



Progressive Airspace Design: Guidance for Airspace Around UK Aerodromes

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Chapter 1

Introduction

Background and aim

- 1.1 This guidance is intended to support airspace change sponsors by illustrating how alternative airspace structures and classifications can be used to deliver incremental improvements in safety performance. It presents the ‘toolbox’ of options and outlines the key factors that should be considered when selecting the most appropriate configuration for a given aerodrome environment. It does not prescribe a fixed pathway but instead promotes a clearer understanding of the range of possibilities available within the current regulatory framework. The overarching aim is to encourage proportionate, risk-based airspace design that improves safety outcomes, while supporting greater operational flexibility and equitable access to airspace.
- 1.2 Historically, the design of airspace around aerodromes has followed a relatively linear model: unlicensed aerodromes are afforded no airspace-based protection, followed by the establishment of an aerodrome traffic zone (ATZ), with subsequent safety-driven developments often leading directly to the introduction of controlled airspace, typically a control zone (CTR) and associated control area (CTA) of class D. While this model may remain valid in some cases, it may not always represent the most proportionate or flexible approach to achieving safety outcomes.
- 1.3 Developed in alignment with the International Civil Aviation Organisation (ICAO) Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS)¹, this document also considers regional considerations as provided by EUROCONTROL². While these frameworks set out the principles for airspace structure design and management, the guidance recognises the distinct national characteristics of the UK airspace system and reflects how international and regional provisions are implemented within this context.

Airspace Modernisation Strategy

- 1.4 The Airspace Modernisation Strategy (AMS) describes how the selection of an appropriate airspace structure must follow a clear understanding of the air traffic service (ATS) level required at the aerodrome. Once it has been determined

¹ Annex 2 – Rules of the Air, Annex 11 – Air Traffic Services, PANS-ATM (Doc 4444), PANS-OPS (Doc 8168)

² European Route Network Improvement Plan (ERNIP) Part 1

whether an ATS is needed, the next step is to decide the level of service required, which then informs the choice of airspace classification and supporting structures necessary to achieve the desired level of safety performance. Complementary guidance to assist aerodrome operators and change sponsors in determining ATS provision is intended to be published separately and, once available, should be consulted as an initial step before progressing to airspace structure design.

- 1.5 Alongside work to improve alignment between the UK's Flight Information Services framework and ICAO SARPs and PANS, the AMS describes a series of measures that will affect airspace structures around aerodromes in class G airspace. The implementation of these measures will be informed by operational need, supported by safety assurance activity and underpinned by the guidance contained in this document. This includes the potential use of additional airspace structures overlaying an ATZ in class G airspace to deliver incremental improvements in safety and efficiency, without requiring the establishment of controlled airspace.
- 1.6 The AMS also highlights the future transition to a System Wide Information Management (SWIM) environment, which will mean availability of standardised, digital aeronautical datasets via information services. For airspace structure design, this means reducing reliance on local agreements that are currently not visible in the UK Aeronautical Information Publication (AIP) and helping the CAA ensure that all airspace structures are formally recorded and published through aeronautical information services. Regularising these structures is essential to support simplification and interoperability. This will enable all airspace users, including unmanned aircraft systems, to access and easily consume information as the UK moves towards a SWIM environment. This approach not only aligns with AMS objectives for a harmonised and digitised approach to data-driven airspace but also underpins safety, efficiency and equity by ensuring that critical information is available to all stakeholders in the right place, at the right time, in the right format.

Relationship to CAP1616, Airspace Change Process

- 1.7 This guidance should be used by airspace change sponsors when developing conceptual airspace structure designs. It provides practical design considerations and the structural options available at an aerodrome and offers complementary material to assist with assessing and refining an airspace change proposal (ACP).

Chapter 2

Principles for airspace classification and design

Purpose

- 2.1 This chapter sets out the principles that should guide the selection of airspace classification and design of airspace structures in the vicinity of UK aerodromes. They provide the foundation for proportionate, risk-based decisions before considering the structural options described in Chapter 3 and the use cases in Chapter 4. These principles support the AMS' aspiration for a continuum of airspace, ensuring that structures around aerodromes integrate effectively with adjacent en-route airspace while maintaining equitable access for all users.

Principles for selection of airspace classification

- 2.2 These principles are based on SARG Policy 127: Policy for the Classification of UK airspace, further informed by guidance material from the ERNIP Part 1³, adapted to reflect the specific considerations of airspace design in the aerodrome environment:
- a) **Level of ATS to be provided:** The nature of the service (non-ATS, AFIS, ATC) and whether separation is required between instrument flight rules (IFR) and visual flight rules (VFR) flights⁴.
 - b) **Safety performance requirements:** Evidence from risk assessments to achieve an acceptable level of safety performance, including relevant safety data from airport or air navigation service provider (ANSP) safety management systems where available, previous air safety incidents and consideration of mid-air collision (MAC) and airspace infringement risk.
 - c) **Traffic complexity and mix:** Consider the volume of IFR flights and the type and density of traffic, including scheduled commercial passenger flights. Also assess interaction with VFR circuits and the regularity of integration of diverse aircraft types.
 - d) **Complexity and continuity of the operational environment:** Including interaction with adjacent airspace, published procedures, proximity to other aerodromes, implications for flight planning and the objective of achieving seamless transition between aerodrome-related structures and the en-route network.

³ ERNIP Part 1, 2.3.3.2 Airspace Classification Toolbox

⁴ As per the attributes of the airspace classifications as described in SERA.6001.

- e) **Equitable access for airspace users⁵**: Maintaining reasonable access and avoiding unnecessary restrictions for sporting and recreational activity, aerial work, commercial operations and unmanned aircraft systems activity.
- f) **Environmental and local constraints**: Noise-sensitive areas, terrain and other factors influencing airspace design.
- g) **Meteorological conditions**: Weather patterns and day/night operations.
- h) **Proportionality and cost-benefit**. Balancing safety improvements against the impact on airspace users and the cost of equipment or service provision.

Note: These considerations should take account of the needs of all airspace users and, where relevant, respect operational requirements such as freedom of movement, access to controlled airspace and the ability to accommodate priority flights and other special operations.

Considerations for aerodrome airspace structures

- 2.3 Sponsors should apply the least restrictive classification and minimum volume necessary to achieve an acceptable level of safety performance, supported by a documented safety case. Where separation is required through the provision of an ATC service, then controlled airspace is required to define where the service is provided. Where separation is not required, sponsors should consider how additional airspace structures, in conjunction with an ATZ in class G airspace, could deliver incremental improvements in safety performance.

Sectorisation

- 2.4 Where radio mandatory zones (RMZs), control zones (CTRs) or control areas (CTAs) are required to manage the risks associated with instrument procedures, operating in visual circuit patterns and/or operating in areas where radar vectors are provided to aircraft, consideration should be given as to whether these airspace structures could be sectorised to reflect their differing operational purposes. These sectors should be adjoining, but consideration should be given as to whether they can remain operationally distinct. This approach supports the principles of the AMS, particularly the development of flexible use of airspace and a lower airspace management cell capable of coordinating temporary activations. Airspace structures should be designed with this flexibility in mind to allow deactivation when not required.

⁵ Equitable access reflects the CAA's statutory duty under Section 70(2) of the Transport Act 2000 to satisfy the requirements of operators and owners of all classes of aircraft and the Air Navigation Directions 2023 Article 3(c) requirement to reflect all airspace users' needs on an equitable basis.

Overlaying additional airspace structures

- 2.5 Where a CTR, CTA or ATZ is established, additional airspace structures such as RMZs, transponder mandatory zones (TMZs), temporary reserved areas (TRAs) or temporary segregated areas (TSAs) may be applied as overlays to mitigate risk or enhance situational awareness. These overlays should remain separate constructs, normally activated in conjunction with the underlying airspace and must preserve the access and service expectations associated with the classification (for example, VFR access in class E airspace without an ATC clearance).

Activation

- 2.6 Activation of airspace structures should align with the periods and conditions notified in the AIP or by NOTAM. When the associated service is not provided, the structure is not active and blind transmissions by pilots on the designated frequency should be encouraged in accordance with the Radiotelephony Manual (CAP 413)⁶.

Further generic guidance

- 2.7 The general principles for airspace design set out in the CAP 1616 airspace change process continue to apply in the aerodrome environment. The considerations in this chapter are additional and context-specific; sponsors should apply them alongside CAP 1616 when developing proposals.

