

European Action Plan for Airspace Infringement Risk Reduction

Air navigation service (including FIS) providers
Recommendations & Best Practices



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 Air navigation service (including FIS) providers. 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

**Air navigation service
(including FIS) providers**

REF	Recommendation	Rationale
ANSP1	<p>Ensure ATCO and FISO communication skills and discipline is included in FIS training and licensing/certification.</p> <p>See also recommendation AU8</p>	<p>This action reinforces the objectives and provisions of the Action Plan for Air Ground Communications, focusing on the aspects that are of particular importance in the communication exchange between ATS units and VFR flights. ATS staff should be trained to: Strictly apply the readback/hearback procedure; Actively seek confirmation in case of doubt; Use unambiguous call-signs - full call-sign or call-sign coupled with type of aircraft; Use published reference points in ATS messages to pilots as far as possible; Use simple ATC clearances and instructions; Use more concise transmissions, if necessary broken into shorter segments; Use reduced rate of speech and better articulation when talking to VFR pilots; Issue pre-warning of instructions to be passed; Provide FIS in English language; Acquire adequate knowledge of and apply communication failure procedures as required.</p> <p>Improve and harmonise FISO training curriculum. The training curriculum should be improved to adequately match the level of service to be provided. FIC staff should receive dedicated training to improve their awareness and understanding of VFR flights' needs, specificities, and light aircraft performances. Best practices already exist (e.g., in Germany) to deliver emergency situation training to FIC staff and VFR pilots in a coordinated manner. A sufficient number of FIC staff should be made available to support the provision of enhanced FIS. A number of ATS providers have already implemented dedicated training programmes for staff that become redundant or underutilised due to the increasing automation of ATS provision (e.g., implementation of OLDI). See also 6.20 and 6.23 above.</p> <p>Add familiarization basic training for: ATCO and FISO in training meetings; for Pilots at ATC/FIS Centres.</p>
ANSP2	<p>Implement a properly tuned Area Proximity Warning function.</p>	<p>The objective is to implement an automated safety net function that should systematically alert controllers of airspace infringements, i.e., of unauthorised entries into controlled and restricted airspaces. Implementation decision should be based on positive cost-benefit-analysis and safety assessment. Area Proximity Warning (APW) is a ground-based safety net intended to warn the controller of unauthorised penetration into an airspace volume by generating, in a timely manner, an alert of a potential or actual infringement.</p> <p>Use APW Safety net data to highlight “hotspots” where potential or actual airspace infringements have occurred. This can in turn be used to focus work on airspace infringement causes and mitigations This can also be used for the investigation of the causes of the potential airspace infringements and later for the mitigations.</p> <p>It is recommended that a survey is undertaken to determine the relevant implementation of this function and its effectiveness.</p>

REF	Recommendation	Rationale
ANSP3	Establish a platform to discuss procedures, incidents and hotspots between aerodromes, local ATS units and flying clubs. See also recommendation AU7.	<p>This action aims to establish standard coordination procedures between closely located ATS units, military, and user sites. The implementation of such procedures will reduce the volume of routine coordination, and thus controller and pilot workload. The FUA concept implementation work should also take account of the specific needs of the GA VFR flights with regard to the timely dissemination of information about the activation/deactivation of reserved airspaces (including those for glider activity). Implementation of (direct) communication lines or means between local ATS units, military units and GA airports/airfields should be considered in this respect. The implementation of the above referred coordination procedures, which would enhance the FUA procedures in <FL195 airspace at local level, should be preceded by careful safety assessment</p> <p>Establish Local Airspace Infringement Teams (LAITs) to be run by the airspace owner. Participants should be included from ANSP's, airspace users (GA, CA and MA), local airports and regulators. Provide more general information on hotspots and ways of communication.</p>
ANSP4	The ANSP & Regulator should establish a procedure to provide feedback on individual incidents to the 'Airspace Infringer'.	<p>Set up a process to allow direct access to individual pilots to acquire the relevant information immediately after an incident.</p> <p>Be aware that information provided «right after an incident» may not be sufficiently considered. It is useful to have information as soon as possible in order to avoid repeated mistakes if the infringer continues operating. However, all parties should assess whether the completeness of the available information might risk cancelling out the advantages brought by immediate access to the pilot.</p> <p>This direct process should respect Just Culture principles to avoid any negative consequences e.g., TXPD off. Anonymous ways of providing the relevant safety information could be considered.</p>
ANSP5	Enhance and harmonise FIS provision to VFR flights	<p>Harmonisation of FIS provided to VFR flights should be based on European IRs/AMCs/GMs, ICAO SARPs and existing best practices. Examples of best practices are thus the Low Airspace Radar Service provided in UK airspace and the radar information services provided in German airspace.</p> <p>Radar-derived information available at ATS units should be used to enhance the information passed to pilots. It should include, as appropriate, navigational assistance, coordination of controlled airspace entry/crossing clearance, passing traffic information and information about restricted airspace activation/deactivation and concerned traffic, as well as provision of other aeronautical information and information about potentially hazardous conditions. The service could include provision of warnings to pilots of any unfavourable factors including airspace infringement and traffic warnings. FIS "level" could be raised to enable proactive prevention of potential conflict situations. The scope of this action should include the harmonisation of services provided by civil and military FIS provider organisations.</p>

