,

Having regard to Regulation (EC) No 549/2004 of the European Parliament and of the Council of 10 March 2004 laying down the framework for the creation of the single European sky (the framework Regulation), and in particular Article 8(1) thereof,

Whereas:

(1) Aeronautical data and aeronautical information of appropriate quality are required to ensure safety and support new concepts of operation within the European air traffic management network (hereinafter EATMN).

(2) The International Civil Aviation Organisation (hereinafter ICAO) has defined aeronautical data and aeronautical information quality requirements in terms of accuracy, resolution and integrity that should be met and maintained within the EATMN when processing aeronautical data and aeronautical information.

(3) Those ICAO requirements are considered to provide a sufficient baseline for current data quality requirements but there are known deficiencies that should be addressed, notably to support future applications.

(4) Annex 15 to the Convention on International Civil Aviation (hereinafter the Chicago Convention) should provide the main baseline for the data quality requirements. References to provisions of Annex 15 to the Chicago Convention should not automatically imply a reference to Annex 4 to the Chicago Convention or other Annexes to the Chicago Convention.

(5) Examination of the current situation has demonstrated that the quality requirements relating to aeronautical data and aeronautical information are not always met within the EATMN, in particular the accuracy and integrity requirements.

(6) A significant amount of paper-based, manual activity still takes place within the aeronautical data chain, which leads to significant opportunities for the introduction of errors and the degradation of data quality. Measures should therefore be adopted to improve the situation.

(7) Eurocontrol has been mandated in accordance with Article 8(1) of Regulation (EC) No 549/2004 to develop requirements supplementing and strengthening Annex 15 to the Chicago Convention in order to achieve aeronautical information of sufficient quality. This Regulation is based on the resulting mandate report of 16 October 2007.

(8) In accordance with the requirements of Regulation (EC) No 552/2004, aeronautical information should be provided progressively in an electronic form, based on a commonly agreed and standardised data set. Those requirements should eventually be applicable to all aeronautical data and aeronautical information within the scope of this Regulation.

(9) This Regulation should not cover military operations and training as referred to in Article 1(2) of Regulation (EC) No 549/2004.

(10) Military organisations providing aeronautical information for use in general air traffic operations are an essential part of the aeronautical data process and Member States should ensure that the quality of such data is sufficient to meet its intended use.

(11) The timely provision and publication of new or amended aeronautical data and aeronautical information in accordance with the amendments and update cycle requirements of ICAO and Member States are considered essential to support the achievement of data quality.

(12) Member States should exercise effective management and control over all aeronautical data and aeronautical information origination activities to ensure that data is provided with sufficient quality to meet its intended use.

(13) The constituents and procedures that are used by originators of data need to be interoperable with the systems, constituents and procedures used by aeronautical information service providers in order to enable safe, seamless and efficient operation of the EATMN.

(14) With a view to maintaining or enhancing existing safety levels of operations, Member States should be required to ensure that the parties concerned carry out a safety assessment including hazard identification, risk assessment and mitigation processes. Harmonised implementation of these processes to the systems covered by this Regulation requires the identification of specific safety requirements for all interoperability and performance requirements.

(15) In accordance with Article 3(3)(d) of Regulation (EC) No 552/2004, implementing rules for interoperability should describe the specific conformity assessment procedures to be used to assess the conformity or suitability for use of constituents as well as the verification of systems.

(16) This Regulation has an impact on a wide range of parties. It should therefore take into account the individual capabilities and levels of involvement within the data chain of the parties, to ensure that provisions are applied progressively to achieve required data quality.

(17) The measures provided for in this Regulation are in accordance with the opinion of the Single Sky Committee,

HAS ADOPTED THIS REGULATION:

CHAPTER I

GENERAL PROVISIONS

Article 1

Subject matter

This Regulation lays down the requirements on the quality of aeronautical data and aeronautical information in terms of accuracy, resolution and integrity.

Article 2

Scope

1.This Regulation shall apply to European air traffic management network (EATMN) systems, their constituents and associated procedures involved in the origination, production, storage, handling, processing, transfer and distribution of aeronautical data and aeronautical information.

It shall apply to the following aeronautical data and aeronautical information:

(a) the integrated aeronautical information package as defined in Article 3(7) made available by Member States, with the exception of aeronautical information circulars;
(b) electronic obstacle data, or elements thereof, where made available by Member States;
(c) electronic terrain data, or elements thereof, where made available by Member States;
(d) aerodrome mapping data, where made available by Member States.

2.This Regulation shall apply to the following parties:

(a) air navigation service providers;
(b) operators of those aerodromes and heliports, for which instrument flight rules (IFR) or Special-visual flight rules (VFR) procedures have been published in national aeronautical information publications;
(c) public or private entities providing, for the purposes of this Regulation:
    (i) services for the origination and provision of survey data;
    (ii) procedure design services;
    (iii) electronic terrain data;
    (iv) electronic obstacle data.

3.This Regulation shall apply up to the moment when the aeronautical data and/or aeronautical information are made available by the aeronautical information service provider to the next intended user.

In the case of distribution by physical means, this Regulation shall apply up to the moment when the aeronautical data and/or aeronautical information has been made available to the organisation responsible for providing the physical distribution service.

In the case of automatic distribution through the use of a direct electronic connection between the aeronautical information service provider and the entity receiving the aeronautical data and/or aeronautical information, this Regulation shall apply:

(a) up to the moment when the next intended user accesses and extracts aeronautical data and/or aeronautical information held by the aeronautical information service provider; or

(b) up to the moment when the aeronautical data and/or aeronautical information is delivered by the aeronautical information service provider, into the next intended user's system.