⁶ Radiotelephony Manual (CAP 413), Chapter 4, paragraphs 4.163-4.170, 4.175-4.178

Chapter 3

Airspace structure options by ATS provision

3.1 This chapter introduces a series of decision trees that present potential airspace configuration options around UK aerodromes. Each figure illustrates a logical sequence of considerations based on the level of ATS and operational context, supporting proportionate, risk-based choices to achieve an acceptable level of safety performance. These decision trees assume that a requirement for an airspace structure has already been identified and are intended to support consideration of the range of options available within the current regulatory framework. It may be possible to manage risk without an associated airspace structure and they are not intended to prescribe or mandate a specific solution. The decision trees simply act as a practical tool to guide sponsors through the available options before applying the design guidance presented later in this document.

3.2 The airspace structures included in this chapter are:

- a) Aerodrome traffic zone (ATZ).
- b) Radio mandatory zone (RMZ).
- c) Transponder mandatory zone (TMZ).
- d) Control zone (CTR).
- e) Control area (CTA).

Note: See CAP 1430, UK Air Traffic Management Vocabulary for associated definitions.

Non-ATS – aerodrome with no air-ground communication

3.3 If there is no aeronautical station⁷ at the aerodrome, it is not expected that an airspace structure would be established for the protection of aerodrome traffic.

3.4 Pilots should be encouraged to use the SAFETYCOM frequency (135.480 MHz) to make position and intention broadcasts in accordance with the procedures set out in the Radiotelephony Manual (CAP 413)⁸ and the AIP GEN 3.4.

⁷ Aeronautical station can be considered to mean the same as 'aeronautical radio station' as defined in Air Navigation Order 2016 Schedule 1.

⁸ Radiotelephony Manual (CAP 413), Chapter 4, paragraphs 4.162-4.178

Non-ATS – aerodrome with air-ground communication

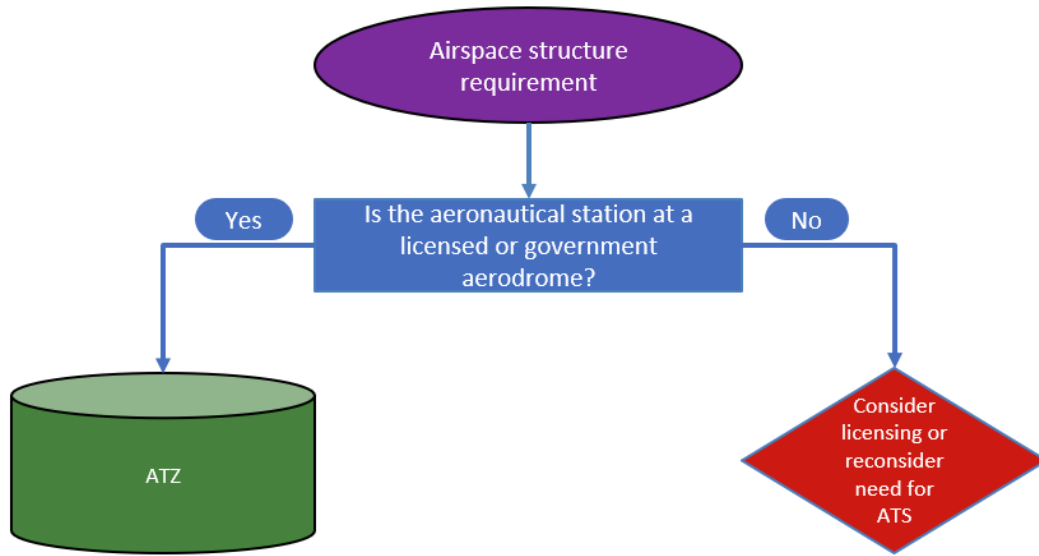


Figure 3.1 - Non-ATS - aerodrome with air-ground communication decision tree

Aerodrome Flight Information Service (AFIS) aerodrome

Aerodrome traffic circuit

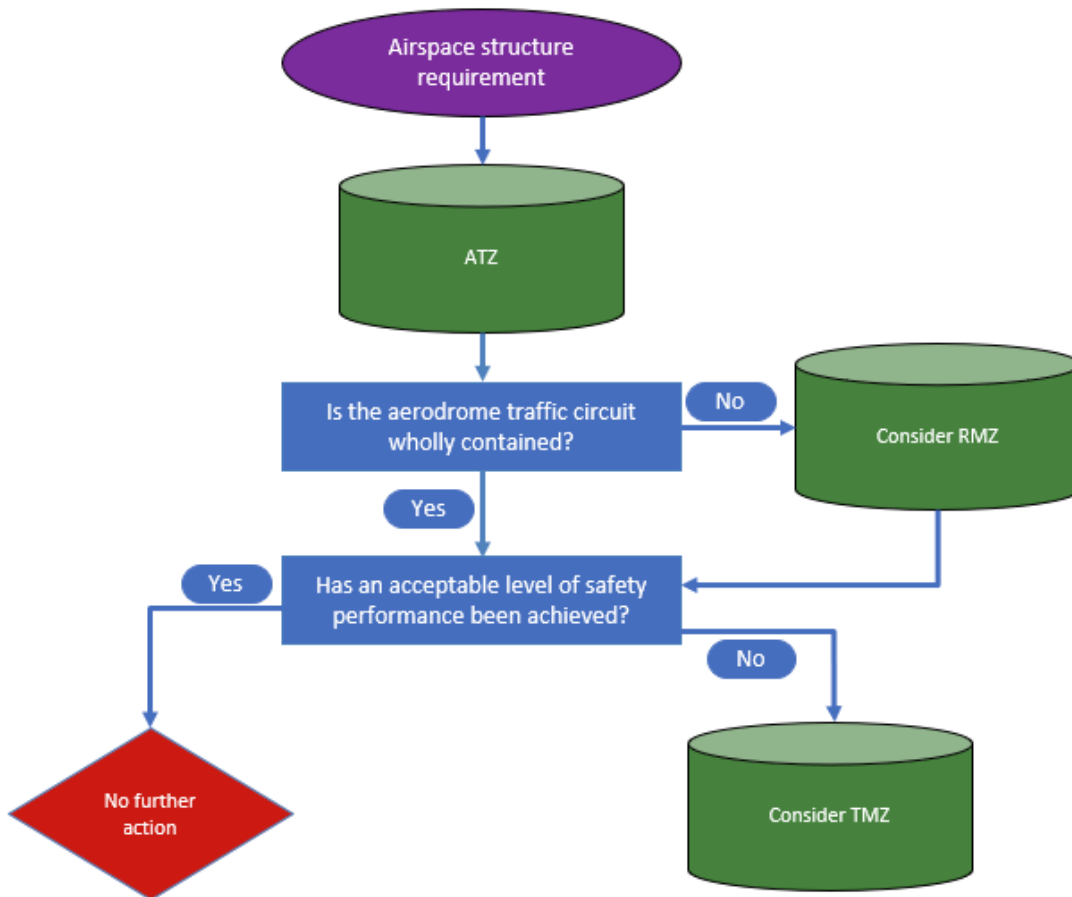


Figure 3.2 - AFIS aerodrome traffic decision tree

Instrument flight procedure (IFP)

- 3.5 CAP 2304⁹ outlines the conditions under which instrument approach procedures (IAPs) may be established at aerodromes without an Approach Control Service and/or without instrument runways. As a result, some aerodromes providing AFIS support IFPs. In these cases, an airspace structure may be needed to enable the safe and predictable integration of instrument traffic into the surrounding class G airspace environment.

