

12 October 2023

## Policy Statement

### POLICY FOR THE DESIGN OF CONTROLLED AIRSPACE STRUCTURES

#### 1 Introduction

- 1.1 The CAA's statutory obligations include the need to "secure the most efficient use of airspace consistent with the safe operation of aircraft and expeditious flow of air traffic" and to "take account of any guidance on environmental objectives given to the CAA by the Secretary of State"<sup>1</sup>. Moreover, the CAA (Air Navigation) Directions 2023<sup>2</sup> require the CAA to "develop and publish rules, guidelines, technical design criteria and common procedures for the use of UK airspace". Pursuant to these requirements, the purpose of this Airspace Policy Statement is to provide technical design criteria for controlled airspace structures<sup>3</sup>.
- 1.2 This policy statement supersedes that of the same name published on 11 August 2022.
- 1.3 The purpose of this Policy Statement is to provide generic design criteria for controlled airspace and further describe the lateral and vertical relationship required where air traffic services (ATS) routes, standard instrument departure (SID) routes, standard instrument arrival (STAR) routes and instrument approach procedures (IAP) are contained within controlled airspace<sup>4</sup>. It is one of a number of documents that must be read in the context of each other to understand UK policy on airspace design; these are outlined in Section 7 References below.
- 1.4 References to EU regulations in this Policy Statement are to those regulations as retained and amended in UK domestic law under the European Union (Withdrawal) Act 2018.

#### 2 Background

- 2.1 Controlled airspace is airspace of defined dimensions within which air traffic control (ATC) service is provided in accordance with the airspace classification. Its purpose is to create a known air traffic environment to achieve the objectives of the ATC service<sup>5</sup>: to prevent collisions between aircraft and to expedite and maintain an orderly flow of air traffic.
- 2.2 Controlled airspace used in the en-route phase of flight consists of control areas (CTA) within which specific air traffic services (ATS) routes have been defined for the purpose of flight planning, and to expedite and maintain an orderly flow of air traffic<sup>6</sup>.
- 2.3 Controlled airspace in the vicinity of an aerodrome will consist of control zones (CTR), CTAs and may include terminal control areas (TMA), which are designed to contain specific ATS routes, STARs, SIDs and IAPs; these are further described in Annex A.

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<sup>1</sup> Section 70 of the Transport Act 2000.

<sup>2</sup> The Civil Aviation Authority (Air Navigation) Directions 2023 Article 3(d).

<sup>3</sup> See also Article 46 of UK Reg (EU) 2018/1139.

<sup>4</sup> This Airspace Policy Statement assumes that the requirements for obstacle clearance have been met in accordance with the design criteria detailed within ICAO Doc 8168 PANS-OPS.

<sup>5</sup> SERA.7001(a), (b) and (c) from the Annex to UK Reg (EU) No 923/2012, transposed from ICAO Annex 11 section 2.3.1.

<sup>6</sup> Note that AIC Y104/2018 details CAA policy to re-designate airways as CTAs and that as such, airways are no longer designated in UK airspace.

These structures, allied with the provision of appropriate ATS, permit the safe and effective integration of IFR flights with other IFR and VFR flights.

- 2.4 UK airspace design policy for controlled airspace, ATS routes, SIDs and STARs is based upon the requirements detailed within ICAO Standards and Recommended Practices (SARPs)<sup>7</sup> and Procedures for Air Navigation Services (PANS)<sup>8</sup>, supplemented where necessary by guidance material published by the CAA<sup>9</sup> and Eurocontrol; see Section 7 below.
- 2.5 In the UK, the guiding principle in establishing a volume of controlled airspace is that we must “seek to ensure that the amount of controlled airspace is the minimum required to maintain a high standard of air safety and, subject to overriding national security or defence requirements, that the needs of all airspace users is reflected on an equitable basis”<sup>10</sup>.

### 3 **Scope**

- 3.1 All ATS Routes, SIDs, STARs and IAPs established within controlled airspace (including CTR, CTA and TMA structures) are within the scope of this policy statement.
- 3.2 ATS routes and instrument approach procedures established in class G airspace are out of scope of this policy statement.