REF	Recommendation	Rationale
		<p>Provision of FIS across Europe is not consistent.</p> <p>There are good reasons for different levels of service provision under FIS. Level of service is a decision that rests with the state. As long as the service meets the minimum required by the state then the state is deemed compliant. At the moment there are no ongoing initiatives to harmonise FIS at the European level. EASA is waiting for the implementation of Part ATS and will review this later to see if any further action is needed.</p> <p>The principles and fundamentals of provision of FIS are established in Commission Implementing Regulation No. 923/2012. The upcoming PART-ATS which will be included in Commission Implementing Regulation 2017/373, will further detail the specific technical requirements for FIS and provide harmonization to the suitable extent. Based on the implementation feedback, consideration for further refinement of existing FIS provision could be undertaken.</p>
ANSP6	Review the controlled airspace structure and simplify boundaries where possible	<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 reliable protection of the IFR traffic established on the extended runway centreline and within 15 NM from the runway threshold from the nearby VFR traffic. This would reduce the number of operationally unnecessary RAs generated by TCAS. Alignment of <FL195 airspace structure boundaries and of VFR routes (corridors) 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 underutilised 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> <p>Introduce, where necessary, standard VFR entry, exit and crossing procedures and/or routes in busy controlled airspaces.</p> <p>Meet with relevant stakeholders for review of proposals, e.g., Airlines, ANSP's, GA, etc.</p> <p>Add the promotion of implementing VFR routes/corridors in controlled airspace – if they are deemed beneficial – where simplification is not possible.</p>

REF	Recommendation	Rationale
ANSP7	Facilitate the exchange of information and operational experience between ATCOs/FISOs and pilots at local level.	<p>“Open doors days” at ATS units and familiarisation visits by ATS staff to flying clubs and military sites should improve the understanding of each other's operational needs, capabilities, and concerns. ATS staff will improve their awareness of single-pilot aircraft operation (pilot workload, limits, priorities, etc.) and mission/training requirements (for military). Pilots will improve their knowledge of controllers' tasks, ways of working and the assistance that may be provided to them by ATS. Other approaches that could be adopted are dedicated safety seminars with the participation of all airspace user types, service provider organisations and regulatory authorities, or periodic safety analyses (e.g., bi-annual) of the common use of airspace. Pilot associations and flying clubs could play a role in improving the interface with ATC. Knowledge exchange programmes should include pilots with different experience from the various type of operations, e.g., pilots of light aircraft, gliders, helicopters, etc.</p>
ANSP8	<p>Ensure adequate Radio and Surveillance data coverage in the airspace where FIS is provided.</p> <p>See also recommendation AD5</p>	<p>Review and improve, if necessary, the low-level radio coverage in particular around CTRs/TMAs and of airspaces containing high density VFR routes and choke points. Some receiver/transmitter sites, built for IFR traffic, may not be appropriate for FIS provision due to the terrain. Subject to availability, the number of ATS frequencies for the provision of FIS in busy areas may need to be reviewed and increased to ensure the required quality of service provision and better controlled airspace protection.</p> <p>There are new and increasing options available in non-radar surveillance available, e.g. Non-cooperative Radar Air Target Identification radar detection, ADS-B, multi-static primary, RadNet etc.</p>
ANSP9	For VFR traffic in uncontrolled airspace, transfer services from ATC sectors to dedicated FIS positions at ACCs, Mil centres or aerodromes.	<p>The objective is to ensure provision of FIS from dedicated positions that will not reduce the level of service to VFR flights when there is a high level of IFR traffic in the airspace assigned to the ATC sector(s). Procedures may be established for the delegation of services to VFR flights in class E airspace from the control sectors to FIC, if appropriate and depending on the specific operational environment and regulatory framework.</p> <p>The aim should always be to have a dedicated FIS position at an ACC ideally with a Surveillance display, including offshore services.</p>
ANSP10	Include a dedicated and harmonised VFR services training module in ATCO/FISO training curriculum.	<p>The objective is to ensure that ATS staff: Are aware of the different levels of training and experience of PPL holders, military, and airline pilots:</p> <ul style="list-style-type: none"> Have improved knowledge of light aircraft, ultra-light, gliders and balloons and their performance characteristics, which will ensure correct understanding and communication with GA pilots. (ATS/FIC controllers should be trained to ask, not to assume). Are familiar with the cockpit workload of VFR flights (mostly single-pilot operated aircraft) in the various conditions and flight phases.