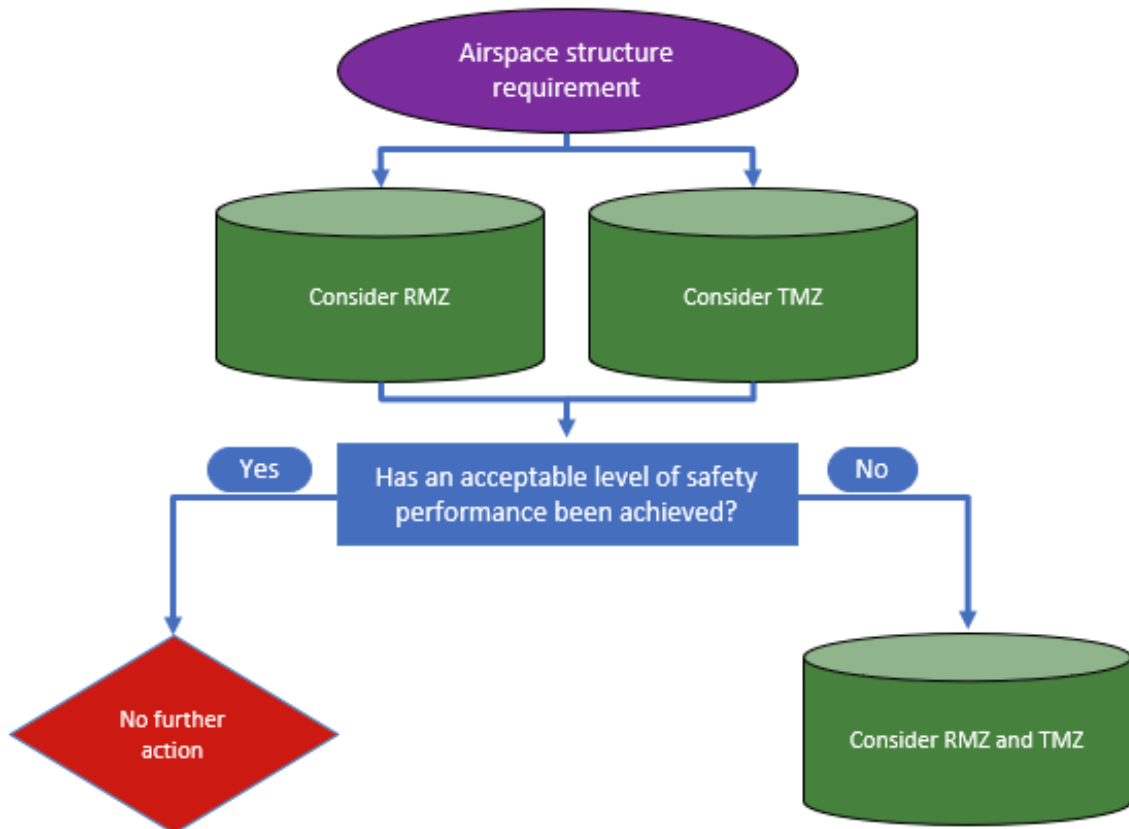


Figure 3.3 - AFIS IFP decision tree

⁹ CAP2304, Applications for instrument approach procedures to aerodromes without Approach Control and/or with a non-instrument runway – additional policy, guidance, and Acceptable Means of Compliance

Air traffic control (ATC) unit in uncontrolled airspace

Policy context: ATS Provision in uncontrolled (class G) Airspace

- 3.6 The UK has a complex and nuanced position with regards to its activities in class G airspace. An ATC service is provided to all flights in airspace classifications 'A' to 'D' and to IFR flights in class E airspace. Flight information service (FIS) is available on request to all flights in class G airspace and to VFR flights in class E airspace¹⁰, and is achieved through the provision of the UK Flight Information Services. ATC service is not provided in uncontrolled airspace, even when the air traffic services unit is certificated as an ATC unit.
- 3.7 The complexity mentioned above relates to the activities at those aerodromes in class G airspace that lie within an ATZ, and where what is referred to as an ATC unit is established. 'ATZ adopt the classification of airspace within which they are situated'¹¹ and flights operating within that airspace are required to comply with the SERA and the Rules of the Air Regulations. As regards operations within an ATZ, Rule 11 of the Rules of the Air Regulations 2015 applies and, where an ATC unit is established, it requires that an aircraft 'must not fly, take off or land within the aerodrome traffic zone of an aerodrome unless the commander of the aircraft has...obtain[ed] the permission of that unit to enable the flight to be conducted safely within the aerodrome traffic zone'.
- 3.8 Long-standing custom and practice within the UK is that the ATC unit provides its permission to fly, take off or land using the operating procedures and radiotelephony phraseology associated with aerodrome control and/or approach control. However, this is not considered to be an ATC service, because the ATZ is within class G airspace. Outside the ATZ, the ATC unit discharges the aerodrome and/or approach control function through the provision of one of the services described in the UK Flight Information Services CAP 774.
- 3.9 The CAA understands that this position has nuance and complexity that require clarification and simplification. The AMS requires the CAA to review the provision of FIS in the UK, with a view to more closely aligning with ICAO provisions. However, until the AMS vision has been realised, there are opportunities to achieve incremental improvements in safety performance. The following airspace solutions may be considered in support of that objective.

¹⁰ (UK) SERA.6001, transposed from ICAO Annex 11 Section 2.6.