Article 3

Definitions

For the purpose of this Regulation, the definitions in Article 2 of Regulation (EC) No 549/2004 shall apply. The following definitions shall also apply:

1.'aeronautical data' means a representation of aeronautical facts, concepts or instructions in a formalised manner suitable for communication, interpretation or processing;

2.'aeronautical information' means information resulting from the assembly, analysis and formatting of aeronautical data;

3.'data quality' means a degree or level of confidence that the data provided meets the requirements of the data user in terms of accuracy, resolution and integrity;

4.'accuracy' means a degree of conformance between the estimated or measured value and the true value;

5.'resolution' means a number of units or digits to which a measured or calculated value is expressed and used;

6.'integrity' means a degree of assurance that a data item and its value have not been lost or altered since the data origination or authorised amendment;

7.' integrated aeronautical information package ' (hereinafter IAIP) means a package in paper, or electronic media, which consists of the following elements:

(a) aeronautical information publications (hereinafter AIP), including amendments;

(b) supplements to the AIP;

(c) the NOTAM, as defined in point 17 and pre-flight information bulletins;

(d) aeronautical information circulars; and

(e) checklists and lists of valid NOTAMs;

8.' obstacle data ' means data concerning all fixed (whether temporary or permanent) and mobile objects, or parts thereof, that are located on an area intended for the surface movement of aircraft or that extend above a defined surface intended to protect aircraft in flight or that stand outside those defined surfaces and that have been assessed as being a hazard to air navigation;

9.'terrain data' means data about the surface of the earth containing naturally occurring features such as mountains, hills, ridges, valleys, bodies of water, permanent ice and snow, and excluding obstacles;

10.' aerodrome mapping data ' means data collected for the purpose of compiling aerodrome mapping information;

11.'survey data' means geospatial data that is determined by measurement or survey;

12.'procedure design' means the combination of aeronautical data with specific flight instructions to define instrument arrival and/or departure procedures that ensure adequate standards of flight safety;

13.‘ aeronautical information service provider ’ means the organisation responsible for the provision of an aeronautical information service, certified in accordance with the requirements of Commission Implementing Regulation (EU) No 1035/2011;

14.‘next intended user’ means the entity that receives the aeronautical information from the aeronautical information service provider;

15.‘direct electronic connection’ means a digital connection between computer systems such that data may be transferred between them without manual interaction;

16.‘data item’ means a single attribute of a complete data set, which is allocated a value that defines its current status;

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

18.‘digital NOTAM’ means a data set that contains the information included in a NOTAM in a structured format which can be fully interpreted by an automated computer system without human interpretation;

19.‘data originator’ means an entity responsible for data origination;

20.‘data origination’ means the creation of a new data item with its associated value, the modification of the value of an existing data item or the deletion of an existing data item;

21.‘period of validity’ means the period between the date and time on which aeronautical information is published and the date and time on which the information ceases to be effective;

22.‘data validation’ means the process of ensuring that data meets the requirements for the specified application or intended use;

23.‘data verification’ means the evaluation of the output of an aeronautical data process to ensure correctness and consistency with respect to the inputs and applicable data standards, rules and conventions used in that process;

24.‘ critical data ’ means data as classified under point (c) of the integrity classification defined in Chapter 1, Section 1.1 of Annex 15 to the Chicago Convention on International Civil Aviation (hereinafter the Chicago Convention);

25.‘ essential data ’ means data as classified under point (b) of the integrity classification defined in Chapter 1, Section 1.1 of Annex 15 to the Chicago Convention.

CHAPTER II

INTEROPERABILITY AND PERFORMANCE REQUIREMENTS

Article 4

Data set

The parties referred to in Article 2(2) shall provide aeronautical data and aeronautical information in accordance with the data set specifications described in Annex I.

Article 5

Data exchange

1.The parties referred to in Article 2(2) shall ensure that the aeronautical data and aeronautical information referred to in the second subparagraph of Article 2(1) are transferred between themselves by direct electronic connection.

2.Air navigation service providers shall ensure that the aeronautical data and aeronautical information referred to in the second subparagraph of Article 2(1) are transferred between themselves in accordance with the data exchange format requirements laid down in Annex II.

3.Member States may exclude digital NOTAM from the data exchange format referred to in paragraph 2.

4.Aeronautical information service providers shall ensure that all aeronautical data and aeronautical information within the AIPs, AIP amendments and AIP supplements provided by a Member State are made available to the next intended user, as a minimum:

(a) in accordance with the publication requirements identified in the ICAO standards referred to in points 4 and 8 of Annex III;

(b) in a way that allows the content and format of the documents to be directly readable on a computer screen; and

(c) in accordance with the data exchange format requirements laid down in Annex II.

Article 6

Data quality

1.Member States shall ensure that air navigation service providers comply with the data quality requirements laid down in Annex IV, Part A.

2.When providing aeronautical data and/or aeronautical information, the parties referred to in Article 2(2) shall comply with the evidence requirements laid down in Annex IV, Part B.

3.When exchanging aeronautical data and/or aeronautical information between themselves, the parties referred to in Article 2(2), shall establish formal arrangements in accordance with the requirements laid down in Annex IV, Part C.

4.When acting as data originators, the parties referred to in Article 2(2), shall comply with the data origination requirements laid down in Annex IV, Part D.

5.Aeronautical information service providers shall ensure that aeronautical data and aeronautical information provided by data originators not referred to in Article 2(2) are made available to the next intended user with sufficient quality to meet the intended use.