### 4 **Applying the Policy for the Design of Controlled Airspace Structures**

- 4.1 The technical design criteria described in this policy statement applies to all controlled airspace design proposals submitted to the CAA (in accordance with the procedures detailed in CAP 1616). Key regulatory references and guidance material are listed in the references section of this policy statement below.
- 4.2 CAP 785B, Implementation and Safeguarding of Instrument Flight Procedures (IFPs) in the UK, stipulates that a full review of IFPs is required on a 5-yearly basis<sup>11</sup><sup>12</sup>. The CAA considers that where controlled airspace is established to contain these IFPs, and where such a review identifies the need for changes to that IFP, it is axiomatic that there may be a subsequent and associated need to amend the airspace containing that IFP. Moreover, multiple references within the ATM/ANS Implementing Rule<sup>13</sup> highlight that the management and safety management systems of air navigation service providers (ANSPs) should seek to review and examine particular elements or procedures of a specific operation and their functional system<sup>14</sup>. The purpose being to ensure that the ANSP can provide its services in a safe, efficient, continuous, and sustainable manner, consistent with any foreseen level of overall demand for a given airspace<sup>15</sup>.
- 4.3 As such, the review should include the airspace design and volume, associated ATS routes and/or SIDs and STARs and the associated ATS arrangements, to ensure that the airspace:
- satisfies changing safety, operational and environmental conditions and requirements; and,
  - meets the principle stated in paragraph 2.5 above.

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<sup>7</sup> ICAO Annex 2 and Annex 11.

<sup>8</sup> ICAO Doc 4444 PANS-ATM and Doc 8168 PANS-OPS Volumes I, II and III.

<sup>9</sup> For example, airspace policy statements relating to subjects such as [‘Point Merge and Trombone Transition Procedures’](#)

<sup>10</sup> The Civil Aviation Authority (Air Navigation) Directions 2017 (as amended) Article 3(ba).

<sup>11</sup> CAP 785B Implementation and Safeguarding of Instrument Flight Procedures in the UK Chapter 3 (transposed from ICAO Annex 11 Appendix 7 Paragraph 6).

<sup>12</sup> Clarification on the responsibility for the conduct of the review is contained within CAP 785B Chapter 1.

<sup>13</sup> UK Reg (EU) 2017/373.

<sup>14</sup> For example, UK Reg (EU) 2017/373 Annex III Subpart B ATM/ANS.OR.B.005(a)(4) and AMC2 ATM/ANS.OR.B.005(a)(3) point (b)(5).

<sup>15</sup> UK Reg (EU) 2017/373 Annex III Subpart B ATM/ANS.OR.B.001.

## 5 Definitions

5.1 For the purposes of this policy statement, the following definitions apply:

- (a) 'Aerodrome' means a defined area (including any buildings, installations and equipment) on land or water or on a fixed, fixed off-shore or floating structure intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft (UK Reg (EU) No 923/2012 Article 2(6)).
- (b) 'Aerodrome traffic' means all traffic on the manoeuvring area of an aerodrome and all aircraft flying in the vicinity of an aerodrome. An aircraft operating in the vicinity of an aerodrome includes but is not limited to aircraft entering or leaving an aerodrome traffic circuit (UK Reg (EU) No 923/2012 Article 2(9)).
- (c) 'Aerodrome traffic zone (ATZ)' means an airspace of defined dimensions established around an aerodrome for the protection of aerodrome traffic (UK Reg (EU) No 923/2012 Article 2(11)).  

Note. The term ATZ also has the meaning assigned to it by Air Navigation Order 2016 Article 5.
- (d) 'Air Navigation Services (ANS)' means air traffic services; communication, navigation and surveillance services; meteorological services for air navigation; and aeronautical information services (CAA).
- (e) 'Air traffic' means all aircraft in flight or operating on the manoeuvring area of an aerodrome (UK Reg (EU) No 923/2012 Article 2(26)).
- (f) 'Air traffic control (ATC) service' means a service provided for the purpose of preventing collisions between aircraft, and on the manoeuvring area between aircraft and obstructions; and expediting and maintaining an orderly flow of traffic (UK Reg (EU) No 923/2012 Article 2(30)).
- (g) 'Air traffic service (ATS) means a generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service) (UK Reg (EU) No 923/2012 Article 2(32)).
- (h) 'Air traffic services (ATS) airspaces' means airspaces of defined dimensions, alphabetically designated, within which specific types of flights may operate and for which air traffic services and rules of operation are specified (UK Reg (EU) No 923/2012 Article 2(33)).
- (i) 'Approach transition' means a performance-based navigation (PBN) procedure that links the standard instrument arrival (STAR) to the initial approach fix (IAF) or intermediate fix (IF) of an instrument approach procedure (IAP) (Implementation and Safeguarding of Instrument Flight Procedures (IFPs) in the UK, CAP 785B).