¹¹ MATS Part 1 (CAP 493) Section 1 Chapter 2 paragraph 6.1

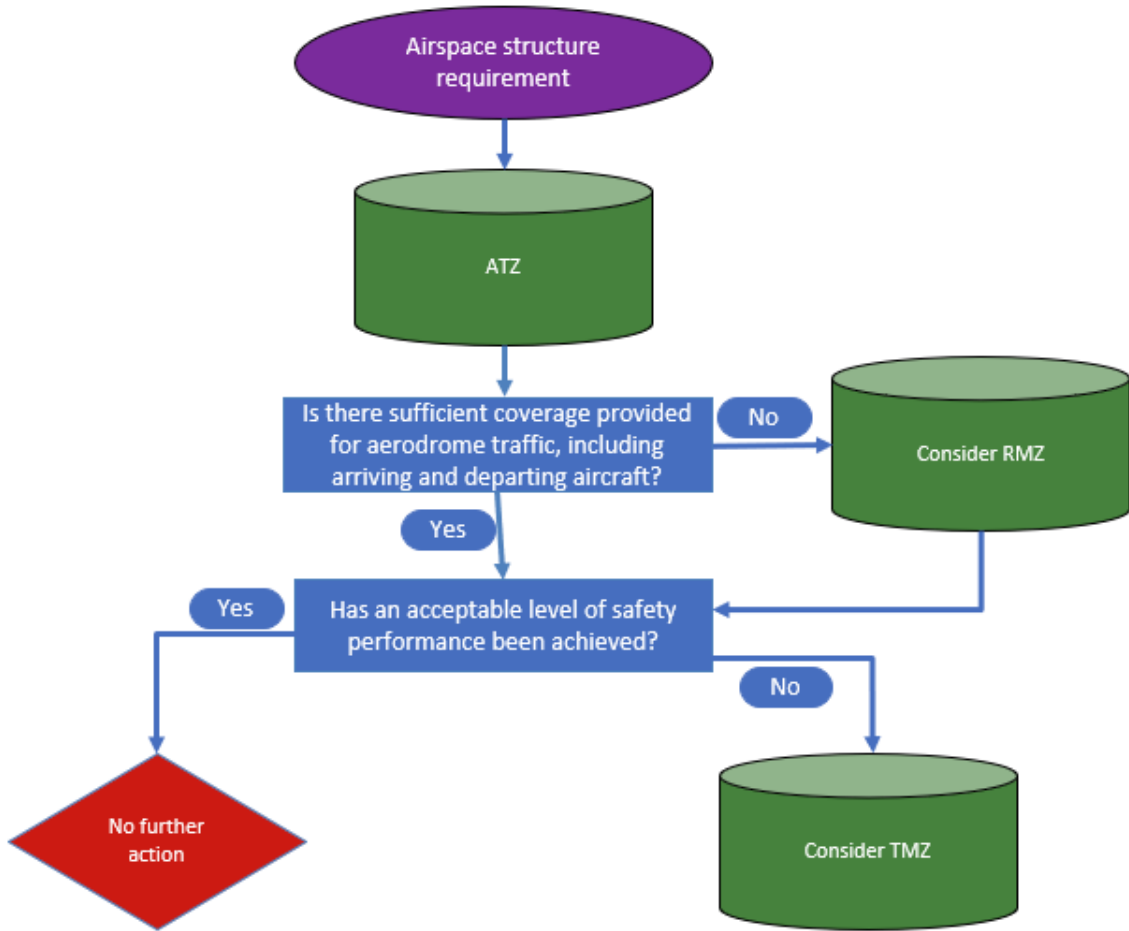


Figure 3.4 - ATC unit in uncontrolled airspace decision tree

ATC unit requiring controlled airspace

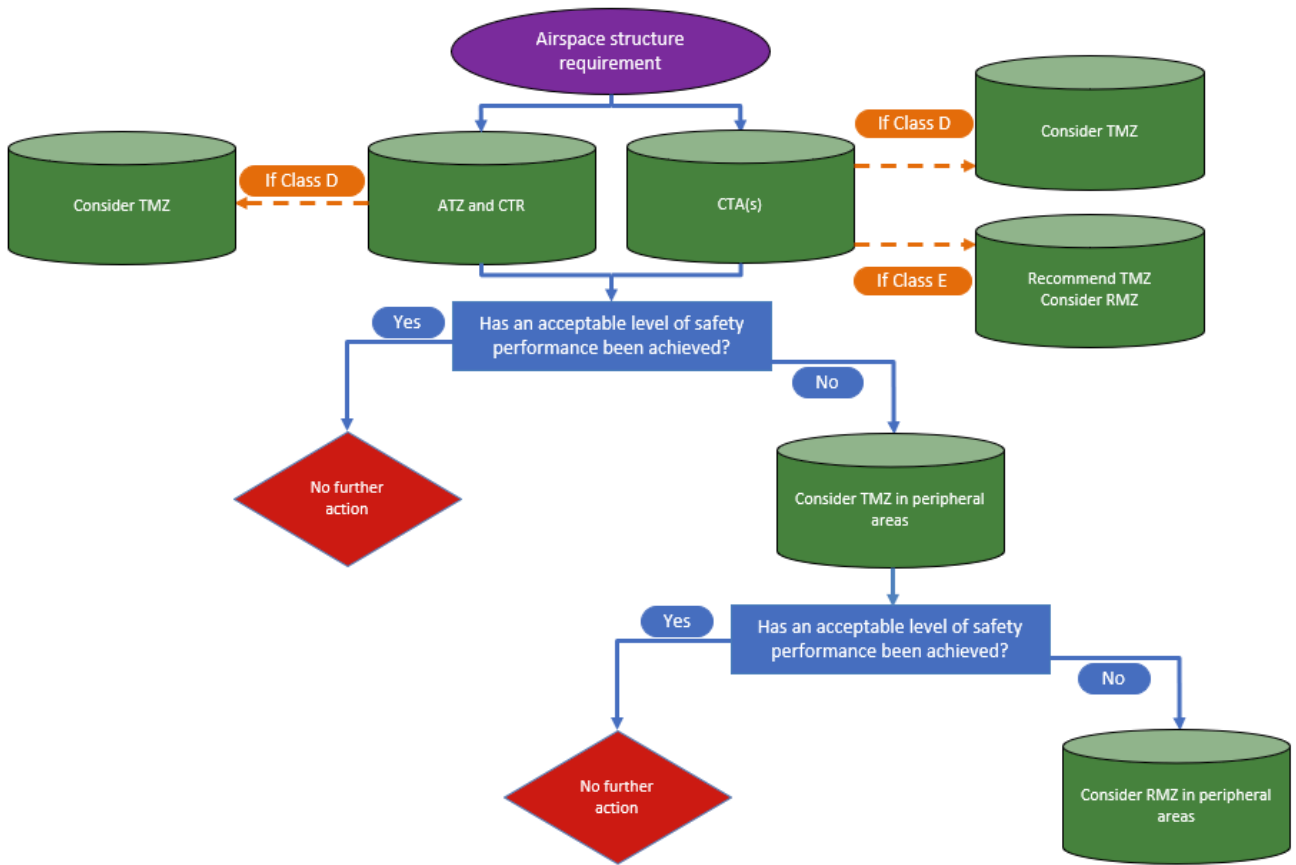


Figure 3.5 - ATC unit in controlled airspace decision tree

Chapter 4

Aerodrome airspace structures

- 4.1 This chapter explores the airspace structures that can be utilised around aerodromes in the UK and how they can be applied in various operational contexts to deliver incremental improvements in safety and efficiency. While some structures are well established, others are less widely used despite their potential to support safe and efficient operations.

Advisory airspace

- 4.2 Although advisory airspace is not currently established in the UK, it remains an ICAO-recognised option that sponsors may consider in specific circumstances. Its purpose is to provide an air traffic advisory service where a known traffic environment is desirable but controlled airspace is not justified. This structure may be applied as a temporary or transitional measure during periods of operational change, such as when moving toward or away from controlled airspace, to maintain an acceptable level of safety performance.

Flight restriction zone (FRZ)

- 4.3 The term flight restriction zone (FRZ) has the meaning assigned to it by Air Navigation Order (ANO) 2016 Articles 94A and 94B.
- 4.4 The purpose of a FRZ is to restrict operation of unmanned aircraft in the vicinity of a protected aerodrome.
- 4.5 In practice, FRZs are notified and operated as restricted areas¹² with associated identifiers.

Aerodrome traffic zone (ATZ)

- 4.6 An ATZ can be considered at licensed or government aerodromes with an aeronautical station, AFIS aerodromes and at aerodromes with an ATC unit.
- 4.7 ATZ dimensions and operating requirements are prescribed by Article 5 of the Air Navigation Order 2016 and Rule 11 of the Rules of the Air Regulations 2015 (see Figure 4.1).
- 4.8 An ATZ adopts the classification of airspace in which it is situated.

¹² SARG Policy 133: Policy for the Establishment and Operation of Special Use Airspace, Annex E

ATZ within a CTR

- 4.9 ATZ are designated within a CTR in order to increase the flexibility afforded to pilots and ATS providers regarding compliance with the requirements for VFR and special VFR flight detailed within SERA.5005(b) and SERA.5010(c).¹³

Radio mandatory zone (RMZ)

- 4.10 An RMZ can be considered at AFIS aerodromes and at aerodromes with an ATC unit.
- 4.11 An RMZ can be established in class E, F or G airspace.

RMZ to enhance conspicuity in the vicinity of the aerodrome traffic circuit

- 4.12 If an existing or proposed ATZ in class G airspace does not fully encompass the aerodrome traffic circuit, an RMZ may be established to provide a known traffic environment in a larger volume of airspace so as to wholly contain the aerodrome traffic circuit and mitigate the risk of MAC outside the ATZ.
- 4.13 The RMZ should be the minimum dimensions necessary to wholly contain the aerodrome traffic circuit pattern, including typical joining and departure procedures. The chosen shape should suit the local context, considering factors such as circuit geometry, local traffic flows, adjacent airspace, environmental constraints and the position of obstacles.