6.When acting as the entity responsible for the official request for a data origination activity, the parties referred to in Article 2(2) shall ensure that:

(a) the data are created, modified or deleted in compliance with their instructions;

(b) without prejudice to Annex IV, Part C, their data origination instructions contain, as a minimum:

  (i) an unambiguous description of the data that are to be created, modified or deleted;

  (ii) confirmation of the entity to which the data are to be provided;

  (iii) the date and time by which the data are to be provided;

  (iv) the data origination report format to be used by the data originator.

7.The parties referred to in Article 2(2) shall comply with the data process requirements laid down in Annex IV, Part E.

8.The parties referred to in Article 2(2) shall ensure that error reporting, feedback and rectification mechanisms are established and operated in accordance with the requirements laid down in Annex IV, Part F.

Article 7

Consistency, timeliness and personnel performance

1.Where aeronautical data or aeronautical information is duplicated in the AIP of more than one Member State, the aeronautical information service providers responsible for those AIPs shall establish mechanisms to ensure consistency between the duplicated information.

2.Aeronautical information service providers shall ensure that aeronautical data and aeronautical information items published in the AIP of their Member State are annotated to indicate those that do not meet the data quality requirements laid down in this Regulation.

3.Aeronautical information service providers shall ensure that the most current update cycles applicable to AIP amendments and AIP supplements are made publicly available.

4.The parties referred to in Article 2(2) shall ensure that their personnel responsible for tasks in the provision of aeronautical data or aeronautical information are made aware of and apply:

(a) the requirements for AIP amendments, AIP supplements and NOTAM laid down in the ICAO standards referred to in points 5, 6 and 7 of Annex III;

(b) the update cycles applicable to the issue of AIP amendments and supplements referred to in point (a) of this paragraph for the areas for which they are providing aeronautical data or aeronautical information.

5. Without prejudice to Implementing Regulation (EU) No 1035/2011, the parties referred to in Article 2(2) shall ensure that their personnel responsible for tasks in the provision of aeronautical data or aeronautical information are adequately trained, competent and authorised for the job they are required to do.

Article 8

Tools and software requirements

The parties referred to in Article 2(2) shall ensure that all tools and software used to support the origination, production, storage, handling, processing and transfer of aeronautical data and/or aeronautical information comply with the requirements laid down in Annex V.

Article 9

Data protection

1.The parties referred to in Article 2(2) shall ensure that aeronautical data and aeronautical information are protected in accordance with the requirements laid down in Annex VI.

2.The parties referred to in Article 2(2) shall ensure that traceability is maintained on each data item during its period of validity and for at least 5 years following the end of that period or until 5 years after the end of the period of validity for any data item calculated or derived from it, whichever is later.

CHAPTER III

QUALITY, SAFETY AND SECURITY MANAGEMENT REQUIREMENTS

Article 10

Management requirements

1. Without prejudice to Implementing Regulation (EU) No 1035/2011, the parties referred to in Article 2(2) shall implement and maintain a quality management system covering their aeronautical data and aeronautical information provision activities, in accordance with the requirements laid down in Annex VII, Part A.

2.The parties referred to in Article 2(2) shall ensure that the quality management system referred to in paragraph 1 of this Article defines procedures to meet the safety management objectives laid down in Annex VII, Part B and the security management objectives laid down in Annex VII, Part C.

3.The parties referred to in Article 2(2) shall ensure that any changes to the existing systems referred to in the first subparagraph of Article 2(1) or the introduction of new systems are preceded by a safety assessment, including hazard identification, risk assessment and mitigation, conducted by the parties concerned.

4.During that safety assessment, the requirements referred to in Article 7(3), Annex I, Annex II and points 1 and 2 of Part A of Annex IV shall be considered as safety requirements and shall be taken into consideration, as a minimum.

CHAPTER IV

CONFORMITY ASSESSMENT AND ADDITIONAL REQUIREMENTS

Article 11

Conformity or suitability for use of constituents

Before issuing EC declarations of conformity or suitability for use as referred to in Article 5 of Regulation (EC) No 552/2004, manufacturers of constituents of the systems referred to in the first subparagraph of Article 2(1) of this Regulation, or their authorised representatives established in the Union, shall assess the conformity or suitability for use of those constituents in compliance with the requirements laid down in Annex VIII.

Article 12

Verification of systems

1.Air navigation service providers which can demonstrate or have demonstrated that they fulfil the conditions laid down in Annex IX shall conduct a verification of the systems referred to in the first subparagraph of Article 2(1) in accordance with the requirements laid down in Annex X, Part A.

2.Air navigation service providers which cannot demonstrate that they fulfil the conditions laid down in Annex IX shall subcontract to a notified body a verification of the systems referred to in the first subparagraph of Article 2(1). That verification shall be conducted in accordance with the requirements laid down in Annex X, Part B.

Article 13

Additional requirements

The parties referred to in Article 2(2)(b) and (c) shall:

(a) ensure the security clearance of their personnel responsible for tasks in the origination, production, storage, handling, processing, transfer and distribution of aeronautical data or aeronautical information, as appropriate;

(b) ensure that their personnel responsible for tasks in the provision of aeronautical data or aeronautical information are made duly aware of the requirements laid down in this Regulation;

(c) develop and maintain operations manuals containing the necessary instructions and information to enable their personnel responsible for tasks in the provision of aeronautical data or aeronautical information to apply this Regulation;

(d) ensure that the manuals referred to in point (c) are accessible and kept up to date and that their update and distribution are subject to appropriate quality and documentation configuration management;

(e) ensure that their working methods and operating procedures comply with this Regulation.

