



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

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1. INTRODUCTION

1.1. This material has been prepared to provide step-by-step guidance on the application of performance-based navigation (PBN) in developing an Airspace Change Proposal (ACP). Each ACP is unique and may have significance for interested parties locally who use or adjoin the airspace in respect of which a change is proposed. In exercising its air navigation functions, the Irish Aviation Authority must give priority to maintaining a high standard of safety in the provision of air traffic services.

1.2. Any requests for further information or observations on this ASAM should be forwarded to ansdinfo@iaa.ie

2. REFERENCES

- 2.1. ICAO Annex 11 – Air Traffic Services
- 2.2. ICAO Doc 9992 - Manual on the use of Performance Based Navigation (PBN) in airspace design
- 2.3. ICAO Doc 4444 - Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM)
- 2.4. ICAO Doc 8168 - Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS)
- 2.5. ICAO Doc 9426 - Air Traffic Services Planning Manual
- 2.6. ICAO Doc 9613 - Performance-based Navigation (PBN) Manual
- 2.7. ICAO Doc 9869 - Manual on Required Communication Performance (RCP)
- 2.8. ICAO Doc 9931 - Continuous Descent Operations (CDO) Manual and
- 2.9. ICAO Doc 9993 - Continuous Climb Operations (CCO) Manual.

3. Scope

3.1. Airspace changes considered in this guidance material may be sought in connection with the establishment or amendment of the published limits of the following areas:

- 3.1.1. Aerodrome Traffic Zone (ATZ);
- 3.1.2. Control zone (CTR);
- 3.1.3. Control Area (CTA);
- 3.1.4. Military Operational Area (MOA);
- 3.1.5. Restricted area (EIR);
- 3.1.6. Prohibited area (EIP);
- 3.1.7. Danger area (EID); and
- 3.1.8. Amending the classification of airspace

3.2. ACP follows a number of principles including, but not limited to:

- 3.2.1. Safety: - The safety of air navigation is the most important consideration;



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- 3.2.2. International Obligations: - ASD shall perform its functions in a manner consistent with the obligations of Ireland under the Chicago Convention, the Single European Sky, European Union and National law relating to the safety of air navigation;
- 3.2.3. Environment: - In as far as practicable, the environment is protected from the effects of the operation and use of aircraft; and the effects associated with the operation and use of aircraft;
- 3.2.4. Consultation: In the performance of its functions and the exercise of its powers, ASD may consult with other relevant bodies and organizations. A list of ACP organizations is contained in Annex A.
- 3.2.5. Efficient use of airspace: Airspace management must be conducted to provide the most efficient use of airspace consistent with the safe operation of aircraft.

4. Airspace Change Process

The development and implementation of an airspace concept can be broken down into four main phases: plan, design, validate and implement. Within these four main areas are seventeen separate activities.

4.1. Activity 1: Agree on operational requirement.

Airspace changes are triggered by operational requirements. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.2. Activity 2: Create the airspace design team

In order to respond to the operational requirement identified in Activity 1, an airspace concept must be developed, validated and implemented. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.3. Activity 3: Agree on objectives, scope and timelines

One of the first tasks of the airspace design team is to define and agree on the objectives of the project. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.4. Activity 4: Analyze the reference scenario

Before starting the design of the new airspace concept, it is important to have an appreciation of the current situation. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.5. Activity 5: Select performance criteria, safety policy and safety criteria

The in-depth analysis of the reference scenario in Activity 4 provides direct input to the new airspace concept. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.6. Activity 6: Agree on ATM/CNS assumptions



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The airspace concept to be developed is based upon certain ATM/CNS assumptions. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.7. Activity 7: Airspace routes and holds

PBN makes it possible to place routes in the most optimum locations provided that there is the necessary coverage provided by the ground- or space-based navigation aids. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.8. Activity 8: Initial procedure design

The preliminary procedure design runs in concert with the airspace design. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.9. Activity 9: Airspace volumes and sectorization

The design of ATS routes, terminal routes, airspace structures and ATC sectorization is an iterative process. The airspace structures and the ATC sectorization are considered once the ATS and terminal routes have been completed. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.10. Activity 10: Confirming the ICAO navigation specification identified in Activity 6

The activity is the confirmation of the navigation specification from the PBN Manual that matches, in terms of navigation performance/functionality, the requirements of the airspace concept. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.11. Activity 11: Airspace concept validation

Once the airspace design is complete, the airspace concept will have become a comprehensive body of work that needs to be validated and checked by the project team. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.12. Activity 12: Finalization of procedure design

The procedure design process is only finalised once the airspace concept has been validated. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.13. Activity 13: Validation of procedure design

The creation of an RNAV or RNP instrument flight procedure or ATS route follows a series of steps from the origination of aeronautical and obstacle data through survey to the final publication of the procedure and subsequent coding of it for use in an airborne navigation database. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.