- 4.14 This guidance does not prescribe a specific RMZ shape. Options may include rounded-rectangular RMZs aligned with the runway (see Figure 4.2) or bespoke configurations adapted to the aerodrome's operating environment. Consideration should always be given to selecting a boundary depiction that is simple, clear and easily interpreted when published in the AIP

RMZ to enhance conspicuity in the vicinity of an IFP

- 4.15 If, following assessment, it is determined that procedural mitigations alone do not achieve an acceptable level of safety performance, the unit may consider an RMZ to reduce the MAC risk while an IFP established in class G airspace is in use.
- 4.16 The dimensions and shape of the airspace structure(s) should be the minimum necessary to achieve the required level of safety performance. The design should reflect the specific geometry of the IAP, which includes a missed approach procedure where applicable, as well as considering the surrounding airspace, nearby aerodromes and terrain.
- 4.17 In determining the boundaries of airspace structures around IFPs, sponsors may use the criteria in the CAA's Policy for the Design of Controlled Airspace

¹³ SARG Policy 126: Policy for the Design of Controlled Airspace Structures

Structures as a guide¹⁴. Key principles are that the lateral limits should, in the first instance, be predicated on the primary area identified during the procedure design, use of the nominal track with an appropriate buffer where this is not possible and safe vertical margins between the flight profile and the airspace limit. However, it should be recognised that the safety argument and mitigations will differ in uncontrolled airspace, so this may need to be adapted depending on the operational context.

- 4.18 Typically, RMZs around IAPs would be expected to extend from the surface¹⁵, but there may be cases where IFPs require stepped airspace bases. If so, levels should be specified that maintain a safe vertical margin between the procedure and the airspace structure.

RMZ for to enhance conspicuity in the vicinity of aircraft being provided with vectors

- 4.19 Where an ATC unit provides vectors to assist aircraft in its navigation, for example, to position onto final approach in class G airspace, the safety case should determine whether the area where vectoring is provided requires enhanced conspicuity equivalent to that afforded to an IFP within an RMZ. If so, an additional RMZ may be established to encompass the vectoring area.
- 4.20 The design of an RMZ intended to support vectoring should reflect the operational characteristics of the environment. Factors such as aircraft performance, intercept geometry as well as terrain and obstacle clearance should be considered to ensure the RMZ provides sufficient area, while minimising the volume of airspace required.

RMZ in class E airspace

- 4.21 If the establishment of a TMZ in class E airspace is not suitable, an RMZ may be considered to establish a known traffic environment where a more restrictive classification is not warranted, subject to the safety case and operational context.
- 4.22 An RMZ would not typically be designated in class E airspace where a TMZ is also established.

