

**Integrity of Aeronautical
Information - Data
Publication**

CHAIN

*Controlled and Harmonised
Aeronautical Information Network*

CHAIN/0030

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Abstract

This document exists as one of a set of documents which provide guidance for organisations wishing to improve and enhance the integrity of their information.

It contains all the requirements which apply explicitly to the publication of aeronautical information by the State AIS. Requirements for general data management and processing, as well as quality management are included within an over-arching document "Principles – Data and Quality Management".

Although provided as guidance only, it is written in a style to allow States to use as regulatory material.

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TABLE OF CONTENTS

1.	INTRODUCTION	1
1.1	General.....	1
1.2	Relationship with other Documents	1
1.3	Application of Guidance Material	1
1.4	Scope of this Document	1
1.5	Structure of this Document.....	1
1.6	Use of the Term 'Document'	2
1.7	Requirements References.....	2
2.	DOCUMENT MANAGEMENT.....	3
2.1	General.....	3
2.2	Quality Assurance.....	3
2.3	Data Management and Tool / Equipment Calibration	3
2.3.1	Requirements	3
2.3.2	Ensuring Compliance	3
2.4	Document Processing Requirements	4
2.4.1	Document Processing Procedures	4
2.4.2	Consistency of Documentation	5
2.4.3	Document Modification	6
2.4.4	Document Configuration Management.....	6
2.5	Means of Compliance	7
3.	DOCUMENT CONTENT	8
3.1	General.....	8
3.2	Document Identification	9
3.3	Change History.....	10
4.	DOCUMENT PRESENTATION.....	11
4.1	General.....	11
4.2	Format	11
4.2.1	General.....	11
4.2.2	Units of Measurement	11
4.2.3	Co-ordinates	12
4.2.4	Dates	12
4.2.5	Time.....	12
4.2.6	Distance.....	13
4.2.7	Heights	13
4.2.8	Bearings	13
4.2.9	Symbology.....	14
4.3	Scale.....	14

4.4	Accuracy	14
4.5	Resolution.....	15
4.6	Origination	16
4.7	Abbreviations	16
4.8	Base Information.....	16
4.9	Metadata.....	16
4.10	Design and Layout	17
5.	DOCUMENT REPRODUCTION AND DISTRIBUTION	18
5.1	Reproduction.....	18
5.2	Distribution	18
6.	DOCUMENT STORAGE AND CONTROL	19
6.1	General.....	19
6.2	Configuration Management.....	19
6.3	Document Storage	20
7.	USE OF AUTOMATED SYSTEMS.....	21
8.	THE ELECTRONIC AIP (eAIP).....	22
8.1	History & Overview	22
8.2	Application.....	22

1. INTRODUCTION

1.1 General

A set of guidance material documents has been produced by EUROCONTROL to support the implementation of processes and systems throughout the Aeronautical Information data process with a view to ensuring the integrity of information when published.

This document 'Integrity of Aeronautical Information – Data Publication' establishes the minimum requirements for the process involved in the provision of aeronautical data publication and applies to all organisations within the European Civil Aviation Conference (ECAC) Area involved in the publication process for Aeronautical Information.

1.2 Relationship with other Documents

This document exists as one of a set of documents aimed at providing guidance to organisations wishing to improve and enhance the integrity of their information.

A full description of the set of documents, their status and applicability may be found in the over-arching document "Integrity of Aeronautical Information Principles – Data and Quality Management".

1.3 Application of Guidance Material

This document *shall* apply to all National Administrations responsible for Aeronautical Information Services (AIS).

[CHAIN-0030-0010]

All organisations *shall* determine the extent to which this guidance material applies to their own responsibilities and functions.

[CHAIN-0030-0020]

Data publication *shall* be deemed to include all activities following receipt of data by the relevant National Administration responsible for Aeronautical Information Services (AIS).

[CHAIN-0030-0030]

1.4 Scope of this Document

Where data is published in a State Aeronautical Information Publication (AIP) then the published data *shall* be in accordance with this guidance material.

[CHAIN-0030-0040]

1.5 Structure of this Document

This main part of this document comprises six further sections as follows:

- Section 2 specifies requirements for Document Management;
- Section 3 provides requirements for the content of documents;
- Section 4 contains guidance and requirements for the presentation of documents;
- Section 5 specifies how document Reproduction and Distribution should be performed;
- Section 6 outlines the requirements specifically needed for the storage and control of documents;

- Section 7 presents guidance on requirements that should be considered for automated document systems.