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4.14. ASD Regulatory Assessment

It is at this stage that the ACP will be submitted to ASD for assessment. The directorate will study the content of the proposal in detail. Should the detail within the proposal be considered insufficient, a request for supplementary information will be submitted to the change sponsor. In such cases, the process timeline will be suspended pending acceptance of the supplementary information. The proposal will not proceed to the regulatory consultation stage until the directorate has received all outstanding information. On completion of the case study, the directorate will reach a decision to accept or reject the proposal. A decision to accept the proposal would be subject to the satisfactory outcome of the regulatory consultation that follows completion of the case study. Acceptance at this stage does not constitute approval of the Proposal.

General Assessment Processes

- ✓ Safety
- ✓ International requirements
- ✓ Environment
- ✓ Consultation and communication
- ✓ Aeronautical study

This stage may take up to five months to complete. This includes one month in order to conduct the case study and up to four months for regulatory consultation. The directorate will apply a minimum of a 12-week consultation period. The timescale for this stage may be significantly reduced in those cases where it is decided that regulatory consultation is not required.

4.15. ASD summary and present results

When the airspace analysis is complete (e.g., all measurable items have been generated and analyzed for all of the proposed alternatives and all environmental and safety assessments have been performed), the substance of the analysis, including conclusions and/or recommendations are documented. As discussed, for any change to the ATM system, a safety risk management assessment must be written, accepted and approved for the airspace change. This documentation, along with the environmental assessment as required, are presented to decision makers.

When the airspace study is complete, the substance of the analysis, including conclusions and recommendations, should be recorded in a study report. This report should specify any recommended airspace actions, sector realignments, route adjustments, and procedural changes that will be necessary to implement the recommendations. The study report conveys the key findings of the airspace and environmental study and documents the analysis for historical reference.

Outline for an airspace study report



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The following list is a recommendation of the content to include in an airspace study report following an executive summary which contains a brief, stand-alone summary of the study. Supply reference material or detailed numerical results in appendices.

Problem Statement

- ✓ What is the nature and severity of the problem? What elements of the airspace are affected by this problem (procedures, automation and infrastructure)? What traffic characteristics are assumed? If the problem depends on planned changes to the airspace, what changes are being assumed, with what timetable?

Background

- ✓ What is the background of the problem? Who are the key stakeholders and what are their concerns? What chain of events has led to the decision to conduct an airspace study?

Summarize and present results

- ✓ **Scope**
 - What was the study scope? What were the constraints of time, resources, and tools?
- ✓ **Study objective(s)**
 - What was the original study objective?
 - Did that objective change, and if so, for what reasons?
- ✓ **Stakeholders and decision makers**
 - What stakeholders were involved with this study? What was the relationship of the airspace design team to other organizational entities, including other regions and other study teams? What input was received from the stakeholders?
- ✓ **Alternatives**
 - What alternatives were considered throughout the study? Which alternatives were rejected early in the study and why? Which alternatives were selected for detailed development? How does each alternative represent a feasible course of action? What are the potential environmental impacts for each alternative? What are the potential safety impacts for each alternative?
- ✓ **Technical Approach**
 - What technical approach was used for this study? What metrics were used to evaluate the alternatives? What model or models were used? What data sources were used? What were the limitations of this approach? How were environmental issues evaluated? How were safety issues evaluated?
- ✓ **Results**
 - What results were obtained from the study? How are those results expressed using the study metrics?



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- ✓ Conclusions
 - What are the key observations resulting from this study? What conclusions can be drawn from any part of this study, including the initial evaluation, discussions among stakeholders, and analysis of the alternatives? Are any of the conclusions pertaining to matters outside the specific scope of this study?
- ✓ Recommendations
 - Based on the study, what is the recommended course of action? Should additional alternatives be considered? Does the analytical approach used for this study need improvement?