RMZ in peripheral areas to controlled airspace

- 4.23 Where an increased level of safety performance is required, but a more restrictive classification is not warranted in peripheral areas adjacent to controlled airspace, the preferred approach is to establish a TMZ to mitigate the

¹⁴ B2.2-B2.3

¹⁵ This ensures unknown traffic does not transit beneath the IAP. In class G airspace, a controller cannot deem that traffic within the lateral boundaries of an RMZ, but not displaying altitude information, is outside its vertical limits.

risk posed by unknown aircraft operating near or infringing controlled airspace. If a TMZ is not suitable, an RMZ may be implemented to create a known traffic environment, subject to an appropriate safety case.

Frequency monitoring code

- 4.24 Where a CAA-approved situation display is available to the FISO or ATCO and there is a desire to reduce frequency congestion or increase flexibility for local traffic, a Frequency Monitoring Code (FMC)¹⁶ may be introduced to allow radio- and transponder-equipped aircraft to transit the RMZ without establishing two-way communication, provided they squawk the published code and maintain a continuous listening watch on the designated frequency.¹⁷

Transponder mandatory zone (TMZ)

- 4.25 A TMZ can be considered at AFIS aerodromes and at aerodromes with an ATC unit.
- 4.26 CAP 670 defines mandatory technical requirements for surveillance equipment used to support ATS provision.
- 4.27 Change sponsors should be aware that the designation of a TMZ places a requirement for flights to carry and operate SSR Mode S Elementary Surveillance transponders unless in compliance with alternative provisions prescribed for that particular airspace by the ANSP. Such provisions may include the use of alternate forms of electronic conspicuity, such as ADS-B, where their use has been addressed within the airspace change safety assessment¹⁸.
- 4.28 Where a CAA-approved situation display is available, a TMZ can support its effective use by requiring that all aircraft within the designated area carry an approved electronic conspicuity (EC) device¹⁹ to achieve a recognised air traffic environment which, in turn, permits ATS to provide more specific traffic information on collision hazards²⁰. A TMZ can also enable airborne collision warning and/or avoidance systems²¹.
- 4.29 A TMZ that is established to support service provision ceases to be active when no service is being provided, unless the safety case justifies mitigating MAC risk by enabling an EC safety net to support airborne collision avoidance systems

¹⁶ Also known as a Listening Squawk.

¹⁷ See Annex 1 for the CAA's policy position on the use of a FMC in an RMZ.

¹⁸ (UK) GM2(b) SERA.6005(b) Requirements for communications and SSR transponder

¹⁹ As per CAP 1391, Electronic Conspicuity devices.

²⁰ (UK) GM1 SERA.6005 para (a)(2), subject to the privileges and limitations of their license and permissions associated with the equipment or system in use.

²¹ (UK) GM1 SERA.6005 para (a)(1)

when the airspace is not being actively monitored or managed by the air navigation services provider (ANSP).

- 4.30 A TMZ can be established in class D, E, F or G airspace.

TMZ overlay to enhance conspicuity in the vicinity of aerodrome traffic in class G airspace

- 4.31 Where a TMZ is established in conjunction with an ATZ and/or RMZ around aerodrome traffic, it may be simplest for the TMZ to share the same lateral and vertical dimensions. However, where a safety assessment identifies a requirement for electronic conspicuity in peripheral areas to support situational awareness, consideration may be given to defining further TMZ(s) outside of this boundary.
- 4.32 A TMZ associated with aerodrome traffic should only be established in addition to an ATZ and/or RMZ. It is not expected that a TMZ would be used as the sole means of mitigating MAC risk for the aerodrome traffic circuit.

TMZ to enhance conspicuity in the vicinity of an IFP

- 4.33 If, following assessment, it is determined that procedural mitigations alone do not achieve an acceptable level of safety performance, the unit may consider a TMZ to reduce the MAC risk while an IFP established in class G airspace is in use.
- 4.34 Design considerations when establishing a TMZ around an IFP should follow the same principles described for RMZs in 4.15 to 4.18, including potential alignment with the IFP's primary area, appropriate lateral and vertical buffers and the need for proportionate dimensions based on the local operational context.

TMZ in areas of excessive radar clutter

- 4.35 TMZs are considered a proportionate solution when surveillance radar performance is degraded by radar clutter, such as in the vicinity of wind turbines, to mitigate reduced surveillance capability and maintain a recognised traffic environment.

TMZ in class E airspace

- 4.36 Class E airspace will normally be overlaid with a TMZ to enable the additional safety net of a recognised air traffic environment where cooperative surveillance systems may be used in the management of such airspace²².
- 4.37 A TMZ would not typically be designated in class E airspace where an RMZ is also established.

²² CAP1711, Airspace Modernisation Strategy 2023–2040, Part 1: Strategic objectives and enablers, Chapter 5, Use Case 1

TMZ in class D airspace

- 4.38 Enhancement of a class D CTA by the additional notification of a TMZ should be considered if required to meet safety criteria identified by the ANSP in their safety assessment²³.

TMZ in peripheral areas to controlled airspace

- 4.39 In certain areas on the periphery of controlled airspace, the establishment of a recognised air traffic environment can significantly enhance overall safety performance without necessitating the use of a more restrictive airspace classification. Where the complexity or density of operations in peripheral class G airspace creates a risk of unknown traffic infringing controlled airspace, the introduction of a TMZ, potentially associated with a FMC, can provide an effective mitigation. These measures enhance the conspicuity of aircraft and enable controllers to maintain situational awareness of traffic operating near the boundary of controlled airspace.
- 4.40 The primary objective of a TMZ in such contexts is to ensure that aircraft operating in the designated area are electronically visible by means of a transponder or other EC device as specified by the ANSP. This creates a more predictable operating environment, allowing controllers to provide timely and accurate traffic information to flights within controlled airspace and to manage potential conflicts proactively. Importantly, this approach supports the principle of proportionality by avoiding the imposition of controlled airspace where it is not justified by traffic levels or operational requirements.
- 4.41 When designing these structures, the dimensions should be the minimum necessary to achieve the intended safety outcome, taking into account local traffic patterns, terrain and the proximity of aerodromes. Provisions should also be made for non-equipped aircraft to access the airspace under agreed procedures, ensuring that the measure does not unduly restrict general aviation activity. By implementing TMZ in this way, airspace planners can strike a balance between maintaining equitable access and ensuring a safe, efficient ATC service in complex environments (see Figure 4.3).

Frequency Monitoring Code

- 4.42 Where a CAA-approved situation display is available to the FISO or ATCO and it is desirable to distinguish which aircraft in a TMZ are contactable, an FMC¹⁶ may be introduced to allow radio- and transponder-equipped aircraft to show they are maintaining a continuous listening watch on the designated frequency.

²³ UK (EU) Reg No 2017/373 Annex IV Part-ATS ATS.OR.205 and associated AMC and GM refers.

Controlled airspace

- 4.43 Controlled airspace in the vicinity of an aerodrome will consist of CTRs, CTAs and may include terminal control areas (TMA), which are designed to contain specific ATS routes, standard instrument arrivals (STARs), standard instrument departures (SIDs) and IAPs²⁴.
- 4.44 In all cases when designing controlled airspace structures, consideration should be given as to whether an acceptable level of safety performance can be achieved with a less restrictive classification of airspace.
- 4.45 In all cases when designing controlled airspace structures, consideration should be given as to whether an acceptable level of safety performance can be achieved with a smaller volume of controlled airspace.
- 4.46 Where controlled airspace structures are required to contain IFPs, airspace designers should consider whether that volume of airspace should a single volume or sub-divided to facilitate the future aims of the AMS, specifically the increased use of switchable and runway-dependent CTAs and the potential for sectorised, dynamically activated volumes. CTRs and CTAs should be designed with this flexibility in mind, enabling selective activation based on operational demand and allowing for efficient coordination through a lower airspace management function.
- 4.47 Where possible, airspace structure design should maintain continuity between terminal controlled airspace and the en-route structure to support seamless ATC service. If this is not practicable, and safety and operational assessments justify a design that does not connect to the overlying, controlled airspace, the terminal structure may end at a level below that base.
- 4.48 When determining the appropriate classification of airspace, the starting point must be the nature of the flight rules applied and the separation required between flights⁴. The purpose of classification is to ensure that the services provided by air traffic units deliver the level of protection expected under those rules²⁵. Accordingly, the choice of classification should flow directly from an assessment of who needs protection from whom in the given environment, with consideration of the other factors described in 2.2.
- 4.49 Controlled airspace structures must be designed to ensure clarity of classification and service provision. Individual CTRs and CTAs must not include multiple service providers, as this creates ambiguity over responsibility for separation and coordination. Overlapping structures are not permitted, nor is the inclusion of

²⁴ SARG Policy 126: Policy for the Design of Controlled Airspace Structures, paragraph 2.3

²⁵ Pursuant to the CAA (Chicago Convention) Directions 2007 and in accordance with SERA.6001, the UK applies the ICAO airspace classification system.

more than one airspace classification within a single CTR, CTA or TMA. These practices compromise the integrity of the airspace design and reduce predictability for both service providers and airspace users.

