

European Action Plan for Airspace Infringement Risk Reduction

Airspace Design Recommendations
& Best practices 2.0

EAPAIRR

European Action Plan for Airspace Infringement Risk Reduction

Introduction

Airspace infringement, also known as “unauthorised penetration of airspace” is a major operational hazard that can result from the division of airspace into different classes and structures, with their associated procedures and services, and its joint use by different categories of users, often with competing objectives and different operational requirements and capabilities.

Infringements are not rare events in busy European airspaces and, without prompt action by air traffic controllers and pilots, could result in a loss of separation, or even mid-air collision. Recognising the severity of this threat to aircraft operations and the need to ensure the safe use of airspace and sustainable development of commercial, military and general aviation in the short, medium and long term, the major aviation stakeholder groups in Europe agreed that coordinated actions should be taken to control this aviation risk. The launch of the Airspace Infringement Safety Improvement Initiative in 2006 provided the vehicle for achieving this goal.

The first Action Plan was initiated in 2006, and was the key deliverable of the European Airspace Infringement Initiative. This initiative delivered an action plan in 2009, presenting a set of safety improvement measures and provides guidance on how they can best be implemented.

This action was partially adopted throughout the European Aviation Industry.

The plan was developed with the support of, and active contributions from, organisations representing the airspace users, service providers, regulatory and military authorities. Notable contributions were made by the International Council of Aircraft Owner and Pilot Associations (European region), Europe Air Sports, Association of European Airlines, International Air Transport Association, the European Commission and EUROCONTROL.

Ten years after that publication the issue of Airspace Infringements is still present, as is the associated risk. Many local and regional initiatives have been running for a number of years. These have resulted in the sharing of many best practices and have gone some way to reducing the risk slightly: but they have come nowhere near to eliminating it. With a further developed aviation industry which has seen increased traffic in both General Aviation and Commercial Aviation and flexible use of Airspace by the military, the environment has changed as well. Other developments like the evolution of Flight Information Service, 8.33kHz implementation, development of surveillance and detection equipment, changes in airspace structure and activations and last but not least the rapidly increasing professional and recreational drone activities may have an impact on the risk as well.

All the aforementioned elements and the open ends to the questions, demand a renewed European Airspace Initiative. Again the ultimate goal is to develop a risk reduction action plan and support airspace users, civil and military service providers and national authorities in implementing the recommended safety improvement measures for the timeframe 2020-2030. CANSO and EUROCONTROL chair the initiative which draws on the expertise and close support of a working group of stakeholders.

The recommendations have been divided in 5 domains: Airspace Design (AD), ANSPs (ANSP), Airspace Users (AU), AIM & Meteorology (AIM) and Regulators (REG). The document is available in a full version and in booklets per domain, and is complemented by a list of implemented best practices by the contributing stakeholders.

This document refers to the recommendations and best practices for Airspace Design. The information on the other domains, as well as the complete introduction and context can be found in the full version on <https://skybrary.aero/articles/european-airspace-infringement-action-plan>.

EAPAIRR v2.0 Recommendations

Airspace Design

REF	Recommendation	Rationale
AD1	The design principles should encompass the safety, environmental and operational criteria, and the strategic policy objectives that the change sponsor seeks to achieve in developing the airspace change proposal.	<p>Design principles must be set through a two-way process and involve effective engagement.</p> <p>The change proposal should include the maintenance of a high level of safety and avoid overflying densely populated areas where possible.</p> <p>The proposal should also include other design principles that reflect local considerations or impacts on other airspace users so that they are considered as part of the design process. The development of these design principles can be undertaken by the change sponsor without additional engagement. All design options will need to demonstrate how they meet (or don't meet) the design principles. The design principles should consider U-Space and UAS operations.</p>
AD2	Any change must be transparent and involve stakeholder engagement throughout the entire process.	<p>Those potentially affected by a change in airspace design should feel confident that their voice has a formal place in the process if trust is not to be eroded. Openness also allows change sponsors to see more clearly what is expected from them.</p> <p>The change should include assessing the impact of airspace changes on certified navigation systems and apps.</p>
AD3	Maintain and enhance safety by design	States should perform an assessment of the impact of airspace complexity on the workload for all affected airspace users and publish the results of an agreed objective measurement either for each airspace change or at regular intervals.
AD4	Where possible, design airspace boundaries with ground features that are not susceptible to significant change, and do not delimit airspace by national borders	Features such as roads, railways and major topographical features aid navigation and situational awareness. This is less true of towns, cities, and industrial parks as they grow with economic expansion.
AD5	Where new airspace is established provision should be made for ATS outside of controlled airspace to facilitate airspace infringement prevention. See also recommendation ANSP8	ATS should provide airspace infringement warning and navigational assistance.
AD6	The design should be as simple as possible to avoid confusion or pilot overload in interpreting the airspace.	Complex airspace with multiple CTAs or differing levels and complex shapes are inherent airspace infringement hot spots. The design should consider adjacent controlled airspaces to avoid creating narrow corridors that increase funnelling and risk of airspace infringement and mid-air collision.

