



**AERONAUTICAL SERVICES
ADVISORY MEMORANDUM
(ASAM)
Focal Point: Gen**

ASAM.
No: 012
Issue 2
Date:21.01.15
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Title: Guidance Material on Aeronautical Chart Validation

1. INTRODUCTION

- 1.1. This guidance material has been prepared to assist those who are involved in construction of Aeronautical Charts for publication in AIP Ireland. Aeronautical Charts in Ireland are developed in accordance with the provisions contained in ICAO Annex 4.
- 1.2. The Aeronautical Chart Validation process encompasses the acquisition of data, design and promulgation of charts. It starts with compilation and verification of the many inputs and ends with ground and/or flight validation of the finished chart for publication.
- 1.3. Aerodrome Operating Minima;
 - 1.3.1. The obstacle clearance altitude/heights (OCA/H) for the aircraft categories for which the procedure is designed shall be shown on the relevant instrument approach chart.
 - 1.3.2. The state does not publish visibility, MDA, DH, DA, MDA/H or DA/H on charts.
- 1.4. 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

- Doc 8697 - Aeronautical Chart Manual:
- Doc 9674 – AN/946 World Geodetic System 1984 (WGS-84) Manual:
- Annex 4 - Aeronautical Charts:
- Annex 15 - Aeronautical Information Services.
- EC Reg 73/2010

3. Scope

- 3.1. In designing an aeronautical chart, simplicity and flyability are the objectives of a good chart.
- 3.2. Throughout the world, unnecessarily complicated charts have been attributed to causing aircraft accidents. Charting designers must consider the final chart from the viewpoint of the cockpit crew and human factors flight safety.
- 3.3. Aeronautical charts considered in this document include;
 - 3.3.1. Aerodrome Obstacle Chart – ICAO Type A;
 - 3.3.2. Aerodrome Obstacle Chart – ICAO Type B;
 - 3.3.3. Aerodrome Terrain and Obstacle Chart – ICAO (Electronic);
 - 3.3.4. Precision Approach Terrain Chart - ICAO;
 - 3.3.5. Enroute Chart - ICAO;
 - 3.3.6. Standard Departure Chart – Instrument (SID) – ICAO;
 - 3.3.7. Standard Arrival – Instrument (STAR) – ICAO;
 - 3.3.8. Instrument Approach Chart – ICAO;
 - 3.3.9. Visual Approach Chart – ICAO;
 - 3.3.10. Aerodrome/Heliport Chart – ICAO;
 - 3.3.11. Aircraft Parking/Docking Chart – ICAO;
 - 3.3.12. Aeronautical Chart – ICAO 1:500,000;
 - 3.3.13. Electronic Aeronautical chart Display – ICAO and



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3.3.14. ATC Surveillance Minimum Altitude Chart - ICAO

4. Charting Design Documentation

4.1. The documentation provided by the charting designer electronically is divided into three categories and includes:

4.1.1. documentation required for publication in the AIP in accordance with ICAO Annexes 4 and 15;

4.1.2. information required on the chart such as:

- 4.1.2.1. title;
- 4.1.2.2. name and reference of the sheet;
- 4.1.2.3. the name and producing agency
- 4.1.2.4. symbols (shall conform to those shown in appendix 2 – ICAO Chart Symbols);
- 4.1.2.5. units of measurements;
- 4.1.2.6. scale and projection;
- 4.1.2.7. date of validity of aeronautical information;
- 4.1.2.8. correct colours;
- 4.1.2.9. relief in the form of either contours or spot elevations;
- 4.1.2.10. airspace areas and classifications;
- 4.1.2.11. air traffic services;
- 4.1.2.12. magnetic variation to decimal of a degree;
- 4.1.2.13. typography;
- 4.1.2.14. aeronautical data;
- 4.1.2.15. Aeronautical coordinates indicating latitude and longitude shall be expressed in terms of the WGS-84 geodetic reference datum;
- 4.1.2.16. controlling obstacle for each segment of the procedure;
- 4.1.2.17. airfield and navigation facility data;
- 4.1.2.18. procedural and minimum altitudes for each segment;
- 4.1.2.19. track guidance;
- 4.1.2.20. textual or abbreviated description, path terminators and Aeronautical data base requirements where applicable;
- 4.1.2.21. the latest available information displayed on the chart for the effective date, such as the magnetic variation/station declination;
- 4.1.2.22. associated positional data e.g. co-ordinates, bearings, distances; and
- 4.1.2.23. For modifications or amendments to existing charts, the reasons for any changes.

4.1.3. Additional documentation required to facilitate ground and flight validation of the chart.

4.2. Rounding of results shall follow the standard guidelines in ICAO Annex 4 and related ICAO publications.



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4.3. All charts shall undergo a final verification for accuracy and completeness by the designer prior to validation and publication.

4.4. All charts shall be retained to assist in recreating the chart in the future in the case of incidents and for periodic review and maintenance. The periodic retention shall not be less than the operational lifetime of the chart.

5. Requirement for new or updated charts

5.1. New charts

5.1.1. Where an operational requirement exists for a new chart, the Aerodrome operator or the Air Navigation Services Provider (the applicant), as appropriate, shall ensure that such a chart is designed in accordance with the standards outlined and the electronic chart submitted to the Pans-Ops & Airspace Inspector for approval at least 20 working days prior to the AIRAC sign-off date. The Pans-Ops & Airspace Inspector shall issue a written report to the charting designer with comments and observations.

5.1.2. The applicant shall consult with Pans-Ops & Airspace Inspector, in advance or during the charting process, to clarify regulatory requirements.