- 4.50 Further high-level guidance on design of CTRs, CTAs, TMAs and their associated classification can be found in Annex A of SARG Policy 126: Policy for the Design of Controlled Airspace Structures and section 5 of SARG Policy 127: Policy for the Classification of UK Airspace.

Supporting Figures

- 4.51 The following figures are for illustrative purposes to provoke consideration of the options only and are not to scale or intended to be used as a design template.

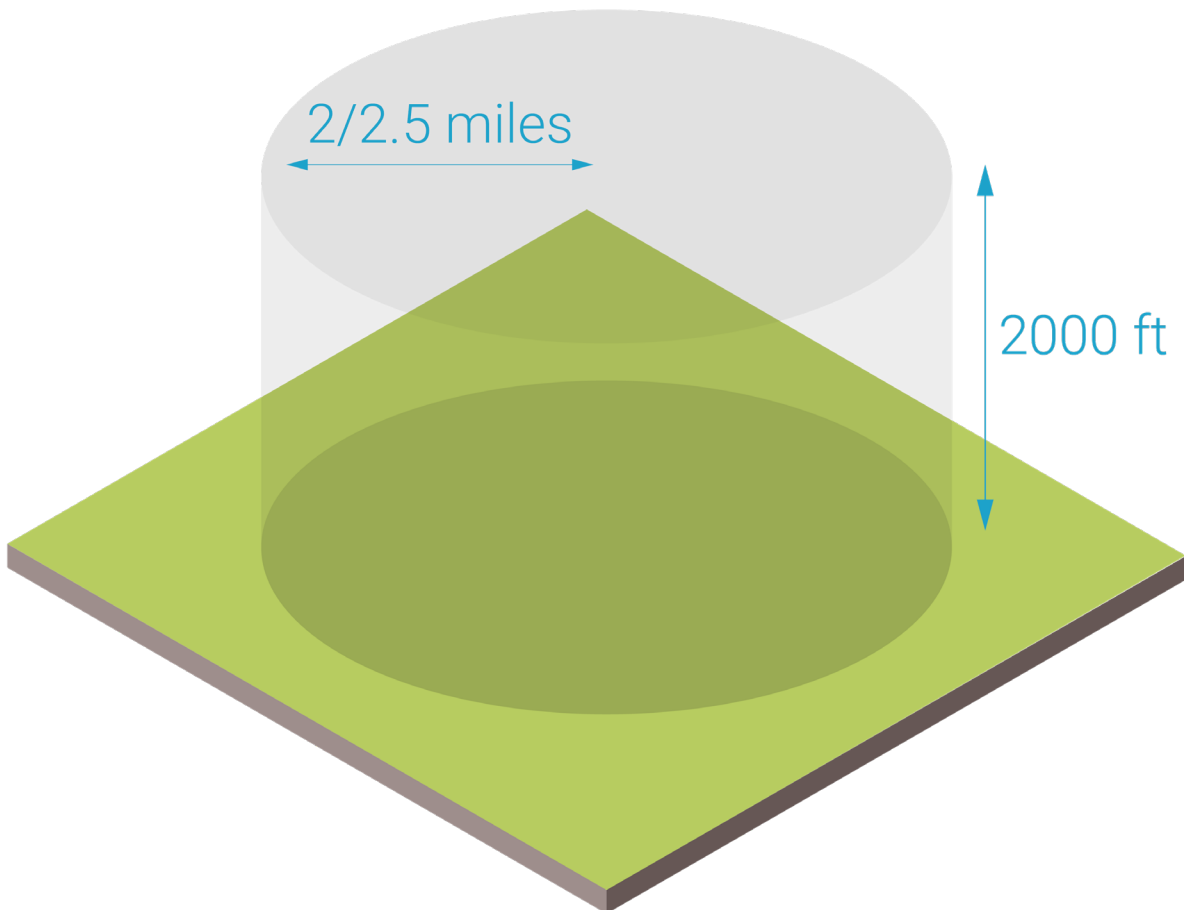


Figure 4.1 Aerodrome Traffic Zone

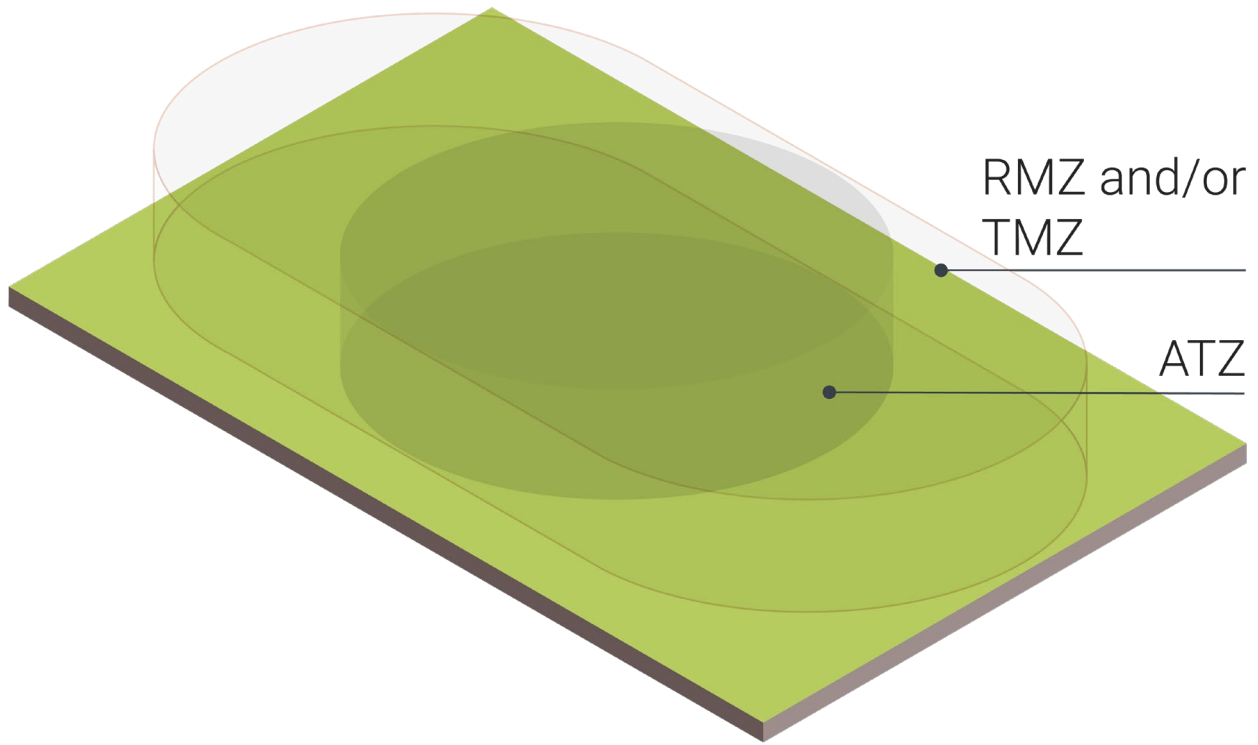


Figure 4.2 Rounded-rectangular RMZ and/or TMZ, with ATZ

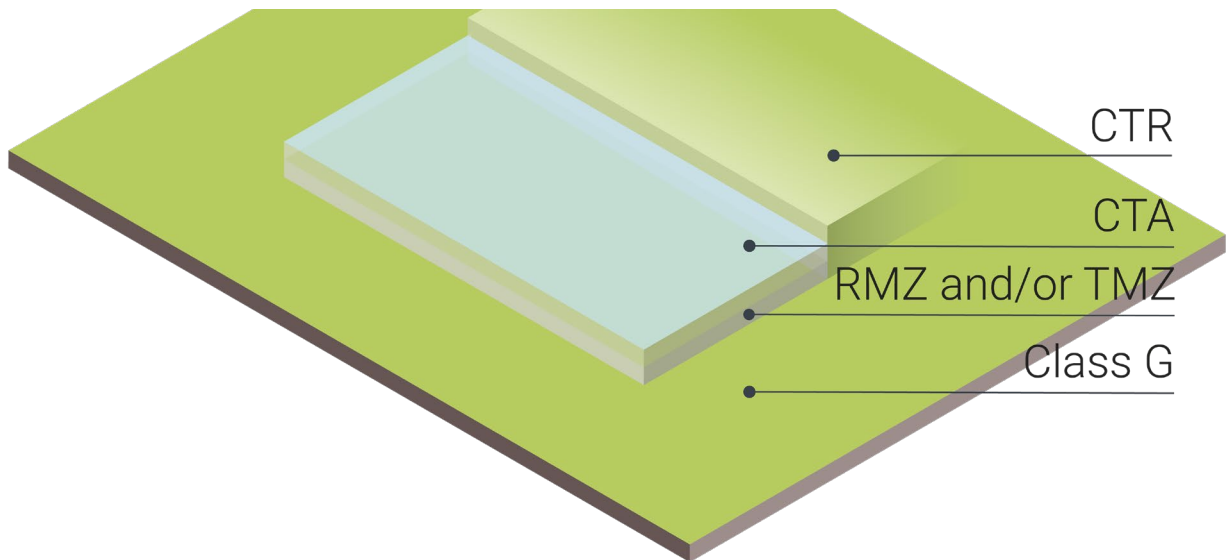


Figure 4.3 Peripheral RMZ and/or TMZ adjacent to controlled airspace structures

Chapter 5

Airspace with overlapping or competing requirements

- 5.1 Airspace around aerodromes is increasingly subject to congested and contested demands, with multiple users and services operating in close proximity. This chapter provides guidance on designing and managing airspace where overlapping or competing requirements exist, supporting safe, proportionate and coordinated use of complex environments.
- 5.2 The airspace structures introduced in this chapter are:
- a) Temporary reserved area (TRA).
 - b) Temporary segregated area (TSA).

Note: See SARG Policy 133, Policy for the Establishment and Operation of Special Use Airspace (SUA) for amplifying information and data provision requirements relevant to each SUA construct.

Define a mutually acceptable boundary

- 5.3 If two proposed or established airspace structures under the control of different authorities overlap, the preferred approach is to reach an agreement on a delineation that satisfies both parties. For example, if one unit determines that there is no requirement to deliver services in a portion of airspace, the structure could be redesigned to exclude that area. Once a mutually acceptable boundary has been agreed, two distinct structures can then be established.

Uncontrolled airspace structure that overlaps with a CTR or CTA

- 5.4 In certain cases, aerodromes are situated within the lateral limits of a CTR, or an airspace structure is established or proposed around an aerodrome that overlaps laterally and/or vertically with a CTR or CTA. Where agreement on distinct structures cannot be reached, it may be necessary to establish an arrangement for the shared use of airspace. Historically, some airspace structures were established through local agreements, often without full alignment to regulatory requirements introducing inconsistencies in airspace design, service provision²⁶ and formal notification. This guidance provides a framework for formalising such

²⁶ CAP 3096, Review of Letters of Agreement that create non-compliant airspace design refers to examples where AFIS or AGCS is being provided in controlled airspace.

interactions through airspace structures that reflect current policy and safety expectations and ensure appropriate publication in the AIP.

- 5.5 **Use of TRA/TSA in overlapping airspace.** Where an airspace structure proposed or established around an AFIS or non-ATS aerodrome overlaps with an existing CTR or CTA, the overlapping portion should be designated as either a TRA or TSA (see Figure 5.1 and 5.2), based on the assessed risk and the resulting access restrictions required during activation.
- 5.6 If other aircraft may be allowed to transit during the period of activation, the uncontrolled, overlapping airspace structure should be a TRA.
- 5.7 If other aircraft will not be allowed to transit during the period of activation, the uncontrolled, overlapping airspace structure should be a TSA.
- 5.8 The management of any airspace structure established under this guidance should be based on a Letter of Agreement (LoA) between the relevant parties. This LoA should include the nomination of an SUA authority²⁷ as well as conditions for activation and deactivation, the responsibilities of each unit and any necessary operational procedures to ensure safe use of the airspace.
- 5.9 Where the intended operational environment requires procedures that differ from those associated with the airspace classification, the change sponsor should propose a bespoke rule set for use during periods when the TRA/TSA is active. The structure and rule set must be developed as part of the ACP, assessed through the CAP 1616 process and shown to deliver an acceptable level of safety performance. The rule set must be clearly defined, proportionate to the identified risks and documented in the supporting LoA. When the TRA/TSA is not active, the extant rules relevant to the published airspace classification remain applicable.

²⁷ SARG Policy 133 mandates the appointment of an SUA authority and CAP740, UK Airspace Management Policy, Chapter 9 details the responsibilities of the SUA authority and associated CAA oversight commitments.