REF	Recommendation	Rationale
AD7	Base levels of CTA should be as high as possible to allow containment of SIDs and STARs but also elevate lower limits of TMAs where possible.	Enable the retention of as much uncontrolled airspace as possible.
AD8	National authorities should play the leading role in establishing and promoting local implementation priorities and actions in consultation with airspace users and service provider organisations.	While airspace infringement is an important operational risk across much of Europe, the nature and scale of the problem varies between States. There are several key factors which will shape the local airspace infringement risk reduction strategies. These will determine the most appropriate and effective actions to be taken by individual States. These are: the complexity of the airspace structure; the scale of military flying activity; the scale and maturity of both commercial and general aviation sectors; the scope and nature of air traffic service provision; and the State's regulatory and legislative frameworks. Therefore, the number of Action Plan recommendations that can be implemented is likely to vary from State to State.
AD9	Review the controlled airspace structure and simplify boundaries where possible.	<p>A safety assessment must be made for all changes at the functional system level with regard to the Airspace Structure.</p> <p>This action is particularly relevant to areas of dense VFR traffic. It should aim to simplify, where possible, the numerous boundary level changes of TMAs and CTRs that can contribute to vertical navigation error. It should also aim to ensure the protection of the IFR traffic established on the extended runway centreline and within 15 NM from the runway threshold from nearby uncontrolled VFR traffic. This would reduce the number of operationally unnecessary RAs generated by TCAS. Alignment of the <FL195 airspace structure, boundaries and of ATS routes for VFR flights (hereinafter referred to VFR routes) with prominent ground features and landmarks should be sought to make them more easily identifiable by pilots during flights. The review should be informed by identification of hot spots based on the analysis of incident reports (e.g. airspace infringements) or other appropriate methods. Automated tools may also be used to plot actual flight tracks in a particular area onto the existing airspace structures in order to identify potential inconsistencies in the design of protected (controlled) airspaces. Such methods will also facilitate the identification of under-utilised portions of controlled or restricted airspaces that may be released for use by GA VFR flights. This action concerns ANSPs that have been delegated the responsibility of developing and implementing changes to the airspace organisation subject to the approval of the National authorities.</p>