REF	Recommendation	Rationale
		<ul style="list-style-type: none"> Are aware of the fact that a VFR GA flight might not be able to follow the clearance due to the need to stay in VMC. <p>Inclusion of dedicated limited training in VFR flying may be considered. It will improve ATCO/FISO understanding of VFR flying</p>
ANSP11	Optimise SSR code assignment procedures to make best use of transponders' MODE-S, MODE A/C data and other surveillance methods, e.g., ADS-B, etc.	<p>Better utilisation of SSR codes can assist in the identification of traffic in congested airspace. Existing best practices should be applied as widely as possible. For example, a "FIR or AC lost" SSR code applied by FIS units to aircraft when pilots are unsure of their position draws attention to the aircraft and its predicament without multiple communications taking place across sectors.</p> <p>MODE-S data, and ADS-B are all useful tools for reducing the risk of airspace (and even separation) infringements by increasing the controller's ability to monitor and anticipate aircraft intentions.</p> <p>Implementing Frequency Monitoring SSR codes would identify that the aircraft is listening on their frequency should the ATCO/FISO wish to call them. It is specifically valuable for aircraft operating outside of a busy CTR. Other examples are: implementation of mandatory transponder areas or zones (e.g., at and above a certain altitude or flight level); SSR codes and frequency coupling; GA single event codes; dedicated codes for VFR routes etc.</p>
ANSP12	Improve tactical coordination procedures between adjacent civil/military control units.	<p>Improved civil - military coordination (ASM level 3) will enable: The provision of up-to-date, correct information to all flights about current airspace restrictions and their use; Timely action by the controllers/officers (in the control units concerned) in the case of imminent or actual infringement of controlled or restricted airspace to reduce the severity of the possible consequences. Implementation of this action should be considered within the scope of efforts for further enhancement of the FUA concept.</p>
ANSP13	Early provision of weather data to assist GA pilots in avoiding adverse weather in accordance with SERA.9005.	<p>Additional navigation support should be provided to VFR flights in compliance with ICAO Doc 4444 PANS-ATM, section 15.4.1 "Strayed VFR flights and VFR flights encountering adverse meteorological conditions" in order to help pilots avoid flying into meteorological conditions not conforming with the required minima</p> <p>Technology now allows for data uplink with weather information directly to the aircraft, although it should be noted that this kind of ADS-B is not yet mandated in Europe.</p> <p>The requirement to provide relevant weather information as part of the FIS is already included in SERA.9005, without specifying the means of transmission.</p> <p>An EASA Best Intervention Strategy to promote existing methods to facilitate the availability of weather information to pilots (CA and GA) in flight is being developed and will be submitted to stakeholders for consultation.</p>

REF	Recommendation	Rationale
ANSP14	Promote the use of SSR and/or radio mandatory airspace in the vicinity of busy and/or complex controlled airspace.	<p>The objective of this action is to ensure the protection of high-density controlled airspaces, like busy TMAs and CTRs. Implementation decisions should be taken following analysis of safety data and records. It should be noted that establishing mandatory R/T buffer zone may not always be possible. Indeed, the feasibility of implementing such buffer airspace depends on the typology of adjacent airspace (continuous controlled airspace, military airspace, etc.) and relevant consultation with other stakeholders and airspace users. Implementation of mandatory R/T buffer zones should also include a review of existing «buffer airspace» at the TMA or CTR boundaries and corresponding optimisation of such airspace to the necessary minimum due to the additional protection provided by the R/T buffer zone. A possible implementation may include tracking all flights operating within a certain range of the controlled airspace in question. Depending on the operational need a minimum altitude/level above which the requirement will be applicable may be defined. Since radio communication is not required in class G airspace, an alternative means of reducing the probability of severe airspace infringement incidents occurring is to require GA flights to maintain listening watch on 121.5 MHz, except when in contact with an ATS unit. This would help ATC contact an airspace infringing aircraft early enough to prevent the infringement from evolving into high-risk incident.</p> <p>A potential solution for a buffer is the use of Transponder Mandatory Zones around/below Controlled Airspace, with a co-located Radio Mandatory Zone.</p>
ANSP15	Harmonise the requirements for the provision of FIS and licensing of ATCOs/FISOs, including: a harmonised FISO training curriculum and improved communication training of FISOs.	<p>Improve and harmonise FISO training curriculum. Training curriculum should be improved to adequately match the level of service to be provided. FIC staff should receive dedicated training improving their awareness and understanding of the VFR flights' needs, specialties, and light aircraft performance characteristics. Best practices already exist to deliver emergency situation training to FIC staff and VFR pilots in a coordinated manner. Enough FIC staff should be made available to support the provision of enhanced FIS. Several ATS providers have already implemented dedicated training programmes for staff that become redundant or underutilised due to the increasing automation of ATS provision.</p> <p>This action reinforces the objectives and provisions of the Action Plan for Air Ground Communications, focusing on the aspects that are of particular importance in the communication exchange between ATS units and VFR flights. ATS staff should be trained to: Strictly apply the readback/hearback procedure; Actively seek confirmation in case of doubt; Use unambiguous call-signs - full call-sign or call-sign coupled with type of aircraft; Use published reference points in ATS messages to pilots, to the extent possible; Use simple ATC clearances and instructions; Use more concise transmissions, if necessary broken in segments; Use reduced rate of speech when talking to VFR pilots; Issue pre-warning of instructions to be passed; Provide FIS in English language; Acquire adequate knowledge of and apply communication failure procedures as required</p>