CHAPTER V

FINAL PROVISIONS

Article 14

Transitional provisions

1.Member States which, prior to the entry into force of this Regulation, have notified a relevant difference to ICAO in accordance with Article 38 of the Chicago Convention, may maintain their national provisions on the subjects listed in Annex XI to this Regulation until 30 June 2014 at the latest.

2.Aeronautical data and aeronautical information published before 1 July 2013 and not amended shall be brought in line with this Regulation by 30 June 2017 at the latest.

Article 15

Entry into force and application

1.This Regulation shall enter into force on the 20th day following its publication in the Official Journal of the European Union.

It shall apply from 1 July 2013.

2.By way of derogation from the second subparagraph of paragraph 1, Article 4, Article 5(1), Article 5(2), Article 5(3) and Article 5(4)(c) shall apply from 1 July 2014.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

ANNEX I

DATA SET SPECIFICATIONS REFERRED TO IN ARTICLE 4

PART A IAIP, aerodrome mapping and electronic obstacle data

1.The aeronautical data and aeronautical information referred to in points (a), (b) and (d) of the second subparagraph of Article 2(1) shall be provided according to a common data set specification which shall:

(a) be documented either:

- by using the unified modelling language (UML), specified in the document referred to in point 13 of Annex III, in the form of class diagrams and associated definitions for classes, attributes, associations and lists of values, or
- by using a feature catalogue specified in accordance with the ISO standard referred to in point 25 of Annex III;

(b) define, as individual data elements, each aeronautical feature for which the information is requested to be published in accordance with the ICAO standards referred to in point 10 of Annex III and the Eurocae document referred to in point 24 of Annex III;

(c) provide for each attribute the definition of its allowable values in the form of a data type, a range of values or an enumerated list;

(d) include the definition of a temporal model, UTC based, which can express the complete lifecycle of an aeronautical feature:

- from the creation date and time to the date and time of permanent withdrawal,
- including the permanent changes that create new baselines for that feature;

(e) include the definition of the rules that may constrain the possible values of the feature properties or the temporal variation of these values. This shall include, as a minimum:

- constraints that impose accuracy, resolution and integrity for positional (horizontal and vertical) data,
- constraints that impose the timeliness of the data;

(f) apply a naming convention for features, attributes and associations, which avoids the use of abbreviations;

(g) base the description of geometrical elements (point, curve, surface) on the ISO standard referred to in point 14 of Annex III;

(h) base the description of the metadata information on the ISO standard referred to in point 15 of Annex III;

(i) include the metadata items listed in Annex I, Part C.

2.Regarding the ISO standards, the relevant certificate issued by an appropriately accredited organisation, shall be considered as a sufficient means of compliance. The parties referred to in Article 2(2) shall accept the disclosure of the documentation related to the certification to the national supervisory authority upon the latter’s request.

PART B Electronic terrain data sets

The electronic terrain data referred to in point (c) of the second subparagraph of Article 2(1) shall:

(a) be provided digitally in accordance with the ICAO standards referred to in points 9, 9a and 12 of Annex III;

(b) include the metadata items listed in Annex I, Part C.

PART C Metadata

The metadata for the data set specifications defined in Part A and Part B shall include the following items, as a minimum:

(a) the data originator of the data;

(b) amendments made to the data;

(c) the persons or organisations that have interacted with the data and when;

(d) details of any validation and verification of the data that has been performed;

(e) effective start date and time of the data;

(f) for geospatial data:

- the earth reference model used,
- the coordinate system used;

(g) for numerical data:

- the statistical accuracy of the measurement or calculation technique used,
- the resolution,
- the confidence level as required by the ICAO standards referred to in points 1 and 12 of Annex III and in other relevant ICAO standards;

(h) details of any functions applied if data has been subject to conversion/transformation;

(i) details of any limitations on the use of the data.

ANNEX II

AERONAUTICAL DATA EXCHANGE FORMAT REQUIREMENTS REFERRED TO IN ARTICLE 5

PART A IAIP, aerodrome mapping and electronic obstacle data

1.The aeronautical data and aeronautical information referred to in points (a), (b) and (d) of the second subparagraph of Article 2(1) shall be formatted in accordance with a common specification, which shall:

- use the extensible mark-up language (XML) specification as defined in the ISO standard referred to in Annex III point 17 for data encoding,
- be expressed in the form of an XML schema; in addition, a schematron as defined in the ISO standard referred to in point 19 of Annex III may be used for expressing business rules,
- enable the exchange of data for both individual features and feature collections,
- enable the exchange of baseline information as a result of permanent changes,

- be structured in accordance with the features, attributes and associations of the data set definition described in Annex I, Part A; the mapping rules shall be documented,
- implement strictly the enumerated lists of values and range of values defined for each attribute in the data set,
- comply with the geography mark-up language (GML) specification, as defined in the reference referred to in point 18 of Annex III, for the encoding of geographical information.

2.Regarding the ISO standards, the relevant certificate issued by an appropriately accredited organisation, shall be considered as a sufficient means of compliance. The parties referred to in Article 2(2) shall accept the disclosure of the documentation related to the certification to the national supervisory authority upon the latter’s request.

PART B Electronic terrain data

1.The electronic terrain data referred to in point (c) of the second subparagraph of Article 2(1) shall be provided in a common format compliant with the ISO standards referred to in points 14 to 18 of Annex III.

2.Regarding the ISO standards, the relevant certificate issued by an appropriately accredited organisation, shall be considered as a sufficient means of compliance. The parties referred to in Article 2(2) shall accept the disclosure of the documentation related to the certification to the national supervisory authority upon the latter’s request.