**Note.** Eurocontrol have published guidance material on the nature of what are termed 'transitions' [here](#).

- (j) 'ATS route' means a specified route designed for channelling the flow of traffic as necessary for the provision of air traffic services (UK Reg (EU) No 923/2012 Article 2(46)).

**Note.**

- (a) The term 'ATS route' is used to mean variously airway<sup>6</sup>, advisory route, controlled or uncontrolled route, arrival or departure route, etc.
- (b) An ATS route is defined by route specifications which include an ATS route designator, the track to or from significant points (waypoints), distance between significant points, reporting requirements, and as determined by the competent authority, the lowest safe altitude (UK Reg (EU) No 923/2012 Article 2(46) GM1).

- (k) 'ATS surveillance service' is a term used to indicate a service provided directly by means of an ATS surveillance system (ICAO Doc 4444 PANS-ATM).
- (l) 'ATS surveillance system' is a generic term meaning variously, ADS-B, PSR, SSR or any comparable ground-based system that enables the identification of aircraft.
- Note.** A comparable ground-based system is one that has been demonstrated by comparative assessment or other methodology, to have a level of safety and performance equal to or better than monopulse SSR (ICAO Doc 4444 PANS-ATM).
- (m) 'Control area (CTA)' means a controlled airspace extending upwards from a specified limit above the earth (UK Reg (EU) No 923/2012 Article 2(56)).
- (n) 'Controlled airspace' means an airspace of defined dimensions within which air traffic control service is provided in accordance with the airspace classification (UK Reg (EU) No 923/2012 Article 2(58)).
- Note.** Controlled airspace is a generic term which covers ATS airspace Classes A, B, C, D and E (UK Reg (EU) No 923/2012 Article 2(58) GM1).
- (o) 'Control zone (CTR)' means a controlled airspace extending upwards from the surface of the earth to a specified upper limit (UK Reg (EU) No 923/2012 Article 2(61)).
- (p) 'Danger area' means an airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times (UK Reg (EU) No 923/2012 Article 2(65)).
- (q) 'Flight information service (FIS)' means a service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights (UK Reg (EU) No 923/2012 Article 2(77)).
- (r) 'IFR' means the symbol used to designate the instrument flight rules (UK Reg (EU) No 923/2012 Article 2(87)).
- (s) 'IFR flight' means a flight conducted in accordance with the Instrument Flight Rules (UK Reg (EU) No 923/2012 Article 2(88)).
- (t) 'Initial approach procedure' means a stand-alone conventional approach procedure following the completion of an existing standard instrument arrival (STAR) terminating at the intermediate fix (IF) or final approach fix (FAF). This can typically be used to facilitate radiocommunication failure (RCF) procedures (Implementation and Safeguarding of Instrument Flight Procedures (IFPs) in the UK, CAP 785B).
- (u) 'instrument approach procedure (IAP) means a series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply. Instrument approach procedures are classified as follows:
- (a) non-precision approach (NPA) procedure. An instrument approach procedure designed for 2D instrument approach operations Type A;
  - (b) approach procedure with vertical guidance (APV). A performance-based navigation (PBN) instrument approach procedure designed for 3D instrument approach operations Type A;
  - (c) precision approach (PA) procedure. An instrument approach procedure based on navigation systems (ILS, MLS, GLS and SBAS Cat I) designed for 3D instrument approach operations Type A or B (UK Reg (EU) No 923/2012 Article 2(90)).

