**Title: Guidance Material on Aeronautical Instrument Flight Procedure Chart Validation**

## 1. INTRODUCTION.

1.1. This guidance material has been prepared to assist those who are involved in construction of Aeronautical Instrument Flight Procedure Charts for publication in AIP Ireland. Aeronautical Instrument Flight Procedures Charts in Ireland are developed in accordance with the provisions contained in ICAO Annex 4.

1.2. The Aeronautical Instrument Flight Procedure 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 as applicable.

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 procedure chart.

1.3.2. The state **does not** publish visibility, MDA, MDH, DA, or DA/H on charts.

1.4. Readers should forward advice of errors, inconsistencies, or suggestions for improvement to this regulatory requirement to the AUSD@iaa.ie .

1.5. This replaces ASAM No.012 “Guidance Material on Aeronautical Charts” Issue 2, Date: 21.01.15.

1.6. ASAM No.012 “Guidance Material on Aeronautical Charts”, Issue 2, Date: 21.01.15 is hereby cancelled.

## 2. REFERENCES.

- ICAO Doc 9906 - Quality Assurance Manual for Flight Procedure Design.
- ICAO Doc 8168 - Construction of Visual and Instrument Flight Procedures
- ICAO Doc 8697 - Aeronautical Chart Manual.
- ICAO Doc 9674 – AN/946 World Geodetic System 1984 (WGS-84) Manual.
- ICAO Annex 4 - Aeronautical Charts.
- ICAO Annex 15 - Aeronautical Information Services.
- Commission Regulation (EU) 469/2020 as regards requirements for air traffic management/air navigation services, design of airspace structures and data quality, runway safety and repealing Regulation (EC) No 73/2010.
- Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, (EU) No 1035/2011 and (EU) 2016/1377 and amending Regulation (EU) No 677/2011).

## 3. Definitions.

3.1. AIP Ready. AIP ready means the applicant has clarified through the appropriate channels the regulatory requirements they must meet before conducting their charting process resulting in a product that is only then deemed ready to be submitted to the CA for regulatory approval.

## 4. Scope.

4.1. In designing an aeronautical chart, simplicity and flyability are the objectives of a good chart.

4.2. 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.

4.3. Aeronautical charts considered in this document include.

4.3.1. Standard Departure Chart – Instrument (SID) – ICAO.

4.3.2. Standard Arrival – Instrument (STAR) – ICAO.

4.3.3. Instrument Approach Chart – ICAO.

4.3.4. Aeronautical Chart – 1:250,000 (N & S, E & W).

4.3.5. Aeronautical Chart – ICAO 1:500,000.

4.3.6. ATC Surveillance Minimum Altitude Chart – ICAO.

## 4. Charting Design Documentation.

4.1. The documentation provided by the charting designer electronically 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 in accordance with ICAO Annex 4 Chapter 2 and the relevant chapter for the particular chart.

4.1.3. Additional documentation required to facilitate validation of the chart as applicable.

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

4.3. All charts shall undergo a final verification for accuracy and completeness by the senior designer or a separate designer to the designer who completed the original work, prior to validation and publication.

4.4. All charts and associated documentation shall be retained to assist in recreating the chart in the future in the case of incidents and additionally 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 sponsor), as appropriate, shall ensure that such a chart is designed in accordance with the standards outlined and the electronic chart submitted to the Airspace and U-Space Inspector at AUSD@iaa.ie for approval by the IAA Submission Date in accordance with ASAM 009 Guidance Material on Aeronautical Information Regulation and Control (AIRAC)'s.. The Airspace and U-Space Inspector shall issue a written report to the charting designer with comments and observations via a CRD (See Annex 1).

5.1.2. The Airspace and U-Space Inspector will acknowledge receipt in writing including timescales for the evaluation.

5.1.3. The Airspace and U-Space Inspector shall issue a written report to the sponsor with comments and observations noted pertaining to the chart via a CRD (See Annex 1).

5.1.4. Submissions are reviewed on a first in, first out policy, unless otherwise agreed with the sponsor.

5.1.5. The review process shall be rejected if any of the following conditions exist:

5.1.5.1. Insufficient submission.

5.1.5.2. Discrepancies noted.

5.1.5.3. Requirements not met.

5.1.5.4. Not submitted in the required time.

5.1.6. **Re-submissions** following a rejection will be regarded as a separate submission and the process will recommence.

5.1.7. The applicant shall consult with the Airspace and U-Space Inspector, in advance of and/or during the charting process, to clarify any regulatory requirements. The submission to AUSD shall be AIP ready prior to the regulatory approval process through the AIRAC cycle (see ASAM 009).

**NOTE**: A full design file including associated documentation shall be required for any new or revised chart.

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 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 and EU 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 an aerodrome physical characteristic such as runways.

5.2.1.11. When any other significant change occurs to aeronautical, including cultural, or topographical data.

5.2.2. The revised electronic chart shall be submitted to the Airspace and U-Space Inspector at AUSD@iaa.ie for approval by the AUSD Submission Date in accordance with ASAM 009 Guidance Material on Aeronautical Information Regulation and Control (AIRAC)'s.

5.2.3. The Airspace and U-Space Inspector will acknowledge in writing with timescales for the evaluation.

5.2.4. Submissions are reviewed on a first in, first out policy, unless otherwise agreed with the sponsor.

5.2.5. The review process shall be rejected if any of the following conditions exist:

5.2.5.1. Insufficient submission.

5.2.5.2. Discrepancies noted.

5.2.5.3. Requirements not met.

5.2.5.4. Not submitted in the required time.

5.2.6. **Re-submissions** following a rejection will be regarded as a separate submission and the process will recommence.