1.6 Use of the Term 'Document'

Within this guidance material the term 'document' is used to describe the finished product delivered to a customer of the State AIS. This may be a traditional paper-based document (or an electronic representation of it, such as Adobe's PDF) or a true electronic publication, such as an AIP published using the EUROCONTROL eAIP specification.

Unless otherwise specifically stated, all requirements apply equally to both styles of publication. Where a requirement specifically applies to publication in a particular form, this will be explicitly stated.

1.7 Requirements References

Each statement of guidance, be it recorded using 'shall', 'should', or 'may', has been uniquely identified with a reference number which is enclosed in square brackets [].

These reference numbers will be used to allow requirements to be traced from the compendium of standards, through guidance and to assessment of actual performance by a State, through its auditing process.

2. DOCUMENT MANAGEMENT

2.1 General

This section specifies:

- a. Requirements for document management processes and practices that apply to all organisations involved in the publication of aeronautical data;
- b. Processes and functions to be undertaken as part of data publication.

The methods and tools to be used in order to comply with these requirements are not specified, unless deemed absolutely necessary.

This document management process is published in order to:

- a. Ensure compliance of the data quality reported to National Administrations, as specified in this guidance material;
- b. Ensure that the document management processes are carried out such that the integrity of the data is not jeopardised at any point in the process;
- c. Ensure that document management tools are developed and managed in a controlled manner to ensure the integrity of the overall process;
- d. Provide for the development of appropriate metadata to the extent that complete audit trails are available at all times.

Note: A document refers to any element of the Integrated Aeronautical Information Package (IAIP) produced by the AIS, including all their constituent parts, e.g. cover page, charts, etc. Such documents, e.g. AIP, NOTAM, etc., may be presented on printed paper and in an electronic form.

2.2 Quality Assurance

The quality assurance requirements applicable to the procedures, processes and outputs described in this document are specified in the companion document, Integrity of Aeronautical Information Principles - Data and Quality Management.

2.3 Data Management and Tool / Equipment Calibration

2.3.1 Requirements

The data management and tool / equipment calibration requirements applicable to the procedures, processes and outputs described in this document are specified in the companion document, Integrity of Aeronautical Information Principles - Data and Quality Management.

2.3.2 Ensuring Compliance

Each organisation *shall* have a system for handling problems reported during document management and for those reported by the subsequent user in the aeronautical data chain after delivery of the data.

[CHAIN-0030-1010]

- a. All problems *shall* be recorded, as *shall* the means by which they were resolved;

[CHAIN-0030-1020]

- b. Any errors or anomalies *shall* be resolved and documented;

[CHAIN-0030-1030]

- c. All errors or anomalies detected in the document *shall* be resolved prior to delivery;

[CHAIN-0030-1040]

- d. Information concerning any errors or anomalies found in the document after it has been delivered, *shall* be made available to all affected users;

[CHAIN-0030-1050]

- e. The means by which errors or anomalies are resolved *shall* be reported immediately to all affected users.

[CHAIN-0030-1060]

2.4 Document Processing Requirements

2.4.1 Document Processing Procedures

It is essential that clearly defined procedures exist for the processing of information and its publication as a document. These procedures should be implemented such that the guidance material presented here and within the overarching “Principles – Data and Quality Management” paper have been addressed.

Correct and auditable application of these procedures should then provide a State with confidence that it both meets the integrity levels required and may demonstrate this in any investigation or audit.

Organisations *shall* have a set of operational document processing procedures that ensure the effective planning, operation and control of its processes.

[CHAIN-0030-1070]

These procedures *shall* take account of:

- a. The size and type of the activities being undertaken;
- b. The complexity of the processes and their interactions;
- c. Competence of the personnel performing the procedure(s).

[CHAIN-0030-1080]

The document processing procedures *shall* define:

- a. The method of origination for all documents that are originated locally;

[CHAIN-0030-1090]

- b. The means by which a document is assembled;

[CHAIN-0030-1100]

- c. The means used to confirm that a document that is originated locally has not been corrupted prior to being stored;

[CHAIN-0030-1110]

- d. The means by which validation of any document is to be performed (see below);

[CHAIN-0030-1120]

- e. The means used to confirm that the document has been received without corruption;

[CHAIN-0030-1130]

- f. The method to be used to provide the user with the ability to verify that the document received by the user has not been corrupted (when provided in electronic form);

[CHAIN-0030-1140]

- g. The method to be used to verify a received document;
[CHAIN-0030-1150]
- h. The action to be taken when a document fails a verification or validation check;
[CHAIN-0030-1160]
- i. The method by which document quality is preserved;
[CHAIN-0030-1170]
- j. The means used to ensure that a stored document is protected from corruption;
[CHAIN-0030-1180]
- k. The method by which the user is assured that, whenever a document is changed, the content of the new document meets the data quality requirements;
[CHAIN-0030-1181]
- l. The requisite skills and competencies necessary to perform each procedure;
[CHAIN-0030-1190]
- m. The tools required for the procedure.
[CHAIN-0030-1200]

The means by which validation of a document is to be performed *shall* include:

- a. When the source of a document cannot be trusted, how an appropriate validation can be performed;
[CHAIN-0030-1210]
- b. When multiple suppliers are available for a document, how differences between them are determined and resolved.
[CHAIN-0030-1220]

Recommendation: In determining publication procedures, organisations *should* adhere to the best practice detailed within the AIS Data Process and its associated procedures.