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AD10	Harmonise airspace classification below FL195 in line with the strategic airspace design principles.	<p>An appropriate strategic design of the airspace is crucial in permitting the ATM System to provide the right services, at the right time and in the right places decreasing routine tasks and the requirement for tactical intervention. Harmonisation of airspace classification below FL195 should be based on the ICAO-defined airspace classes. It should aim for the establishment of common vertical limits, as far as practicable. It should also include harmonised application of associated rules, procedures, and air traffic services.</p> <p>It is highly recommended deploying airspace structures that provide a greater degree of strategic de-confliction with particular consideration of cross-border operations. The EUROCONTROL Agency should support and facilitate the harmonisation efforts of the Member States within the framework of the existing EATM working arrangements (NETOPS and sub-groups) providing the required expertise, and in line with the approved Strategic Guidance in support of the execution of the European ATM Master Plan and SES regulations.</p>
AD11	Eliminate class A from TMAs and airspace below FL195 wherever and whenever possible.	This increases the availability of airspace for General Aviation while providing a more tailored approach to retaining the necessary controlled airspace for commercial flights to operate.
AD12	Resize CTRs and TMAs on a case-by-case basis, especially at lower levels.	This increases the availability of airspace for General Aviation while providing a more tailored approach to retaining the necessary controlled airspace for commercial flights to operate.
AD13	Create VFR routes in the CTRs if they are deemed beneficial in accordance with the needs of all stakeholders in this area.	This may lead to a more predictable traffic behaviour for both pilots and controllers, with routes between easily identifiable points.
AD14	<p>Resize special activities airspace to limit them to the minimum required and restrict their activation to what is strictly necessary.</p> <p>Eliminate those areas/zones that are no longer needed.</p>	<p>This increases the availability of airspace for General Aviation and reduces the frequency of ‘technical’ airspace infringements, i.e., those ‘infringements’ where the airspace is notified as restricted but eventually no activity is taking place in it.</p> <p>This concerns: Prohibited, Restricted and Danger Areas</p> <p>Military Exercise Area, Military Training Area, Air Defence Identification Zone (ADIZ), Cross-Border Area (CBA), Temporary Reserved Area (TRA), Temporary Segregated Area (TSA)</p> <p>Flight plan Buffer Zone (FBZ)</p>

EAPAIRR v2.0 Best Practices

Airspace Design

All of the following best practices are real life examples, kindly provided by contributing stakeholders to the EAPAIRR working group. Please note that the framework, applicability and local circumstances for implementing these recommendations may differ in your own situation.

Section Reference	Best Practice	Source
AD2	<p>Intended airspace changes will be announced to all airspace users in spring each year.</p> <p>Airspace users are involved at an early stage as soon as airspace change proposals are available.</p> <p>Formal Annual Airspace User Conference in autumn with Ministry of Transport, DFS, General Aviation, Commercial Aviation, Military.</p> <p>Airspace changes are implemented in March the following year (with depiction on ICAO VFR chart).</p>	DFS
AD3	<p>Airspace changes are implemented to improve safety (IFR/VFR deconfliction).</p> <p>After implementation, all airspace changes will be validated during the VFR flying season with regard to effectiveness and possible adaptations.</p>	DFS
AD4	<p>It has become best practice over the years to apply clear and easy borders in the airspace design instead of landmarks (railways etc.). There is no general request by VFR users to use landmarks as airspace boundaries (Airspace C, D, TMZ, RMZ etc.). Clear and simple lines are preferred. However, landmark based boundaries are still used sometimes in special occasions (e.g. Glider sectors).</p>	DFS
	<p>To derive the topographical information needed, correlate the existing reporting system with tools like google earth, to ensure topographical relations are identified and local hotspots can be identified.</p>	ACG
AD8	<p>Formal Annual Airspace User Conference in autumn with Ministry of Transport, DFS, General Aviation, Commercial Aviation, Military.</p> <p>Catalogue of Criteria for the Establishment of Airspaces (Airspace Concept Germany), Ministry of Transport and Infrastructure: The aim of this catalogue is to determine generally applicable criteria for the establishment, modification and cancellation of airspaces, especially in the vicinity of IFR aerodromes, considering the interests of the various user groups as far as possible. On this basis, airspace measures can be implemented in a transparent and comprehensible way.</p>	DFS
AD10-11	<p>As a new recommendation from DFS please find the information about the newer established airspace class "D" and "C" (not CTR) with the designation "HX". This helps a lot in these areas.</p> <p>German AIP ENR 1-15 Airspaces Classes with HX</p> <p>As an example the AIP AIC VFR 01/20, 12.Mar 2020 – Class D airspace (not CTR) EDDP "HX"</p>	DFS

Section Reference	Best Practice	Source
AD12	<p>As a new recommendation from DFS please find the information about the newer established airspace class “D” and “C” (not CTR) with the designation “HX”. This helps a lot in these areas.</p> <p>German AIP ENR 1-15 Airspaces Classes with HX</p> <p>As an example the AIP AIC VFR 01/20, 12.Mar 2020 – Class D airspace (not CTR) EDDP “HX”</p>	DFS
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Contributors

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