Title: Guidance Material on Positional Data, Preparation and Validation

1 INTRODUCTION

The council of ICAO, adopted, as a standard the geodetic reference system WGS-84, to be used as the sole reference datum for all published aeronautical information from January 1998. The World Geodetic System 1984 (WGS-84) is a global system whose datum centre coincides with the centre of gravity of the Earth

ICAO Annex 15 Amendment 28 was adopted by the council so that it's SARPS (Standards and Recommended Practices) reflects the World Geodetic System 1984 (WGS-84). Consequential amendments to the SARPS of Annexes 4, 11 14 and 15 have been adopted.

The introduction of area navigation, from January 1998 onward required the use of common accurate aeronautical information. Safety of operations will demand a high and assured level of accuracy, integrity and precision for co-ordinate and other aeronautical data used in navigation systems for IFR operations.

Readers should forward advice of errors, inconsistencies, requests for further information or suggestions for improvement to this regulatory requirement to the ansdinfo@iaa.ie

2 REFERENCES

ICAO Annex 4, Aeronautical Charts

ICAO Annex 11, Air Traffic Services

ICAO Annex 14, Aerodromes

ICAO Annex 15, Aeronautical Information Services

Doc 8168 – ICAO Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS)

Doc 9137 - ICAO Airport Services Manual

Doc 8697 - ICAO Aeronautical Chart Manual

Doc 9674 – ICAO WGS-84 Implementation Manual

Aeronautical Information Exchange Model (AIXM) - Obstacle Model Proposal

EUROCAE: User Requirements for Terrain and Obstacle Data, ED-98A

EUROCAE: Standards for processing aeronautical data, ED-76

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

3 General

3.1 Introduction

It is the responsibility of the IAA to ensure that integrity of aeronautical data is maintained throughout the data process from survey/origin to the next intended user. That aeronautical data quality requirements related to the accuracy, integrity, resolution and data classification shall be as provided in Annexes 4, 11, 14 and 15.

3.2 Objective

The objective of this guidance material is;

- To specify the aeronautical data required; and
- To specify that the standard for provision of such data in terms of accuracy, integrity and resolution complies with Annexes 4, 11, 14 and 15;
- Note: The distribution of aeronautical data is the responsibility of the AIS unit.

4 Aeronautical Data

4.1 Types of Aeronautical Data

General

For the purpose of this guidance material aeronautical data may be detailed in terms of latitude, longitude, elevation, height, altitude, bearing, distance and magnetic variation/declination.

Various types of aeronautical data are addressed including surveyed points, declared points and calculated points.

Surveyed Point

A surveyed point is a clearly defined physical point, specified by latitude and longitude, which has been determined by a survey, conducted in accordance with a specification provided by the IAA. These specifications are listed on the IAA web site - https://www.iaa.ie/index.jsp?p=172&n=305

Declared Point

A declared point is a point in space, defined by latitude and longitude that is not dependent upon, nor formally related to any known surveyed point. Typically these include airspace boundary points, oceanic entry and exit points, prohibited, restricted and danger areas outside control areas.

Calculated Aeronautical Data

Calculated aeronautical data is data which has been derived, by mathematical manipulation, from a known surveyed point or declared point.

4.2 Sources of Aeronautical Data

General

Aeronautical data originates from not only the technical branches within the Authority but also from outside sources; including Aerodrome Operators, Procedure and Airspace Designers, Air Navigation Obstacle Developers, Air Navigation Services Providers, the Military and other Government agencies.

Aerodrome Operators

Specific aerodrome information, including for example, gate positions, obstructions and declared distances is often provided by the owner/operator of the aerodrome.

Procedure and Airspace Designers

Aeronautical data associated with Instrument Approach Procedures (IAP's), Standard Instrument Departures (SID's), Standard Terminal Arrival Routes (STAR's) and Holding Procedures are often determined by the designer responsible for the procedure and supplied in the form of an Aeronautical database coding in accordance with the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume II

Air Navigation Obstacle Developers

Developers of objects constituting Air Navigation Obstacles under SI 215/2005 may be obliged to provide aeronautical data as a condition of a planning permission, or by agreement with the IAA.