[CHAIN-0030-1230]

2.4.2 Consistency of Documentation

There is an increasing trend today for information to be provided in multiple forms and, in some cases, multiple products. For example, an AIP may be published using traditional paper means and provided as an electronic publication.

Additionally, despite the requirement of ICAO for no duplication of information within or across AIPs, this is never the case and, from a practical stand-point, is unlikely to ever be complied with. For example, co-ordination points are published in the AIP of both affected States and a Navaid used for both en-route and approach navigation will appear within both the ENR and AD sections of a State's AIP. Furthermore, the publication resolution for the different instances may vary, leading to slightly different information being seen within the publication.

States *shall* ensure that the generation of different publications (either products or publication means) occurs as late as possible in the publication process so as to minimise the risk of inconsistency.

[CHAIN-0030-1240]

Where information is presented within more than one publication, it *shall* be taken from the same source.

[CHAIN-0030-1250]

Where information is published in more than one place and at different resolutions, it shall be ensured that the correct rounding processes have been applied.

[CHAIN-0030-1260]

Where there is no regulation enforcing publication at different resolutions, States *may* consider publication using a single, common resolution.

[CHAIN-0030-1270]

Note: Publications made using database technology greatly assist in ensuring the consistency of information within and across publications.

2.4.3 Document Modification

Organisations *shall* not modify aeronautical data contained within a document without having received a notification of change to that data from the originating organisation.

[CHAIN-0030-1280]

The amended document *shall* not be transmitted to the subsequent data user without the approval of the originator.

[CHAIN-0030-1290]

Records that trace the change to the originator's request and approval *shall* be kept for all document modifications.

[CHAIN-0030-1300]

2.4.4 Document Configuration Management

Each distinct version of a document *shall* be assigned a unique identification.

[CHAIN-0030-1310]

The document identification *shall* also be used as a physical label attached to any portable storage medium used to hold the document.

[CHAIN-0030-1320]

The configuration management procedures *shall* ensure that a document cannot be changed without changing the document identification.

[CHAIN-0030-1330]

Records *shall* be maintained that identify the data content of all documents in order to support traceability.

[CHAIN-0030-1340]

These records *shall* ensure that:

- a. Documents *may* be easily associated with the data originator;

[CHAIN-0030-1350]

- b. Procedures used to produce the document are fully documented;

[CHAIN-0030-1360]

- c. The documents requiring amendment when updated aeronautical data are received are clearly identified;

[CHAIN-0030-1370]

- d. The method of storage, and the numbers of copies held, *shall* be such that due attention is given to protection against physical damage and deterioration, i.e., loss of archived documents will not result in the loss of all copies.

[CHAIN-0030-1380]

A copy of each document *shall* be retained for a period determined in the Configuration Management Plan (see Integrity of Aeronautical Information Principles – Data and Quality Management).

[CHAIN-0030-1390]

2.5 Means of Compliance

Recommendation: Tools (software or otherwise) *should* be used during the activities associated with aeronautical data publication; for example, Configuration Management Tools. Any such tools used in the process *should* be qualified, as described in Chapter 7 of the Data and Quality Management document (CHAIN/0028).

[CHAIN-0030-1400]

3. DOCUMENT CONTENT

3.1 General

It is essential that the content of documents be such that the user will find the information which he or she desires in a clear and unambiguous manner. Furthermore, the information contained should match that prescribed by regulatory bodies for the document in question.

The publications issued *shall* publish the aeronautical information for the entire territory of the State.

[CHAIN-0030-2010]

Note: This does not preclude information being provided in one or more publications.

If the State is responsible for the provision of Air Traffic Services (ATS) outside its own territory, this information *shall* be published.

[CHAIN-0030-2020]

The information presented within a State's AIP *shall* not unnecessarily duplicate information from within the AIP or from other sources.

[CHAIN-0030-2030]

Where duplication is necessary within a document it *shall* be ensured that the information published is taken from a single, common source.