ANNEX III PROVISIONS REFERRED TO IN ARTICLES AND ANNEXES

1. Chapter 3, Section 3.7 (Quality management system) of Annex 15 to the Chicago Convention — Aeronautical Information Services (Fourteenth edition — July 2013, incorporating Amendment No 37).

2. Chapter 3, Section 1.2.1 (Horizontal reference system) of Annex 15 to the Chicago Convention — Aeronautical Information Services (Fourteenth edition — July 2013, incorporating Amendment No 37).

3. Chapter 3, Section 1.2.2 (Vertical reference system) of Annex 15 to the Chicago Convention — Aeronautical Information Services (Fourteenth edition — July 2013, incorporating Amendment No 37).

4. Chapter 4 (Aeronautical Information Publications (AIP)) of Annex 15 to the Chicago Convention — Aeronautical Information Services (Fourteenth edition — July 2013, incorporating Amendment No 37).

5. Chapter 4, Section 4.3 (Specifications for AIP Amendments) of Annex 15 to the Chicago Convention — Aeronautical Information Services (Fourteenth edition — July 2013, incorporating Amendment No 37).

6. Chapter 4, Section 4.4 (Specifications for AIP Supplements) of Annex 15 to the Chicago Convention — Aeronautical Information Services (Fourteenth edition — July 2013, incorporating Amendment No 37).

7. Chapter 5 (NOTAM) of Annex 15 to the Chicago Convention — Aeronautical Information Services (Fourteenth edition — July 2013, incorporating Amendment No 37).

8. Chapter 6, Section 6.2 (Provision of information in paper copy form) of Annex 15 to the Chicago Convention — Aeronautical Information Services (Fourteenth edition — July 2013, incorporating Amendment No 37).

9. Chapter 10, Section 10.1 (Coverage areas and requirements for data provision) of Annex 15 to the Chicago Convention — Aeronautical Information Services (Fourteenth edition — July 2013, incorporating Amendment No 37).

9a Chapter 10, Section 10.2 (Terrain data set — content, numerical specification and structure) of Annex 15 to the Chicago Convention — Aeronautical Information Services (Fourteenth edition — July 2013, incorporating Amendment No 37

10. Appendix 1 (Contents of Aeronautical Information Publication (AIP)) of Annex 15 to the Chicago Convention — Aeronautical Information Services (Fourteenth edition — July 2013, incorporating Amendment No 37).

11. Appendix 7 (Aeronautical data publication resolution and integrity classification) of Annex 15 to the Chicago Convention — Aeronautical Information Services (Fourteenth edition — July 2013, incorporating Amendment No 37).

12. Appendix 8 (Terrain and obstacle data requirements) of Annex 15 to the Chicago Convention — Aeronautical Information Services (Fourteenth edition — July 2013, incorporating Amendment No 37).

13. Object Management Group Unified Modelling Language (UML) Specification Version 2.1.1.

14. International Organisation for Standardisation, ISO 19107:2003 — Geographic information — Spatial schema (Edition 1 — 8.5.2003).

15. International Organisation for Standardisation, ISO 19115:2003 — Geographic information — Metadata (Edition 1 — 8.5.2003 [Corrigendum Cor 1:2006 5.7.2006]).

16. International Organisation for Standardisation, ISO 19139:2007 — Geographic information — Metadata — XML schema implementation (Edition 1 — 17.4.2007).

17. International Organisation for Standardisation, ISO 19118:2011 — Geographic information — Encoding (Edition 2 — 10.10.2011).

18. International Organisation for Standardisation, ISO 19136:2007 — Geographic information — Geography Mark-up Language (GML) (Edition 1 — 23.8.2007).

19. International Organisation for Standardisation, ISO/IEC 19757-3:2006 — Information technology — Document Schema Definition Languages (DSDL) — Part 3: Rule-based validation — Schematron (Edition 1 — 24.5.2006).

20. ICAO Doc 9674-AN/946 — World Geodetic System — 1984 Manual (Second Edition — 2002).

21. Chapter 7, Section 7.3.2 (Cyclic redundancy check (CRC) algorithm) of ICAO Doc 9674-AN/946 — World Geodetic System — 1984 (WGS-84) Manual (Second Edition — 2002).

22. International Organisation for Standardisation, ISO/IEC 27002:2005 — Information technology — Security techniques — Code of practice for information security management (Edition 1 — 15.6.2005).

23. International Organisation for Standardisation, ISO 28000:2007: — Specification for security management systems for the supply chain (Edition 1 — 21.9.2007 under revision, to be replaced by Edition 2 target date 31.1.2008 [At enquiry stage]).

24. Eurocae ED-99A, User Requirements for Aerodrome Mapping Information (October 2005).

25. International Organisation for Standardisation, ISO 19110:2005 — Geographic information — Methodology for feature cataloguing (Edition 1).

ANNEX IV

DATA QUALITY REQUIREMENTS REFERRED TO IN ARTICLES 6 AND 7

PART A Data quality requirements

1.Data quality requirements for each data item within the scope of aeronautical data and aeronautical information referred to in the second subparagraph of Article 2(1) shall be as defined by the ICAO standards referred to in Annex III point 11 and other relevant ICAO standards without prejudice to point 2 of this Annex.

2.Data quality requirements for a data item within the scope of aeronautical data and aeronautical information referred to in the second subparagraph of Article 2(1) shall be established based on a safety assessment of the intended uses of the data item where:

(a) a data item is not defined by the ICAO data quality standards referred to in point 11 of Annex III and other relevant ICAO standards; or

(b) the data quality requirements for a data item are not met by the ICAO data quality standards referred to in point 11 of Annex III and other relevant ICAO standards.