REF	Recommendation	Rationale
		Harmonisation of FIS provided to VFR flights should be based on European IRs/AMCs/GMs, ICAO recommendations and existing best practices. Examples of best practices are i.e the Low Airspace Radar Service provided in UK airspace and the radar information services provided in German airspace. Radar-derived information available at ATS units should be used to enhance the information passed to pilots. It should include, as appropriate, navigational assistance, coordination of controlled airspace entry/crossing clearance, passing traffic information and information about restricted airspace activation/deactivation and concerned traffic, as well as provision of other aeronautical information and information about potentially hazardous conditions. The service could include provision of warnings to pilots of any unfavourable factors including airspace infringement and traffic warnings. FIS level could be raised to enable proactive prevention of potential conflict situations. The scope of this action should include the harmonisation of services provided by civil and military FIS provider organisations.
ANSP16	Ensure all MORs are timely and comprehensive to enable review/investigation and collation of causal factors.	This is particularly important in states where there is post-infringement communication between the ANSP and the pilot. Timely reporting and investigation allow for greater accuracy in causal factor identification when recollections are fresh in the memories of all parties.

EAPAIRR v2.0

Best Practices

**Air navigation service
(including FIS) providers**

Section Reference	Best Practice	Source
ANSP1	Best practises e.g. In Germany to deliver emergency situation training to FIC staff and VFR pilots in a coordinated manner.	DFS
ANSP2	EUROCONTROL APW Speciation and Guidance Material is available on SKYbrary . The APW Speciation (community developed) provides help and advice in procuring a new system. The Guidance Material provides ANSPs with a set of best practices to tune the system.	EUROCONTROL
ANSP3	ntroduce a Local Airspace Infringement Team (LAIT). LAITs are run by the airspace owner (APT). Participants from ANSP's, airspace users (both GA and CA), local airports and regulator contribute to a successful working arrangement. Apart from reviewing specific incidents, also more general info on hotspots and way of communication is being shared. Home - Airspace Safety	UK CAA
ANSP6	Add the promotion of implementing VFR routes/corridors in controlled airspace, where simplification is not possible. In GER the responsibility is by the regulator (BMVI Ministry of Transport and Infrastructure)	DFS
	Intended airspace changes will be announced to all airspace users in spring each year. Airspace users are involved at an early stage as soon as airspace change proposals are available. Formal Annual Airspace User Conference in autumn with Ministry of Transport, DFS, General Aviation, Commercial Aviation, Military. Airspace changes are implemented in March the following year (with depiction on ICAO VFR chart).	DFS
	Airspace changes are implemented to improve safety (IFR/VFR deconfliction). After implementation, all airspace changes will be validated during the VFR flying season with regard to effectiveness and possible adaptations.	DFS
	Formal Annual Airspace User Conference in autumn with Ministry of Transport, DFS, General Aviation, Commercial Aviation, Military. 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.	DFS

Section Reference	Best Practice	Source
ANSP7	Develop a Pilot Infringement Questionnaire (PIQ) for asking pilots to provide their perspective on an Airspace Infringement event, i.e. why the infringement happened and what could be done to prevent recurrence.	NATS/ UK CAA
	Facilitate a “season opener”, where GA Pilots and ATC/FIS representatives can exchange information, share experiences, and discuss actual topics.	ACG
ANSP14	Mandatory usage of Transponders, especially mode- S, ensures the availability of all relevant information, like registration, altitude, and so on, to provide the best service and feedback available to pilots.	ACG

EAPAIRR

Contributors

The authors would like to gratefully acknowledge the commitment displayed by the following organisations in providing their time, resource, collaborative effort, and especially their expertise in creating this European Action Plan for Aviation Safety.





SUPPORTING EUROPEAN AVIATION

© **EUROCONTROL - March 2022**

This document is published by EUROCONTROL for information purposes. It may be copied in whole or in part, provided that EUROCONTROL is mentioned as the source and it is not used for commercial purposes (i.e. for financial gain). The information in this document may not be modified without prior written permission from EUROCONTROL.

www.eurocontrol.int