[CHAIN-0030-2040]

Note: Although ICAO Annex 15 states that "Each AIP shall not duplicate information within itself or from other sources" this requirement is not able to be met in a practicable manner. Indeed, both the template AIP provided in Annex 15 and the specimen AIP provided in Doc 8126 clearly show duplication of some data. For example, a radio navigation aid may be used both for the en-route phase of flight and hence is included in the ENR section, and for approach and hence is included in the AD section.

If the degree of reliability of the information published is, in any way, considered doubtful, it *shall* be clearly indicated as being so.

[CHAIN-0030-2050]

Where the processing of information leading up to publication, or the publication process itself does not comply with either the international regulations or this guidance material, this *shall* be clearly indicated within the publication.

[CHAIN-0030-2060]

Where deviations from international regulations or this guidance material have been made, the course of action taken *shall* be published.

[CHAIN-0030-2070]

Documents *should* be republished at regular intervals to ensure that their information remains as up-to-date as practicable and to avoid the over use of hand amendments.

[CHAIN-0030-2080]

Note: A document *should* be republished if a significant change is required.

Where the usability of a document is adversely affected through its physical size, division into separate documents *shall* be considered.

[CHAIN-0030-2090]

Note: This is particularly relevant to charts where more, larger scale charts may provide increased clarity over one, small scale chart.

Recommendation: Where a chart is provided on several sheets, an overlap between the sheets *shall* be provided.

[CHAIN-0030-2100]

Where several charts are used to provide related information, there *shall* be no large variation in the scales used.

[CHAIN-0030-2110]

3.2 Document Identification

It is important that a specific publication and subsequent releases/versions of it are able to be uniquely identified. This indication should be clearly displayed on the publication and used as the primary reference for it.

Each document published *should* clearly indicate the issuing authority.

[CHAIN-0030-2120]

Where a document is jointly issued, the name of all issuing authorities *shall* be indicated on the cover page and any tables of content.

[CHAIN-0030-2130]

Each publication *shall* be clearly identified with a part number.

[CHAIN-0030-2140]

Note: In some cases, such as for some charts, the part number may comprise the name of physical entities such as aerodromes of major cities.

Recommendation: If information is issued in more than a single part, the document identification *should* clearly indicate this through the use of sub-part numbers.

[CHAIN-0030-2150]

Recommendation: If information is issued in more than a single series, the document identification *should* clearly indicate this through the use of series numbers.

[CHAIN-0030-2155]

Note: NOTAM is a prime example which demonstrates the use of series and sub-part numbers.

If the publication is intended to be kept in a folded manner, the document identification information *shall* be visible when the sheet is folded.

[CHAIN-0030-2160]

If a document is published containing erroneous information and a new publication is issued to replace it, a new part number *shall* be allocated.

[CHAIN-0030-2170]

Where updates are made to a document on a cyclical basis, the part number *shall* comprise information which clearly indicates the cycle in which the publication was made.

[CHAIN-0030-2180]

Recommendation: Part numbers issued to indicate cyclical publications *should* be sequential.

[CHAIN-0030-2190]

Where the publication is made by way of a bound paper copy, the identification information *shall* be provided on the cover page.

[CHAIN-0030-2200]

If the publication is made by way of loose-leaf paper, the identification information *shall* be provided on each and every page.

[CHAIN-0030-2210]

The date of validity of each publication *shall* be clearly shown on each page.

[CHAIN-0030-2220]

If no information exists which is required for inclusion within a publication, a clear indication that no information exists and the reason for this *shall* be given.

[CHAIN-0030-2230]

3.3 Change History

A document change history provides an essential component through which the reader may ascertain what, if any, changes have been made since their last use of a publication. This is of particular relevance for users who may make regular use of a publication and hence wish only to ascertain any differences from the material with which they are familiar.

Each publication *shall* provide a history of amendments made.

[CHAIN-0030-2240]

A brief description of each amendment *shall* be included.

[CHAIN-0030-2250]

The date of each amendment *shall* be recorded within the history.

[CHAIN-0030-2260]

4. DOCUMENT PRESENTATION

4.1 General

The following requirements provide the expected behaviour of systems and staff in the presentation of Aeronautical Information when publications are prepared.

It is essential that a publication allows users to gain the best and clearest understanding of the information presented. Whilst information may be factually correct, its bad or unclear presentation may lead to a loss of integrity through a misunderstanding in its reading and subsequent use.

Unless specifically mentioned otherwise, all requirements apply equally to paper and electronic publications.

The format and presentation of the publications prepared *shall* be provided in a manner that is fit for use by the receiving user within their normal operating environment.

[CHAIN-0030-3010]

For charts, a suitable projection *shall* be selected.