3.The data quality requirements for the data items referred to in point 2 shall be developed in accordance with a standardised process describing the methodology for the derivation and validation of these requirements prior to publication, taking due account of the potential impact on relevant ICAO provisions.

4.Where a data item has more than one intended use, only the most stringent data quality requirements, arising from the safety assessment referred to in point 2, shall be applied to it.

5.Data quality requirements shall be defined to cover the following for each data item within the scope of aeronautical data and aeronautical information referred to in the second subparagraph of Article 2(1):

(a) the accuracy and resolution of the data;

(b) the integrity level of the data;

(c) the ability to determine the origin of the data;

(d) the level of assurance that data is made available to the next intended user prior to its effective start date/time and not deleted before its effective end date/time.

6.All of the data items needed to support each application data set and/or a valid subset of the data set shall be defined.

PART B Evidence requirements

Arguments and evidence shall be generated to show that:

(a) accuracy and resolution requirements are complied with at data origination and maintained through to publication to the next intended user, including, whenever the resolution of a data item is reduced or changed, or the data is translated into a different coordinate system or unit of measurement;

(b) the origin and change history for each data item is recorded and available for audit;

(c) the aeronautical data or aeronautical information is complete or any missing items are declared;

(d) all data origination, production, storage, handling, processing, transfer or distribution processes used for each data item are defined and adequate for the assigned level of integrity of the data item;

(e) data validation and verification processes are adequate for the assigned integrity level of the data item;

(f) manual or semi-automated data processes are performed by trained and qualified staff, with clearly defined roles and responsibilities that are recorded in the organisation's quality system;

(g) all tools and/or software used to support or implement the processes are validated as fit for purpose in accordance with Annex V;

(h) an effective error reporting, measurement and corrective action process is in operation in accordance with Part F.

PART C Formal arrangements

Formal arrangements shall include the following minimum content:

(a) the scope of aeronautical data or aeronautical information to be provided;

(b) the accuracy, resolution and integrity requirements for each data item supplied;

(c) the required methods for demonstrating that the data provided conforms with the specified requirements;

(d) the nature of action to be taken in the event of discovery of a data error or inconsistency in any data provided;

(e) the following minimum criteria for notification of data changes:

- criteria for determining the timeliness of data provision based on the operational or safety significance of the change,
- any prior notice of expected changes,
- the means to be adopted for notification;

(f) the party responsible for documenting data changes;

(g) the means to resolve any potential ambiguities caused where different formats are used to exchange aeronautical data or aeronautical information;

(h) any limitations on the use of data;

(i) requirements for the production of quality reports by data providers to facilitate verification of data quality by the data users;

(j) metadata requirements;

(k) contingency requirements concerning the continuity of data provision.

PART D Data origination

1.The surveying of radio navigation aids and the origination of calculated or derived data whose coordinates are published in the AIP shall be carried out in accordance with appropriate standards and at least in accordance with the relevant ICAO provisions referred to in point 20 of Annex III.

2.All surveyed data shall be referenced to WGS-84 as specified in the ICAO provisions referred to in point 2 of Annex III.

3.A geoid model, sufficient to meet the ICAO provisions referred to in point 3 of Annex III and the aeronautical data and aeronautical information quality requirements laid down in Annex IV, shall be used in order that all vertical data (surveyed, calculated or derived) may be expressed relative to mean sea level via the Earth Gravitational Model 1996. A ‘geoid’ means the equipotential surface in the gravity field of the Earth, which coincides with the undisturbed mean sea level extended continuously through the continents.

4.Surveyed, calculated and derived data shall be maintained throughout the lifetime of each data item.

5.Survey data categorised as critical or essential data shall be subject to a full initial survey, and thereafter shall be monitored for changes on a yearly basis, as a minimum. Where changes are detected, re-survey of the relevant data shall be undertaken.

6.The following electronic survey data capture and storage techniques shall be employed:

(a) reference point coordinates shall be loaded to the surveying equipment by digital data transfer;

(b) the measurements in the field shall be stored digitally;

(c) raw data shall be digitally transferred and loaded into the processing software.

7.All survey data categorised as critical data shall be subject to sufficient additional measurement to identify survey errors not detectable by single measurement.

8.Aeronautical data and aeronautical information shall be validated and verified prior to use in deriving or calculating other data.

PART E Data process requirements

1.Where processes or parts of processes used in the origination, production, storage, handling, processing, transfer and distribution of aeronautical data and aeronautical information are subject to automation they shall be:

(a) automated to a level commensurate with the context of the data process;

(b) automated to optimise the allocation and interaction of human and machine to achieve a high degree of safety and quality benefits of the process;

(c) designed to avoid the introduction of data errors;

(d) designed to detect errors in received/input data.

2.Where aeronautical data and aeronautical information is entered manually, it shall be subject to independent verification to identify any errors that may have been introduced.

PART F Error reporting and rectification requirements

The error reporting, measurement and corrective action mechanisms shall ensure that:

(a) problems identified during aeronautical data and aeronautical information origination, production, storage, handling and processing, or those identified by users after publication, are recorded and reported to the aeronautical information service provider;

(b) all problems reported with the aeronautical data and aeronautical information are analysed by the aeronautical information service provider and the necessary corrective actions are determined;

(c) all errors, inconsistencies and anomalies detected in critical and essential aeronautical data and aeronautical information are urgently resolved;

(d) affected data users are warned of errors by the aeronautical information service provider by the most effective means, taking into account the integrity level of the aeronautical data and aeronautical information and using the notification criteria agreed in the formal arrangements in accordance with Annex IV, Part C point (d);

(e) error feedback from data users and other aeronautical data and aeronautical information providers is facilitated and encouraged;

(f) error rates for aeronautical data and aeronautical information are recorded on each occasion that aeronautical data and aeronautical information is transferred between the parties referred to in Article 2(2);

(g) error rates for those errors detected prior to transfer and those reported after transfer can be identified separately.