5.2. Revision of existing charts

5.2.1. Each chart published in AIP Ireland should be revised as follows:

- 5.2.1.1. when a significant change to the obstacle environment occurs, requiring an amendment of procedural minimum altitudes;
- 5.2.1.2. when a published bearing or bearing, track or radial would fall into error by 1 degree, consequent on a change to magnetic variation or station declination;
- 5.2.1.3. to improve safety or operational efficiency, as identified by an interested party;
- 5.2.1.4. to accommodate changes to aircraft category or characteristics;
- 5.2.1.5. to accommodate route connectivity or airspace organisation change;
- 5.2.1.6. necessitated by changes to the supporting navigation facility environment;
- 5.2.1.7. to comply with amendments to applicable ICAO provisions and other international and national standards and recommended practices;
- 5.2.1.8. where a change in procedural attitude is required;
- 5.2.1.9. due to errors or anomalies;
- 5.2.1.10. when a significant change occurs to aerodrome physical characteristics such as runways; and
- 5.2.1.11. When any other significant change occurs to aeronautical, cultural or topographical data.

5.2.2. The revised electronic chart shall be submitted to the Pans-Ops & Airspace Inspector for approval at least 20 working days prior to the AIRAC sign-off date.

5.2.3. Each chart should be reassessed annually and a revision proposed if necessary.

5.2.4. **NOTE**; A full design file shall be required for any new or revised chart.



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6. Competency of the Charting Designer

- 6.1. In order to ensure that charts submitted to the IAA for approval for publication in AIP Ireland, meet the required standard of quality assurance the proficiency of the charting designer should be maintained.
- 6.2. Aeronautical charts submitted for approval should be accompanied by details of qualifying competence of designers.
- 6.3. Aeronautical charting designers should undergo aeronautical charting training at least every 3 years.

7. Aeronautical Charting Design Automation

7.1. General

- 7.1.1. Charting design automation tools have the potential to reduce errors in the charting design process, as well as to standardise the application of the Annex 4 criteria.

7.2. Aeronautical Charting Design Automation

- 7.2.1. The charting design provider shall ensure that the software packages used in the design of charts have been validated. A description of the procedures to be used to ensure that all equipment, including software is operated in accordance with the manufacturer's operating instructions and manuals, shall be made readily available to the charting designer.

8. Quality Assurance

- 8.1. The service provider is responsible for ensuring that the provision of aeronautical charts is as specified by ICAO Annex 4.
- 8.2. All charts submitted to ASD as part of a report shall be AIP ready for publication in accordance with Annex 4 requirements.
- 8.3. Use of software
 - 8.3.1. Where the drawing of flight paths should be done using accredited software.
- 8.4. Data Processing
 - 8.4.1. Data processing and transfer techniques shall, where practicable, be based on electronic rather than manual methods. Techniques for deriving positional data shall ensure that accuracy, resolution and integrity of such data complies with ICAO Doc 9674 AN/946 (WGS-84 Manual).
- 8.5. Exceptions from Annex 4 Criteria
 - 8.5.1. Any exceptions from Annex 4 criteria applied in the charting construction should be identified. Such exceptions will require to be considered in conjunction with operators before approval for publication is issued.
- 8.6. Consultation with User Representatives
 - 8.6.1. The applicant is advised to consult with user representatives, where feasible, before submission of new charts, particularly where there are complexities in the chart design.



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Such consultation may be informal but a note of the outcome may be included with the supporting documentation. During the validation process a determination will be made as to whether formal consultation with user representatives is required;

8.6.2.liaise with the Instrument Flight Procedure Provider;

8.6.3.liaise with AIS; and

8.6.4.The Pans-Ops & Airspace Inspector.

9. Ground and Flight Validation

9.1. Validation

9.1.1.Validation is the necessary final quality assurance step in the charting design process, prior to publication. The purpose of validation is the verification of all elements of the chart.

9.2. Final Validation

9.2.1.Final validation is a review of the entire charting package by a person(s) trained in charting design and with appropriate knowledge of chart validation issues. It is meant to arrest errors in criteria and documentation.

9.2.2.The final validation would also determine if further amendments are needed prior to submission for publication.

9.2.3.The IFP designer may participate in the final validation of the chart to assist in its evaluation and obtain direct knowledge of issues related to the procedure's design from the charting designer.

10. Safety Assessment

10.1. Safety Assessment

10.1.1. The charting design provider shall carry out a safety assessment in respect of proposals for new charting designs or any significant changes to a revised chart. Charts shall be published only when the assessment has shown that an acceptable level of safety will be met.

10.1.2. Safety risk control/mitigation process shall include hazard/consequence identification and safety risk assessment.

10.1.3. The charting design provider shall ensure that the results and conclusions of the safety assessment and mitigation process of a new or changed chart are specifically documented, and that this documentation is maintained throughout the life of the chart.

11. Non Conformities

11.1. In the event that the validation reveals non-conformities, it will be the responsibility of ASD to report these to the service provider in the form of a report.

11.2. If the non-conformities are not rectified to the satisfaction of ANSD, than the following may be considered:



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11.2.1. Variation or cancellation of the chart.

11.3. Ultimately, it may be necessary to consider the identification of alternative means of service provision to ensure that the service provider reaches the required standard.

11.4. If a safety critical non-conformity is identified, unless it can be rectified immediately, notification of the deficiency shall be distributed to users by the most appropriate means available. It may be necessary to call for the withdrawal and replacement of the affected charts.