- (v) 'Instrument flight procedure (IFP)' means a standard instrument departure (SID), a standard instrument arrival (STAR), an approach transition, an initial approach procedure or an instrument approach procedure (IAP) (Implementation and Safeguarding of Instrument Flight Procedures (IFPs) in the UK, CAP 785B)).
- (w) 'instrument meteorological conditions (IMC)' mean meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions (UK Reg (EU) No 932/2012 Article 2(91)).
- (x) 'Performance based navigation (PBN)' means area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.  
**Note.** Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept (ICAO Doc 4444 PANS-ATM).
- (y) 'Primary area' means a defined area symmetrically disposed about the nominal flight track in which full obstacle clearance is provided (see also 'secondary area'.) (ICAO Doc 8168 PANS-Ops Volume I).
- (z) 'Prohibited area' means an airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited (UK Reg (EU) No 932/2012 Article 2(103)).
- (aa) 'Required navigation performance (RNP)' means a statement of the navigation performance necessary for operation within a defined airspace.  
**Note.** Navigation performance and requirements are defined for a particular RNP type and/or application (ICAO Doc 4444 PANS-ATM).
- (ab) 'Restricted area' means an airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions (UK Reg (EU) No 932/2012 Article 2(111)).
- (ac) 'Secondary area' means a defined area on each side of the primary area located along the nominal flight track in which decreasing obstacle clearance is provided (see also 'primary area') (ICAO Doc 8168 PANS-Ops Volume I).
- (ad) 'Special VFR (SVFR) flight' means a VFR flight cleared by air traffic control to operate within a control zone in meteorological conditions below VMC (UK Reg (EU) No 923/2012 Article 2(122)).
- (ae) 'Standard instrument arrival (STAR)' means a designated instrument flight rule (IFR) arrival route linking a significant point, normally on an ATS route, with a point from which a published instrument approach procedure can be commenced (ICAO Doc 4444 PANS-ATM).
- (af) 'Standard instrument departure (SID)' means a designated instrument flight rule (IFR) departure route linking the aerodrome or a specified runway of the aerodrome with a specified significant point, normally on a designated ATS route, at which the en-route phase of a flight commences (ICAO Doc 4444 PANS-ATM).
- (ag) 'Terminal control area (TMA)' is a control area normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes (ICAO Annex 11).
- (ah) 'VFR' means the symbol used to designate the visual flight rules (UK Reg (EU) No 923/2012 Article 2(139)).
- (ai) 'VFR flight' means a flight conducted in accordance with the visual flight rules (UK Reg (EU) No 923/2012 Article 2(140)).

- (aj) 'visual meteorological conditions (VMC)' mean meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima (UK Reg (EU) No 923/2012 Article 2(142)).

## 6 Technical Design Criteria

- 6.1 High-level design criteria for controlled airspace structures are detailed within [Annex A](#).
- 6.2 Specific design criteria for the containment within controlled airspace of ATS routes, SIDs, STARs, IAPs and flights subject to vectoring instructions from air traffic control are detailed within [Annex B](#).

## 7 References

### 7.1 Legislation

- UK Reg (EU) 2017/373 Air Traffic Management/Air Navigation Services Implementing Regulation (ATM/ANS IR); and,
- UK Reg (EU) No 923/2012 Standardised European Rules of the Air (SERA).

### 7.2 ICAO SARPs and PANS

- ICAO Annex 2 – Rules of the Air;
- ICAO Annex 11 – Air Traffic Services;
- ICAO Doc 8168 PANS-OPS; and
- ICAO Doc 4444 PANS-ATM.

- 7.3 **Related CAA CAPs & Airspace Policy Statements.** We have included the most relevant documents below, but a full list can be found on the [CAA website](#).

#### 7.3.1 CAPs

- CAP 1616 - Airspace Change;
- CAP 778 - Policy and Guidance for the Design and Operation of Departure Procedures in UK Airspace;
- CAP 785A - Oversight of UK Approved Procedure Design Organisation;
- CAP 785B Implementation and Safeguarding of Instrument Flight Procedures (IFPs) in the UK;
- CAP 740 - UK Airspace Management Policy;
- CAP 1054 - Aeronautical Information Management;
- CAP 1385 - Performance-Based Navigation: Enhanced Route Spacing Guidance;
- CAP 1561 - Reforming Policy on the Design and Use of UK Airspace;
- CAP 1711 - Airspace Modernisation Strategy; and,
- CAP 1961 - Airspace Change Process for GNSS Instrument Approach Procedures (IAPs) without an Approach Control Service.