ANNEX V

TOOLS AND SOFTWARE REQUIREMENTS REFERRED TO IN ARTICLE 8

1.Tools used to support or automate aeronautical data and aeronautical information processes shall meet the requirements of points 2 and 3, where the tool:

- has the potential to create errors in critical or essential data items,
- is the sole means of detecting errors in critical or essential data items,
- is the sole means of detecting discrepancies between multiple versions of manually entered data.

2.For the tools referred to in point 1, performance, functionality and integrity level requirements shall be defined to ensure that the tool performs its function within the data process without adversely impacting the quality of aeronautical data or aeronautical information.

3.The tools referred to in point 1 shall be validated and verified against the requirements referred to in point 2.

4.The tools referred to in point 1, which are implemented fully or partially in software, shall satisfy the following additional requirements:

- the software requirements shall correctly state what is required by the software in order to satisfy the tool requirements,
- all software requirements shall be traceable to the tool requirements referred to in point 2,
- the validation and verification of software, as defined in points 5 and 6 respectively, shall be applied to a known executable version of the software in its target operating environment.

5.The validation of software means the process of ensuring that software meets the requirements for the specified application or intended use of the aeronautical data or aeronautical information.

6.The verification of software means the evaluation of the output of an aeronautical data and/or aeronautical information software development process to ensure correctness and consistency with respect to the inputs and applicable software standards, rules and conventions used in that process.

ANNEX VI

DATA PROTECTION REQUIREMENTS REFERRED TO IN ARTICLE 9

1.All data transferred in an electronic format shall be protected against loss or alteration of data by the application of the CRC32Q algorithm as referred to in point 21 of Annex III. The cyclic redundancy check (hereinafter CRC) value shall be applied before the final verification of the data prior to storage or transfer.

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

3.Aeronautical data and aeronautical information shall be given an appropriate level of security protection during storage and when exchanged between the parties referred to in Article 2(2), to ensure that the data cannot be accidentally changed or subjected to unauthorised access and/or alteration at any stage.

4.The storage and transfer of aeronautical data and aeronautical information shall be protected by a suitable authentication process such that recipients are able to confirm that the data or information has been transmitted by an authorised source.

ANNEX VII

QUALITY, SAFETY AND SECURITY MANAGEMENT REQUIREMENTS REFERRED TO IN ARTICLE 10

PART A Quality management system

1.A quality management system supporting the origination, production, storage, handling, processing, transfer and distribution of aeronautical data and aeronautical information shall:

- define the quality policy in such a way as to meet the needs of different users as closely as possible,
- set up a quality assurance programme that contains procedures designed to verify that all operations are being conducted in accordance with applicable requirements, standards and procedures, including the relevant requirements of this Regulation,
- provide evidence of the functioning of the quality system by means of manuals and monitoring documents,
- appoint management representatives to monitor compliance with, and adequacy of, procedures to ensure safe and efficient operational practices,
- perform reviews of the quality system in place and take remedial actions, as appropriate.

2.An EN ISO 9001 certificate, issued by an appropriately accredited organisation, shall be considered as a sufficient means of compliance to the requirements of point 1. The parties referred to in Article 2(2) shall accept the disclosure of the documentation related to the certification to the national supervisory authority upon the latter’s request.

PART B Safety management objectives

1.The safety management objectives shall be:

- to minimise the contribution to the risk of an aircraft accident arising from data errors as far as reasonably practicable,
- to promote awareness of safety around the organisation by sharing lessons arising from safety activities and by involving all staff to propose solutions to identified safety issues and improvements to assist the effectiveness and efficiency of the processes,
- to ensure that a function is identified within the organisation being responsible for development and maintenance of the safety management objectives,
- to ensure that records are kept and monitoring is carried out to provide safety assurance of their activities,
- to ensure improvements are recommended, where needed, to provide assurance of the safety of activities.

2.The achievement of the safety management objectives shall be afforded the highest priority over commercial, operational, environmental or social pressures.

PART C Security management objectives

1.The security management objectives shall be:

- to ensure the security of aeronautical data aeronautical information received, produced or otherwise employed so that it is protected from interference and access to it is restricted only to those authorised,
- to ensure that the security management measures of an organisation meet appropriate national or international requirements for critical infrastructure and business continuity, and international standards for security management, including the ISO standards referred to in points 22 and 23 of Annex III.

2.Regarding the ISO standards, the relevant certificate issued by an appropriately accredited organisation, shall be considered as a sufficient means of compliance. The parties referred to in Article 2(2) shall accept the disclosure of the documentation related to the certification to the national supervisory authority upon the latter’s request.

ANNEX VIII

Requirements for the assessment of the conformity or suitability for use of constituents referred to in Article 11

1.The verification activities shall demonstrate the conformity of constituents with the interoperability, performance, quality and safety requirements of this Regulation, or their suitability for use whilst these constituents are in operation in the test environment.

2.The manufacturer, or its authorised representative established in the Union, shall manage the conformity assessment activities and shall in particular:

- determine the appropriate test environment,
- verify that the test plan describes the constituents in the test environment,
- verify that the test plan provides full coverage of applicable requirements,
- ensure the consistency and quality of the technical documentation and the test plan,
- plan the test organisation, staff, installation and configuration of test platform,
- perform the inspections and tests as specified in the test plan,

- write the report presenting the results of inspections and tests.