[CHAIN-0030-3020]

Note: Some charts have a requirement for a particular projection type whilst others do not specify the type.

The name and basic parameters for the projection *shall* be clearly marked on the chart.

[CHAIN-0030-3030]

Publications *shall* be provided in English.

[CHAIN-0030-3040]

Publications *may* additionally be provided in one or more of the ICAO working languages, as well as the national language(s).

[CHAIN-0030-3050]

Whenever a conversion is necessary from one unit of measurement to another, the conversion value provided in ICAO Annex 5 *shall* be used.

[CHAIN-0030-3060]

4.2 Format

4.2.1 General

The format in which information is presented is of utmost importance, be it presented in an electronic or paper document. If the format of the information provided is not in accordance with the requirements, is inconsistent or ambiguous, no matter how carefully the integrity of the information has been maintained throughout the processing chain, it may be lost at the final stage, when it is interpreted by the user.

4.2.2 Units of Measurement

The units of measurement selected for use in the publications *shall* adhere to Annex 5.

[CHAIN-0030-3070]

The units of measurement used for publications *shall* be clearly visible when a single page or chart is viewed by a user.

[CHAIN-0030-3080]

For charts, the provision of a conversion scale *shall* be considered to provide the user with a means of undertaking a 'ball park' check of any conversions performed.

[CHAIN-0030-3090]

If provided, conversion scales *shall* be provided on each chart face.

[CHAIN-0030-3100]

4.2.3 Co-ordinates

All co-ordinates *shall* be published with reference to the WGS-84 co-ordinate reference system.

[CHAIN-0030-3110]

If the co-ordinate to be published has been transformed from another co-ordinate system to WGS-84, it *shall* be clearly indicated as such.

[CHAIN-0030-3120]

If publication is achieved through the use of a paper documents or through the electronic representation of a paper document¹, any co-ordinate transformations *shall* be indicated through the use of an * (Asterisk).

[CHAIN-0030-3130]

If publication is made using true electronic media (e.g. XML), the data structure used *shall* allow for the clear indication of any co-ordinate transformation.

[CHAIN-0030-3140]

Electronic publication of data *shall* contain details of the reference systems employed.

[CHAIN-0030-3150]

4.2.4 Dates

Any date published *shall* be published using the Gregorian calendar.

[CHAIN-0030-3160]

A date using a local calendar system *may* be published.

[CHAIN-0030-3170]

If a date is published using a local calendar, this *shall* be in addition to a date published using the Gregorian calendar.

[CHAIN-0030-3180]

If dates are published using a local calendar, this *shall* be clearly indicated.

[CHAIN-0030-3190]

4.2.5 Time

Any time published *shall* be published using Co-ordinated Universal Time (UTC).

[CHAIN-0030-3200]

A time using a local time system *may* be published.

[CHAIN-0030-3210]

¹ e.g. PDF or a Word Processing file.

If a time is published using a local time reference, this *shall* be in addition to a time published in UTC.

[CHAIN-0030-3220]

If times are published using a local time frame, this *shall* be clearly indicated.

[CHAIN-0030-3230]

4.2.6 Distance

Distances *shall* be calculated as geodesic distances.

[CHAIN-0030-3240]

4.2.7 Heights

Heights *shall* be published with reference to Mean Sea Level (MSL) for all points where a vertical component is required.

[CHAIN-0030-3250]

Where the geoid undulation is published, this *shall* be provided with reference to the WGS-84 ellipsoid.

[CHAIN-0030-3260]

If a height is published using a local reference, this *shall* be clearly indicated and the reference provided.

[CHAIN-0030-3270]

Within a publication containing terrain data, the height information provided for each post *shall* be referenced to a single vertical datum.

[CHAIN-0030-3280]

If spot heights represented on a chart are of unreliable accuracy they *shall* be indicated as such.

[CHAIN-0030-3290]

If publication is achieved through the use of a paper documents or through the electronic representation of a paper document², unreliable spot heights *shall* be indicated by a \pm symbol and a warning *shall* be provided in the margin of the chart.

[CHAIN-0030-3300]

If publication is made using true electronic media (e.g. XML), the data structure used *shall* allow for the clear indication of any unreliable spot heights.

[CHAIN-0030-3310]

4.2.8 Bearings

Where a bearing is shown it *shall* be clearly indicated if it is given with reference to magnetic North or true North.

[CHAIN-0030-3320]

Magnetic variation over time *shall* be provided in any publication which contains bearings.

[CHAIN-0030-3330]

Charts *shall* be oriented with true North towards the top of the page.

[CHAIN-0030-3340]

² e.g. PDF or a Word Processing file.