#### 7.3.2 Airspace Policy Statements

- Policy for the Classification of UK Airspace;
- Point Merge and Trombone Transition Procedures;
- Replication of conventional SIDS, STARs and Holds using PBN;

- Policy for Radio Mandatory Zones and Transponder Mandatory Zones;
- Special Use Airspace - Safety Buffer Policy for Airspace Design Purposes.

#### 7.4 **Other related guidance material**

- [EUROCONTROL Route Network Improvement Plan \(ERNIP\) Part 1;](#)
- [EUROCONTROL European PBN Route Spacing Handbook.](#)

#### 8 **Review of Policy**

- 8.1 The CAA shall review this policy statement and its associated annexes on a discretionary basis but not less than triennially from its publication date.

#### 9 **Point of Contact**

- 9.1 Any queries or further guidance required on the content of this Airspace Policy Statement should be marked for the attention of Airspace & ATM Policy and sent to:  
[ats.enquiries@caa.co.uk](mailto:ats.enquiries@caa.co.uk)

- 9.2 Any queries or further guidance required on the implementation of this Airspace Policy Statement should be marked for the attention of Airspace Regulation and sent to:  
[airspaceregulation@caa.co.uk](mailto:airspaceregulation@caa.co.uk)

## Annex A

**High-Level Design Criteria for Controlled Airspace Structures****A1 Introduction**

- A1.1 The classification and designation of ATS airspaces follows a determination of the need for air traffic services<sup>16</sup>. When it has been determined that ATS will be provided in particular portions of the airspace or at particular aerodromes, then those portions of the airspace or those aerodromes shall be designated in relation to the air traffic services that are to be provided<sup>17</sup>.
- A1.2 The classification of ATS airspaces in the UK is addressed through CAA Policy for the Classification of UK Airspace.

**A2 Policy**

- A2.1 Those portions of UK airspace where it is determined that air traffic control (ATC) service<sup>18</sup> will be provided to instrument flight rules (IFR) flights shall be designated as control areas (CTA) or control zones (CTR)<sup>19</sup>.
- A2.2 Those portions of controlled airspace wherein it is determined that air traffic control service will also be provided to visual flight rules (VFR) flights shall be designated as classes B, C, or D airspace<sup>20</sup>.

**A3 Control Zones (CTR)**

- A3.1 The lateral limits of CTR shall:
- (a) extend to at least 5 NM from the centre of the aerodrome or aerodromes concerned in the directions from which approaches may be made; and,
  - (b) encompass at least those portions of the airspace, which are not within CTA, containing the paths<sup>21</sup> of IFR flights arriving at and departing from aerodromes to be used under instrument meteorological conditions (IMC).
- A3.2 ICAO note<sup>22</sup> that aircraft holding in the vicinity of aerodromes are considered as arriving aircraft. However, this does not imply that holding must be 'contained' within the CTR alone; it may be contained in CTA.
- A3.3 Where a CTR is located outside the lateral limits of a CTA, an upper limit for the CTR shall be established at a level which can be easily identified by pilots.
- A3.4 Where a CTR is located within the lateral limits of a CTA, it shall extend upwards from the surface of the earth to at least the lower limit of the CTA. If the upper limit is established at a level higher than the lower limit of the CTA established above it, the upper limit shall be established at a level which can be easily identified by pilots.
- A3.5 The lateral limits of CTR, including where arc radius is used, should be measured from the Aerodrome Reference Point (ARP); however, another point of reference may be used to satisfy local design requirements.

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<sup>16</sup> ICAO Annex 11 section 2.4.

<sup>17</sup> ICAO Annex 11 section 2.5.1.

<sup>18</sup> The procedures for air traffic services provided in UK controlled airspace are detailed within the Manual of ATS (MATS) Part 1 (CAP 493), adopted from ICAO Annex 11 and ICAO Doc 4444 PANS-ATM.

<sup>19</sup> ICAO Annex 11 section 2.5.2.2.1.

<sup>20</sup> ICAO Annex 11 section 2.5.2.2.1.1.

<sup>21</sup> In this context, 'paths' should be interpreted as meaning notified ATS routes, instrument approach and departure procedures (including holding and missed approach procedures), and the area in which aircraft receive vectoring instructions to join the final approach track.