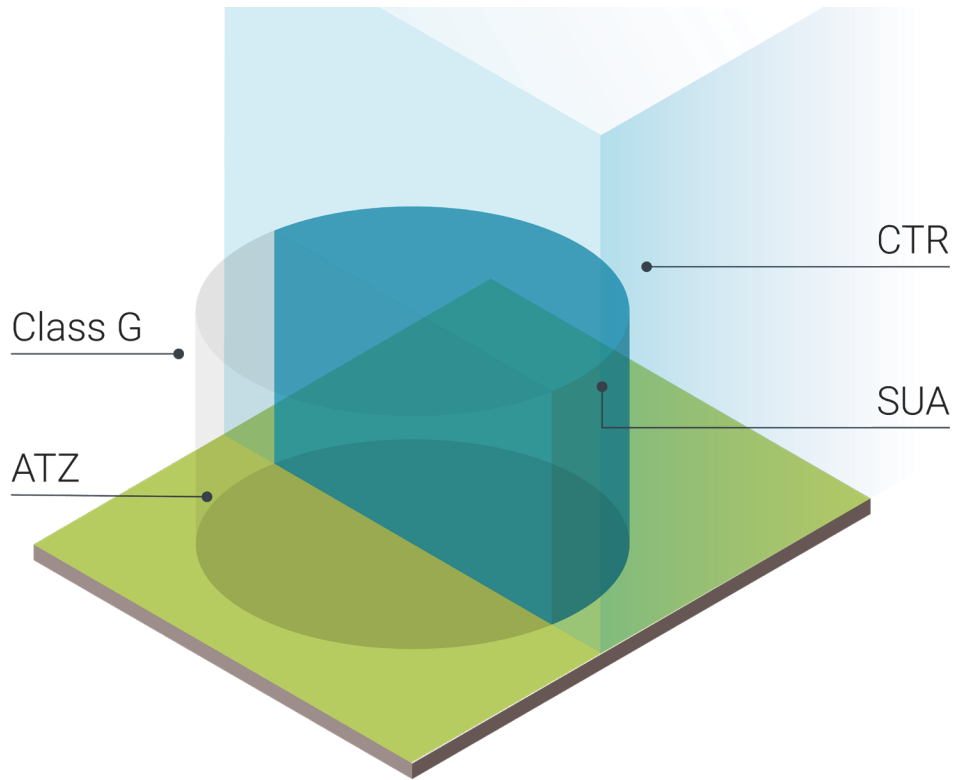


Figure 5.1 Overlapping CTR and ATZ, with corresponding SUA

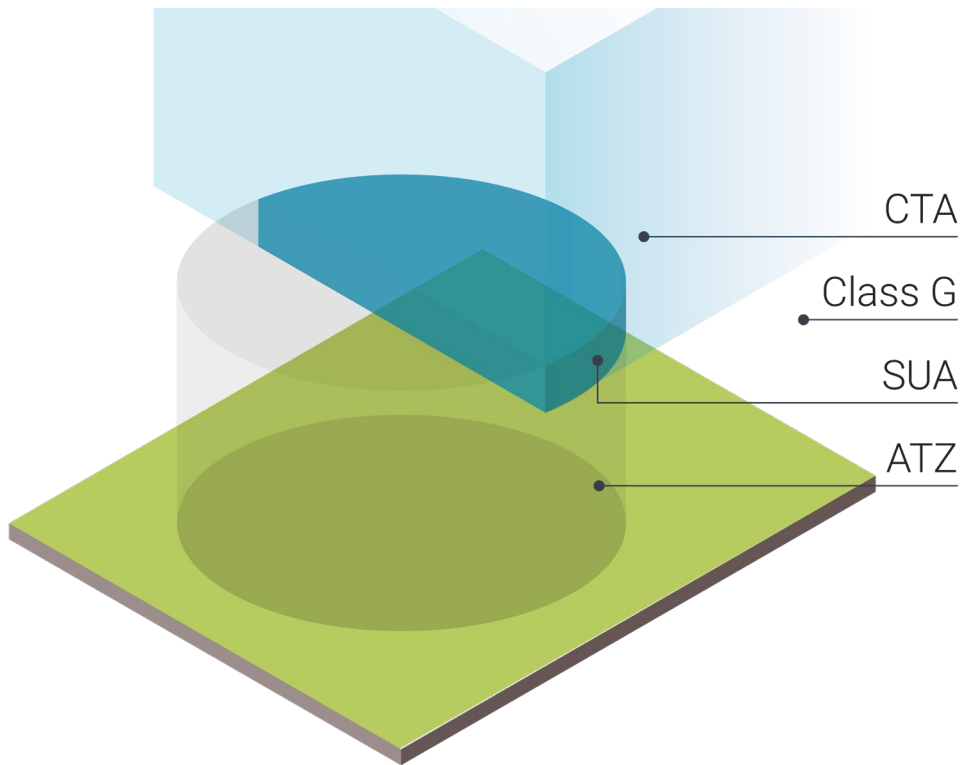


Figure 5.2 Overlapping CTR and ATZ, with corresponding SUA

Controlled airspace structures

- 5.10 Where two ATC units have a recurring requirement for one unit to temporarily provide ATC service within a defined volume of controlled airspace for which another unit is the designated service provider, the airspace should be established as a distinct, permanent structure. This may involve the sub-division of an existing CTR/CTA. This allows the structure to be formally notified in the AIP, rather than solely exist as a construct defined in an LoA or MATS Part 2.
- 5.11 The design of the airspace structure should be the result of negotiation between the two ATC units. The process should consider operational requirements and respective traffic patterns.
- 5.12 One unit should be designated as the primary controlling authority. This designation should be based on which unit has the more consistent or operationally significant requirement to manage the airspace. The secondary unit can then be delegated as the controlling authority in accordance with agreed procedures.
- 5.13 ATS units (ATSUs) that are authorised to provide ATC services within an aerodrome CTR/CTA and are not the notified airspace controlling authority will be designated Enhanced ATSU²⁸.
- 5.14 A supporting LoA should be established between the units. This should define the procedures for how the airspace should be prioritised in use, how to manage the delegation of the provision of ATS and the responsibilities of each party. Consideration should be given to factors such as the category of flight and the nature and frequency of scheduled commercial operations.

The role of special use airspace in enabling BVLOS unmanned aircraft flight in the vicinity of an aerodrome

- 5.15 The integration of Beyond Visual Line of Sight (BVLOS) unmanned aircraft (UA) with 'traditional' airspace users near aerodromes presents unique challenges. These challenges stem from traffic density and variability, the presence of notified procedures and the need to maintain equitable access for all users. At present, BVLOS UA may require adaptations to permit their managed accommodation alongside other airspace users and maintain an acceptable level of safety performance²⁹. An example of such an adaptation is the designation of SUA structures. Their use must be underpinned by a robust safety case and

²⁸ SARG Policy 117: Policy for ATS Provision Within Controlled Airspace by Units not Notified as the Controlling Authority, paragraph D1.3

²⁹ The CAA describes its pathway toward the objective of enabling integrated, unsegregated operations for all airspace users within CAP 2533, Airspace Policy Concept - Airspace Requirements for the Integration of BVLOS Unmanned Aircraft.

coordinated through appropriate LoAs, ensuring alignment with existing aerodrome operations and airspace design.

- 5.16 BVLOS UA operators are strongly encouraged to engage with an ANSP at the earliest opportunity when considering the establishment of SUA to support BVLOS operations. Early collaboration enables the ANSP to contribute to the design of airspace structures that are operationally feasible, proportionate and compatible with existing ATS provision and this partnership may, where appropriate, be extended to joint airspace change sponsorship. In many cases, ANSP involvement from the outset can facilitate the development of an ACP that offers greater flexibility in terms of coexistence with existing procedures and airspace users, thereby increasing the likelihood of the proposal being successful.

APPENDIX 1

References and bibliography

Glossary

- A1 Definitions of commonly used air traffic management vocabulary can be found in CAP 1430, UK Air Traffic Management Vocabulary.

Bibliography

- A2 The following bibliography provides a list of useful references for stakeholders. This list is not exhaustive and the change sponsor may need to reference additional documents.
- EUROCONTROL ERNIP Part 1 (European Route Network Improvement Plan)
 - CAP 413: Radiotelephony Manual
 - CAP 670: Air Traffic Services Safety Requirements
 - CAP 740: UK Airspace Management Policy
 - CAP 778: Policy and Guidance for the Design and Operation of Departure Procedures in UK Airspace
 - CAP 785B: Implementation and Safeguarding of IFPs in the UK
 - CAP 797: Flight Information Service Officer Manual
 - CAP1054: Aeronautical Information Management
 - CAP1391: Electronic Conspicuity devices
 - CAP 1616: Airspace Change Process
 - CAP 1711, 1711a, 1711b: Airspace Modernisation Strategy (Parts 1, 2, and 3)
 - CAP 2304: Applications for instrument approach procedures to aerodromes without Approach Control and/or with a non-instrument runway – additional policy, guidance, and Acceptable Means of Compliance
 - CAP2520: Policy and Guidance for the implementation of Point in Space Helicopter operations in the UK
 - CAP2533: Airspace Policy Concept - Airspace Requirements for the Integration of Beyond Visual Line of Sight (BVLOS) Unmanned Aircraft

- CAP3096: Review of Letters of Agreement that create non-compliant airspace design
- ICAO Annex 2: Rules of the Air
- ICAO Annex 11: Air Traffic Services
- ICAO Annex 15: Aeronautical Information Services
- ICAO Doc 4444: Procedures for Air Navigation Services (PANS-ATM)
- ICAO Doc 8168: Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS) Volumes I and II
- SARG Policy 105: Policy for 'Point Merge' and 'Trombone' Transition Procedures
- SARG Policy 109: Policy for the replication of conventional SIDs, STARs and Holds using PBN
- SARG Policy 111: Standard Instrument Departure Truncation Policy
- SARG Policy 113: Standard Instrument Arrival Route (STAR) Truncation Policy
- SARG Policy 115: Establishment and Dimensions of Aerodrome Traffic Zones (ATZ)
- SARG Policy 116: Reduction in Notified Hours or Disestablishment of Airspace Restrictions
- SARG Policy 117: Policy for ATS Provision Within Controlled Airspace by Units not Notified as the Controlling Authority
- SARG Policy 123: Policy for Radio Mandatory Zones and Transponder Mandatory Zones
- SARG Policy 125: Aeronautical Data Associated with CAP 1616 Airspace Changes
- SARG Policy 126: Policy for the Design of Controlled Airspace Structures
- SARG Policy 127: Policy for the Classification of UK Airspace
- SARG Policy 133: Policy for the Establishment and Operation of Special Use Airspace
- UK Regulation (EU) No 923/2012
- UK Regulation (EU) 2019/947

ANNEX A

CAA Policy Position

Use of an FMC in lieu of an initial call in an RMZ

A1.1 SERA.6005(a)(2) states:

'Before entering a radio mandatory zone, an initial call [...] shall be made by pilots on the appropriate communication channel'

The word 'shall', as used in regulatory documents, indicates a mandatory requirement with which pilots must comply.

A1.2 The purpose of this initial call is to allow the ANSP to develop its situational awareness of the air traffic operating within the RMZ. However, where the ANSP utilises ATS surveillance systems, the use of an FMC could remove the need for pilots to make that initial call – the FMC indicating that the aircraft is maintaining a continuous voice communication watch on the appropriate communication channel – and thus reduce RT occupancy.

A1.3 The CAA is aware that, as written, SERA.6005(a)(2) does not include the flexibility for ANSPs to specify the use of an FMC instead of a pilot making an initial call. However, FMCs are currently used in this manner within existing CAA-approved RMZ arrangements.

A1.4 In the short-term, airspace change sponsors seeking to utilise an FMC within an RMZ as an alternative to pilots making an initial call should consider the potential safety effects within their safety assessment. If the CAA decides to approve the airspace change proposal, the CAA will also grant an exemption against the requirement for pilots to make an initial call. Such an exemption would set out the conditions under which the alternative procedure applies and would ensure that the RMZ's operating arrangements remain legally robust.

A1.5 In the long-term, the CAA intends to address this issue through our Rules of the Air rulemaking activity, thus removing the need to grant an exemption.