Where true North is not towards the top of the page, the chart *shall* show the direction of true North.

[CHAIN-0030-3350]

4.2.9 Symbology

The symbology used within publications *shall* comply with the ICAO standards.

[CHAIN-0030-3360]

4.3 Scale

The scale to which a chart is prepared, or the fact that it is not to scale, is of major importance to users and has a direct bearing on some flight decisions.

It is, therefore, essential that charts are prepared in a manner that allows the user to clearly understand and utilise the information presented.

For charts, the scale / projection of a chart *shall* be clearly visible.

[CHAIN-0030-3370]

Charts *shall*, wherever practicable, be drawn to scale.

[CHAIN-0030-3380]

Recommendation: The scale selected *should* take into consideration the size of the printed page and the information to be shown.

[CHAIN-0030-3390]

If a chart is not drawn to scale, this *shall* be clearly indicated with the phrase "NOT TO SCALE".

[CHAIN-0030-3400]

Charts *shall*, when drawn to scale, display a scale bar.

[CHAIN-0030-3410]

If a chart is provided electronically, it *shall* be possible to vary the scale at which it is displayed.

[CHAIN-0030-3420]

Charts *shall* provide suitably marked axis, graduation marks and grids to allow for the approximate reference of features to location.

[CHAIN-0030-3430]

Where shown, graduation marks and grids *shall* be shown at regular intervals.

[CHAIN-0030-3440]

Where shown, the meridians and parallels, corresponding to the grid used for the chart, *shall* be indicated using labels in the margin.

[CHAIN-0030-3450]

Where necessary, labels for meridians and parallels *shall* be visible when the chart is folded.

[CHAIN-0030-3460]

4.4 Accuracy

All information *shall* be published with the degree of accuracy required by ICAO.

[CHAIN-0030-3465]

Note: Whilst some requirements for accuracy are contained within ICAO Annex 15, the majority of the accuracy requirements are contained within other annexes more closely associated with the origination process.

Usually information is provided to the AIS for publication with the required degree of accuracy, although, in exception circumstances, this may not be the case. As the publication process cannot make information more accurate than its origination, it is essential that any non-compliance with accuracy requirements, and the reasons for this, is published.

Publications *shall* clearly indicate where information has not, or it is believed that there is a risk that it has not been originated with the required degree of accuracy.

[CHAIN-0030-3470]

A statement of guaranteed accuracy *shall* be provided where information does not comply with that required.

[CHAIN-0030-3480]

4.5 Resolution

ICAO defines clear requirements for the publication resolution of some information. For other data, however, no specification is made. Furthermore, these requirements are for publication only, with the resolution of the data provided throughout the chain needing to meet this final requirement.

All information *shall* be published with the degree of resolution required by ICAO.

[CHAIN-0030-3490]

Note: ICAO requirements for the resolution of information are contained within Annexes 4 and 15.

Recommendation: The resolution specified by ICAO *should* not be exceeded as this may lead to ambiguity.

[CHAIN-0030-3500]

Note: In some cases, it may be necessary for information to be provided to a resolution which is different by an order of magnitude, for example, to the nearest half foot.

Where information has been originated to a greater degree of resolution than that required for publication, the following rounding approach *shall* be adopted:

- a. If the number in the extra decimal place is less than 5, it and any other numbers that may have been extended in the calculation to additional decimal places *shall* be truncated (deleted);
- b. If the number in the extra decimal place is a 5, 6, 7, 8 or 9, the last character of the final value *shall* be rounded up by 1.

[CHAIN-0030-3510]

Care *shall* be taken to ensure that double rounding does not occur.

[CHAIN-0030-3520]

Note: Double rounding can occur when the same calculated value is used for more than one application, each having different resolution requirements.

4.6 Origination

Where data has been originated by and under the authority of another State, this *shall* be clearly indicated within the publication.

[CHAIN-0030-3530]

4.7 Abbreviations

Where abbreviations are used, these *shall* take the form of the official ICAO abbreviation, where one exists.

[CHAIN-0030-3540]

Where no official ICAO abbreviation exists, the State *shall* create its own abbreviation.

[CHAIN-0030-3550]

Where a State creates an abbreviation, it *shall* avoid the duplication of an official ICAO abbreviation.

[CHAIN-0030-3560]

All abbreviations *shall* be presented with their full meaning within publications.

[CHAIN-0030-3570]

4.8 Base Information

If base information, such as topographical information for charts, is used, the date of origination *shall* be specified in the publication.

[CHAIN-0030-3580]

4.9 Metadata

Metadata provides data about data, for example, information relating to the quality of the information, its origination and a history of its processing.