<sup>22</sup> Note to ICAO Annex 11 section 2.11.5.1.



- A3.6 In order to increase the level of flexibility associated with the utilisation of the volume of airspace within a CTR, an ATZ shall be embedded within the CTR<sup>23</sup>.
- A4 Control Areas (CTA)**
- A4.1 CTAs, including terminal control areas (TMA), shall be delineated so as to encompass sufficient airspace to contain the flight paths of those IFR flights or portions thereof to which it is desired to provide the applicable parts of the ATC service, taking into account the available navigation capabilities.
- A4.2 The lower limit of a CTA shall not be less than 700 ft agl. However, wherever practicable and in order to permit VFR flights under the CTA to comply with SERA.5005(f)<sup>24</sup>, the lower limit of a CTA adjoining a CTR should be no lower than 1 500 ft agl; the use of an expanded CTR to permit higher CTA base levels is preferable. There is no requirement for the lower limit to be established uniformly in a given CTA.
- A4.3 The lateral limits of CTA, including where arc radius is used, should be measured from the ARP; however, another point of reference may be used in order to satisfy local design requirements.
- A4.4 An upper limit of a CTA shall be established when either:
- (a) ATC service will not be provided above such upper limit; or,
  - (b) the CTA is situated below an upper CTA; in which case the upper limit shall coincide with the lower limit of the upper CTA.
- A5 Terminal Control Areas (TMA)**
- A5.1 TMAs are normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes to permit the safe integration of arriving and departing traffic flows; typically, they encompass the transition between the terminal and en-route phases of flight. A TMA is usually controlled by an area control centre.
- A5.2 The complexity of the route structure and interface procedures (particularly interaction with en-route services), together with associated ATC operations, will determine the extent of a TMA. Base levels should be set at the highest practicable levels to contain integrated ATS route, SIDs, and STARs profiles, yet simultaneously permit the effective availability of airspace below the base of controlled airspace for the use by transit traffic. Notwithstanding this, the base of a TMA should not be less than 2 000 ft agl.
- A6 ATS Routes and CTA in En-route Airspace**
- A6.1 The establishment of a detailed ATS route network depends upon the composition of the air traffic it is intended to serve. Where national operations constitute the bulk of the traffic which is to be accommodated, priority should be given to satisfying these needs. However, adequate arrangements should be made to meet the needs of international operations through appropriate trunk routes and development of these trunk routes must be co-ordinated on at least a regional basis.
- A6.2 The majority of the ATS routes so established will be permanently available; however, there will be cases:
- (a) when routes are required only for specific periods of the year (seasonal routes);  
or,

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<sup>23</sup> For example, the presence of an ATZ embedded within the CTR affords pilots and ATS providers a degree of flexibility regarding compliance with the requirements for VFR and special VFR flight detailed within SERA.5005(b) and SERA.5010(c).

<sup>24</sup> Annex to UK (EU) Reg No 923/2012 Standardised European Rules of the Air (SERA).