3.The manufacturer, or its authorised representative established in the Union, shall ensure that the constituents involved in the origination, production, storage, handling, processing, transfer and distribution of aeronautical data and aeronautical information integrated in the test environment meet the interoperability, performance, quality and safety requirements of this Regulation.

4.Upon satisfying completion of verification of conformity or suitability for use, the manufacturer, or its authorised representative established in the Union, shall under its responsibility draw up the EC declaration of conformity or suitability for use, specifying notably the requirements of this Regulation met by the constituent and its associated conditions of use in accordance with point 3 of Annex III to Regulation (EC) No 552/2004.

ANNEX IX

CONDITIONS REFERRED TO IN ARTICLE 12

1.The air navigation service provider must have in place reporting methods within the organisation that ensure and demonstrate impartiality and independence of judgement in relation to the verification activities.

2.The air navigation service provider must ensure that the personnel involved in verification processes carry out the checks with the greatest possible professional integrity and the greatest possible technical competence, and are free of any pressure and incentive, in particular of a financial type, which could affect their judgment or the results of their checks, in particular from persons or groups of persons affected by the results of the checks.

3.The air navigation service provider must ensure that the personnel involved in verification processes, have access to the equipment that enables them to properly perform the required checks.

4.The air navigation service provider must ensure that the personnel involved in verification processes, have sound technical and vocational training, satisfactory knowledge of the requirements of the verifications they have to carry out, adequate experience of such operations, and the ability required to draw up the declarations, records and reports to demonstrate that the verifications have been carried out.

5.The air navigation service provider must ensure that the personnel involved in verification processes, are able to perform their checks with impartiality. Their remuneration shall not depend on the number of checks carried out, or on the results of such checks.

ANNEX X

PART A Requirements for the verification of systems referred to in Article 12(1)

1.The verification of systems identified in the first subparagraph of Article 2(1) shall demonstrate the conformity of these systems with the interoperability, performance and safety requirements of this Regulation in an assessment environment that reflects the operational context of these systems.

2.The verification of systems identified in the first subparagraph of Article 2(1) shall be conducted in accordance with appropriate and recognised testing practices.

3.Test tools used for the verification of systems identified in the first subparagraph of Article 2(1) shall have appropriate functionalities.

4.The verification of systems identified in the first subparagraph of Article 2(1) shall produce the elements of the technical file required by point 3 of Annex IV to Regulation (EC) No 552/2004 including the following elements:

- description of the implementation,
- the report of inspections and tests achieved before putting the system into service.

5.The air navigation service provider shall manage the verification activities and shall in particular:

- determine the appropriate simulated operational and technical environment reflecting the operational environment,
- verify that the test plan describes the integration of systems identified in the first subparagraph of Article 2(1) in an operational and technical assessment environment,
- verify that the test plan provides full coverage of the applicable interoperability, performance and safety requirements of this Regulation,
- ensure the consistency and quality of the technical documentation and the test plan,
- plan the test organisation, staff, installation and configuration of the test platform,
- perform the inspections and tests as specified in the test plan,
- write the report presenting the results of inspections and tests.

6.The air navigation service provider shall ensure that the systems identified in the first subparagraph of Article 2(1) under its responsibility meet the interoperability, performance and safety requirements of this Regulation.

7.Upon satisfying completion of verification of conformity, air navigation service providers shall draw up the EC declaration of verification of system and submit it to the national supervisory authority together with the technical file as required by Article 6 of Regulation (EC) No 552/2004.

PART B Requirements for the verification of systems referred to in Article 12(2)

1.The verification of systems identified in the first subparagraph of Article 2(1) shall demonstrate the conformity of these systems with the interoperability, performance and safety requirements of this Regulation in an assessment environment that reflects the operational context of these systems.

2.The verification of systems identified in the first subparagraph of Article 2(1) shall be conducted in accordance with appropriate and recognised testing practices.

3.Test tools used for the verification of systems identified in the first subparagraph of Article 2(1) shall have appropriate functionalities.

4.The verification of systems identified in the first subparagraph of Article 2(1) shall produce the elements of the technical file required by point 3 of Annex IV to Regulation (EC) No 552/2004 including the following elements:

- description of the implementation,
- the report of inspections and tests achieved before putting the system into service.

5.The air navigation service provider shall determine the appropriate operational and technical assessment environment reflecting the operational environment and shall have verification activities performed by a notified body.

6.The notified body shall manage the verification activities and shall in particular:

- verify that the test plan describes the integration of systems identified in the first subparagraph of Article 2(1) in an operational and technical assessment environment,
- verify that the test plan provides full coverage of the applicable interoperability, performance and safety requirements of this Regulation,
- ensure the consistency and quality of the technical documentation and the test plan,
- plan the test organisation, staff, installation and configuration of the test platform,
- perform the inspections and tests as specified in the test plan,
- write the report presenting the results of inspections and tests.

7.The notified body shall ensure that the systems identified in the first subparagraph of Article 2(1) operated in an operational assessment environment meet the interoperability, performance and safety requirements of this Regulation.

8.Upon satisfying completion of verification tasks, the notified body shall draw up a certificate of conformity in relation to the tasks it carried out.

9.Then the air navigation service provider shall draw up the EC declaration of verification of system and submit it to the national supervisory authority together with the technical file as required by Article 6 of Regulation (EC) No 552/2004.

ANNEX XI

ICAO DIFFERENCES REFERRED TO IN ARTICLE 14

Chapter 3, Section 3.5.2 (Cyclic redundancy check) of Annex 15 to the Chicago Convention — Aeronautical Information Services. (Fourteenth edition — July 2013, incorporating Amendment No 37).