Such information is of critical importance to allow a State's AIS to both meet and demonstrate compliance with the ICAO requirements for the quality and traceability of aeronautical information.

Where the electronic publication of data is employed, each publication *shall* be provided with details of the reference systems employed.

[CHAIN-0030-3590]

If applicable, details of the capture and processing methodology employed in generating the publication *shall* be provided.

[CHAIN-0030-3600]

Note: This is of particular interest in the publication of terrain data.

Each publication *shall* provide details of the compliance of the content with the associated quality requirements.

[CHAIN-0030-3610]

Any general metadata associated with publication *shall* be included within the product specification.

[CHAIN-0030-3620]

4.10 Design and Layout

The information provided within a publication *shall* be presented in a clear and unambiguous manner.

[CHAIN-0030-3630]

The information presented for each topic within a publication *shall* be kept to a minimum such that the user is not 'overloaded' with unnecessary information.

[CHAIN-0030-3640]

The manner in which the information is presented *shall* consider the normal operating conditions under which the user will operate.

[CHAIN-0030-3650]

5. DOCUMENT REPRODUCTION AND DISTRIBUTION

5.1 Reproduction

States *shall* ensure that adequate resources are available for an expedient and timely reproduction of a publication.

[CHAIN-0030-4010]

The resulting reproductions *shall* be checked using a random sampling technique to ensure that the quality of the resulting documents meets that needed.

[CHAIN-0030-4020]

When a failure in reproduction has been identified, the root-cause *shall* be investigated.

[CHAIN-0030-4030]

If the root-cause of a failure in reproduction indicates that it is likely that more copies are affected, a wider quality check *shall* be performed.

[CHAIN-0030-4040]

5.2 Distribution

Distribution by postal service is unlikely to result in a loss of integrity and instead the most likely issue encountered will be non-delivery. Mechanisms exist such that the user may identify if publications have been missed and this guidance material does not elaborate further upon these.

Distribution by electronic media, however, does present a different risk whereby the user does receive a document which lacks integrity but is unaware of this situation and, therefore, takes the information received as being correct.

For this reason, additional requirements are presented here to assist in the detection of corruption of publications distributed through electronic means.

Each publication distributed by a means other than the Aeronautical Fixed Service (AFS), *shall* be protected through the use of a CRC.

[CHAIN-0030-4050]

Note: See the Data and Quality Management volume for further details and requirements for the application of CRCs.

The recipient *shall* be provided with a means of checking the validity of the received publications.

[CHAIN-0030-4060]

States *should* also consider the application of digital signatures for the final delivery of publications.

[CHAIN-0030-4070]

6. DOCUMENT STORAGE AND CONTROL

6.1 General

The premise on which the storage and control of publications should be managed is no different to that of individual data items.

It is essential that adequate controls are in place such that the various editions of a publication are maintained in a manner which allows the provision of previous editions, that the stored material is protected against corruption and that if corruption occurs, it may be detected.

6.2 Configuration Management

Ensuring that both delivered documents and those under preparation are developed within a controlled environment provides assurance that all actors involved in the publication process work from a consistent and common document or data baseline.

Many document configuration control systems exist today, some of which may be downloaded free of charge from the Internet.

Each distinct version of a document *shall* be assigned a unique identification.

[CHAIN-0030-5010]

Each edition of a document *shall* be clearly indicated.

[CHAIN-0030-5020]

Document editions *shall* be indicated through use of either:

- a. A date;
- b. A version number;
- c. A date and version number;
- d. A unique serial number.

[CHAIN-0030-5030]

The document identification *shall* also be used as a physical label attached to any portable storage medium used to hold the document.

[CHAIN-0030-5035]

Where a clear indication of the status or functional content of a publication is required, for paper products the use of coloured paper *may* be used.

[CHAIN-0030-5040]

Each published version of a document *shall* be retained within a controlled environment.

[CHAIN-0030-5050]

If a released version of a document is considered to be a draft release it *shall* be clearly indicated as such.

[CHAIN-0030-5060]

If a document is published which replaces another previously published document, this *shall* be clearly indicated.

[CHAIN-0030-5070]

The configuration management procedures *shall* ensure that a document cannot be changed without changing the document identification.

[CHAIN-0030-5080]

Records *shall* be maintained that identify the data content of all documents in order to support traceability.

[CHAIN-0030-5090]

These records *shall* ensure that:

- a. Documents *may* be easily associated with the data originator;

[CHAIN-0030-5100]

- b. Procedures used to produce the document are fully documented;

[CHAIN-0030-5110]

- c. The documents requiring amendment when updated aeronautical data are received, are clearly identified;

[CHAIN-0030-5120]

- d. The method of storage, and the numbers of copies held, *shall* be such that due attention is given to protection against physical damage and deterioration, i.e., loss of archived documents will not result in the loss of all copies.