- (b) where specific routes can be made available only during weekends or because they traverse areas which, during the week, are reserved for other activities (e.g. Conditional Routes); or
- (c) where routes whose use depends on special co-ordination procedures can only be affected on an ad-hoc basis for the specific flights involved, dependent on the circumstances as they prevail at that time.
- A6.3 Such non-permanent routes should also be included in the ATS route network with a clear indication of the limitations imposed on their use.
- A6.4 The status given to individual ATS routes is primarily determined by the amount and type of traffic using the route.
- A6.5 ICAO Annex 11 requires that, when ATS routes are established, a protected airspace along each route and a safe spacing between adjacent ATS routes shall be provided<sup>25</sup>. In the UK this means that, where ATS routes are established and it has been determined that ATC service will be provided to IFR and/or VFR flights operating along those ATS routes, controlled airspace will be established to afford the protection required and to 'contain' such ATS routes. The "safe spacing" required between adjacent ATS routes is addressed in CAP 1385 and EUROCONTROL's European PBN Route Spacing Handbook.
- A6.6 En Route CTAs shall be delineated so as to encompass sufficient airspace to contain the primary area defined by the procedure PBN specification and upper & lower limits of those IFR flights to which it is desired to provide the applicable parts of the ATC service, taking into account the available navigation capabilities.
- A7 Radio and Transponder Mandatory Zones**
- A7.1 Radio and transponder mandatory zones (RMZ and TMZ respectively) may be established when the establishment of a more restrictive classification of airspace is not warranted but additional measures to enhance flight safety are required.
- A7.2 The objective of a RMZ and TMZ is to enhance the conspicuity of aircraft operating within, or in the vicinity of, complex, or otherwise busy airspace when the establishment of a more restrictive classification of airspace is not warranted, in order to maintain a balance between safe, efficient operations and fair, equitable access for all airspace users. Enhanced conspicuity can enable, as appropriate:
- airborne collision warning and/or avoidance systems;
  - a known or recognised air traffic environment<sup>26</sup> which, in turn, permits ATS to provide more specific traffic information on collision hazards; and,
  - ground-based safety nets such as short-term conflict alert (STCA) and minimum safe altitude warning (MSAW).
- In addition, a RMZ may also be notified to facilitate:
- the provision of flight information, alerting and search and rescue services<sup>27</sup>; or
  - coordination with appropriate military units or with ATS units in adjacent States in order to avoid the possible need for interception for the purpose of identification<sup>28</sup>.
- A7.3 As an example, VFR flights are not required to obtain an ATC clearance, nor be in continuous two-way air-ground voice communication with air traffic services (ATS) to cross class E airspace<sup>29</sup>. Where the safety requirements identified by the airspace change

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<sup>25</sup> ICAO Annex 11 section 2.13.1.

<sup>26</sup> The terms 'known traffic' and 'recognised air traffic environment' are defined in [CAP 1430 The UK Air Traffic Management Vocabulary](#).

<sup>27</sup> SERA.4001(b)(3) and SERA.5025(b).

<sup>28</sup> SERA.4001(b)(4) and SERA.5025(b).

<sup>29</sup> SERA.6001(a)(5) and Appendix 4 contained in the Annex to UK Reg (EU) No 923/2012.

sponsor identify the need to establish a known or recognised air traffic environment and the establishment of a more restrictive classification of airspace is not warranted, a RMZ and/or TMZ may be proposed in order to enhance flight safety.

- A7.4 It is important to note that the existence of a RMZ/TMZ does not confer or suggest any particular airspace classification; it adopts the background classification of the airspace that it is embedded within. The CAA's [Policy for Radio Mandatory Zones and Transponder Mandatory Zones](#) contains further details on the establishment and operation of RMZ and TMZ.

## Annex B

## Design Criteria for Containment of Instrument Flight Procedures and ATS Routes in Controlled Airspace Below FL 195

### B1 Introduction

B1.1 Where it is determined that air traffic control (ATC) service will be provided to instrument flight rules (IFR) and/or visual flight rules (VFR) flights (see [Annex A](#)), controlled airspace is established. It is designed to achieve the purpose described in paragraph 2.1 by providing sufficient airspace to contain notified ATS routes, instrument approach and departure procedures (including holding and missed approach procedures), and the area in which aircraft receive vectoring instructions to join the final approach track.

**Note.** The term ‘sufficient airspace’ in paragraph B1.1 is considered to mean that the volume of controlled airspace should:

- (a) safely contain the primary area of these procedures; and
- (b) permit compliance with air traffic management procedures for the tactical handling of flights to achieve a safe and efficient flow of air traffic.

### B2 Policy

B2.1 SERA.6001(b) requires that “all airspace above FL 195 shall be classified as class C airspace”. As such, the requirements described within this Annex apply solely to the containment of instrument flight procedures below FL 195.

B2.2 Noting the additional, specific, lateral containment criteria detailed in sections B3 and B4 below, the lateral containment of IFP and ATS routes should, in the first instance, be predicated upon the primary area identified through the design of these procedures. Where competing airspace requirements preclude containment by primary area, containment of the nominal track defined by the procedure may be less than that afforded by the primary area but should not be less than 3 NM from the lateral limit of controlled airspace.

B2.3 Vertical containment of IFP and ATS routes shall ensure that the flight profile remains at least 500 ft above the lower limit of controlled airspace and 500 ft below the upper limit of controlled airspace. Where it is necessary to contain an IFP above stepped controlled airspace bases, levels shall be specified which ensure that the vertical containment requirement is met.