Air Navigation Services Providers

The Air Navigation Services Provider may provide aeronautical data in respect of airspace positions, intersections of great circle routes, aerodrome runway extended centreline fixes, navigation aids, associated flight calibration testing and other significant positions required for display on radar screens and Air Traffic Management generally.

ATS - Military (The Irish Air Corps)

The Military ATS Authority may provide aeronautical data in respect of military aerodromes, associated approach/departure/arrival procedures, airspace boundaries of military operational areas, restricted areas, danger areas, prohibited areas and temporary airspace.

Other Government Agencies

Government agencies may provide aeronautical data such as for defining danger areas, prohibited areas, temporary airspace or the location of dangerous occurrences as well as supplying survey data for aeronautical purposed.

4.3 Classification of Aeronautical Data

Aeronautical data integrity requirements have been removed. Consequently, the following classification shall apply:

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

Aeronautical data quality requirements related to the classification shall be as provided in appendices to Annex 4, Annex 11, Annex 14 and Annex 15

5 Specification for Aeronautical Data

As per aeronautical data quality requirements contained within appendices to Annex 4, Annex 11, Annex 14 and Annex 15. . These specifications are listed on the IAA web site - https://www.iaa.ie/index.jsp?p=172&n=305

6 Responsibilities for Aeronautical Data

AIS Responsibilities

- Deal with queries relating to aeronautical data;
- Publish aeronautical data;
- Supply aeronautical data to end users in a secure manner; and
- To log instances of non compliance

ASD Responsibilities

- Ensure the aeronautical data quality requirements contained within appendices to Annex 4, Annex 11, Annex 14 and Annex 15 are met;

- Maintain traceability records for aeronautical data;
- Carry out validation on all aeronautical data;
- Ensure that all aeronautical data are as quality assured, have been validated, formatted, are adequately described, traceable and protected by CRC;
- To log instances of non compliance, conduct reviews at appropriate intervals and implement any necessary corrective action;
- Deal with queries relating to aeronautical data; and
- Note: An asterisk (*) will be used to identify aeronautical data which do not meet the requirements contained within appendices to Annex 4, Annex 11, Annex 14 and Annex 15

7 Procedures for Providing Quality Aeronautical Data

Procedures for deriving aeronautical data by survey:

- Specification for survey to be provided/agreed with ASD;
- Survey to be carried out by approved data originators;
- The aeronautical survey report data will be validated against ICAO and EU requirements;
- Non conforming data to be referred back for correction; and
- Any error identified and corrective action taken to be recorded.

Procedures for deriving aeronautical data by transformation:

- Establish accuracy for data to be transformed;
- Establish accuracy loss from transformation process;
- Confirm that accuracy when transformed will meet the required specification for the specific data;
- Transformed data to be validated against ICAO & EU requirements;
- Non conforming data to be referred back to originator for correction; and
- Any error identified and corrective action taken to be recorded

Procedures for declaring aeronautical data:

- Confirm the aeronautical data is routine or essential data and suitable for declaring;

  Note: Critical data is not suitable for declaring;
- Declared data to be validated against ICAO & EU requirements;
- Non conforming data to be referred back to originator for correction; and
- Any error identified and corrective action taken to be recorded

Procedures for deriving aeronautical data by calculation:

- Aeronautical data by mathematical manipulation from a point whose position is known may be derived manually or be software generated;
- Mathematical manipulation of known positional data to derive new positional data to be carried out only by approved persons;
- Positional data derived by mathematical means to be validated against ICAO requirements;
- Non conforming data to be referred back to originator for correction; and
- Any error identified and corrective action taken to be recorded.

7.1 Working Practices

Rounding Convention

- The final results of computations should be rounded only. Where appropriate, to the nearest required digit. A value of .5 shall normally be rounded upwards.
- The rounding of values shall meet the corresponding resolution requirements contained within appendices to Annex 4, Annex 11, Annex 14 and Annex 15 as well as Doc 8168 – ICAO Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) Vol II.

Transfer of Data

Transfer of data shall generally be by electronic /digital means (e.g. AIXM/CD/DVD).

Data Processing

Data processing techniques shall were practicable be based on electronic rather than manual methods.