5.3. Approval Process.

5.3.1. Submissions shall be in compliance with ASAM 009 - Guidance Material on Aeronautical Information Regulation and Control (AIRACs).

5.3.2. All approved publication documentation must be submitted to AIS prior to the AIS Sign-Off Date.

5.3.3. AUSD will acknowledge in writing with timescales for the evaluation.

5.3.4. Submissions are reviewed on a first in, first out policy, unless otherwise agreed with the sponsor.

5.3.5. The review process shall be rejected if any of the following conditions exist:

5.3.5.1. Insufficient submission.

5.3.5.2. Discrepancies noted.

5.3.5.3. Requirements not met.

5.3.5.4. Not submitted in the required time.

5.3.6. Re-submissions following a rejection will be regarded as a separate submission and the process will recommence.

5.3.7. The result of the evaluation will be by means of a Comment Response Document (CRD). See Annex I.

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

## 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 in accordance with S.016 Safety Regulatory Requirements for Aeronautical Charting Providers.

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 refresher/recurrent 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 AUSD 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. The drawing of flight paths should be done using ICAO Doc 9906 guidance for the validation (not certification) of procedure design tools, notably with regard to criteria.

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 ICAO 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.

8.5.2. VFR Aeronautical chart 1:250,000 (N/S, E/W) undergoes a consultation process through the IAA charting workshops and has the same verification and validation process applied as an ICAO chart.

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. 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.

8.6.1.1. The sponsor shall consult with stakeholders, before submission. Evidence of consensus shall be included with the submission.

8.6.1.2. liaise with the Instrument Flight Procedure Provider.

8.6.1.3. liaise with AIS.

8.6.1.4. The Airspace and U-Space Inspector.

## 9. 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 also determines 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 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 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. The 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. If the validation process reveals non-conformities, it will be the responsibility of AUSD 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 AUSD, then the following may be considered:

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 additionally, be necessary to call for the withdrawal and replacement of the affected charts.

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| | ASD.F.324<br>AMDT No: 01<br>Issue Date: 14/10/20 | AIRSPACE AND U-SPACE DIVISION<br>POLICY AND PROCEDURES |
| **Title: Common Response Document - Airspace**<br>(Airspace and U-Space Division, Instrument Flight Procedure Chart Validation, Common Response Document) | | |
| **Responsibility: Manager of Airspace and U-Space Division, Aviation Infrastructure Department** | | |

**Name of Change :**

**Contributors :**

**Consolidator :**

**COMMENT RESPONSE DOCUMENT HISTORY**

| Issue | Date | Description |
|---|---|---|
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**REVIEWED DOCUMENTS**

| Acronym | Filename | Document Title | Version | Issue Date | Date Received |
|---|---|---|---|---|---|
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| | ASD.F.324<br>AMDT No: 01<br>Issue Date: 14/10/20 | AIRSPACE AND U-SPACE DIVISION<br>POLICY AND PROCEDURES |
| **Title: Common Response Document - Airspace**<br>(Airspace and U-Space Division, Instrument Flight Procedure Chart Validation, Common Response Document) | | |
| **Responsibility: Manager of Airspace and U-Space Division, Aviation Infrastructure Department** | | |

**STANDARDS UESD FOR VALIDATION**

| Standard | Amendment | Corrigenda |
|---|---|---|
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| IAA | ASD.F.324<br>AMDT No: 01<br>Issue Date: 14/10/20 | AIRSPACE AND U-SPACE DIVISION<br>POLICY AND PROCEDURES |

**Title: Common Response Document - Airspace**
(Airspace and U-Space Division, Instrument Flight Procedure Chart Validation, Common Response Document)

**Responsibility: Manager of Airspace and U-Space Division, Aviation Infrastructure Department**

This document is intended, through the different issues, to report the remarks corresponding to the regulatory oversight review activities performed on the identified document(s) corresponding to an Instrument Flight Procedure (IFP) and/or Chart Change(s).

Remarks are classified according to the following 4 categories:

- **Major**: A comment on a critical issue AUSD considers significant enough to prevent regulatory approval of the proposed change(s) unless resolved by the service provider (e.g. a non-conformity to applicable regulatory requirements, or non-adherence to an organisation's own requirement, or an important problem that shall be resolved by the organisation).
- **Minor**: A comment on other issues indirectly affecting the compliance demonstration, which AUSD considers are necessary to address before proceeding. Whilst not solely preventing regulatory approval of the proposed change(s) the accumulation of these issues can lead to the prevention of regulatory approval of the proposed change(s).
- **Question**: The question may be associated to an issue that requires clarification. However, upon receipt of further information the CRD question classification will change to a Closed, Minor or Major classification.
- **Editorial**: Observations on missing information or editorials of a nature which are needed to provide clarity or ensure no ambiguity exists by the absence of that information.

Additionally, it is necessary to note that the review process shall be rejected if any of the following conditions exist:

- Insufficient submission;
- Discrepancies noted;
- Requirements not met;
- Not submitted in the required time period.

Re-submissions following a rejection will be regarded as a separate submission and the process will recommence.

Comments and questions may be reclassified following updated information from the service provider.

Comments may have the following status:

- **Open:** For a new comment, or when a response is not yet considered satisfactory by the review team.
- **Dispositioned:** When an action is agreed.
- **Closed:** When the service provider provides a satisfactory written response, or when evidences are provided that an agreed action has been performed.

| No. | Doc. | Section | ANSD Comment/Observation/Question | Regulatory Reference | Classification | ANSP Answer | Status |
|---|---|---|---|---|---|---|---|
| **R1.** | | | | | | | |

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Airspace and U Space Inspector
AUSD/IAA