**Note 1.** [CAP 785B: Implementation and Safeguarding of Instrument Flight Procedures \(IFPs\) in the UK](#) provides guidance on the consideration of restricted areas and danger areas during the IFP design process.

**Note 2.** [Special Use Airspace - Safety Buffer Policy for Airspace Design Purposes](#) describes requirements for lateral and vertical buffers between special use airspace and controlled airspace.

### B3 Containment of SIDs.

B3.1 Current UK policy<sup>30</sup> is that a SID provides a specified IFR departure procedure that should remain wholly within controlled airspace and that permits connectivity with the en-route ATS route system.

B3.2 In addition to the requirements for lateral and vertical containment detailed above, the following additional requirements apply to SIDs.

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<sup>30</sup> CAP 778 Foreword paragraph 2.

**B3.3 RNAV 1 SIDs.**

B3.3.1 For RNAV 1 SIDs established within controlled airspace, the nominal track should not be less than:

- (a) 2 NM from the lateral limits of controlled airspace on 'straight-legs' and 'fixed-radius (RF)' legs of such routes; or
- (b) 3 NM from the lateral limits of controlled airspace on 'non-straight-legs' of such routes,

which includes the RNAV 1 (RNP 1) standard of +/- 1 NM for 95% or more of the flight time<sup>31</sup>.

**B3.4 Conventional SIDs.**

B3.4.1 Where it is not possible to introduce RNAV 1 designs due to operating fleet capabilities or other constraints, the nominal track for SIDs established within controlled airspace should not be less than 5 NM from the lateral limits of controlled airspace.

**B4 Containment of STARs and ATS Routes**

B4.1 STARs and ATS routes should be contained within controlled airspace. For the purposes of this policy statement, STARs are deemed to incorporate both conventional and PBN designs commencing from the enroute structure. Where a STAR is followed by an IFP to link the STAR to the aerodrome IAP, this link IFP will be either a conventional initial approach procedure or a PBN approach transition. These procedures are designed using the conventional or PBN STAR design criteria as applicable.

B4.2 In addition to the requirements for lateral and vertical containment detailed above, the following additional requirements apply to STARs and ATS routes.

**B4.3 RNAV 5 / Conventional STARs and ATS Route Lateral Containment.**

B4.3.1 Specified nominal tracks designed to RNAV 5 and conventional navigational criterion should be not less than 5 NM from the lateral limits of controlled airspace<sup>32</sup> except within such notified CTAs where the lateral limit is less than 5 NM from the centreline and a safety case supports the safe operation of such a route.

**B4.4 RNAV 1 STARs and ATS Route Lateral Containment.**

B4.4.1 For RNAV 1 STARs and ATS routes established within controlled airspace, the nominal track should not be less than:

- (a) 2 NM from the lateral limits of controlled airspace on 'straight-legs' and 'fixed-radius (RF)' legs of such routes; or
- (b) 3 NM from the lateral limits of controlled airspace on 'non-straight-legs' of such routes unless new RNAV 1 procedures are established within existing CTAs where, under previous arrangements, the lateral limit is less than 3 NM from the centreline and a safety case supports the safe operation of such a route.

which includes the RNAV 1 (RNP 1) standard of +/- 1 NM for 95% or more of the flight time<sup>31</sup>Error! Bookmark not defined..

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<sup>31</sup> This value is based on the principle that RNAV 1 route navigation performance standard is based on a total system error (TSE) for navigational tolerances being + or – 1 NM either side of the nominal track for 95% of the total flight time.

<sup>32</sup> Where it relates to RNAV 5 procedures, this value is based on the principle that RNAV 5 route navigation performance standard is based on a total system error (TSE) for navigational tolerances being + or – 5 NM either side of the nominal track for 95% of the total flight time.

**B5 Policy Exceptions**

B5.1 Exceptionally, airspace change sponsors may present proposals for a controlled airspace design that results in a lateral containment of IFPs and ATS routes less than that specified herein. Such proposals must be completely justified, with the associated risks mitigated to a level that is tolerable and as low as reasonably practicable (ALARP) within the safety assessment.