[CHAIN-0030-5130]

- e. A copy of each document *shall* be retained for a period determined in the Configuration Management Plan (see Integrity of Aeronautical Information Principles – Data and Quality Management).

[CHAIN-0030-5140]

6.3 Document Storage

Documents, be it the electronic file, print master or printed copies, should be maintained within a controlled storage environment, such that they may be safely identified at a later stage.

Many configuration management systems will provide the means by which electronic copies may be stored.

Copies of documents published *shall* be stored in a secure environment.

[CHAIN-0030-5150]

The secure environment *shall* offer protection from:

- a. Unauthorised access;

[CHAIN-0030-5160]

- b. Fire;

[CHAIN-0030-5170]

- c. Corruption.

[CHAIN-0030-5180]

All stored publications *shall* be protected through the application of CRCs.

[CHAIN-0030-5190]

7. USE OF AUTOMATED SYSTEMS

The introduction of automated systems is seen as a major step forward in the preservation of data integrity. It has been seen that the need for high levels of manual interaction is a primary cause of a loss of integrity.

Whilst manual interaction and processing will, to a certain extent, always be needed, much of today's publication processing could be automated either fully or through supplementary processes to aid the human operator.

The use of an automated system *shall* not remove the need to meet any of the requirements outlined within the guidance material provided.

[CHAIN-0028-6010]

Where a data publication tool is used to produce a complete document, the State *shall* ensure that traceability is maintained between the tool, including its version, and the document produced.

[CHAIN-0028-6020]

Any system used to provide automated document preparation *shall* be implemented in such a way to ensure that the underlying data may be updated in a timely manner.

[CHAIN-0030-6030]

Automated systems shall be implemented such that States may ensure the consistency of information within a document.

[CHAIN-0030-6040]

Automated systems may be implemented such that States may ensure the consistency of information across documents.

[CHAIN-0030-6050]

Any document automation system in use *shall* be verified and validated, as discussed within the Data and Quality Management Volume.

[CHAIN-0030-6060]

8. THE ELECTRONIC AIP (eAIP)

8.1 History & Overview

By 1998, in the quest for improved quality, efficiency and economy, the Aeronautical Information Services (AIS) of the ECAC States had started to publish their Aeronautical Information Publications (AIPs) in electronic format.

These “electronic AIPs” were provided in one of two ways:

1. As an electronic representation of a paper document, i.e. Adobe’s PDF format;
2. As a document generated using more advanced technology, such as through the use of databases.

Of these two solutions, the former was the most prevalent by far but, whilst providing an advance over a traditional paper copy, did not actually improve the integrity issues. Furthermore, the AIPs produced lacked a harmonised approach.

To address the lack of a common publishing standard and the need for harmonisation and coordination, EUROCONTROL developed the Electronic AIP (eAIP) specification, a truly electronic AIP where the data and presentation are separated.

The eAIP Specification and its associated guidance material was developed between the years 2000-2004 as a project of the AIS AHEAD Programme. Since 2004, it has been enhanced and maintained by the Aeronautical Information Management (AIM) Domain of EATM. It provides a standard way to:

- Publish the content of an AIP (including AIP Amendments (AMDT), AIP Supplements (SUP) and Aeronautical Information Circulars (AIC)) in a structured electronic format;
- Visualise the content of an AIP on a computer screen, using Web technology.

The eAIP Specification is fully compliant with the ICAO requirements for AIP content and structure, as laid down in ICAO Annex 15. In addition, the eAIP Specification enforces a strict application of the ICAO requirements concerning the AIP structure.

The use of the eXtensible Markup Language (XML) for the eAIP Specification guarantees that the eAIP is a truly electronic document. The information content is completely separated from its presentation, which, in turn, may be tailored to support every target media.

The central component of the eAIP Specification is the eAIP Document Type Definition (DTD). This is complemented by additional rules, stylesheets, security considerations, etc. A series of eAIP Manuals and proof of concept tools are also provided, each targeting a specific stakeholder category: users, editors and developers.

The use of the eAIP is seen as a major enhancement to the integrity of information as there is no need for the retyping of data at the point of receipt, removing one manual action known to be the source of errors and loss of integrity.

8.2 Application

States who wish to publish their AIP in electronic form should do so using the eAIP specification.

[CHAIN-0030-7010]

Where a State presents their AIP on the Internet, this shall be derived from the source data as for their paper-based AIP.

[CHAIN-0030-7020]