4.16. Appeals mechanism

The party affected by the ACP result has the right to request a review. Reviews are managed by the National Airspace Policy Body (NAPB) with support from the IAA legal department. The review is undertaken by the NAPB who may appoint a technical assessor who has not been associated with the case under review. The appellant may attend or be represented at the review. If this right is not exercised the review will be based on written representations.

Contents of a brief

- ✓ The brief compiled by ASD will contain the following:
 - The details and facts on how the ACP result was reached.
 - The representations submitted by the appellant.
 - Commentary on the appellant's representations.
- ✓ The brief will be sent to the appellant approximately 2 weeks before the review.
- ✓ Conduct of the review
 - The appellant will be offered an oral hearing which will be open to the public unless there are good reasons for holding it in private. It will be attended by:
 - ❖ Members of the NAPB.
 - ❖ IAA legal adviser acting as clerk to the tribunal and providing legal advice on the conduct of the hearing to the NAPB members.
 - ❖ The appellant.
 - ❖ The appellant's legal adviser, friend and/or witness if required by the appellant.
 - ❖ ASD staff involved with the ACP.
 - ❖ Shorthand writer.
 - ❖ In some cases, one or more technical assessor(s) who have not been involved, in the case appointed by the NAPB.
 - The hearing will be based on the brief and provides the appellant with the opportunity to make oral representations, seek clarification and ask questions. ASD staff will be given the opportunity to seek clarifications or make comments



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on the oral representations of the appellant. The last word will go to the appellant.

- All questions and points must be made through the chair; cross-examination will not be allowed.
 - If any new information or arguments are introduced, either by the appellant or ASD staff, which was not contained within the brief, the hearing may be adjourned to allow time for all parties to consider the new issues.
 - A transcript of the hearing will be supplied to the appellant.
 - If the appellant decides not to attend or be represented at the oral hearing the review will be undertaken by the NAPB members solely based on the brief. This will be without the attendance of the ASD staff involved with the ACP result.
- ✓ The decision
- The appellant will be informed of the decision including the supporting reasons in writing normally within 10 days of the completion of the hearing.

4.17. Activity 14: ATC system integration

The new airspace concept may require changes to the ATC system interfaces and displays to ensure controllers have the necessary information on aircraft capabilities and the appropriate displays to support the new routings. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.18. Activity 15: Awareness and training material

The introduction of PBN can involve considerable investment in terms of training, education and awareness material for both flight crew and controllers. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.19. Activity 16: Implementation

Implementation can only be successful with comprehensive implementation planning as part of the overall project planning and a very careful review of all critical factors during the planning stage. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.

4.20. Activity 17: Post implementation review

After the implementation of the airspace change the system should be monitored and operational data collected to ensure that safety is maintained and to determine whether strategic objectives have been achieved. See ICAO DOC 9992 Manual on the use of Performance Based Navigation (PBN) in airspace design for further guidance on this activity.



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Annex A

ACP Organisations

Dublin Airport	See AIP AD 2 AERODROMES
Shannon Airport	See AIP AD 2 AERODROMES
Cork Airport	See AIP AD 2 AERODROMES
IAA ANS	See AIP GEN 1.1
Air Corps	See AIP AD 2 AERODROMES
Waterford Airport	See AIP AD 2 AERODROMES
Kerry Airport	See AIP AD 2 AERODROMES
Galway Airport	See AIP AD 2 AERODROMES
Weston Airport	See AIP AD 2 AERODROMES
Ireland West Airport	See AIP AD 2 AERODROMES
Sligo Airport	See AIP AD 2 AERODROMES
Donegal Airport	See AIP AD 2 AERODROMES
The Ulster Gliding Club	See AIP ENR 5.5
Aircraft Owners and Pilots Association AOPA Ireland	See AIP ENR 5.5
Queens University Gliding Club	See AIP ENR 5.5
Irish Gliding and Soaring Association	See AIP ENR 5.5
Irish Light Aviation Society ILAS	See AIP ENR 5.5
The Ulster Flying Club	See AIP ENR 5.5
Letterkenny Flying Club	See AIP ENR 5.5
National Aero Club of Ireland	See AIP ENR 5.5
Irish Airline Pilots Association of Ireland IALPA	See AIP ENR 5.5
Irish Air Traffic Controller Association IATCA	See AIP ENR 5.5
Department of Transport	See AIP GEN 1.1
Department of Defence	See AIP GEN 1.1